

Noise Impact Assessment

Additional Permitted Use to Enable the Operation of Gas-fitting and Plumbing Business

**202 Caniaba Road
Caniaba NSW 2480**

Prepared for

Emma Holt & Associates Environmental Consulting

Rev. No	Date	Prepared by	Approved for and behalf of AAS		Notes
Draft	26/08/2024	Garry Hall	Garry Hall		Client review
Rev.1	24/09/2024	Garry Hall	Garry Hall		Reworded DA to Planning Proposal

LIMITATION

This report has been conducted specifically for operations associated with a gas and plumbing business at 202 Caniaba Road Caniaba. The results are specific to the measured background noise levels, the measured noise source levels, the operations and times of operation, building construction, location and layout, and location of residential receivers with respect to the operations. The results and recommendations are not to be relied upon for any other situation.

Copyright © 2024 by Ambience Audio Services. No part of this document may be used for any purpose other than the original Development Application or by a Third Party without permission in writing from the author.

Noise Impact Assessment – Additional Permitted Use to Enable the Operation of Gas-fitting and Plumbing Business – 202 Caniaba Road Caniaba.

© Ambience Audio Services 24/09/2024

Page 1 of 30

Table of Contents

1	INTRODUCTION	3
2	SITE DESCRIPTION AND OPERATIONS	4
2.1	Background Information	4
2.2	Description of Site	4
2.3	Description of Operations.....	6
3	EXISTING BACKGROUND NOISE LEVELS.....	8
3.1	Measurement Procedure.....	8
3.2	Weather Conditions.....	9
3.3	Measurement Results	9
3.4	Discussion of Results.....	10
4	NOISE CRITERIA.....	11
4.1	Intrusiveness Noise	11
4.2	Amenity Noise	11
4.3	Modifying Factors.....	12
4.4	Project Noise Trigger Level (PNTL)	13
5	POTENTIAL NOISE SOURCE LEVELS.....	13
5.1	Measurement Procedure.....	13
5.2	Measurement Results	14
5.3	Predicted Noise Levels	14
6	DISCUSSION OF RESULTS AND NOISE CONTROL MEASURES.....	15
7	SUMMARY	17
	APPENDIX A.....	19
	Definitions of Terms.....	19
	APPENDIX B.....	22
	Comparison of Sound Pressure Levels	22
	APPENDIX C	23
	Measured Background Noise Levels	23
	APPENDIX D	25
	Recommended Noise Control Options	25

1 INTRODUCTION

Ambience Audio Services has been engaged by Environmental Consultants, Emma Holt & Associates, to undertake a noise impact assessment for an additional permitted use to enable the operation of a gas-fitting and plumbing business at 202 Caniaba Road, Caniaba, via Lismore NSW, for a planning proposal to Lismore City Council.

Scope of this report

- Determine Rating Background Levels for the day (7am – 6pm) period
- Identify closest affected residential dwellings
- Measure operational noise source levels
- Calculation of predicted noise levels at the closest receiver locations
- Evaluation of operational noise levels in accordance with procedures and criteria in the NSW Governments Noise Policy for Industrial (NPfI)
- Recommendations for reasonable and feasible noise mitigation measures if required
- Production of report

To assist with the interpretation of some of the terminology used in this report, Appendix A provides definitions of acoustic terms. Appendix B is a chart of everyday sound pressure levels.

2 SITE DESCRIPTION AND OPERATIONS

2.1 Background Information

Horns Gas and Plumbing was operating at 10 Snow Street in the South Lismore Industrial Estate until February 2022, when it was impacted by the floods in February and March. Although the business has operated in the flood prone area before February 2022, the February 2022 flood was approximately 2m higher than any previous recorded flood and caused considerable damage to the premises, stock and equipment. Due to the high risk of continued flooding and inundation of the Snow Street premises and the inability to obtain the necessary insurance, it is not economically viable to continue operation of the business in this location.

Horns Gas and Plumbing are seeking an additional permitted use at the rural property at 202 Caniaba Road Caniaba.

2.2 Description of Site

Surrounding land uses are agricultural, mainly cattle, to the north, rural residential to the west, south and east.

The Lismore Airport is approximately 1600m to the north east and the South Lismore Industrial Area approximately 2500 – 3000m to the north east.

The site is currently zoned RU1 Primary Production under the Lismore LEP 2012 where 'general industry', 'industrial retail outlet' and 'commercial premises', particularly 'goods repair and reuse premises' are prohibited.

The closest affected residential dwelling is 178 Caniaba Rd. The closest wall of the workshop is approximately 17m to the boundary with 178 Caniaba Rd, and 34m to the residential dwelling at 178 Caniaba Rd.

There are several residential dwellings to the south of the workshop (140 – 180m), however would be relatively unaffected by noise from the workshop as there is a substantial natural earth barrier.

Observed noise sources during several site visits were traffic on Caniaba Road, birds, distant cattle, small aircraft using Lismore Airport and the Westpac Rescue Helicopter located next to the airport.

Figure 2.1 Location Map



Image Source – Lismore City Council Online Mapping 26/08/2024

Figure 2.2 Site Map



Image Source – Lismore City Council Online Mapping 26/08/2024

2.3 Description of Operations

Horns Gas and Plumbing provide gas fitting and plumbing service to commercial and domestic customers in the Northern Rivers region of NSW. Most of the work is conducted away from the premises at 202 Caniaba Road.

Most of the potential noise from the site will be from the workshop and outside the workshop, where repairs to caravans are undertaken.

The identified potential noise sources were:

- Moving caravans on-site
- Forklift operation
- Air compressor in the workshop
- Grinding in the workshop
- Hammering in the workshop
- Collection of recycling materials every Thursday morning
- Service van movements (mainly at the start and end of each day)

The operating hours are:

- 7am – 3.30pm Monday – Thursday
- 7am – 1pm Friday

3 EXISTING BACKGROUND NOISE LEVELS

Background noise monitoring was conducted over a 13 day period from the 9th – 22nd of July 2024 at the closest affected residential dwelling at 178 Caniaba Road. The noise logger was located approximately 20m from the residential dwelling behind a wall on the opposite side to the workshop to minimise any noise from the workshop and residential dwelling.

The calibrated noise logger with a microphone height of 1.2m was set to record 15 minute sampling periods with an 'A' frequency weighting and fast response. At the end of the monitoring period, data was downloaded into Bruel & Kjaer BZ5503 environmental noise software and Microsoft Excel for analysis.

3.1 Measurement Procedure

Table 3.1 Instrumentation		
Instrument	Serial #	Calibration Date
Brüel and Kjær 2250 G4 Sound Level Meter	3028735	January 2023
Brüel and Kjær Acoustical Calibrator model 4231	3029274	October 2023

Measurements were made in general accordance with procedures in:

1. Australian Standard AS 1055.1-1997: '*Acoustics - Description and measurement of environmental noise - General procedures*'
2. The NSW Government EPA Noise Policy for Industry (October 2017)

The sound level meters (SLM) conform to Australian Standard 1259 "Acoustics - Sound Level Meters" (1990) as Type 1 precision sound level meters and have an accuracy suitable for both field and laboratory use.

The SLMs' calibrations were checked before and after each measurement period with a Brüel and Kjær acoustical calibrator model 4231. No significant system drift occurred over the measurement periods.

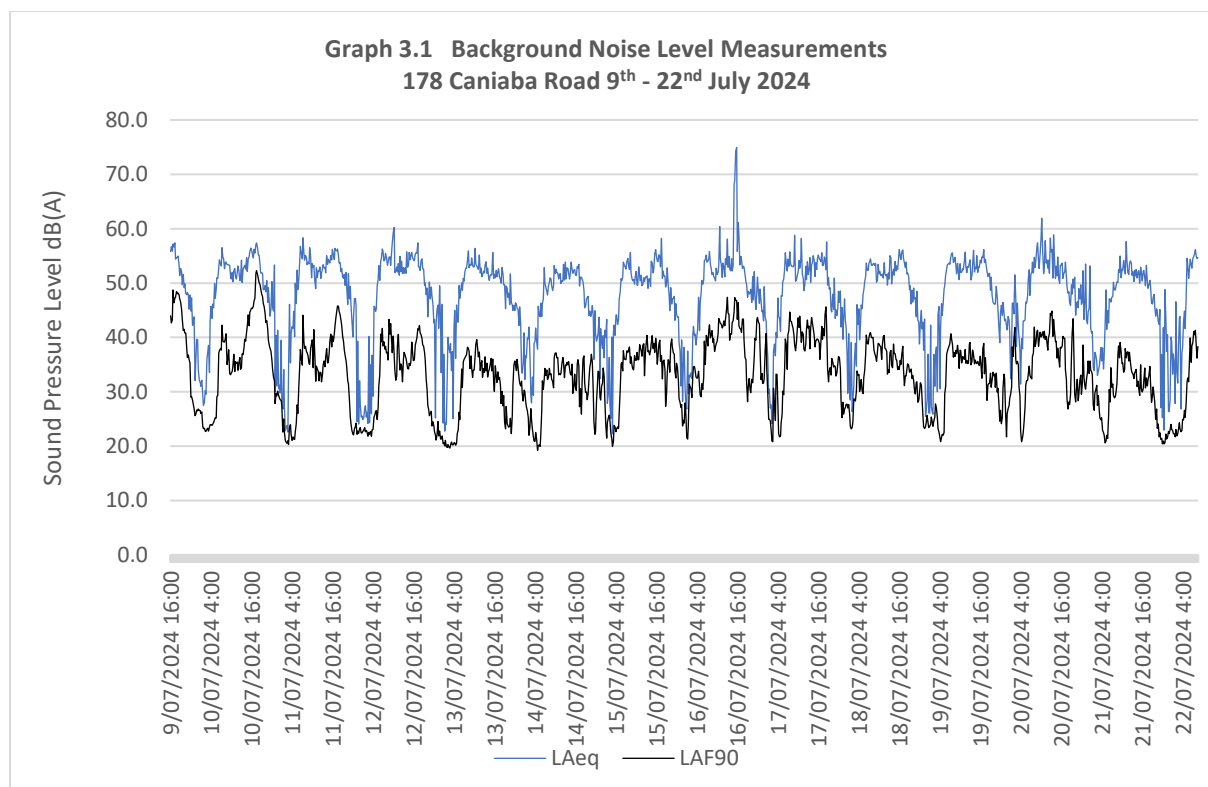
The SLM and calibrator have been checked, adjusted and aligned to conform to the Brüel and Kjær factory specifications and issued with conformance certificates.

3.2 Weather Conditions

Wind and rain data were downloaded from the Bureau of Meteorology website for Lismore airport, approximately 1600m to the north east. There were several rain periods and quite a few periods of wind which exceeded 5m/s over the 13 day periods.

The Rating Background Level (RBL) was calculated with the Long-Term Method in Appendix B of the NPfI. Data that was affected by rain or wind exceeding 5m/s were deleted from calculations.

3.3 Measurement Results



Detailed numerical data is presented in Appendix C.

Table 3.2 Measured Background Noise Levels Summary 178 Caniaba Road (All levels dB L _{A90})													
9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	RBL
IVD	33.7	33.5	34.0	32.7	32.7	30.7	IVD	IVD	34.1	IVD	IVD	IVD	34 / 35*
36.0	38.1	24.2	24.5	23.2	23.2	36.1	IVD	IVD	28.5	28.1	IVD	21.4	26 / 30*
23.2	21.0	22.2	19.9	20.3	20.3	IVD	IVD	IVD	22.0	30.6	IVD	20.9	21 / 30*
IVD - Insufficient Valid Data													
* Assessed as the EPA minimum Rating Background Level													

3.4 Discussion of Results

Graph 3.1 indicates noise levels increase from approximately 5.30 – 6am with the increase in road traffic flows on Caniaba Road, and the increase in human and wildlife activities. The level reduces from approximately 6.30pm with the decrease in road traffic flows.

The background noise levels are typical for this type of rural environment. The calculated Rating Background Levels (RBL) for the day, evening and night time periods were lower than the EPA minimum and have been adjusted to the EPA minimums.

4 NOISE CRITERIA

The NSW Government EPA Noise Policy for Industry (Oct 2017) (NPfI) provides noise criteria for industrial and commercial noise. These are generally in line with criteria given in other states of Australia. This covers noise in urban, suburban and rural areas.

Noise limits from industrial and commercial noise at residential receivers in the NPfI is determined by the lower of two criteria, the intrusiveness criteria and the amenity criteria.

4.1 Intrusiveness Noise

The intrusiveness criterion is summarised as follows:

$L_{Aeq,15minute} \leq \text{rating background level plus 5 decibels.}$

This means that the equivalent continuous (energy average) A - weighted sound pressure level of the noise source under investigation over 15 minutes, cannot be more than 5 decibels above the background noise level. The hours of operation are within the day time period of 7am – 6pm. The intrusiveness noise limit at the closest affected residential dwelling is **40 dB(A) $L_{Aeq,15min}$** .

4.2 Amenity Noise

Amenity noise levels are set to prevent an increase in industrial noise. This site would be considered rural under the NSW Noise Policy for Industry. The amenity noise level for this site is given below in Table 4.2.

Table 4.2 Amenity Noise Levels from Industrial Sources at Residential Receiver (Rural)			
	Monday – Saturday	Sunday & Public Holidays	Recommended Amenity Noise Level L_{Aeq} (dBA)
Day	7.00am – 6.00pm	8.00am – 6.00pm	50
Evening	6.00pm – 10.00pm	6.00pm – 10.00pm	45
Night	10.00pm – 7.00am	10.00pm – 8.00am	40

From Table 2.2 NSW NPfI (Oct 2017)

The amenity noise levels represent the objective for total industrial noise at a receiver location, whereas the project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows:

Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB(A).

The L_{Aeq} is determined over a 15-minute period for the project intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same amount of noise heard by a person for different time periods.

To standardise the time periods for the intrusiveness and amenity noise levels, the NPfI assumes that the $L_{Aeq,15min}$ will be taken to be equal to the $L_{Aeq, period} + 3$ decibels (dB), unless robust evidence is provided for an alternative approach for the particular project being considered.

Table 4.3 Project Amenity Noise Levels from Industrial Source at Residential Receivers (Rural)			
	Monday – Saturday	Sunday & Public Holidays	Project Amenity Noise Level L_{Aeq} (dBA)
Day	7.00am – 6.00pm	8.00am – 6.00pm	50-5+3=48
Evening	6.00pm – 10.00pm	6.00pm – 10.00pm	45-5+3=43
Night	10.00pm – 7.00am	10.00pm – 8.00am	40-5+3=38

4.3 Modifying Factors

When a noise source contains certain characteristics, there is evidence to suggest that it can cause greater annoyance than another noise source at the same noise level. Table C.1 of the NSW NPfI outlines the noise characteristics and the modifying factor corrections.

Low frequency noise characteristic ($L_{Ceq} - L_{Aeq} > 15$ decibels) was observed in the forklift operation. No tonality was observed in any measurements.

Table C3 in the NPfI allows for additional noise for infrequent one-off events in a 24 hour period.

Table C3: Adjustment for duration.

Allowable duration of noise (one event in any 24-hour period)	Allowable exceedance of $L_{Aeq,15min}$ equivalent project noise trigger level at receptor for the period of the noise event, dB(A)	
	Daytime and evening (7 am–10 pm)	Night-time (10 pm–7 am)
1 to 2.5 hours	2	Nil
15 minutes to 1 hour	5	Nil
6 minutes to 15 minutes	7	2
1.5 minutes to 6 minutes	15	5
less than 1.5 minutes	20	10

4.4 Project Noise Trigger Level (PNTL)

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The PNTL is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.

The PNTL is the lower (that is, the more stringent) value of the project intrusiveness noise level and project amenity noise level.

The PNTL for this site for the day time period is 40 dB(A) $L_{eq,15min}$.

5 POTENTIAL NOISE SOURCE LEVELS

Measurements were conducted on the 24th of July 2024 to determine the noise levels and noise characteristics of potential noise sources.

5.1 Measurement Procedure

Table 5.1 Instrumentation		
Instrument	Serial #	Calibration Date
Brüel and Kjær 2250 G4 Sound Level Meter	3028735	January 2023
Brüel and Kjær Acoustical Calibrator model 4231	3029274	October 2023

Measurements were made in general accordance with procedures in:

1. Australian Standard AS 1055.2018: '*Acoustics - Description and measurement of environmental noise*'
2. The NSW Government Noise Policy for Industry (Oct 2017) (NPfI)

The sound level meter (SLM) used during the noise survey conforms to Australian Standard 1259 "*Acoustics - Sound Level Meters*" (1990) as a Type 1 precision sound level meter and has an accuracy suitable for both field and laboratory use.

The SLM's calibration was checked before and after the measurement period with a Brüel and Kjær acoustical calibrator model 4231. No significant system drift occurred over the measurement period.

The SLM and calibrator have been checked, adjusted and aligned to conform to the Brüel and Kjær factory specifications and issued with conformance certificates. The internal test equipment used is traceable to the National Measurement Laboratory at CSIRO, Lindfield, NSW.

The calibrated integrating SLM was fitted with a Bruel & Kjaer windshield and mounted on a 1.3m high tripod to measure noise source levels near the source and 4m inside the adjoining boundary of 178 Caniaba Road.

Noise Impact Assessment – Additional Permitted Use to Enable the Operation of Gas-fitting and Plumbing Business – 202 Caniaba Road Caniaba.

The location 4m from the boundary was the closest accessible location to the boundary and approximately 13m from the residential dwelling.

The SLM was set to A weighted and Fast response. Markers and a simultaneous audio recording were utilised to identify different acoustic events for post event analysis.

At the end of the monitoring period, data was downloaded into Bruel & Kjaer BZ-5503 environmental noise software and Microsoft Excel for analysis.

5.2 Measurement Results

Table 5.2 202 Caniaba Road - Noise Source Measurements Summary (24/07/2024) (all levels in decibels)											
			Duration (mm:ss)		Total		Source Only				
	Measurement Location	Start Time	Total	Source Only	L _A F _{max}	L _A eq	L _A F _{max}	L _A eq	L _z eq	L _A F ₁₀	L _A F ₉₀
Diesel Ute Idling @ 6m	6m from source	9:40 AM	01:31	01:04	63.5	56.4	58.2	56.1	63.1	56.5	55.6
Moving Caravan	4m from boundary	9:51 AM	05:15	03:12	56.8	45.2	54.1	43.4	56.2	46.9	35.8
Forklift Operation	4m from boundary	9:58 AM	03:57	03:22	57.6	48.8	57.6	49.1	67.8	53.0	33.6
Air Compressor	4m from boundary	10:06 AM	03:24	01:59	62.7	48.0	54.0	47.0	57.8	48.4	45.5
Grinding in Shed	4m from boundary	10:13 AM	03:27	02:16	55.4	46.4	53.8	45.2	55.7	48.3	36.2
Hammering in Shed	4m from boundary	10:18 AM	01:35	00:59	56.9	47.4	56.8	46.2	56.2	50.2	37.5

5.3 Predicted Noise Levels

The predicted noise source levels are based on the distance to the boundary, the duration of use during in any 15 minute period, any noise characteristic modifying factor, and the cumulative effect of noise sources operating at the same time.

Table 5.3 Predicted Noise Source Levels 4m from 178 Caniaba Rd Residential Boundary					
Operation	L _{Aeq} (dB)	Duration per 15min (mins)	Modifying Factor for Noise Characteristic (dB)	L _{Aeq,15min} (dB)	Comply with 40 dB(A) L _{eq,15min} PNTL
Moving Caravan	43.4	6		39.4	Yes
Forklift Operation	49.1	15	2	51.1	No
Air Compressor	47.0	15		47.0	No
Grinding in Shed	45.2	3		38.2	Yes
Hammering in Shed	46.2	3		39.2	Yes
Air compressor and Grinding		15 + 3		47.5	No
Air compressor and Hammering		15 + 3		47.7	No

6 DISCUSSION OF RESULTS AND NOISE CONTROL MEASURES

Table 5.3 are the predicted noise levels 4m from the boundary of the closest affected residence.

The air compressor in the workshop is 7 decibels above the PNTL of 40 dB L_{eq,15mins}. Operations conducted at the same time as the air compressor, such as grinding and hammering will also exceed the PNTL.

It is recommended the compressor be mounted in a vented enclosure that is internally lined with acoustic absorbing material such as 50mm Stratocell Whisper. The vented enclosure should be mounted on rubber or neoprene isolation mounts and be freestanding and not attached to the building.

It is recommended that grinding and hammering be conducted in a semi enclosed dedicated workbench for grinding and hammering to reduce noise levels of these operations to the closest affected residential dwelling.

The walls and roof of the semi enclosure should be constructed of 19mm form ply and lined with 50mm Stratocell Whisper. The form ply to be isolated from the building with rubber strips to minimise vibrational energy being transferred via the building.

The roller doors closest to the residential dwelling to be closed at all times while the compressor, grinding and hammering are operational. Any background music in the workshop should be no louder than very quiet conversation.

The forklift was calculated to be approximately 11 decibels above the PNTL. The forklift is mainly used to unload or load refrigerators once every 4 to 5 months to and from the storage shed at the northern end of the operational area. It is recommended the truck be positioned so it acts as a noise barrier to the residential dwelling while the truck is being unloaded or loaded.

It is also recommended the reversing beeper on the forklift be changed to a broadband quacker type audible alarm.

The recycling pick up is every Thursday morning and is approximately 5 mins. The recycling is located at the northern end of the operational area, away from the residential dwelling. Considering the infrequent use of once per week and the short duration, the recycling pick up is not considered to be a noise issue.

The service vans are parked near the workshop and are mainly off-site for most of the day. Considering the short amount of time the service vans would be in use on-site, the noise from the service vans are not considered to be a noise issue.

It is recommended that no music or radio be played in the service vans when on site.

There are no retail sales at 202 Caniaba Road, and generally there are no public vehicles, except for caravans for repair, so vehicle movements on-site are a minimum and not considered to be a noise issue.

7 SUMMARY

A noise impact survey and assessment has been conducted to determine noise levels from the operations from a gas-fitting and plumbing business at 202 Caniaba Road, Caniaba, for a planning proposal to Lismore City Council, for an additional permitted use.

The development proposal is for a gas-fitting and plumbing business that will operate 7am – 3.30pm Monday to Thursday and 7am – 1pm Friday.

Background noise monitoring was conducted with calibrated noise monitoring equipment over a 13 day period at the closest affected residential premises. The Rating Background Level (RBL) was determined to be the EPA minimum of 35 dB(A) for the day time period.

Noise measurements were conducted on 24th the of July 2024 to determine potential noise source levels and noise characteristics.

The results indicate the forklift operation and air compressor exceed the Project Noise Trigger Level of 40 dB(A) $L_{eq,15min}$ for the day time period.

A vented enclosure is recommended for the air compressor. Details for materials and construction are provided in Section 6 of this report.

It is recommended grinding and hammering be conducted in a dedicated semi enclosed workbench area. Details for materials and construction are provided in Section 6 of this report.

Operation of the forklift is infrequent and it is recommended the truck be used as a noise barrier between the forklift and residential dwelling at 178 Caniaba Rd to reduce noise levels to the residential dwelling. It is recommended the reversing beeper on the forklift be changed to a broadband quacker type audible alarm.

The recycling pick up is once per week for approximately 5 mins at the northern end of the operational area and is not considered to be a noise issue.

The service vans are in use for very short periods and not considered to be a noise issue. It is recommended that no music or radio be played in the service vans when on site.

Generally, there are no public vehicles except for caravans for repair, so vehicle movements on-site are a minimum and not considered to be a noise issue.

Garry Hall

A handwritten signature in black ink, appearing to read 'Garry Hall', written in a cursive style.

Acoustic Consultant
Ambience Audio Services

APPENDIX A

Definitions of Terms

Sound pressure level (L_p): A measurable quantity of the size or amplitude of the pressure fluctuations (sound waves) above and below normal atmospheric pressure compared to a reference pressure. Sound pressure levels are measured in decibels whereas sound pressure is measured in pascals (N/m^2).

Decibels (dB): a ratio of energy flows. When used for sound measurement, it is the ratio between a measured quantity of sound pressure and an agreed reference sound pressure. The dB scale is logarithmic and uses the threshold of hearing of $20 \mu Pa$ (micro pascals) as the reference pressure. This reference level is defined as 0 dB.

Frequency (Hz): The number of pressure variations per second (cycles per second) is called the **frequency** of sound and is measured in **Hertz (Hz)**. The rumble of distant thunder has a low frequency, while a whistle has a high frequency. The normal range of hearing for a healthy young person extends from approximately 20Hz up to 20 000 Hz (20 kHz) while the range from the lowest to highest note on a piano is approximately 27.5 Hz to 4.2 kHz.

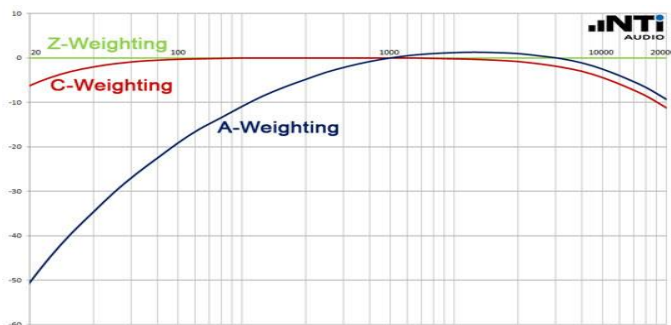
Spectral characteristics: The frequency content of noise.

Octave: a logarithmic unit for ratios between frequencies, with one octave corresponding to a doubling of frequency. For example, the frequency one octave above 40 Hz is 80 Hz.

1/3 Octave: a logarithmic unit of frequency ratio equal to one third of an octave.

“A” frequency weighting: The method of frequency weighting the electrical signal within a noise-measuring instrument to give a very approximate simulate to the human perception of loudness. The symbols for the noise parameters often include the letter “A” (e.g., L_{Aeq} , dBA) to indicate that frequency weighting has been included in the measurement. “A” weighting is most commonly used with regard to noise control issues, regulations and environmental standards.

“C” frequency weighting: The filters used in C weighting captures lower frequencies than A weighting as indicated in the chart below.



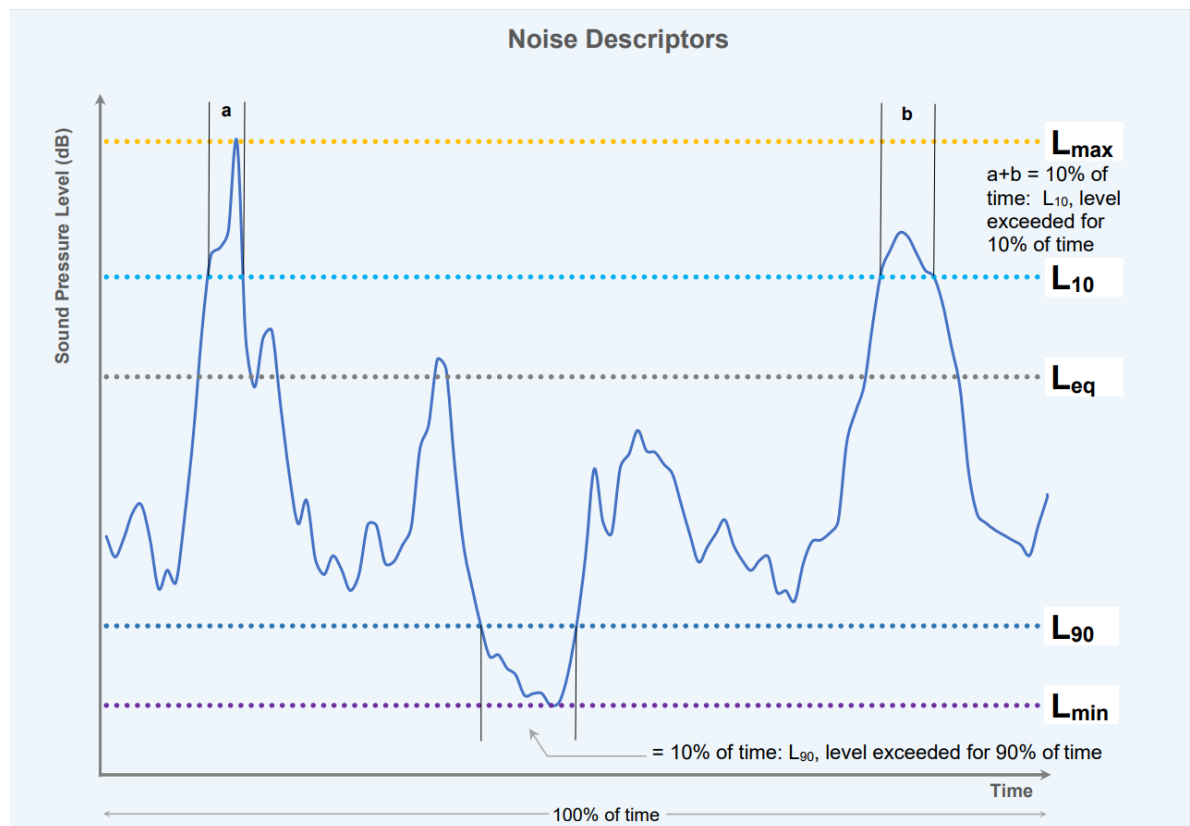
The A-weighting curve is used extensively for general purpose noise measurements but the C-weighting correlates better with the human response to high noise levels.

Fast, Slow and Impulse time weightings: Standardised root-mean-square (rms) averaging times to help define fluctuating noise levels. Impulsive noises have high peak levels with a very short duration (e.g., gun shot), or a sequence of such peaks. The 'Slow' time weighting averages the fluctuations over a one second time base whilst the 'Fast' time weighting averages the fluctuations over a one-eighth of a second time base. Environmental assessment standards usually specify the time weighting (**F**, **S**, or **I**) to be used.

L_{Aeq} : The A-weighted equivalent continuous noise level. A widely used noise descriptor which provides an average of the energy of a constant level of noise which is the same as the varying noise signal being measured. The time in which the measurement was sampled, is indicated with a subscripted number e.g. $L_{Aeq,15 \text{ minute}}$ is a 15-minute sample.

Percentile Levels L_N : The sound pressure level that is exceeded for N per cent of the time over which a given sound is measured. e.g. L_{A90} is the A-weighted sound pressure level that is exceeded for 90% of the time over which a given sound is measured.

L_{A90} is commonly used to describe the **background noise level** for community noise assessments.



Ambient noise: The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far.

Extraneous noise: Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods and by events such as concerts or sporting events. Normal daily traffic is not to be considered extraneous.

Background noise: The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the **L_{A90}** descriptor, fast time weighting.

Intrusive Noise: Refers to noise that intrudes above the background level by more than 5 decibels.

Noise limits: Enforceable noise levels that appear in consents and licences. The noise limits are based on achievable noise levels, which the proponent has predicted can be met during the environmental assessment. Exceedance of the noise limits can result in the requirement for either the development of noise management plans or legal action.

References:

Measuring Sound Brüel and Kjær Sound & Vibration Measurements A/S
September 1984

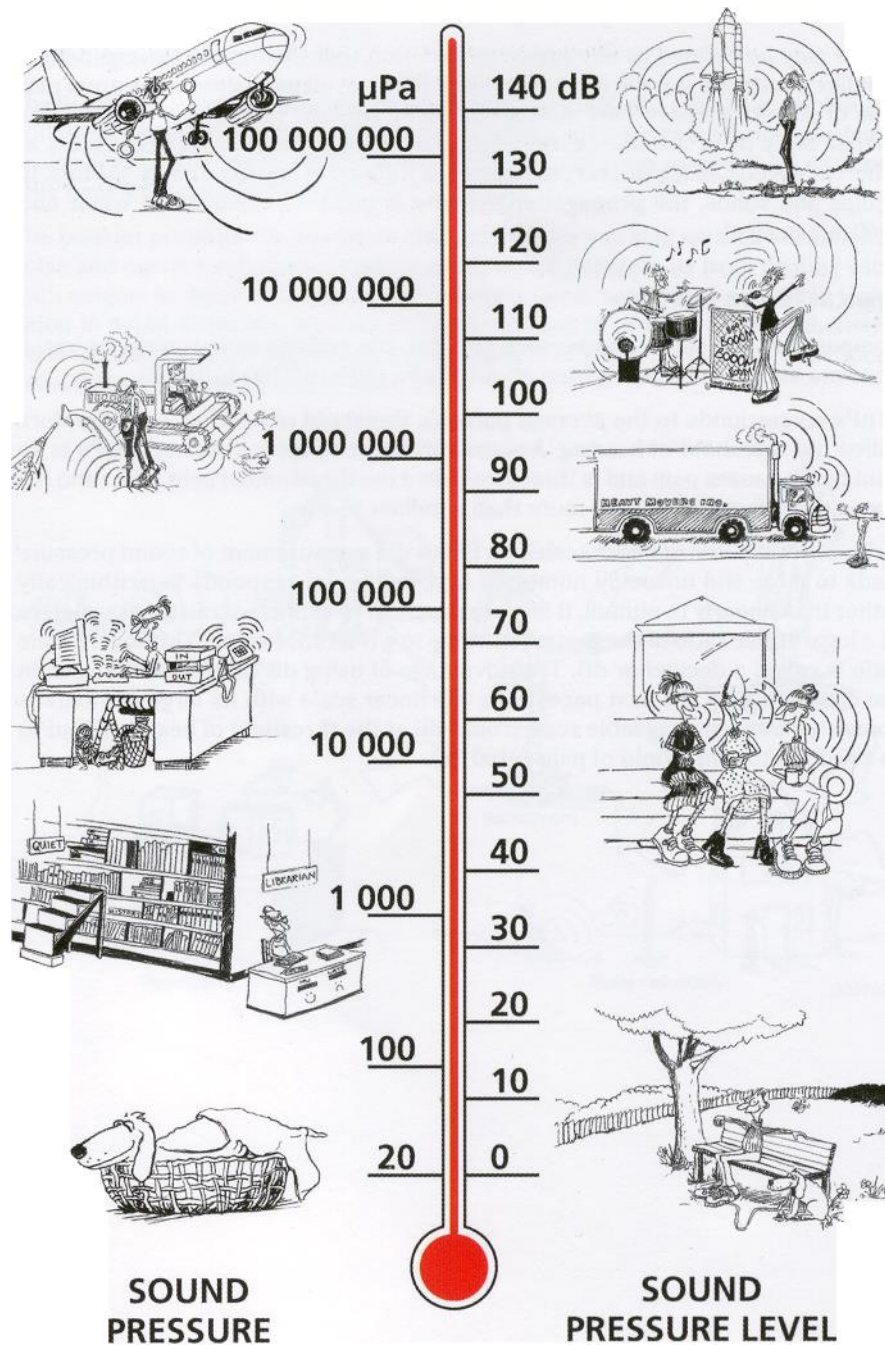
Environmental Noise Brüel and Kjær Sound & Vibration Measurements A/S
2000, 2001

New South Wales Industrial Noise Policy NSW Environment Protection
Authority January 2000

<https://www.nti-audio.com/en/support/know-how/frequency-weightings-for-sound-level-measurements>

APPENDIX B

Comparison of Sound Pressure Levels



Our hearing covers a wide range of sound pressures – a ratio of over a million to one. The dB scale makes the numbers manageable.

Reproduced from
Environmental Noise Brüel and Kjær Sound & Vibration Measurements A/S
 2000, 2001

APPENDIX C

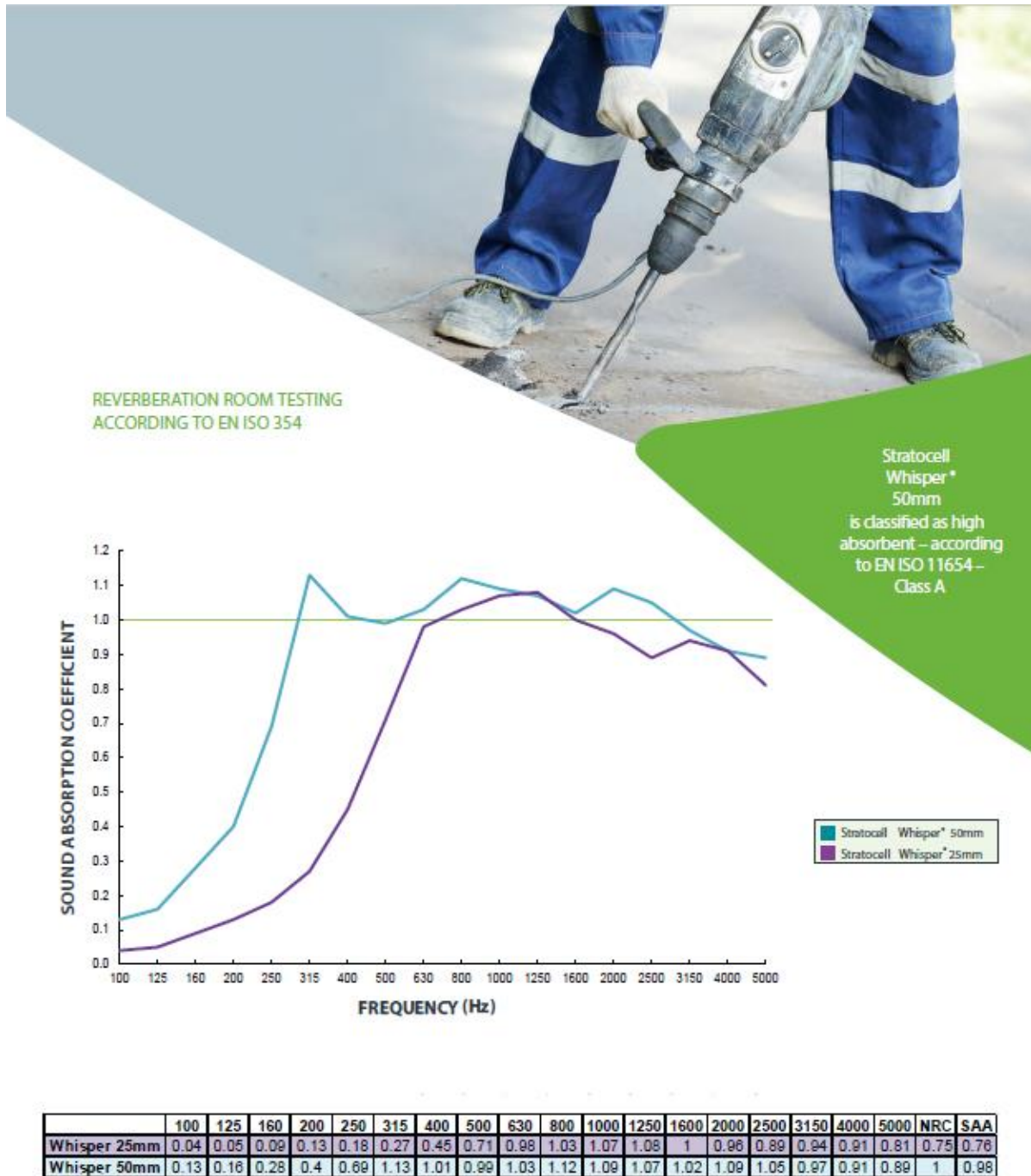
Measured Background Noise Levels

Measured Background Noise Levels dB (LA90,15min) 178 Caniaba Road Caniaba - July 2024														
Start Time	9 th	10 th	11 th	12 th	13 th	14 th	15 th	16 th	17 th	18 th	19 th	20 th	21 st	22 nd
7:00 AM		37.7	34.9	38.4	35.9	35.9	34.3	35.9	40.1	39.9	38.9	32.6	30.8	39.0
7:15 AM		42.3	44.1	39.2	36.3	36.3	33.0	37.5	38.5	40.7	40.7	32.4	31.4	41.1
7:30 AM		39.3	39.2	37.8	36.6	36.6	34.0	37.3	41.4	40.9	39.9	36.5	29.4	40.5
7:45 AM		39.2	38.0	38.4	36.8	36.8	32.3	37.6	42.3	40.0	38.8	37.2	28.9	41.3
8:00 AM		39.1	38.4	37.2	38.2	38.2	32.7	38.2	39.9	40.0	36.4	41.9	29.1	38.3
8:15 AM		39.9	37.4	37.3	38.0	38.0	34.3	35.3	40.4	40.0	37.3	38.3	29.9	36.2
8:30 AM		40.7	37.2	35.8	37.5	37.5	33.2	36.4	41.3	37.6	36.5	39.0	31.5	38.3
8:45 AM		35.0	36.6	43.4	34.2	34.2	33.3	34.9	39.1	36.9	37.6	41.1	36.9	
9:00 AM		36.4	35.2	40.6	36.6	36.6	32.3	34.2	39.7	36.5	37.0	41.3	38.5	
9:15 AM		37.7	35.1	42.5	34.4	34.4	31.9	34.0	37.4	35.6	38.6	38.4	36.2	
9:30 AM		33.4	38.1	39.3	32.7	32.7	30.7	36.7	38.3	37.5	36.9	39.4	39.1	
9:45 AM		33.1	38.9	37.2	34.0	34.0	36.3	35.8	38.8	38.9	34.3	41.0	37.3	
10:00 AM		33.5	39.5	40.3	34.0	34.0	37.2	35.8	39.3	38.8	37.7	40.1	35.2	
10:15 AM		33.7	34.4	36.8	36.7	36.7	37.1	37.2	40.7	38.5	37.6	40.4	35.3	
10:30 AM		34.6	41.5	34.0	38.7	38.7	36.3	35.9	43.5	38.3	35.3	41.0	33.6	
10:45 AM		36.9	36.9	32.1	39.6	39.6	36.3	35.9	43.0	36.0	36.5	39.9	34.1	
11:00 AM		33.7	32.0	32.9	37.9	37.9	33.1	38.7	42.6	38.6	36.3	41.2	38.0	
11:15 AM		35.5	34.7	38.4	36.5	36.5	33.3	38.2	42.4	40.2	35.9	39.6	36.2	
11:30 AM		35.2	34.2	40.6	37.3	37.3	33.1	37.4	41.8	40.4	37.8	40.2	37.2	
11:45 AM		35.5	33.7	36.2	33.9	33.9	33.4	36.6	42.0	38.0	35.3	39.2	37.4	
12:00 PM		34.0	32.0	34.0	35.1	35.1	35.1	38.6	43.1	37.8	35.8	37.7	35.7	
12:15 PM		35.4	33.6	35.1	35.7	35.7	36.3	38.9	42.2	37.4	35.2	40.0	37.3	
12:30 PM		36.3	33.5	34.8	32.7	32.7	35.5	33.0	43.3	33.3	35.2	40.7	35.5	
12:45 PM		34.2	31.9	31.9	34.3	34.3	32.6	37.3	45.0	34.1	38.8	44.5	34.0	
1:00 PM		34.5	33.2	36.0	33.6	33.6	34.9	39.4	47.4	33.6	39.1	44.0	33.5	
1:15 PM		37.0	34.9	37.3	36.5	36.5	34.8	40.4	44.5	37.3	35.0	44.9	33.3	
1:30 PM		36.9	35.7	36.8	33.8	33.8	35.4	37.4	44.2	37.6	35.6	40.2	32.4	
1:45 PM		38.1	34.6	36.1	35.3	35.3	35.0	37.6	39.5	34.8	37.7	43.3	33.5	
2:00 PM		39.7	36.3	35.5	32.7	32.7	35.6	36.8	40.7	34.4	36.8	41.1	33.8	
2:15 PM		39.3	38.0	34.2	33.8	33.8	34.3	37.6	40.6	38.8	35.1	39.2	34.1	
2:30 PM		41.0	35.3	34.2	34.1	34.1	33.4	38.9	42.7	37.1	35.8	39.3	31.0	
2:45 PM		42.0	35.4	35.3	35.0	35.0	33.1	40.3	43.1	37.0	35.3	36.2	31.9	
3:00 PM		44.1	37.2	34.8	36.2	36.2	35.1	38.0	44.8	35.9	35.2	38.0	30.6	
3:15 PM		42.2	39.3	35.4	33.9	33.9	29.7	38.9	47.4	35.9	35.6	36.2	29.3	
3:30 PM		44.6	40.6	39.1	36.0	36.0	30.7	37.3	46.8	34.1	35.0	34.6	34.9	
3:45 PM		45.0	38.3	36.9	31.6	31.6	33.2	39.8	46.8	34.6	34.8	38.2	30.7	
4:00 PM	44.0	45.4	40.3	35.7	30.1	30.1	31.1	38.7	43.4	34.1	36.6	38.0	29.9	
4:15 PM	42.7	45.3	39.3	35.8	34.8	34.8	30.3	35.1	46.4	35.8	34.3	38.4	30.5	
4:30 PM	43.3	45.7	40.7	38.6	32.8	32.8	35.1	36.5	42.1	35.0	32.5	40.2	32.1	
4:45 PM	48.7	46.6	42.0	39.1	31.7	31.7	35.9	38.8	41.7	37.0	38.0	39.9	34.4	
5:00 PM	46.4	47.3	43.7	40.0	33.7	33.7	34.8	39.5	41.5	38.4	38.9	39.9	30.7	
5:15 PM	47.2	51.7	45.0	41.6	32.3	32.3	27.2	35.6	40.9	34.3	33.3	34.1	32.5	
5:30 PM	47.4	52.3	45.8	41.4	32.7	32.7	30.6	36.7	43.4	31.1	36.3	32.3	31.1	
5:45 PM	48.4	51.6	45.7	42.2	31.3	31.3	25.9	32.4	43.4	33.0	34.3	28.6	32.2	
6:00 PM	48.0	50.7	44.8	40.9	27.8	27.8	31.7	35.6	39.5	32.9	28.4	26.8	33.1	
6:15 PM	48.1	50.1	44.2	40.5	30.1	30.1	36.1	35.9	36.3	34.2	31.3	28.2	34.7	
6:30 PM	47.9	49.7	43.1	39.8	27.4	27.4	36.6	34.0	35.9	35.1	31.5	27.7	31.5	
6:45 PM	47.1	49.0	42.3	38.7	29.3	29.3	31.7	27.3	31.8	35.0	31.5	29.5	28.1	
Rain affected data			Wind affected data											

Measured Background Noise Levels dB (LA90,15min) 178 Caniaba Road Caniaba - July 2024														
Start Time	9 th	10 th	11 th	12 th	13 th	14 th	15 th	16 th	17 th	18 th	19 th	20 th	21 st	22 nd
7:00 PM	46.5	48.0	40.2	38.4	24.3	24.3	29.9	29.7	28.2	33.6	33.4	36.8	29.3	
7:15 PM	45.1	47.5	39.2	37.2	23.2	23.2	30.0	33.3	30.8	33.7	30.9	40.8	30.9	
7:30 PM	43.4	46.3	37.8	35.8	27.3	27.3	28.5	35.9	32.5	34.2	32.1	43.5	29.2	
7:45 PM	41.4	45.6	36.6	32.4	24.2	24.2	29.7	35.5	30.4	32.4	33.6	38.4	28.2	
8:00 PM	41.5	44.2	35.6	30.3	23.9	23.9	31.7	33.6	29.8	33.0	33.0	29.6	25.0	
8:15 PM	40.8	42.7	34.4	27.6	23.5	23.5	34.5	38.6	32.3	32.0	33.3	28.1	26.9	
8:30 PM	40.8	43.1	32.0	26.7	23.7	23.7	35.5	39.7	31.7	30.5	30.8	30.1	23.3	
8:45 PM	38.0	41.5	31.5	25.6	25.1	25.1	36.9	38.3	33.4	29.6	33.4	32.3	24.1	
9:00 PM	36.3	39.5	28.8	26.1	22.3	22.3	35.5	37.2	36.6	31.8	29.9	28.4	21.7	
9:15 PM	36.8	38.5	25.3	26.4	25.7	25.7	29.9	36.9	39.9	31.9	30.7	29.6	22.5	
9:30 PM	36.0	38.1	24.2	23.7	31.1	31.1	24.6	33.9	39.5	28.1	28.1	32.1	21.2	
9:45 PM	35.3	37.5	22.9	24.5	34.9	34.9	22.2	32.5	43.3	28.5	24.6	33.1	21.4	
10:00 PM	29.0	35.8	22.2	23.7	35.7	35.7	22.6	35.2	43.7	29.7	26.6	29.5	20.4	
10:15 PM	29.1	34.3	22.1	22.7	34.9	34.9	28.1	34.5	42.8	31.7	24.1	31.6	20.9	
10:30 PM	28.5	32.7	23.2	22.0	33.9	33.9	31.4	32.0	42.5	31.3	25.3	38.6	20.4	
10:45 PM	27.5	32.0	23.6	21.1	36.0	36.0	33.8	28.7	38.0	28.9	30.6	32.6	20.6	
11:00 PM	26.9	27.8	24.3	22.1	34.4	34.4	33.7	28.1	32.3	25.5	33.3	31.0	22.2	
11:15 PM	25.6	29.7	22.2	24.5	32.6	32.6	28.9	27.2	33.4	23.6	32.5	30.5	21.3	
11:30 PM	26.0	29.2	22.8	21.9	31.7	31.7	28.5	27.7	31.5	23.3	26.4	32.4	21.6	
11:45 PM	26.7	30.1	22.4	22.8	31.1	31.1	31.0	23.7	31.6	23.6	21.7	33.6	22.7	
12:00 AM	26.5	29.4	23.2	21.3	32.0	32.0	31.7	24.8	32.5	24.3	26.0	35.6	22.3	
12:15 AM	26.9	28.9	23.5	21.3	29.8	29.8	34.4	24.3	37.6	25.7	26.9	33.4	23.0	
12:30 AM	26.6	28.6	22.4	21.9	28.3	28.3	32.9	28.0	40.7	24.2	27.4	35.7	24.0	
12:45 AM	26.5	28.5	22.5	20.5	30.3	30.3	28.8	26.3	34.2	23.4	28.8	34.0	23.1	
1:00 AM	26.0	27.4	22.7	20.7	30.1	30.1	24.0	21.5	30.0	23.7	29.6	33.7	22.9	
1:15 AM	26.3	22.6	23.0	20.0	28.1	28.1	21.5	21.3	25.0	24.0	30.9	33.2	22.4	
1:30 AM	23.7	25.0	23.4	21.1	27.3	27.3	24.3	23.9	24.9	25.3	38.3	27.5	22.3	
1:45 AM	23.3	22.6	22.7	19.9	26.5	26.5	25.2	31.4	24.6	24.5	36.5	26.6	21.7	
2:00 AM	23.3	21.1	22.9	19.8	25.2	25.2	25.7	30.8	22.8	23.7	39.6	29.8	23.1	
2:15 AM	22.7	20.8	22.6	20.3	22.0	22.0	24.7	30.6	20.9	24.6	41.8	30.4	21.9	
2:30 AM	22.7	20.6	21.8	19.8	23.4	23.4	22.4	29.0	20.8	25.4	35.9	31.2	22.3	
2:45 AM	23.2	21.0	22.5	19.6	26.9	26.9	21.3	33.0	30.7	27.8	35.1	27.5	23.0	
3:00 AM	23.3	20.3	22.2	20.2	25.0	25.0	20.0	34.6	27.8	27.0	35.6	29.3	24.3	
3:15 AM	22.8	23.6	22.7	20.8	23.1	23.1	20.9	34.7	24.7	25.2	35.0	26.3	23.2	
3:30 AM	23.6	23.9	21.8	20.2	21.7	21.7	23.8	34.0	33.3	23.2	31.0	25.2	22.7	
3:45 AM	24.0	22.1	23.0	20.2	20.9	20.9	23.5	32.7	33.2	22.6	29.2	24.8	22.9	
4:00 AM	24.0	21.1	23.1	20.6	20.9	20.9	22.7	32.5	27.1	21.6	22.8	25.3	25.0	
4:15 AM	23.8	21.7	25.4	20.6	22.5	22.5	23.2	32.7	22.3	20.8	20.8	23.0	24.8	
4:30 AM	24.0	21.3	25.7	20.2	21.3	21.3	23.6	33.8	21.7	21.6	21.6	22.5	26.6	
4:45 AM	24.4	21.3	26.4	20.6	19.2	19.2	23.2	30.9	21.8	22.2	22.4	22.1	25.3	
5:00 AM	24.9	22.6	26.5	22.3	20.1	20.1	26.2	29.4	24.4	22.0	24.5	20.6	27.7	
5:15 AM	25.3	24.1	24.9	23.0	20.3	20.3	30.2	29.1	25.9	22.5	27.3	20.9	31.8	
5:30 AM	25.2	27.6	27.1	26.3	20.0	20.0	35.2	31.5	30.1	29.7	31.2	22.0	32.5	
5:45 AM	29.1	26.0	31.1	24.9	22.0	22.0	35.4	30.4	29.5	31.1	32.1	21.4	31.8	
6:00 AM	29.4	30.8	33.1	29.5	26.4	26.4	33.8	32.6	34.6	36.9	32.1	25.6	35.0	
6:15 AM	37.1	34.8	40.6	34.2	32.0	32.0	37.6	39.3	39.7	37.4	33.2	30.4	39.9	
6:30 AM	37.6	37.8	39.2	30.8	30.4	30.4	36.0	35.0	38.7	38.1	34.7	28.2	35.4	
6:45 AM	37.9	35.9	41.7	35.5	32.6	32.6	36.0	40.4	34.2	38.5	33.1	34.4	38.4	
Rain affected data			Wind affected data											

APPENDIX D

Recommended Noise Control Options

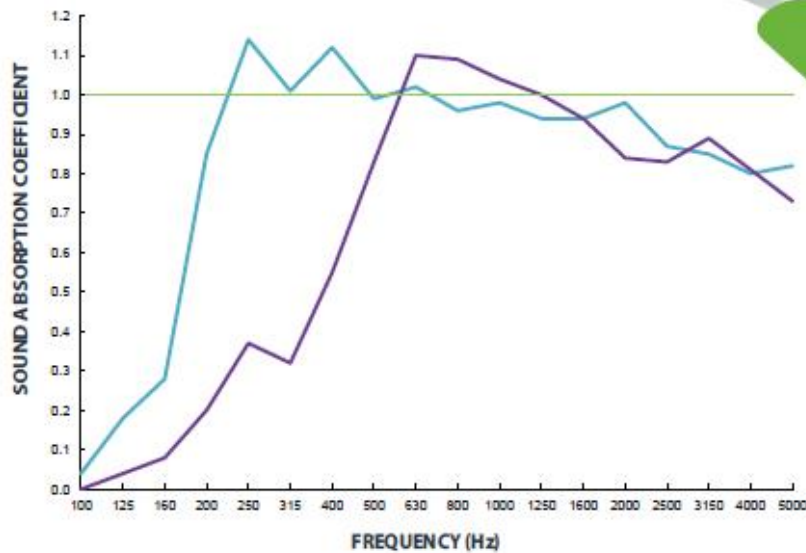


Testing of Stratocell Whisper* was carried out at Istituto Giordano, Bollate in Italy under EN ISO 354:2003 Measurement of Sound Absorption in a reverberation room. Refer to test report no 297999 & 297994

Stratocell Whisper* 3



REVERBERATION ROOM TESTING
ACCORDING TO ASTM C423



Stratocell
Whisper*
25mm and 50mm
is classified as high
absorbent – according
to ASTM C 423

	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	NRC	SAA
Whisper 25mm	0.00	0.04	0.08	0.20	0.37	0.32	0.55	0.83	1.10	1.09	1.04	1.00	0.94	0.84	0.83	0.89	0.81	0.73	0.75	0.78
Whisper 50mm	0.04	0.18	0.28	0.85	1.14	1.01	1.12	0.99	1.02	0.96	0.98	0.94	0.94	0.98	0.87	0.85	0.80	0.82	1	0.98

Testing of Stratocell Whisper was carried out at Intertek, New York in America
under ASTM c423-09a Measurement of Sound Absorption in a reverberation room.
Refer to test report no 101171478CMT-001 & 101171478CMT-001b

Stratocell Whisper* 4



SOUND ABSORPTION

Stratocell Whisper* has an NRC of 1 at 50mm, giving it excellent sound absorbing properties.



MOISTURE RESISTANT

Stratocell Whisper* is unaffected by exposure to moisture. There is no need for a water protection film.



STRONG STRUCTURE

With its self-supporting structure, Stratocell Whisper* foam is easy to cut and easy to install on site.



LIGHT WEIGHT

Stratocell Whisper* foam is easy to handle with a weight of less than 1.5 kilograms per square meter.



FIBRE FREE- WASHABLE

No fibrous materials, low particle emissions and low VOC.



UV RESISTANT

Whisper* UV has been independently tested to over 2000 hours in a QUV accelerated aging chamber. Testing showed that after UV exposure, the material exhibited similar acoustic behaviour to non exposed material. Whisper UV is rated as a self-extinguishing material to DIN 4102 Class B2.



FIRE RETARDANT

Stratocell Whisper* FR foam achieved a Group 1-5 result in the C/VM2 appendix A to ISO 9705:1993 as outlined in New Zealand building code. Similarly it achieved Group 1 compliance of the Australian NCC specification C1.10 to AS ISO 9705-2003 as outlined in the Australian building code.

Stratocell Whisper* is available in Fire Retardant and UV resistant additives.



RIGOROUS APPLICATIONS

Stratocell Whisper® sound absorbing panels are the perfect solution to reduce problems with noise or unwanted sound in all types of indoor and outdoor environments.

Stratocell Whisper® is manufactured to perform in the most rigorous indoor, outdoor and industrial environments. It is a lightweight and durable alternative to traditional materials. It is a closed cell laminated polyethylene foam which has cells that are subsequently opened through the manufacturing process, resulting in a highly efficient sound absorbent material with many unique features such as:

- Superior noise control
- Resistant to moisture
- Flame retardant
- Does not support fungal growth

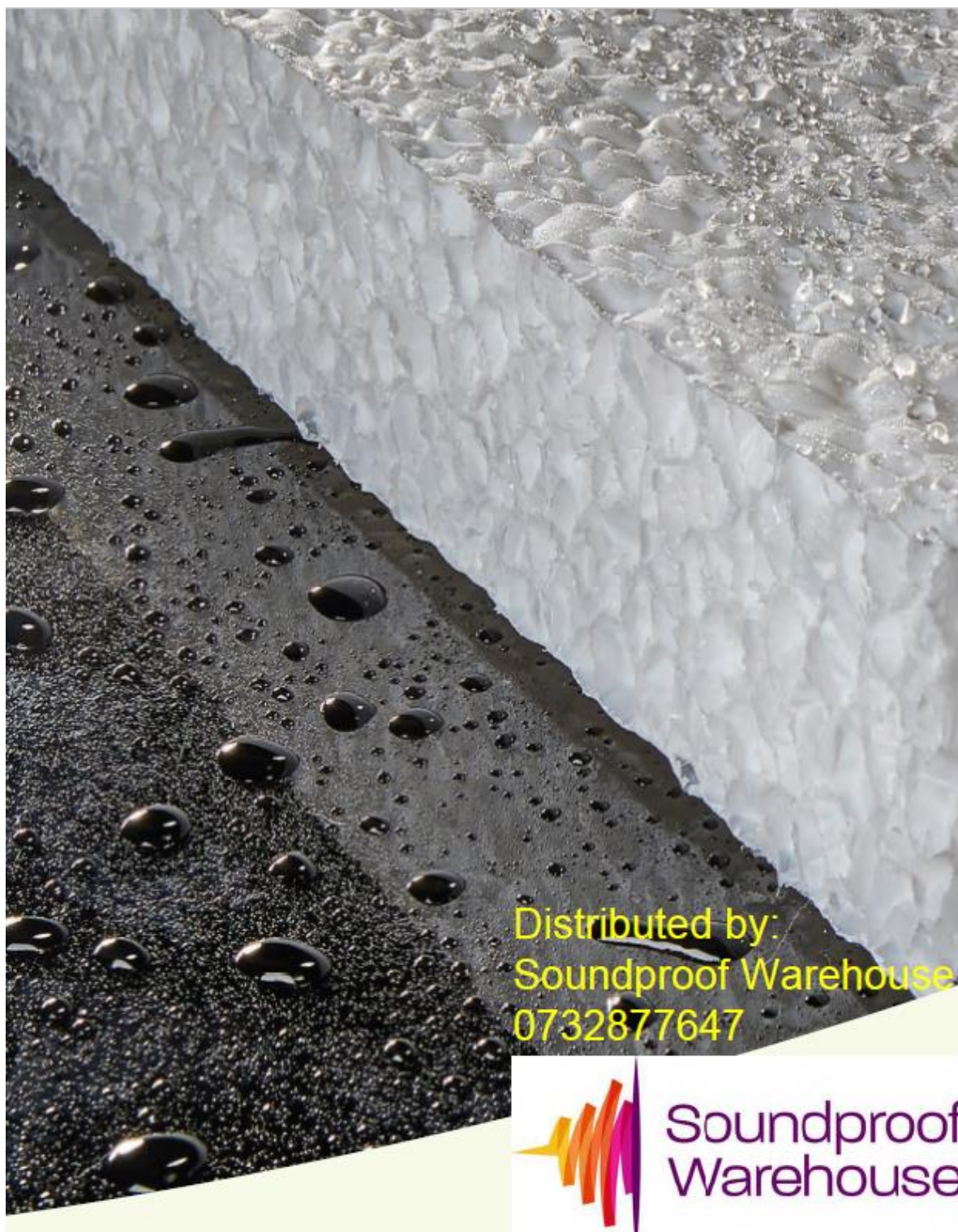
TYPICAL APPLICATIONS:

- Construction
- Machinery
- Automotive
- Transportation
- Buildings
- Industrial



7 Stratocell Whisper®





Distributed by:
Soundproof Warehouse
0732877647

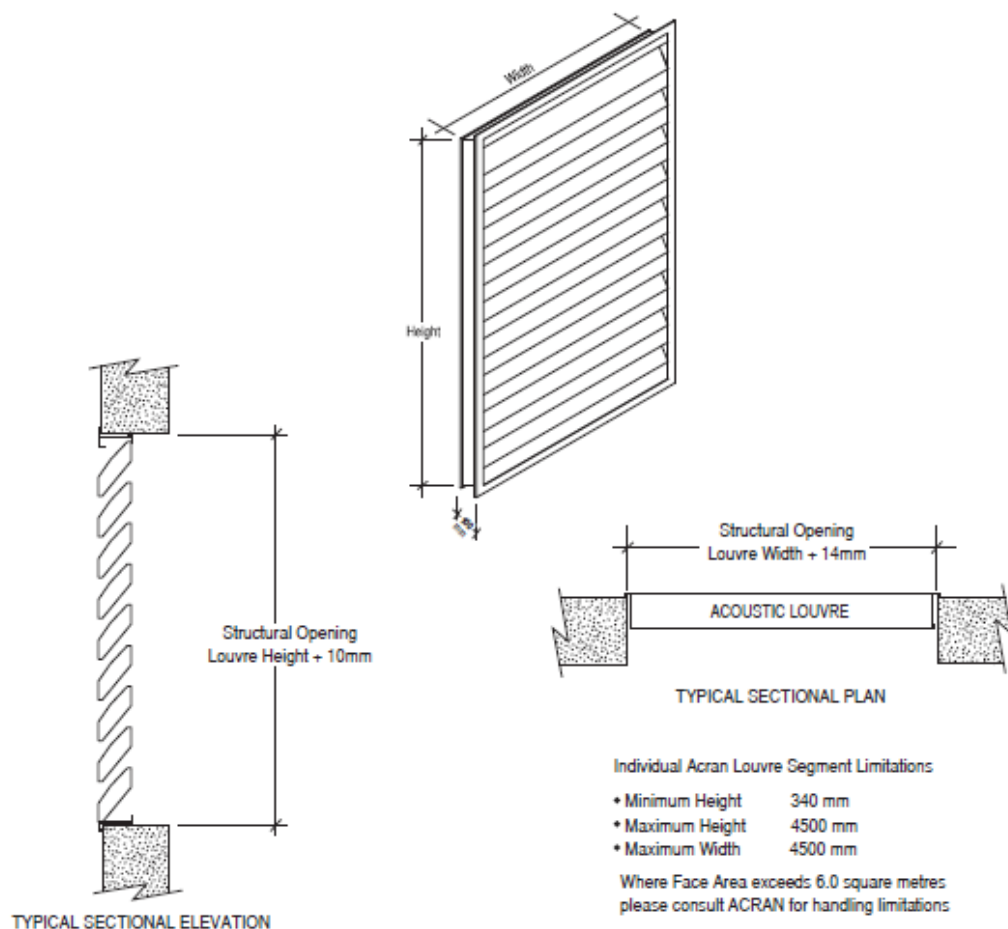


Soundproof
Warehouse

ACRAN ACRAFLOW SERIES 100 ACOUSTIC LOUVRE

NOISE REDUCTION (dB)							Noise Reduction = Transmission Loss + Rd across all frequencies
Model	Octave Band Centre Frequencies (Hz)						
	125	250	500	1000	2000	4000	
Series 100	14	14	16	21	27	27	dB
Series 100S	13	13	15	20	23	23	dB

ACRAN louvres are tested in accordance with AS 1191-2002.
Please refer to ACRAN for detailed Performance Data.



Acran Acoustic Louvres can be built to almost any size subject to Air Pressure Drop & handling limitations.

Please enquire about multiple louvre arrangements and connection details. Triangulated, circular and non rectangular shapes are available.

August 2016