

27 January 2022

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Dear Ben

**Re: Quarterly Environmental Noise Monitoring – Building Product Services,
Quarter 4 2021**

Umwelt has completed Quarter 4 2021 Environmental Attended Noise Monitoring for Building Product Services (BPS), Kembla Grange to satisfy BPS's Environment Protection Licence (EPL) 20747 requirements.

This report presents the results of noise monitoring carried out on 16 and 17 November 2021. The purpose of attended noise surveys is to quantify and describe the ambient noise environment in the region surrounding BPS and to estimate the BPS contribution to the ambient noise levels. Meteorological conditions present at the time of monitoring and the measured BPS noise levels are compared to criteria outlined in EPL20747.

Noise monitoring methodology

The compliance assessment methodology includes the following activities:

- Attended noise monitoring measurements, of fifteen-minute duration, at monitoring locations to measure the ambient noise levels in the surrounding region and to assess the BPS contribution (reported as an LAeq, 15 minute measurement) to the measured noise levels.
- Comparison of the BPS LAeq, 15 minute contribution with the relevant EPL LAeq, 15 minute noise criteria to assess compliance of BPS operations.
- Comparison of the BPS LAF,Max night-time attended noise monitoring results with the night-time LAF,Max criteria outlined in the EPL.

Attended noise monitoring for BPS was conducted in accordance with the NSW Environment Protection Authority (EPA) Noise Policy for Industry (NPfI, 2017), guidelines and the Australian Standard *AS1055:2018, Acoustics – Description and Measurement of Environmental Noise*.

During the attended monitoring sessions, noise measurements were taken with a SVAN 958A Precision Integrating Sound Level Meter (Serial Number 59839) which was calibrated on-site using a Type SV-36, Svantek Sound Level Calibrators (Serial Number 90131). The noise meter was run using three measurement profiles, Z Weighting (linear), C Weighting and A Weighting and records A-weighted 1/3 octave noise levels at 10th of a second intervals over a 15-minute measurement period.

During the attended monitoring sessions the operator maintained a log of noise-related events that occurred and contributed to the ambient noise environment. Particular attention and note was made for contributions associated with BPS operations.

Attended noise monitoring data and results recorded include:

- the LAeq, 15 minute, LA10, 15 minute and LA90, 15 minute noise levels of the ambient acoustic environment for each 15-minute measurement period
- the recorded A-weighted 1/3 octave noise levels at 10th of a second intervals over each 15-minute measurement period
- the results of a 1000 Hz low pass filter at 10th of a second intervals over each 15-minute measurement period
- an assessment of the maximum LA1,1minute noise level recorded over each 15-minute measurement period
- operator comments regarding any extraneous noise sources contributing to the ambient noise levels.

The October 2021 version of EPL 20747 identifies three noise monitoring locations, which are shown in **Figure 1**. EPL 20747 calls for monitoring to be carried out during the day, evening and night period as defined in the Noise Policy for Industry for a minimum of two (2) of the residential locations and one (1) near-field location.

Noise criteria apply under the following meteorological conditions:

- Day – Stability categories A, B, C, D with wind speeds up to and including 3m/s at 10m above ground level.
- Evening – Stability categories A, B, C, D with wind speeds up to and including 3m/s at 10m above ground level.
- Night – Stability categories A, B, C, D with wind speeds up to and including 3m/s at 10m above ground level; or
- Stability Category E and F with wind speeds up to and including 2m/s at 10m above ground level.

For those meteorological conditions not referred to above the noise limits include a plus 5dB allowance.



Figure 1 – Location figure showing the BPS site and noise monitoring locations

Identification of suitable meteorological conditions

Umwelt aims to conduct compliance monitoring during meteorological conditions where criteria will apply. Publicly available weather forecasts, such as Weatherzone and the Bureau of Meteorology's (BOM's) synoptic charts and Meteye forecasts are reviewed and periods of low wind speeds and no rain are selected for monitoring. It is noted that inversion conditions can occur during periods of low wind speeds. Therefore, preferentially targeting calm periods may inadvertently result in the monitoring being undertaken during inversion conditions. During strong inversion conditions, the noise criteria includes a 5 dB allowance and the value of the noise monitoring process is potentially diminished. The 5 dB allowance also applies to periods when the wind speed exceeds those nominated above (as per EPL 20747).

Additionally, local radars may be checked immediately prior to monitoring to confirm the absence of rain or storms during summer months. Based on the prevailing meteorological conditions over 16 and 17 November 2021 the monitoring was conducted at NM1 and NM2.

Meteorological conditions during monitoring were determined from meteorological data obtained from the EPA Kembla Grange Air Quality Monitoring Station (Station ID 526). Averaged data was available in one hour intervals. Stability categories present during monitoring were determined using the method from Fact Sheet D of the NPfI using the sigma theta data to estimate the Pasquill-Gifford stability category, as outlined in Section D1 of the NPfI, as specified in EPL 20747.

The Quarter 4 2021 attended noise monitoring results in **Table 1** include:

- the noise criteria for each monitoring location (for the period when the measurement was taken)
- the estimated noise contribution from BPS
- whether the meteorological conditions include a plus 5dB allowance
- whether BPS is complying with the noise criteria at the time of monitoring.

Further details on the operator comments regarding any extraneous noise sources contributing to the ambient noise levels during the evening and nighttime monitoring period can be found in **Appendix A** as notated run charts.

The meteorological conditions present during each measurement interval are presented in **Table 2**.

Calibration certificates for the sound and vibration analyser and sound level calibrator used are provided in **Appendix B**.

Table 1 Attended Noise Monitoring Results

EPA Id	Start Date and Time of 15 min period	Ambient Noise Levels		Estimated ¹ BPS Contribution and Criteria, dB(A)						Comments
		LA90, 15min	LAeq, 15min	EPL criteria LAeq, 15min	BPS LAeq,15min ¹	EPL criteria LA1,1min	BPS LA1,1min ¹	Met ^{2,3,4} Allowance (0dB/+5dB)	BPS Complies (Yes/No)	
Evening										
NML2	16/11 20:24	48	57	43	< 43	-	-	0 dB	Yes	The BPS is not specifically audible
NML2	16/11 20:43	48	50	43	< 43	-	-	0 dB	Yes	The BPS plant is not specifically audible but the front-end loader was audible moving around the yard area. The maximum instantaneous noise level from the loader was 55 dB(A) associated with the bucket scraping on the ground. The engine noise level was 50 to 52 dB(A)
NML1	16/11 21:15	49	53	43	< 43	-	-	0 dB	Yes	The BPS dust collector fan is audible in the background during lulls in traffic movements
NML1	16/11 21:34	49	54	43	< 43	-	-	0 dB	Yes	The BPS dust collector fan is audible in the background during lulls in traffic movements. A BPS air valve actuator on a feed hopper was audible during the monitoring period at 53 dB(A)
Night										
NML1	17/11 04:23	51	57	40	40	52	< 45	0 dB	Yes	The BPS dust collector fan audible in the background during lulls in traffic movements
NML1	17/11 04:39	49	53	40	40	52	46	0 dB	Yes	The BPS dust collector fan is audible in the background during lulls in traffic movements. The estimated LA1,1minute noise of less than 46 dB(A) associated with the drymix feeder was identified from BPS during the 15-minute monitoring period.

EPA Id	Start Date and Time of 15 min period	Ambient Noise Levels		Estimated ¹ BPS Contribution and Criteria, dB(A)						Comments
		LA90, 15min	LAeq, 15min	EPL criteria LAeq, 15min	BPS LAeq,15min ¹	EPL criteria LA1,1min	BPS LA1,1min ¹	Met ^{2,3,4} Allowance (0dB/+5dB)	BPS Complies (Yes/No)	
NML2	17/11 05:12	50	56	40	< 40	52	< 40	0 dB	Yes	Road traffic noise from the Princes Highway and the dawn bird chorus dominated the noise environment during the measurement period. The fan noise from BPS was only just audible in the background when there were lulls in the road traffic noise level. The estimated LAeq,15minute from BPS was estimated at less than 40 dB(A). No LA1,1minute noise sources were identified from BPS during the 15-minute monitoring period. A truck was in the BPS loading bay and the lights of fork trucks could be seen moving. The activities in the BPS loading bay were not audible at any time.
NML2	17/11 05:39	51	54	40	< 40	52	< 40	0 dB	Yes	Road traffic noise from the Princes Highway and the dawn bird chorus dominated the noise environment during the measurement period. BPS was inaudible even during lulls in the road traffic noise level. The estimated LAeq,15minute from BPS was estimated at less than 40 dB(A). No LA1,1minute noise sources were identified from BPS during the 15-minute monitoring period.
NML2	17/11 06:00	-	-	-	-	-	-	0 dB	Invalid due to rain	Ceased monitoring due to rain
Day										
NML1	17/11 09:30	52	54	46	< 45	-	-	0 dB	Yes	BPS was just audible as road traffic noise from the Princes Highway dominated the noise environment during the measurement period.

EPA Id	Start Date and Time of 15 min period	Ambient Noise Levels		Estimated ¹ BPS Contribution and Criteria, dB(A)						Comments
		LA90, 15min	LAeq, 15min	EPL criteria LAeq, 15min	BPS LAeq,15min ¹	EPL criteria LA1,1min	BPS LA1,1min ¹	Met ^{2,3,4} Allowance (0dB/+5dB)	BPS Complies (Yes/No)	
NML1	17/11 09:50	51	54	46	NA	-	-	0 dB	Yes	BPS was not specifically audible as road traffic noise from the Princes Highway dominated the noise environment during the measurement period.
NML1	17/11 10:05	-	-	51 ⁴	-	-	-	+5 dB	-	Monitoring ceased as BPS was not audible due to ongoing road traffic noise from the Princes Highway and increased wind conditions.
NML2	17/11 10:18	50	55	51 ⁴	NA	-	-	+ 5 dB	Yes	BPS was not audible as road traffic noise from the Princes Highway dominated the noise environment during the measurement period.
NML2	17/11 10:45	50	52	51 ⁴	NA	-	-	+ 5 dB	Yes	BPS was not audible as road traffic noise from the Princes Highway dominated the noise environment during the measurement period.
NML2	17/11 11:00	-	-	51 ⁴	-	-	-	+ 5 dB	-	Monitoring ceased as BPS was not audible due to ongoing road traffic noise from the Princes Highway and increased wind conditions.

NOTE:

- ¹ Assessed by the operator during the monitoring session. Exceedances of EPL limits are shown in bold.
- ² Meteorological conditions under which the noise criteria apply are defined in EPL20747 condition L2.3(a).
- ³ See **Table 2** for specific meteorological data during the monitoring period.
- ⁴ For those meteorological conditions not referred to in EPL20747 condition L2.3(a), the noise limits that apply are the noise limits in condition L2.1 plus 5dB..

Table 2 Meteorological Conditions During Attended Monitoring

EPA Id	Start Date and Time of 15 min period	Meteorological Assessment during Monitoring Period ^{1,3}				Includes Meteorological Allowance ⁴ (0dB/+5dB)
		Rain (mm)	Avg. Wind Speed @ Mic. ² (m/s)	Avg. Wind Speed @ 10m (m/s)	Atmospheric Stability Category (ASC)	
NML2	16/11 20:24	-	< 5	1.3	F	0 dB
NML2	16/11 20:43	-	< 5	1.3	F	0 dB
NML1	16/11 21:15	-	< 5	0.7	F	0 dB
NML1	16/11 21:34	-	< 5	0.7	F	0 dB
NML1	17/11 04:23	-	< 5	0.2	F	0 dB
NML1	17/11 04:39	-	< 5	0.2	F	0 dB
NML2	17/11 05:12	-	< 5	0.6	F	0 dB
NML2	17/11 05:39	-	< 5	0.6	F	0 dB
NML2	17/11 06:00	Light	< 5	0.4	F	0 dB but invalid due to rain
NML1	17/11 09:30	-	< 5	2.2	A	0 dB
NML1	17/11 09:50	-	< 5	2.2	A	0 dB
NML1	17/11 10:05	-	< 5	4.1	D	+5 dB
NML2	17/11 10:18	-	< 5	4.1	D	+5 dB
NML2	17/11 10:45	-	< 5	4.1	D	+5 dB
NML2	17/11 11:00	-	< 5	3.7	A	+5 dB

NOTE:

- ¹ Meteorological conditions were measured by the NSW EPA Air Quality Monitoring Network (Kembla Grange, ID 526). Meteorological parameters are available in intervals of one hour averages.
- ² Wind speed at microphone height was determined by the operator.
- ³ EPL20747 condition L2.3(a) outlines applicable meteorological conditions.
- ⁴ For those meteorological conditions not referred to in EPL20747 condition L2.3(a), the noise limits that apply are the noise limits in condition L2.1 plus 5dB.

Near-field Monitoring

Near-field monitoring was conducted during the evening period to investigate the performance of the dust collector fan and the dust collector pulse system. It was noted during the attended monitoring that while the dust collector fan was not audible at NML2 (Farmborough Road), it was audible in the background at NML1 (Orana Parade) during lulls in the road traffic noise from the Princes Highway. At the time, the dust collector pulse system was not audible at NML1 or NML2.

To investigate the contribution of the dust collector fan to the acoustic environment at NML1 monitoring was conducted at a near-field location so the dust collector fan acoustic signal could be isolated. **Figure 2** shows the one-third octave noise levels of the dust collector fan monitored at a near-field location at the rear of 275 Princes Highway. Having isolated the one-third octave signal of the dust collector fan, the contribution of the dust collector fan to the acoustic environment at NML1 could be quantified. **Figure 3** shows the contribution of the dust collector fan to the one-third octave noise levels at NML1 (Orana Parade) during lulls in road traffic noise.

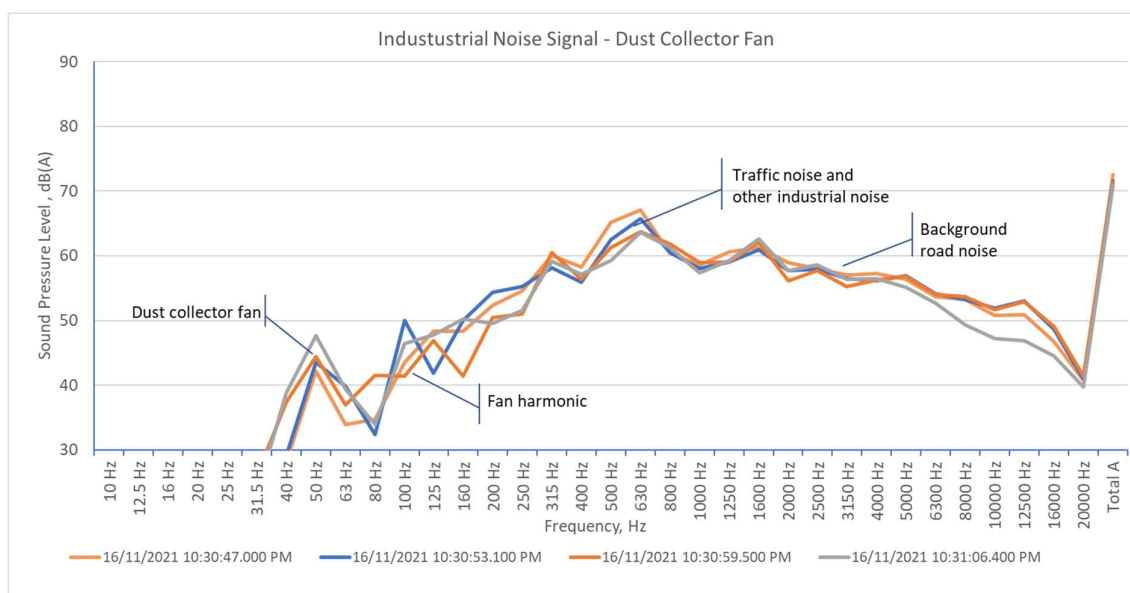


Figure 2 – One-third octave noise levels monitored at a near-field location

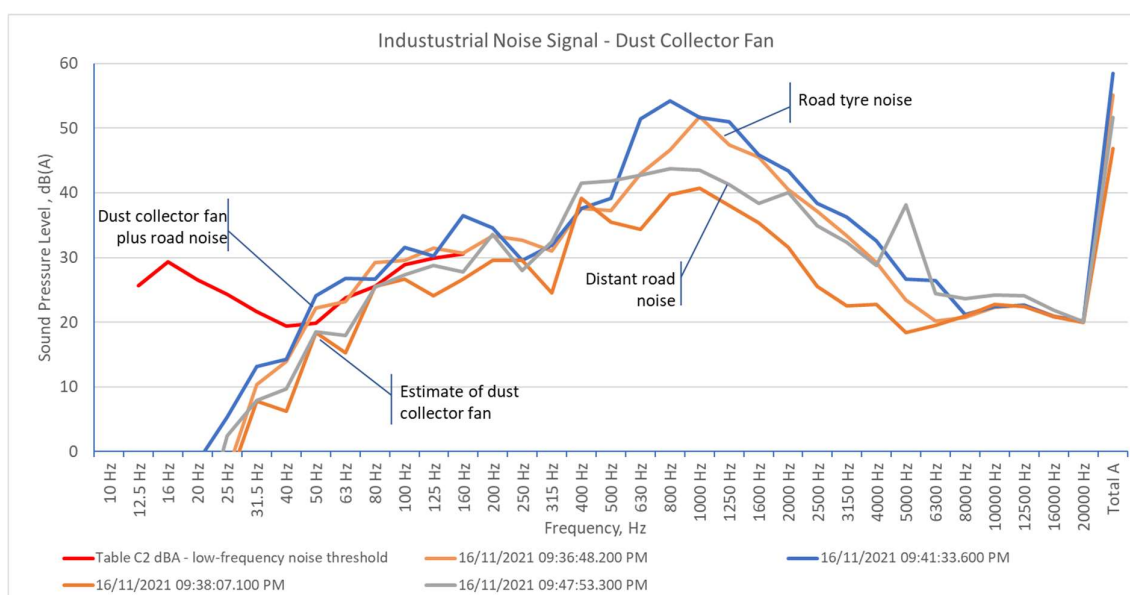


Figure 3 - One-third octave noise levels at NML1

The results in **Figure 3** show the dust collector fan contributes to the acoustic environment at NML1. The difference in the measured source C- to A-weighted sound pressure levels of the acoustic environment is 17 to 18 dB but the measured noise level of the dust collector fan with only distant traffic does not trigger the one-third octave low-frequency noise thresholds in Table C2 of Fact Sheet C in the NPfI.

Statement of Compliance

The results of the Quarter 4 2021 noise monitoring program have been assessed against the EPL20747 noise criteria and the meteorological conditions identified in the license for BPS.

The Quarter 4 2021 attended noise monitoring results show that BPS was compliant with the BPS EPL20747 noise criteria for LAeq,15minute and LA1,1minute noise levels for all monitoring locations.

Recommendations

The attended noise monitoring identified three aspects of the operation that warranted further attention. These are as follows:

1. Attenuation of the exhaust muffler on the front-end loader to reduce the volume of the exhaust note from the loader when it is working in the raw materials yard.
2. Management of the clean-up activities in the raw materials yard during the evening period to avoid the generation of unnecessary noise when the loader bucket strikes the ground or scrapes up spilt material.
3. Installation of a noise barrier adjacent to the dust collector fan. The fan has been relocated to ground level and the reduction in the noise propagation is notable at the NML1 and NML2 monitoring locations. However, the new location of the fan could result in elevated noise levels at NML1 during noise-enhancing meteorological conditions. It could also trigger a plus 2dB low-frequency modifying factor.

Observations

The following observations were made during the attended noise monitoring:

1. The front-end loader broadband reversing beeper was only audible when directly facing the monitoring location.
2. Enclosing the north-facing wall of the loading bay has resulted in the truck loading/unloading activities being inaudible at NML 1 and NML2.
3. Enclosing the dust collector pulse system has reduced the audibility of the pulse system.

We trust this information meets with your current requirements. Please do not hesitate to contact the undersigned on 1300 793 267 should you require clarification or further details of the noise monitoring parameters recorded during this monitoring round.

Yours sincerely

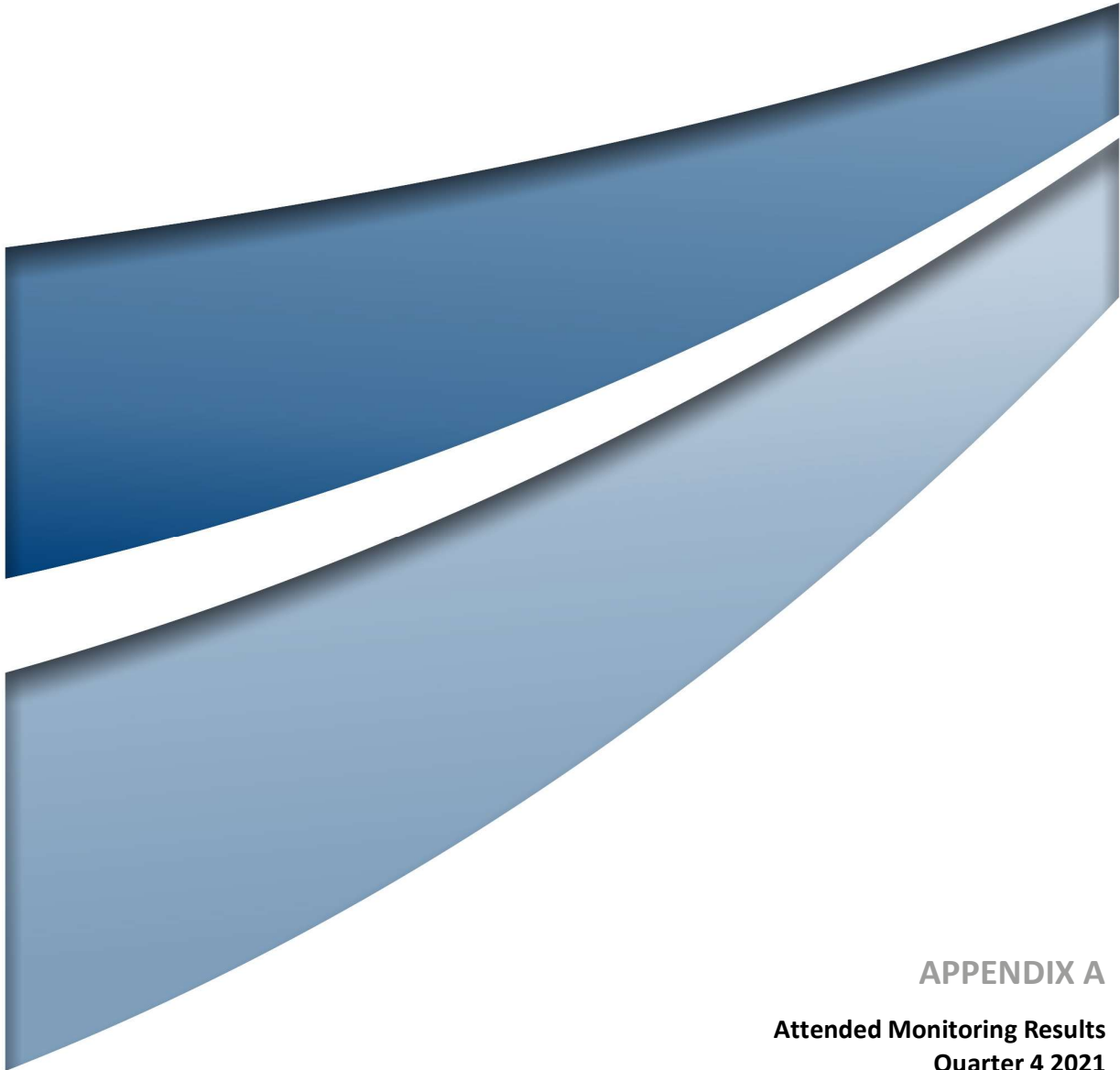


Tim Procter

Practice Lead – Acoustic Environment

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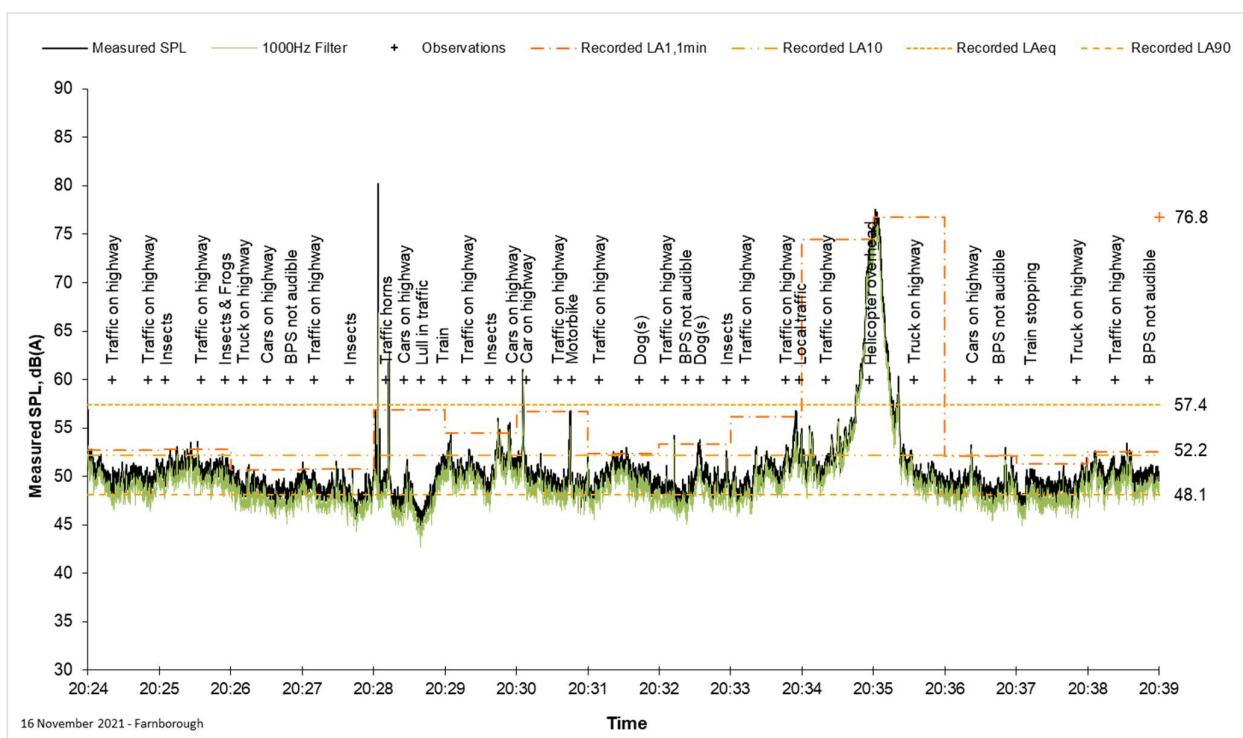
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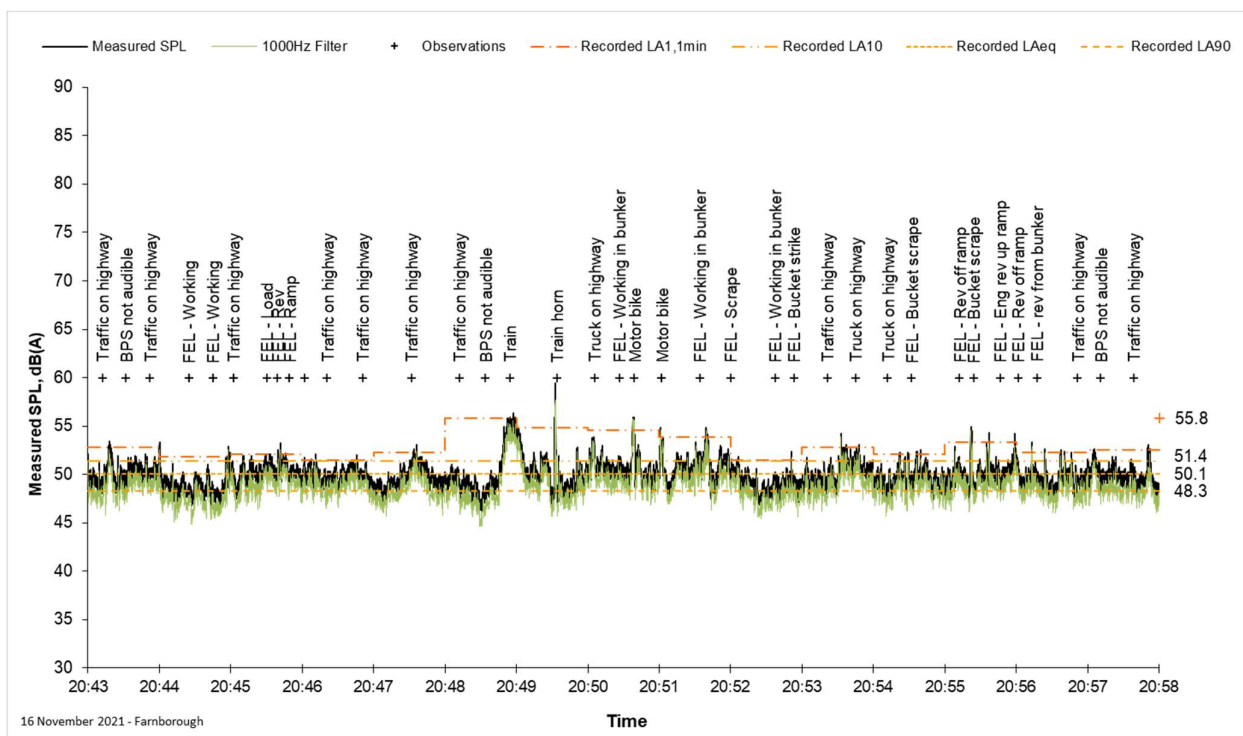
APPENDIX A

**Attended Monitoring Results
Quarter 4 2021**

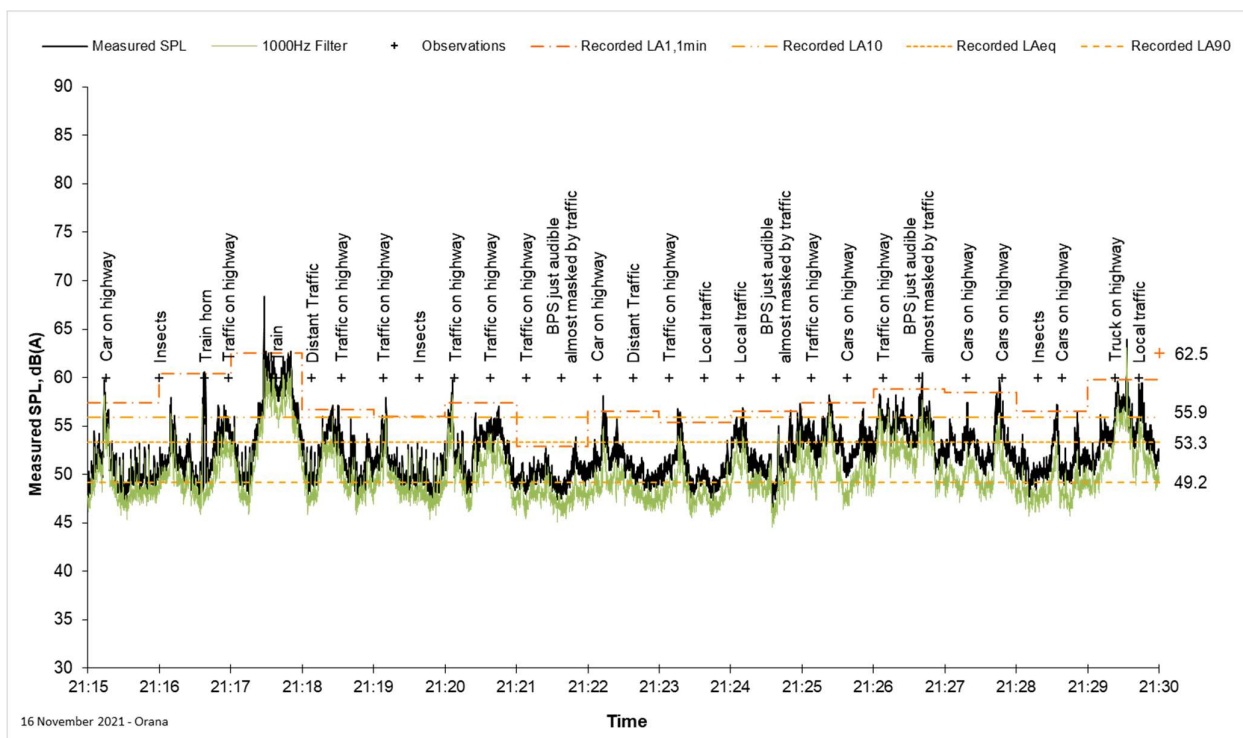
Evening Monitoring Results for NML2, Farmborough Road



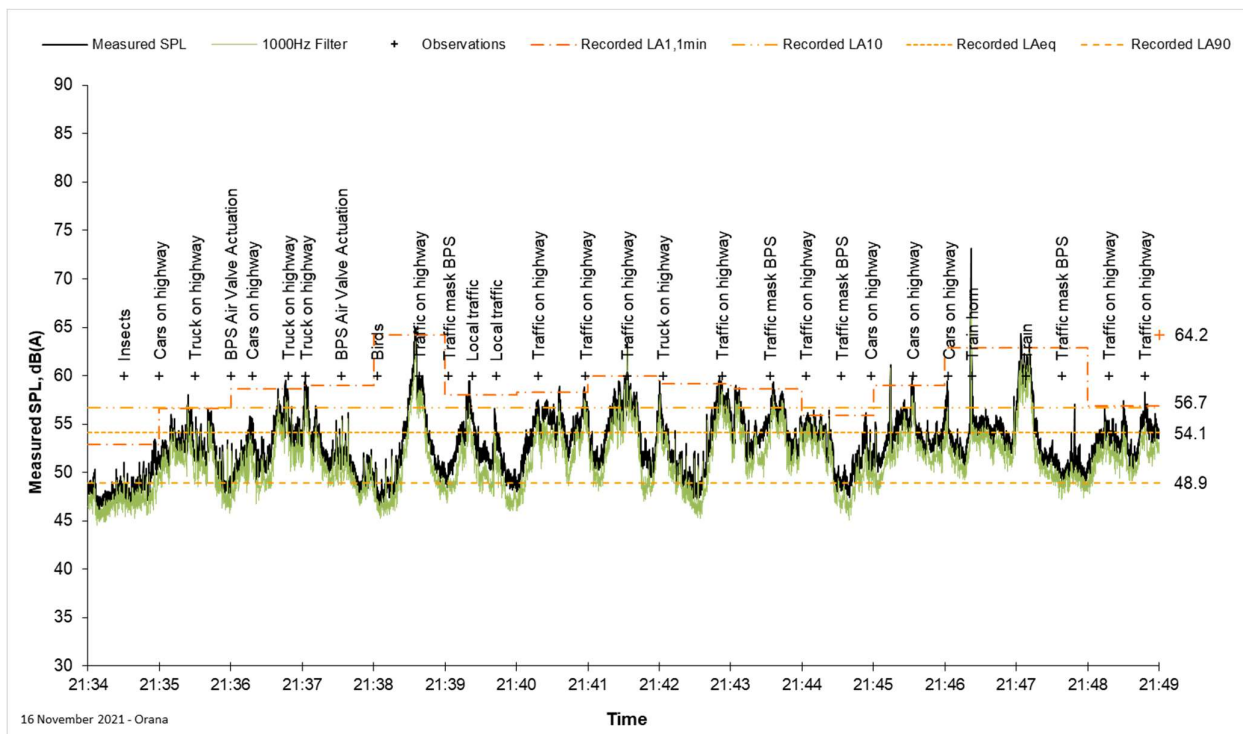
Evening Monitoring Results for NML2, Farmborough Road



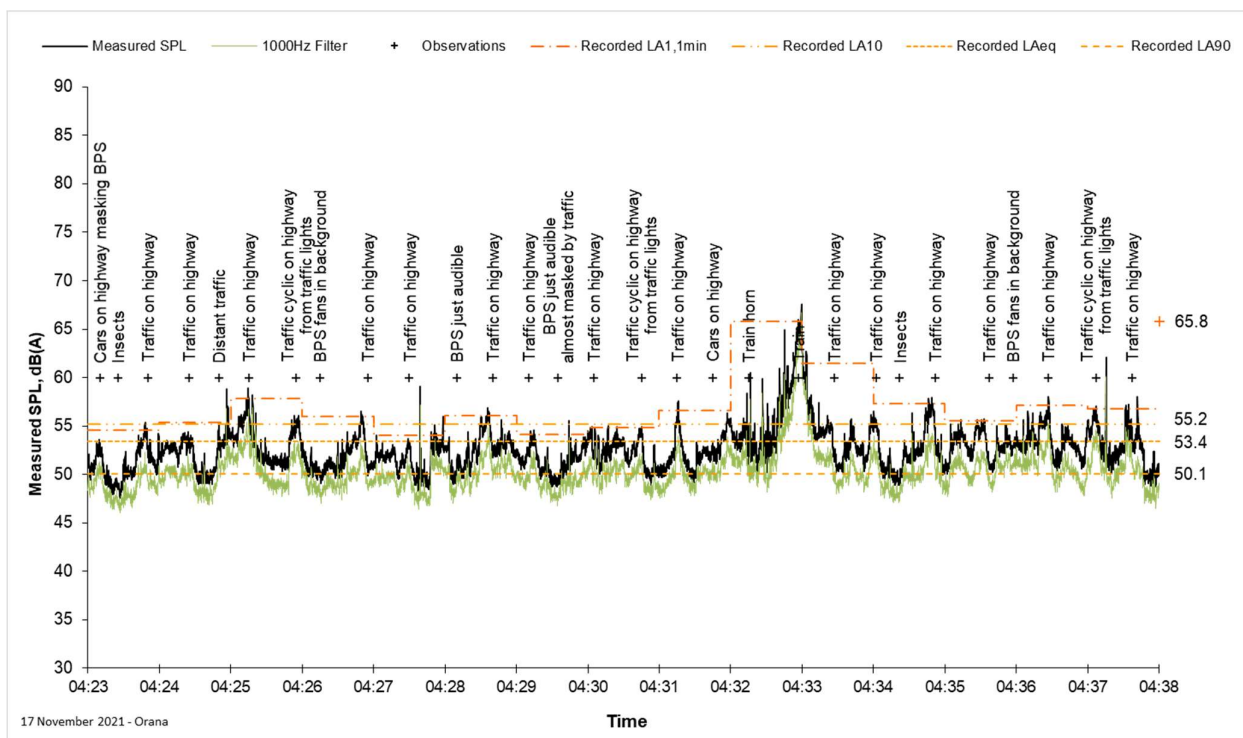
Evening Monitoring Results for NML1, Orana Parade



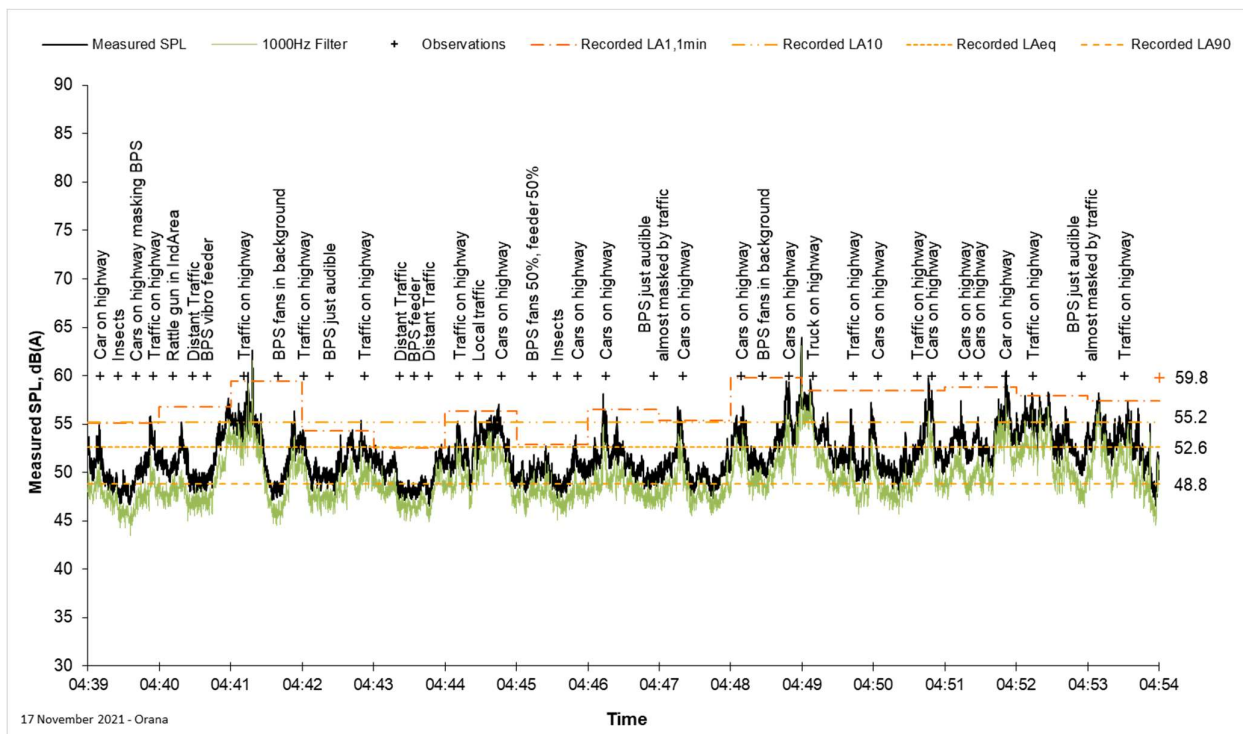
Evening Monitoring Results for NML1, Orana Parade



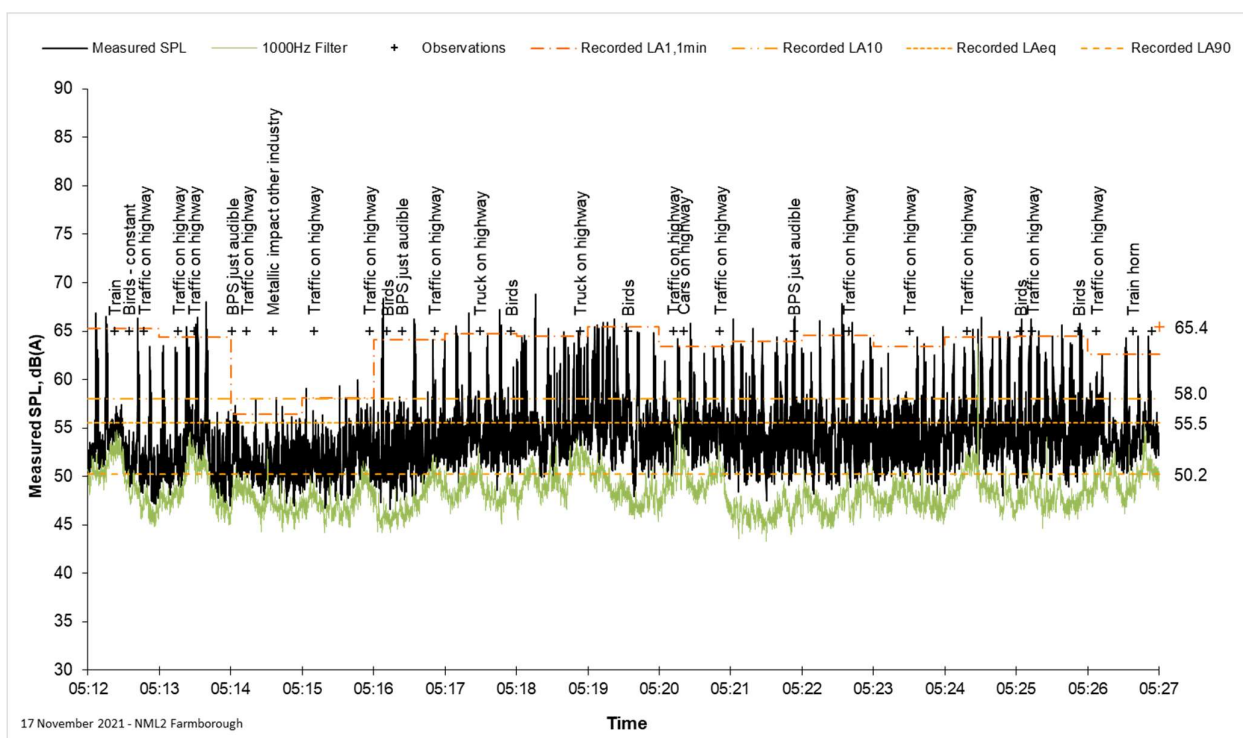
Night Monitoring Results for NML1, Orana Parade



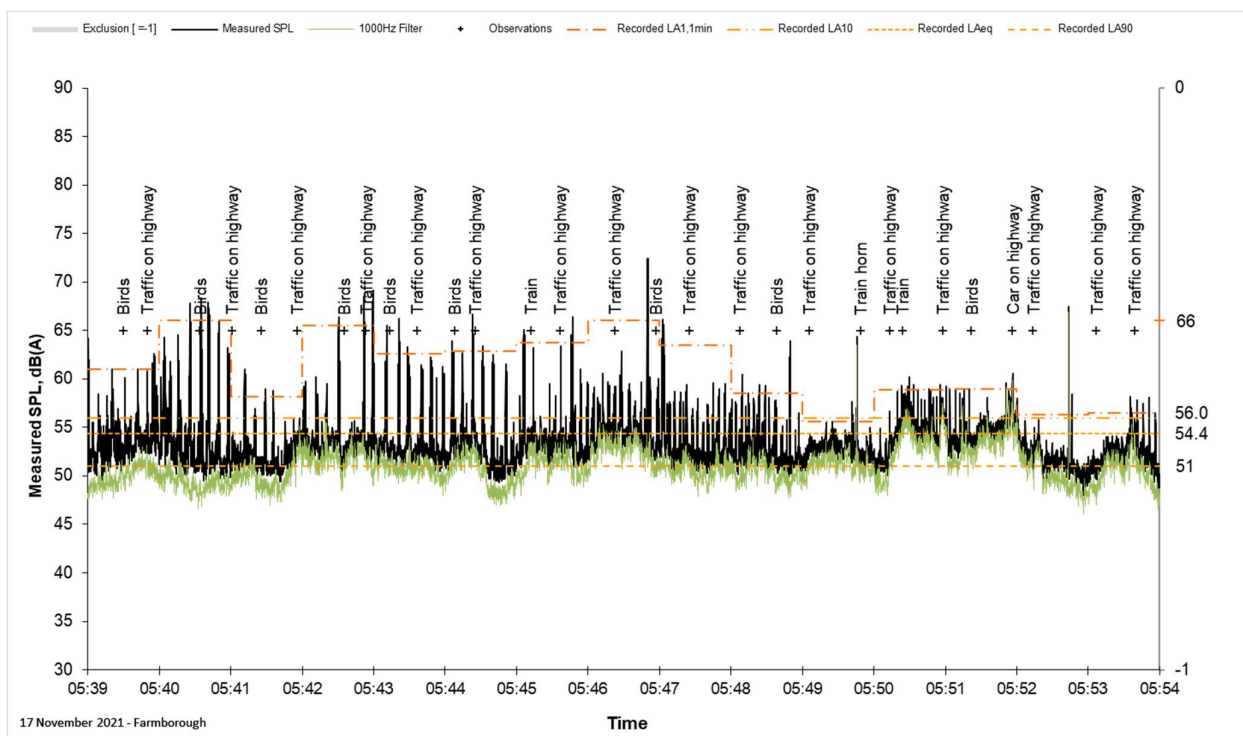
Night Monitoring Results for NML1, Orana Parade



Night Monitoring Results for NML2, Farmborough Road



Night Monitoring Results for NML2, Farmborough Road





APPENDIX B
Calibration Certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE No.: **SLM 27353 & FILT 5902**

Equipment Description: Sound & Vibration Analyser

Manufacturer: Svantek

Model No: SVAN-958A **Serial No:** 59839

Microphone Type: 7052E **Serial No:** 71106

Preamplifier Type: SV12L **Serial No:** 73586

Filter Type: 1/3 Octave **Serial No:** 59839

Comments: All tests passed for class 1.
(See over for details)

Owner: Umwelt (Australia) Pty Ltd
75 York Street
Teralba, NSW 2284

Ambient Pressure: 1007 hPa ± 1.5 hPa

Temperature: 23 °C $\pm 2^\circ$ C **Relative Humidity:** 39% $\pm 5\%$

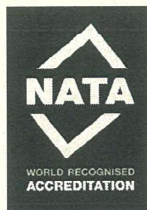
Date of Calibration: 17/07/2020 **Issue Date:** 20/07/2020

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

CHECKED BY: *[Signature]*

AUTHORISED SIGNATURE: *[Signature]*
Hein Soc

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to
Australian/national standards.



Accredited Lab. No. 9262
Acoustic and Vibration
Measurements



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web site: www.acu-vib.com.au

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AVCERT10 Rev. 1.3 15.05.18

CERTIFICATE OF CALIBRATION

CERTIFICATE No: C29893

EQUIPMENT TESTED : Sound Level Calibrator

Manufacturer: Svantek

Type No: SV-36 Serial No: 90131

Owner: Umwelt (Australia) Pty Ltd
75 York Street
Teralba, NSW 2284

Tests Performed: Measured Output Pressure level, Frequency & Distortion

Comments: See Details overleaf. All Test Passed.

Parameter	Pre-Adj	Adj Y/N	Output: (dB re 20 µPa)	Frequency (Hz)	THD&N (%)
Level1:	NA	N	93.98 dB	1000.00 Hz	0.79 %
Level2:	NA	N	113.96 dB	1000.00 Hz	0.50 %
Uncertainty			±0.11 dB	±0.05%	±0.20 %
Uncertainty (at 95% c.i.) k=2					

CONDITION OF TEST:

Ambient Pressure 1015 hPa ±1 hPa

Temperature 24 °C ±1° C

Relative Humidity 48 % ±5%

Date of Receipt : 29/06/2021

Date of Calibration : 01/07/2021

Date of Issue : 01/07/2021

Acu-Vib Test AVP02 (Calibrators)

Procedure: 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.

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%.



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