REVERB ACOUSTICS

Noise and Vibration Consultants

Quarterly Noise Compliance Monitoring Report Armidale Regional Landfill Waterfall Way Armidale NSW

July 2025

Prepared for Armidale Regional Council
Report No. 25-3004-R2

Building Acoustics-Council/EPA Submissions-Modelling-Compliance-Certification

REVERB ACOUSTICS PTY LTD
ABN 26 142 127 768 ACN 142 127 768
PO Box 252 BELMONT NSW 2280
Telephone: (02) 4947 9980
email: sbradyreverb@gmail.com

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1 INTRODUCTION

This report has been prepared for presentation to the NSW Environment Protection Authority (EPA) following attended noise compliance monitoring on 30 June 2025 and unattended monitoring from 1 April 2025 to 30 June 2025, in the vicinity of the Armidale Regional Landfill (ARL) site, Waterfall Way, Armidale. The purpose of the noise monitoring was to determine the noise impact at nearest residential receivers during operation of the ARL site during the day, and to satisfy Conditions L4 and M8 – Environment Protection Licence No.21362. This report is the first Quarterly report and includes additional months to ensure all previously monitored periods have been reported. Also see Reverb Acoustics Report 24-2965-R1 and 25-3004-R1 for previous monitoring at the site. A summary of the site Real Time Monitoring System results is also included with this report.

2 TECHNICAL REFERENCE / DOCUMENTS

AS 1055.1.2.3-1997 *"Acoustics – Description and measurement of environmental noise"*.

NSW Environment Protection Authority (2000). *Industrial Noise Policy*

NSW Environment Protection Authority (1999). *Environmental Criteria for Road Traffic Noise*

NSW Roads and Traffic Authority (2001). *Environmental Noise Management Manual*

AECOM Pty Ltd (3 June 2015). *Noise Management Plan, Armidale Regional Landfill.*

AECOM Pty Ltd (7 May 2009). *Armidale Regional Landfill. Noise Impact Assessment.*

A Glossary of commonly used acoustical terms is presented in Appendix A to aid the reader in understanding the Report.

3 STATUTORY REQUIREMENTS

L4 Noise Limits

L4.1 Noise generated by the premises must not exceed the noise limits presented in the table below. The locations referred to in the table are indicated in Figure 2 – of the document, AECOM Noise Management Plan, Armidale Regional Landfill Facility, dated 18 May 2015, EPA reference DOC15/174439.

Table 1: Noise Emission Limits, dB(A)

Receiver	Limit
Residences on privately owned land during construction	*LAeq(15 minute) 40dB(A)*
Residences on privately owned land during operations	*LAeq(15 minute) 35dB(A)*
Residences on privately owned land known as "Sherraloy" during operation of Cell 1 only	*LAeq(15 minute) 38dB(A)*

L4.2 NOTES:

- *LAeq (15 minute) is the level of noise equivalent to the average of noise levels occurring over the measured period (i.e. 15 minutes).*
- *For the purpose of noise measures required for this Condition, the LAeq noise level must be measured or computed at any point within 30 metres of any residence not on the premises over a period of 15 minutes using the "FAST" response on the sound level meter. Where is can be demonstrated that direct measurement at such a location is impractical, an alternative means of determining compliance under Chapter 11 of the NSW Industrial Noise Policy may be acceptable.*
- *Modifying factors in Section 4 of the NSW Industrial Noise Policy apply to the measured noise levels.*
- *The noise emission limits apply under all meteorological conditions except during rain or wind speeds greater than 3m/s at 10m height, and under "non-significant weather conditions". Field meteorological indicators for non-significant weather conditions are described in the NSW Industrial Noise Policy, Chapter 5 and Appendix E in relation to wind and temperature inversions.*

L5 Hours of Operation

The Licensee shall comply with the operating hours shown in the Table below:

Table 2: Operating Hours

Activity	Day	Hours
Construction	*Monday-Friday*	*7am-5pm*
	Saturday	*8am-1pm*
	Any Other Time	*Only with the prior written approval of the EPA and subject to any conditions that may be imposed.*
Operation	*Monday-Friday*	*7am-5.30pm*
	Saturday	*8am-6pm*
	Any Other Time	*Only during an emergency. The details of any such incident must be reported in accordance with Schedule 5, Condition 6.*

M8 Noise Monitoring

M8.1 The licensee must undertake attended and unattended real time noise monitoring in accordance with the requirements of the Noise Management Plan, "Armidale Regional Landfill Facility Noise Management Plan" by AECOM, dated 18 May 2015 and submitted to the Armidale EPA DOC 15/174439.

4 NOISE MONITORING PROGRAM REQUIREMENTS

4.1 Noise Monitoring Locations

Figure 1: Site Plan

As specified by AECOM, real time noise monitors have been installed on the south and west boundaries of the ARL site. Attended noise measurements have been carried out at both real time monitoring locations on the site and at locations representative of being within 30 metres of the nearest potentially affected residences Strathaven (R1) and Sherraloy (R2). Subjective assessment of noise emissions from the site were also carried out at residential receivers to the north of the site across Waterfall Way, confirming the site was inaudible at these receivers.

All noise level measurements were taken with a Svan 977 Sound Level Meter. The instrument has the capability to measure steady, fluctuating, intermittent and/or impulsive sound, and to compute and display percentile noise levels for the measuring period. A calibration signal was used to align the instrument train prior to measuring and checked at the conclusion. Difference in the two measurements was less than 0.5dB.

To ensure other extraneous noise sources were eliminated from our measurements, continuous monitoring was conducted over an extended period, i.e. 30 minutes. The "roll-back" facility built into the instrument was also utilised to eliminate short-term extraneous noise events. The duration of each extraneous noise source, such as a passing car or truck, birds, livestock, etc, were time stamped and eliminated from the time trace during analysis. The desired noise level descriptor was then recalculated to determine the noise level contribution from the site.

Site, weather and measuring conditions were all satisfactory during our surveys. We therefore see no serious reason to modify the results because of influencing factors related to the site, weather or our measuring techniques. Weather data is not enclosed but available upon request.

Noise levels during operation of the ARL site are to comply with the limits set out in Table 1 at residential receivers. Table 6 of the AECOM report has nominated LAeq noise limits at real time monitoring locations on the ARL site that correspond to compliance at residential receivers. Limits at the real time monitoring locations are reproduced below in Table 3.

Table 3: LAeq Noise Level Limits at ARL Site Real Time Monitoring Locations

Cell in Operation	LAeq Noise Level at Unattended Monitoring Location	
	ARL West - Location 1	ARL South - Location 2
Cell 1	48	42
Cell 2	52	38
Cell 3	59	42
Cell 4	58	40
Cell 5	48	39

4.2 ARL Site Plant & Equipment

In addition to the noise monitoring procedure described above, the following equipment measurements will be undertaken:

- Noise emission levels of all critical items of mobile plant and equipment will be checked for compliance by the environmental Officer with the noise limits appropriate to those items prior to the equipment going into regular service.
- The levels to be monitored will include the LAmax and LAeq levels.
- For equipment and mobile plant used for construction works, measurements will be taken at an appropriate distance, normally 7-10 metres and converted to a Sound Power Level (Lw).
- An Equipment Noise Certificate, presenting relevant sound levels of the equipment tested, will be issued by the Site Environmental Officer (Superintendent, or Superintendent's representative) within the first week of the equipment commencing at the construction site.
- The equipment Lw's will be compared to the levels contained in Table 5 of AECOM's Noise Management Plan. Where they exceed these levels, noise emissions from the site will be recalculated and confirmation that the landfill noise goals can still be met will be provided where appropriate. If noise checks on any equipment result in a prediction of non-compliance, noise mitigation strategies to achieve compliance will be developed and implemented as outlined in Section 5.0 of AECOM's Noise Management Plan.

Test Certificates for all mobile plant and equipment that were operating during our site visits are shown in Appendix B.

5 NOISE MONITORING PROGRAM RESULTS & DISCUSSION

5.1 Attended Monitoring Results

Results for our attended noise level surveys are presented in the following Table, included in the Table are audible noise sources identified during the monitoring period, ranked in order of loudness as read from left to right.

Table 4: Measured Noise Levels June 2025

Time	Date	Lmax	L90	Leq	Audible Noise
R1 – STRATHAVEN (WEST)					
11:20	30/06/25	61.5	33.0	44.5	8,14,20,11,22
Noise Source Contributions:		Birds = 55-61		Livestock = 42-43	
Distant Rd traffic = 33		Drizzle/rain=32			
ARL L90 = Inaudible		**ARL Leq = Inaudible**		**ARL L1 = Inaudible**	
REAL TIME MONITOR (WEST)					
10:10	30/06/25	59.0	35.5	43.0	8,4,19,20
Noise Source Contributions:		ARL Compactor at pit = 36-46		Contractor truck at pit = 44-48	
Birds = 50-59		Contractor tr on acc rd = 40-48			
ARL L90 = <32		**ARL Leq = 38**		**ARL Lmax = 48**	
R2 – SHERRALOY (SOUTH)					
12:20	30/06/25	61.0	32.0	39.2	8,22,4,19
Noise Source Contributions:		Birds = 45-61		ARL Compactor/truck = 33-35	
Drizzle/rain = 39					
ARL L90 = <30		**ARL Leq = <35**		**ARL Lmax = 38-39**	
REAL TIME MONITOR (SOUTH)					
09:30	30/06/25	65.0	30.5	42.5	8,4,19,23,22
Noise Source Contributions:		ARL Compactor at pit = 40-52		Contractor truck at pit = 40-51	
Birds = 50-65		Contractor tr on acc rd = 42-50			
ARL L90 = <30		**ARL Leq = 36-39**		**ARL Lmax = 52**	

Criteria: Day = 38dB(A),Leq(15min) at Sherraloy, 35dB(A),Leq(15min) at Strathaven

Legend of Noise sources (See above Table):

1. ARL scraper
2. ARL quacker/Beeps
3. ARL Excavator bucket bang
4. ARL compactor
5. ARL Excavator
6. ARL rear dump truck
7. ARL 4WD vehicle
8. Birds
9. Passing cars on rd
10. Passing truck on rd
11. Livestock
12. Aeroplane
13. Tractor in paddock
14. Farm activities
15. Dog barking
16. Mobile irrigation sprinkler
17. Wind on mic.
18. Insects, frogs, crickets, etc.
19. Contractor truck on site.
20. Highway traffic
21. Car approaching
22. Drizzle/rain
23. Contr truck on acc road

Table 5: Weather Details

Time	Date	Temperature °C	Rainfall mm	Air Flow
09:30	30/06/25	8.5	0.2	2.0m/s SE
10:30	"	8.7	0.2	3.0m/s SE
11:30	"	8.7	0.0	3.5m/s SE
12:30	"	8.7	0.2	3.0m/s SE

Results of our attended noise surveys confirm that noise emissions from operations at the ARL site were compliant with the criteria at nearest residential receivers and Real Time Monitors. Therefore, no further noise control strategies will need to be implemented at this time.

5.2 Real Time Monitoring Results

Section 11.1.3 of the EPA's Industrial Noise Policy (INP) considers a non-compliance to occur when *"the monitored noise level is more than 2dB above the statutory noise limit specified in the consent or licence condition".* Furthermore, the INP states that *"a development will be in breach of a noise consent or licence condition if sustained non-compliances are not addressed and rectified.* Measured noise levels 2dB(A) above the relevant planning limit are therefore still considered compliant.

Reference to Table 2 reveals that for operations at the ARL to be compliant at nearest residential receivers the noise level contributions from the ARL site activities at Cell 1 must not exceed the following:

	INP Planning Limit	*+2dB(A) Allowance*
Real Time Monitor West (towards Strathaven Residence)	48dB(A),Leq (15 min)	50dB(A),Leq (15 min)
Real Time Monitor South (towards Sherraloy Residence)	42dB(A),Leq (15 min)	44dB(A),Leq (15 min)

The following Table shows monthly summaries of our analysis for both Real Time Monitors at the ARL site. Included within the Table are the percentage of results above each noise level category, i.e. INP Planning Limit, and INP Planning Limit +2dB(A).

Table 6: Real Time Monitoring Results 1 April 2025 to 30 June 2025

Month Year	REAL TIME MONITOR (WEST)			REAL TIME MONITOR (SOUTH)		
	No. 15 Min Periods	%>48dB(A)	%>50dB(A)	No. 15 Min Periods	%>42dB(A)	%>44dB(A)
April 2025	961	3.6	1.7	961	57.8	40.4
May 2025	940	11.3	4.8	980	68.8	50.2
June 2025	920	6.4	2.1	920	38.0	24.5

Reference to the summary results in Table 6 reveal the following:

1. Excursions above Planning Limit of 48dB(A),Leq (15 minute) occurred for 4-11% 15-minute periods at Real Time Monitor (West).
2. Excursions above Planning Limit +2dB(A) of 50dB(A),Leq (15 minute) occurred for 2-5% 15-minute periods at Real Time Monitor (West).
3. Excursions above Planning Limit of 42dB(A),Leq (15 minute) occurred for 38-69% 15-minute periods at Real Time Monitor (South).
4. Excursions above Planning Limit +2dB(A) of 44dB(A),Leq (15 minute) occurred for 25-50% 15-minute periods at Real Time Monitor (South).
5. Based on the above, a warning message would be sent to the ARL site supervisor up to 380 for the period April to June inclusive or 6/day in relation to exceedances at Real Time Monitor (West).
6. Based on the above, a warning message would be sent to the ARL site supervisor up to 1898 for the period April to June inclusive or 29/day in relation to exceedances at Real Time Monitor (South).

As discussed in the previous compliance report, unattended monitoring is generally extremely unreliable at determining source contributions from a development when extraneous noise is high in the vicinity of the monitor. This is the case for the Real Time Monitors at the ARL site. We therefore assume that the AECOM Noise Management Plan specified the Real Time Monitors as an immediate alert for ARL staff when an exceedance occurs, so that noisy item(s) of equipment could be silenced immediately and/or modified operating procedures could be implemented in a timely manner.

The Points accompanying Table 6 reveal that the current Real Time Monitoring setup is problematic and cannot be relied upon to confirm compliance or otherwise. Under the current system the supervisor may receive 35 or more text message warnings each day or in excess of 4 messages every hour, which is impractical from an operational viewpoint. This includes messages sent due to inclement weather, i.e. high wind, rain, etc. Extraneous noise sources, i.e. birds, wildlife, weather, etc, close to each monitor are clearly responsible for the majority of 15-minute excursions above the compliance limits. This has been confirmed conclusively by our attended monitoring at each Station.

5.3 ARL Site Plant & Equipment – Noise emission levels

See Appendix B for Noise Emission Test Certificates of all ARL mobile plant.

6 CONCLUSION

In accordance with the requirements of Conditions L4 and M8 – Environment Protection Licence No.21362, unattended noise compliance monitoring for the period 1 April 2025 to 30 June 2025 and attended monitoring on 30 June 2025, has been completed at the ARL site, Waterfall Way, Armidale.

Analysis of real time monitoring data from the permanent monitors on the ARL site reveal that results are significantly influenced by extraneous noise sources, such as birds, wildlife, natural noise sources, etc. As a result, the supervisor will receive 35 or more unwanted text message warnings each day or in excess of 4 messages every hour, which is impractical from an operational viewpoint.

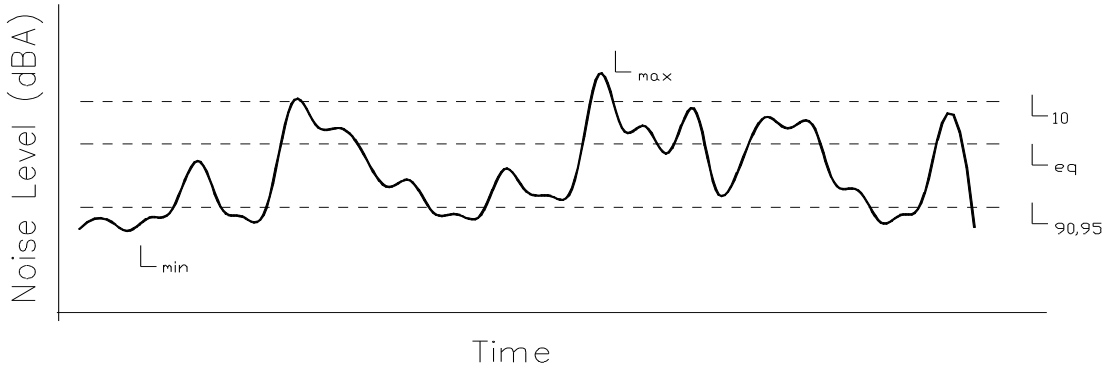
Results of our attended noise surveys at Real Time Monitoring locations on the ARL site and at nearest residential receivers confirm compliance with the criteria. Implying no further noise control needs to be implemented at the site.

REVERB ACOUSTICS
Steve Brady M.A.S.A. A.A.A.S.
Principal Consultant

APPENDIX A
Definition of Acoustic Terms

Definition of Acoustic Terms

Term	Definition
dB(A)	A unit of measurement in decibels (A), of sound pressure level which has its frequency characteristics modified by a filter ("A-weighted") so as to more closely approximate the frequency response of the human ear.
ABL	*Assessment Background Level* – A single figure representing each individual assessment period (day, evening, night). Determined as the L90 of the L90's for each separate period.
RBL	*Rating Background Level* – The overall single figure background level for each assessment period (day, evening, night) over the entire monitoring period.
Leq	Equivalent Continuous Noise Level - which, lasting for as long as a given noise event has the same amount of acoustic energy as the given event.
L90	The noise level which is equalled or exceeded for 90% of the measurement period. An indicator of the mean minimum noise level, and is used in Australia as the descriptor for background or ambient noise (usually in dBA).
L10	The noise level which is equalled or exceeded for 10% of the measurement period. L_{10} is an indicator of the mean maximum noise level, and was previously used in Australia as the descriptor for intrusive noise (usually in dBA).



APPENDIX B
Mobile Plant Test Certificates

NOISE EMISSION TEST CERTIFICATE

Test No: 1	**Date:** 5/02/2024	**Location:** Armidale Landfill Site	
Bgd Noise Level: =	<38dB(A),L90		
Wind Direction:	WNW	**Temperature:**	15°C
Wind Speed:	<2m/sec	**Humidity:**	72%

Machine Specifications:

Machine Type: ATV Vehicle — Description: Polaris Ranger Rival (Diesel)

Measurement Conditions: Dynamic test, drive by.

TEST RESULTS

SOUND PRESSURE LEVEL (SPL) dB(A) @ 10 METRES	SOUND POWER LEVEL (Lw) dB(A)
58	**86**

Lw dB(A)

	Octave Band Centre Frequency Hz							
dB(A)	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
86	65	67	75	82	80	79	72	58

NOISE EMISSION TEST CERTIFICATE

Test No: 2	**Date:** 5/02/2024	**Location:** Armidale Landfill Site	
Bgd Noise Level: =	<38dB(A),L90		
Wind Direction:	WNW	**Temperature:**	15°C
Wind Speed:	<2m/sec	**Humidity:**	72%

Machine Specifications:

Machine Type: Rear Dump Truck	Description: CAT Plant No.725
Measurement Conditions: Dynamic test, drive by.	

TEST RESULTS

SOUND PRESSURE LEVEL (SPL) dB(A) @ 10 METRES	SOUND POWER LEVEL (Lw) dB(A)
75	**103**

Lw dB(A)

	Octave Band Centre Frequency Hz							
dB(A)	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
103	75	87	95	97	98	94	89	74

NOISE EMISSION TEST CERTIFICATE

Test No: 3	**Date:** 5/02/2024	**Location:** Armidale Landfill Site	
Bgd Noise Level: =	<38dB(A),L90		
Wind Direction:	WNW	**Temperature:**	15°C
Wind Speed:	<2m/sec	**Humidity:**	72%

Machine Specifications:

Machine Type: Compactor	Description: Tutt Bryant Hire
Measurement Conditions: Dynamic test, drive by.	

TEST RESULTS

SOUND PRESSURE LEVEL (SPL) dB(A) @ 10 METRES	SOUND POWER LEVEL (Lw) dB(A)
70	**98**

Lw dB(A)

	Octave Band Centre Frequency Hz							
dB(A)	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
98	89	86	90	93	90	88	82	77

NOISE EMISSION TEST CERTIFICATE

Test No: 3	**Date:** 5/02/2024	**Location:** Armidale Landfill Site	
Bgd Noise Level: =	<38dB(A),L90		
Wind Direction:	WNW	**Temperature:**	15°C
Wind Speed:	<2m/sec	**Humidity:**	72%

Machine Specifications:

Machine Type: Excavator	Description: CAT 3210

Measurement Conditions: Dynamic test, drive by.

TEST RESULTS

SOUND PRESSURE LEVEL (SPL) dB(A) @ 10 METRES	SOUND POWER LEVEL (Lw) dB(A)
72	**103**

Lw dB(A)

	Octave Band Centre Frequency Hz							
dB(A)	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
100	77	86	89	93	95	95	90	80

APPENDIX C
Calibration Certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM53394

EQUIPMENT TESTED: Sound Level Meter

Make & Model:	Svantek SVAN 977A	**Serial No:**	69525
Mic. Model:	ACO 7052E	**Serial No:**	68254
Pre-Amp. Model:	Svantek SV 12L	**Serial No:**	72168
Band-Pass Filter:	1/3 Octave	**Test No:**	F053395

Owner: Reverb Acoustics
15 Dianela Street
Floraville, NSW 2280

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1009	hPa ±1 hPa	**Date of Receipt :**	01/04/2025
Temperature	23	°C ±1° C	**Date of Calibration :**	08/04/2025
Relative Humidity	49	% ±5%	**Date of Issue :**	09/04/2025

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: .....

AUTHORISED SIGNATURE: .....
Julian Rietl

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

Acu-Vib Electronics
ACOUSTICS AND VIBRATIONS
Head Office & Calibration Laboratory
Unit 14, 22 Hudson Avenue, Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

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Measurements

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: C53398A

EQUIPMENT TESTED : Acoustic Calibrator

Make & Model:	B&K 4230	**Serial No:**	1139958
Class:	1		
Owner:	Reverb Acoustics 15 Dianela Street Floraville, NSW 2280		
Tests Performed:	Measured Output Pressure level, Frequency & Distortion See Details and Class Tolerance overleaf.		
Comments:	All test passed. The certificate was reissued due to incorrect data. This Certificate supersedes Certificate C53398 issued on 09/04/2025		

CONDITION OF TEST:

Ambient Pressure	1009 hPa ±1 hPa	**Date of Receipt :**	01/04/2025
Temperature	23 °C ±1° C	**Date of Calibration :**	08/04/2025
Relative Humidity	49 % ±5%	**Date of Issue :**	14/04/2025

Acu-Vib Test Procedure: AVP02 (Calibrators)
Test Method: AS IEC 60942 - 2017

CHECKED BY: .....

AUTHORISED SIGNATURE: .....

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

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ACOUSTICS AND VIBRATIONS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Avenue, Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

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Acoustic and Vibration Measurements

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