

Acoustic assessment of proposed new mechanical services equipment

14 Minster Street, Salisbury SP1 1TP



Client: Mission Mars

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0. SUMMARY

- 0.1. ACA Acoustics Limited has been commissioned to assess the acoustic impact of proposed new mechanical services equipment associated with a new pizza restaurant to be installed at 14 Minster Street, Salisbury.
- 0.2. The assessment is required to provide evidence that noise emissions from the equipment will not be detrimental to the amenity of nearby noise-sensitive properties and complies with the Local Authority's requirements.
- 0.3. A survey has been carried out in the vicinity to establish existing background sound levels. Based on Wiltshire Council's requirements, noise from the new plant should be assessed in accordance with BS 4142:2014+A1:2019. Wiltshire Council require the rating level of the new plant to be at least 5dB below the background levels at the most noise-sensitive receptor.
- 0.4. Table 1 below summarises the assessment details of the plant to the most noise-sensitive receptor (NSR).

Ref	Description	Background Level, LA90	Calculated Rating Level, LAr	Excess of Rating Level Over Background Sound Level
NSR1	The upper floor windows above the site, around 2-3m from the exhaust louvre.	46dB	40dB	-6dB

Table 1: Summary of assessment

- 0.5. With the implementation of the recommended mitigation scheme outlined in this report, noise from the proposed equipment will not be disturbing or detrimental to the amenity of the most sensitive noise-sensitive receptor and complies with the planning requirements of Wiltshire Council.

1. INTRODUCTION

New mechanical services equipment associated with a new pizza restaurant is to be installed at 14 Minster Street, Salisbury.

ACA Acoustics Limited has been commissioned by Mission Mars to carry out an assessment of noise emissions from the proposed mechanical plant and, where necessary, to make recommendations for a mitigation scheme to ensure that the amenity of nearby noise-sensitive properties is not compromised.

This report presents results of the sound level survey, computer modelling, and assessment.

2. ACOUSTIC CRITERIA

Wiltshire Council's requirements for noise from new mechanical services equipment are contained in their document *"Planning Consultation Guidance Note – Noise and Vibration"*. This document sets out requirements and methodologies for noise impact assessments. Section 6.6 relates to new industrial or commercial noise sources and requires that an assessment is carried out in accordance with the methodology of BS 4142.

Section 6.6 also discusses appropriate criteria, advising that,

"New developments should contribute and enhance the area in which they are located and where possible i.e. prevent 'noise creep', contribute to the improvement of people's health and quality of life as per the NPSE [Noise Policy Statement for England]. Therefore, the design objective should be:

The development should be designed so as to achieve a rating level of 5dB (LAeq) below the typical background LA90 level at the nearest noise sensitive location."

BS 4142:2014+A1:2019 is commonly used to assess the potential for loss of amenity due to noise from mechanical services equipment and is considered appropriate for this application.

The scope of BS 4142:2014+A1:2019 advises that *"this British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature ... to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident"*.

The assessment method of BS 4142:2014+A1:2019 corrects the specific sound level from the source under investigation to account for characteristics that could make the sound more obtrusive to obtain a rating level. This rating level is compared against the prevailing background noise outside

the noise-sensitive property. Section 11 provides a commentary of the assessment result and advises that:

- a) *Typically the greater this difference [between the rating level and background sound level], the greater the magnitude of the impact;*
- b) *A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- c) *A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context;*
- d) *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

Wiltshire Council's requirement is that noise from the new equipment shall achieve a rating level 5dB below the prevailing background level at 1m outside windows of the nearest affected noise-sensitive properties.

Wiltshire Council's criteria is more stringent than required by the Standard and will ensure there is no adverse impacts on nearby occupants.

3. REVIEW OF SITE LOCATION

The site is located in a town centre area, with mixed use properties nearby and residential apartments at upper floor levels above the development site.

It is proposed that a new pizza oven extract fan is to be installed internally with appropriate filtration, ducted to a louvre in the Minster Street façade. Existing condensers are installed at roof level and are to be retained/reused.

The most affected noise sensitive receptor (NSR) is discussed in Table 2 below.

Receptor	Description
NSR1	The upper floor windows above the site, around 2-3m from the exhaust louvre.

Table 2: Noise sensitive receptor details

Other receptor locations in the vicinity have also been considered and may be affected by the proposed plant, however the receptor location used in the assessment is the most sensitive – sound levels at other positions will be lower.

A marked-up aerial image is included in Figure 1, identifying the location of the proposed equipment and sound level survey measurement position.



Figure 1: Equipment location, measurement position, and closest receptor (available at [google.com/maps](https://www.google.com/maps))

Proposed operating times of the fan will be during opening times of the restaurant, anticipated to be to around 00:00 latest.

4. SOUND LEVEL SURVEY

To assess sound levels from the new mechanical equipment, it is necessary to establish representative background sound levels in the vicinity during the proposed plant operating times.

The background sound level was measured via an unattended survey at the position indicated in Figure 1. This position was considered as being representative of the nearest noise sensitive receptor. The survey was set up by Tom Bateson of ACA Acoustics and conducted between the 07/09/2026 and 09/09/2026.

During the survey, the soundscape in the vicinity was influenced predominantly by local and distant road traffic.

The following equipment was used during the survey. An on-site calibration check was conducted on the sound level meter prior to the survey and repeated after with no deviation noted.

Equipment	Serial Number
NTi Audio Class 1 sound level meter type XL2-TA complete with weatherproof and lockable outdoor environmental kit	A2A-10964-E0
Svantek calibrator type SV33B. Compliant to IEC 60942:2003	167264

Table 3: Equipment used for the sound level survey

Weather conditions at the time of setting up the survey consisted of 100% cloud cover, moderate southerly breeze, dry ground conditions and a temperature of around 23°C.

There were showers during the morning of 8th September, however the extended nature of the survey ensures that a reasonable sample of results have been recorded with appropriate weather conditions. Meteorological conditions are not considered to have adversely impacted the outcome of the assessment.

Results of the survey at the MP1 position are shown in graphical form in Figure 2 below.

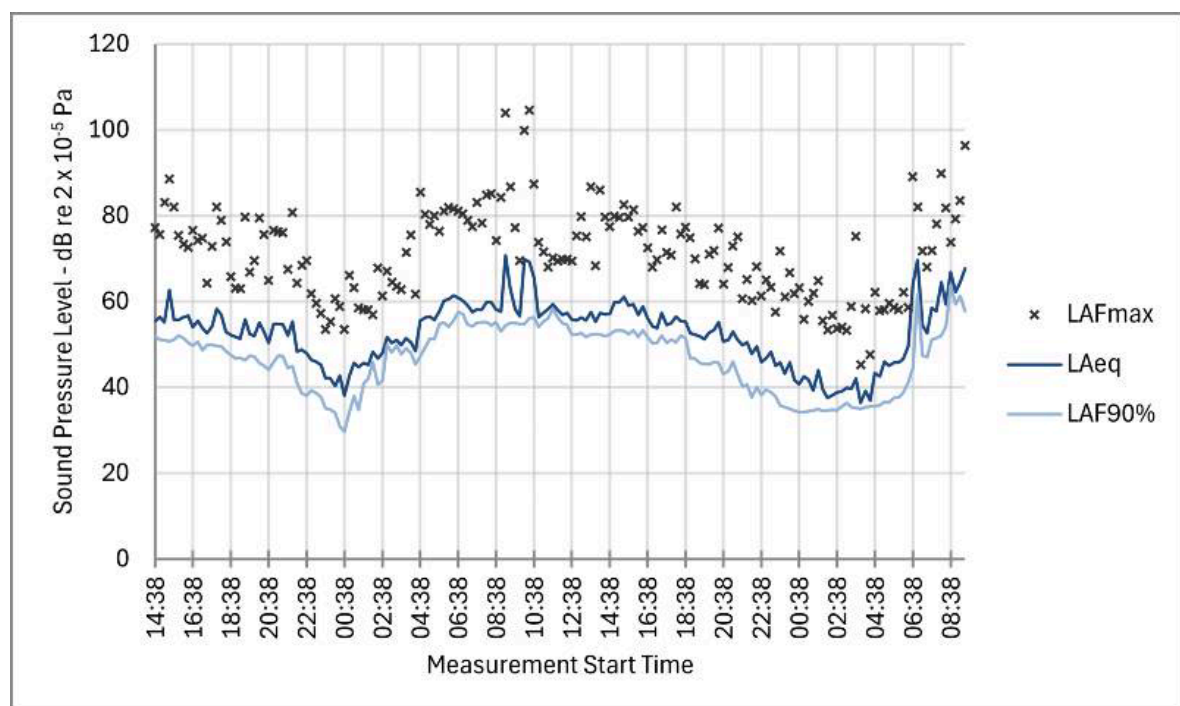


Figure 2: Sound level survey results MP1 – 07/09/2026 to 09/09/2026

In accordance with the methodology set out in BS 4142:2014+A1:2019, the background sound level is not necessarily the lowest recorded value. Instead, the background sound level should be a level which is representative of the underlying soundscape at the receptor location.

There are ongoing construction works on the building during the daytime and therefore these have been discounted from the assessment of representative background sound levels. A statistical analysis of the measured LA90 results during the proposed evening operating times of the plant, when construction works will not influence measured levels, is shown below, following guidance set out in the Standard.

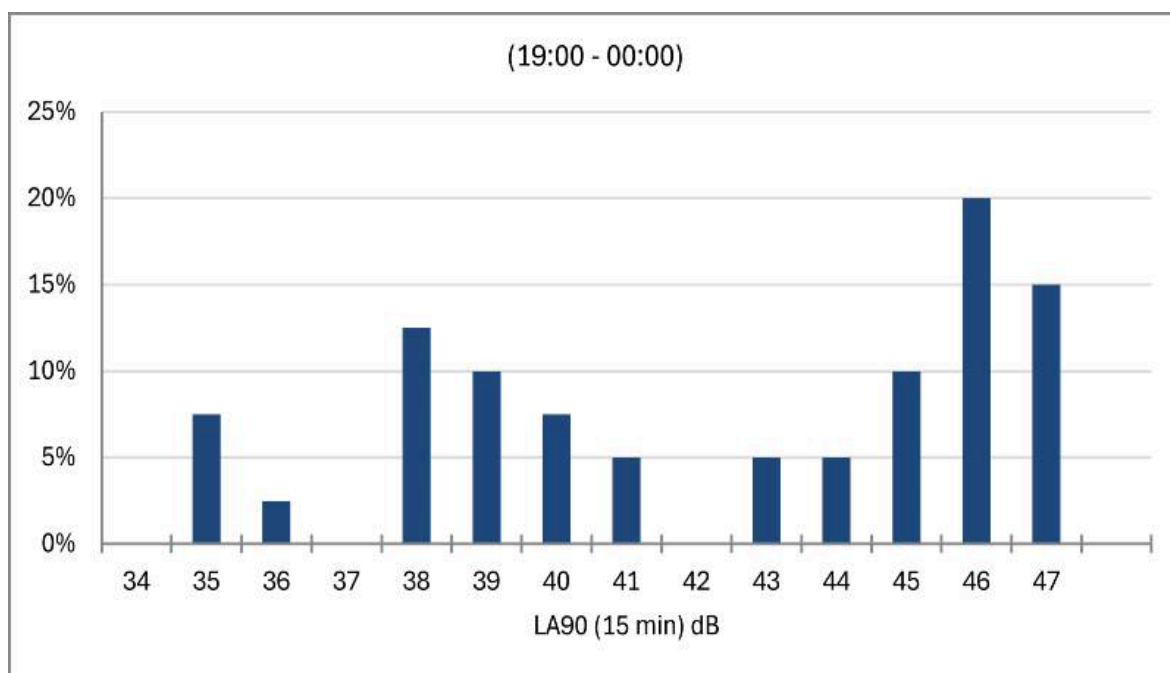


Figure 3: Statistical analysis of measured LA90 sound levels – MP1

Summary results of the survey are provided in Table 4 below.

Receptor	Period	Background Sound Level During Operating Period LA90
NSR1	19:00 to 00:00	46dB

Table 4: Summary sound level survey results

5. ACOUSTIC ASSESSMENT

Confirmation of the equipment models used in the assessment is provided in Table 5 below.

Description	Equipment Model	Airflow (m ³ /s)	Sound Level (L _w A)	Quantity
Pizza Oven Extract	Flakt Woods HT31JM/16/2/5/32	1.1	81dB	1

Table 5: Proposed new mechanical equipment used in the assessment

A computer model has been used to calculate the noise contribution from the proposed plant to outside nearest noise-sensitive windows, using manufacturer's published sound data for the proposed new plant. Ductwork system losses have been calculated in accordance with CIBSE Guide B4 *Noise and vibration control for HVAC*. Environmental corrections have been calculated in accordance with ISO 9613-2.

The assessment has been undertaken using Studio 72's drawing references *AL01* and *AV02*, as provided by the client.

Mitigation recommendations outlined in Section 6 of this report are included in the computer model.

The cumulative calculated specific sound level to outside the most sensitive receptor with all equipment operating is shown in Table 6 below. Summary printouts from the calculation models are included in Appendix A.

Receptor Location	Calculated Specific Sound Level
NSR1	37dBA

Table 6: Calculated cumulative equipment sound levels at 1m outside noise-sensitive windows

Assessment of the calculated rating level to NSR1 for the cumulative impact of all equipment, in accordance with BS 4142:2014+A1:2019, is provided in Table 7 below.

Description	NSR1 Receptor	Relevant Clause	Commentary
Calculated specific sound level to receptor	LAeq 37dB	7.1 7.3.6	New equipment operating. Refer to calculation sheets in Appendix A.
Background sound level	LA90 46dB	8.1.3 8.3	Measured representative background sound level.
Acoustic feature correction	+3dB	9.2	The calculated specific sound levels do not indicate any tonal component and the fan will not be intermittent. However, an axial fan may exhibit distinguishable characteristics and therefore a 3dB penalty has been applied.
Rating level	LAr 40dB	9.2	
Excess of rating level over background sound level	-6dB	11	Assessment indicates a low likelihood of adverse impact

Table 7: Assessment of results in accordance with BS 4142:2014+A1:2019 for all equipment operating

The table above shows the rating level of the proposed new equipment will be at least 6dB below the background LA90 sound level to outside the closest noise-sensitive properties and is therefore compliant with the requirements of Wiltshire Council.

BS 4142:2014+A1:2019 requires an assessment to consider the context of the development, rather than simply adhering to numerical values. Considering the calculated numerical value of the specific sound, allowing a reduction through partially open windows of 15dBA, as recommended in BS 8233:2014, the sound levels inside the neighbouring dwellings due to the proposed new equipment will be 22dBA. This is significantly below the guideline levels for sleeping in bedrooms of LAeq 30dB, set out in BS 8233:2014 and is further confirmation that sound levels from the new mechanical equipment should not be detrimental to the amenity of any noise-sensitive receptors in the vicinity.

The author considers that the context of the assessment does not alter the initial estimate of the impact, and that sound levels from the new mechanical equipment should not be detrimental to the amenity of any residential occupiers in the vicinity.

6. ACOUSTIC MITIGATION TREATMENTS

As discussed in Section 5, noise control treatments have been included in the calculation model. Acoustic specification for the mitigation scheme is provided below.

6.1. Duct Mounted Attenuators

The calculation model includes benefit of a duct-mounted attenuator to the atmospheric side of the fan. Schedule of minimum dynamic insertion loss performance for the attenuator along with description of typical silencer to comply with the specified performance is provided in Appendix B.

Note that the dimensions and free area shown are nominal and the successful supplier should confirm their own selections to meet the minimum specified insertion loss performance.

It is important airflow generated noise from the atmospheric terminal does not increase the cumulative sound level at nearby noise-sensitive properties. Suitable airflow velocity is dependent on the profile of the terminal used and should be verified with the manufacturer accordingly.

6.2. Vibration Isolators

To control the potential for structure-borne noise and vibration from the mechanical equipment affecting adjoining residential and commercial occupants, it is recommended that the plant is installed on vibration isolators.

Vibration isolators for the fan would typically be steel spring type mounts. The isolator supplier would be able to select a suitable model to provide minimum 98% isolation efficiency at the working load and operating speed. Flexible connections should be fitted between the fan and adjoining ductwork both sides.

7. CONCLUSION

A planning application is to be submitted for the installation of new mechanical plant and equipment associated with a new pizza restaurant at 14 Minster Street, Salisbury.

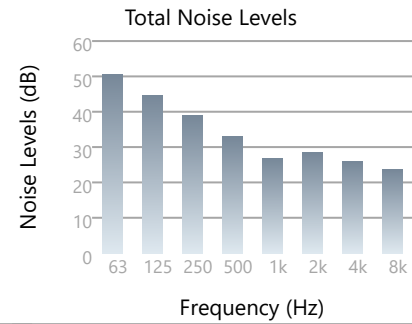
ACA Acoustics have undertaken an assessment of noise from the proposed equipment using manufacturer's published acoustic data. Calculated rating levels for the plant will be at least 5dB below the background sound level during proposed operating times of the equipment when assessed at 1m from the closest noise-sensitive receptor.

The author considers that allowing for the proposed mitigation scheme in this report, the proposed equipment achieves the Local Authority's planning requirements for this development and will not be detrimental to the amenity of nearby noise-sensitive occupant.

Appendix A

Acoustic Calculations

Project Name	Rudy's, Minster Street, Salisbury
Project Reference	260826
Reference	NSR1
Description	Upper Floor Apartments
Noise Limit	41
dBA	37



Calculated Lp at Receptor

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
EF1 Exhaust	1	50	45	39	33	27	28	26	24

260826-ER-1

Calculation Sheet

EF1 Exhaust to NSR1

	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Noise Source								
Noise Source - EF1 Exhaust								
Sound Power Levels	78.0	75.0	74.0	77.0	77.0	75.0	71.0	64.0
Silencer								
	-4.0	-8.0	-13.0	-20.0	-22.9	-16.0	-14.0	-9.0
End Reflection & Directional Directivity								
	-9.0	-6.3	-6.2	-8.2	-11.2	-14.5	-15.0	-15.0
Dc - Reflections & Directivity								
	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Adiv - Geometrical Divergence								
	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5
Aatm - Atmospheric Absorption								
	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.3
Agr - Ground Attenuation								
	3.0	1.4	1.5	1.5	1.5	1.5	1.5	1.5
Abar - Barrier Attenuation								
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
External Receiver								
External Receiver - NSR1								
Sound Pressure, Lp:	50.5	44.7	38.8	32.9	26.9	28.5	26.0	23.7

Appendix B

Noise Control Treatment

Attenuator Schedule

Reference	Location	Description	Insertion Losses (dB)							
			63	125	250	500	1k	2k	4k	8k
ATT1-EF1	EF1 Discharge	900L 50% Free Area c/w/Melindex	4	8	13	20	23	16	14	9

Notes:

1. All dimensions in mm
2. Performance shown as static insertion loss. Dynamic insertion loss performance allowing for airflow generated noise is shown on the relevant calculation sheet.
3. Selections are nominal and the successful supplier should ensure their proposal achieves the minimum required static and dynamic insertion loss performance.