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GRANO SANTO LIMITED

NOISE IMPACT ASSESSMENT REPORT

122 WATER STREET, MANCHESTER M3 4JW

Client: Grano Santo Limited

Report Ref: P9215-R1-V1

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REPORT VERSION CONTROL:

Document Reference	Date	Report Prepared by	Report Checked & Authorised by
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1 INTRODUCTION

1.1 Overview

1.1.1 By instruction from Grano Santo Limited ('the client'), NoiseAir was commissioned to undertake a noise impact assessment (NIA) to support a planning application proposing a change of use from disused warehouse to an artisan bakery with a small retail counter and seating area for café use. This includes the installation of a new kitchen extraction system at 122 Water Street, Manchester M3 4JW, herein referred to as the 'proposed development site'.

1.1.2 General limitations with respect to this NIA are outlined in **Appendix A**.

1.2 Site Description

1.2.1 At the time of writing, the proposed development site is currently a vacant commercial plot which is situated underneath the Manchester train line. It is located in a mixed-use area to the west of central Manchester by the river Irwell. Land usage in the area comprises a mix of residential buildings to the front façade of the site and commercial use buildings to the rear.

1.2.2 The site is situated near Water Street and Liverpool Road. Traffic noise from these roads constitutes the primary noise source in the local area.

1.2.3 The closest identified noise sensitive receptors include the flats which lie directly North of the development site.

1.2.4 **Figure 1** presents a site ariel photograph of the development site with respect to the local area and its context.

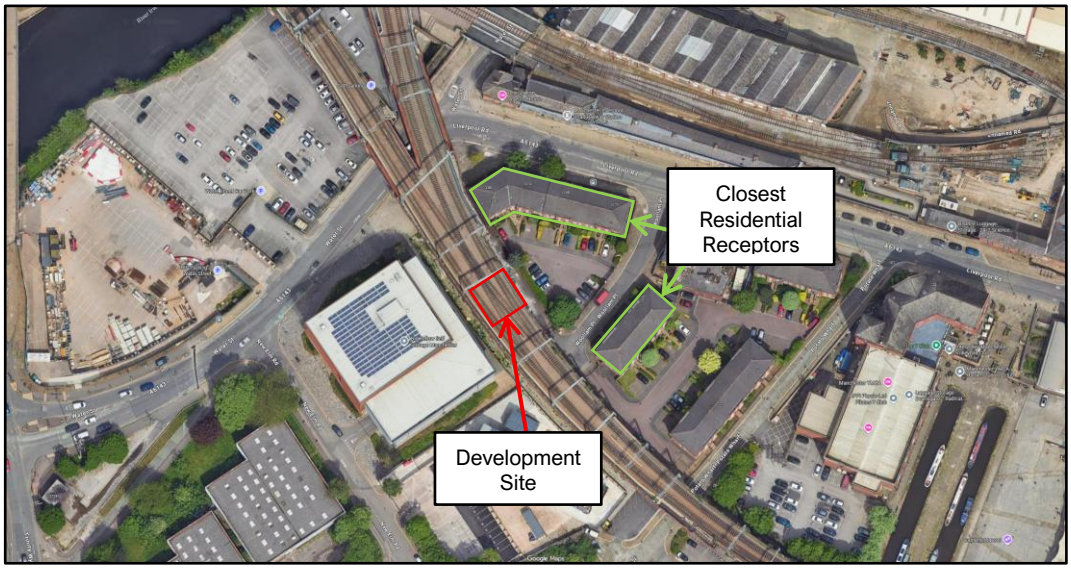


Figure 1: Site Ariel Photograph.

1.3 Development Proposals

1.3.1 At the time of writing, proposals outline the change of use from disused warehouse to an artisan bakery with a small retail counter and seating area for café use. This includes the installation of a new kitchen extraction system to the rear of the development site.

1.3.2 The floor plans and elevations are shown in **Figure 2**.



Figure 2: Floor Plans & Elevations

1.3.3 At the time of writing, the client has not provided any information about the kitchen extraction system to be installed at the site. Therefore, this report aims to set out plant noise limits based on the background noise environment in order to ensure that a **'low impact'** is maintained to nearby receiver façades.

2 RELEVANT GUIDANCE

2.1 British Standard 4142:2014+A1:2019

2.1.1 British Standard 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound, sets the methodology for rating and assessing sound of an industrial and commercial nature, which includes sound from fixed installations such as mechanical and electrical plant and equipment.

2.1.2 In BS 4142:2014+A1:2019, a noise rating is determined and compared with the existing local background sound level based on several more cumulative acoustic feature corrections to apply where appropriate. For example, if the noise includes a distinguishable tone, impulse, intermittency or other readily distinguishable sound characteristic, then additional cumulative penalties individually ranging from 0 to 9 dB may be applied depending on the type of noise.

2.1.3 BS 4142:2014+A1:2019 seeks to determine a “representative” background sound level, stating that “…the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods”.

2.1.4 The assessment of the impact depends upon the margin by which the rating level of the specific sound source exceeds the background sound level but also promotes a consideration of the context in which the sound occurs when making an assessment. BS 4142:2014+A1:2019 states that an initial estimate of the impact of the specific sound is made by subtracting the measured background sound level from the rating level, while considering the following points:

- Typically, the greater this difference, the greater the magnitude of the impact;
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and,
- 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.

2.1.5 Therefore, a BS 4142:2014 assessment may deduce a low impact where the specific sound level is below the background sound level.

3 ACOUSTIC SURVEY

3.1 Noise Monitoring

3.1.1 NoiseAir conducted unattended noise monitoring from the 19th of September 2025 to the 22nd of September 2025 at the development site. Unattended noise monitoring was undertaken at the monitoring location ML1 as presented in **Figure 3**.

3.1.2 The SLM was placed approximately 2 m above local ground level and is deemed representative of typical background noise levels at the nearby residential receptors.

3.1.3 The SLM was placed away from any reflective surfaces, and all measurements are considered to be equivalent to free-field values.

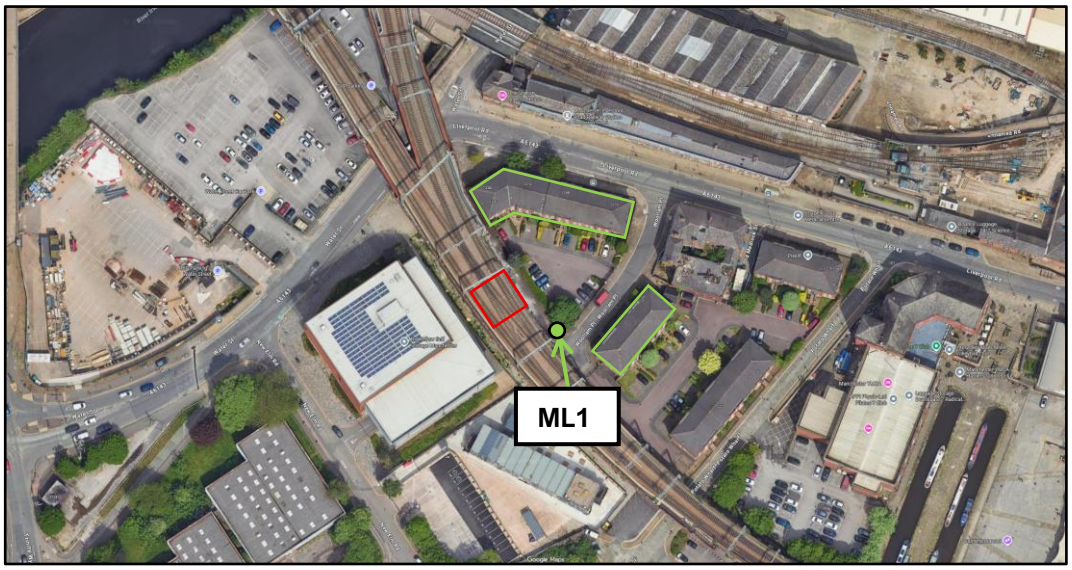


Figure 3: Approximate noise monitoring location

3.1.4 The noise measurements were made using a Class 1, integrating sound level meter (SLM).

3.1.5 The acoustic equipment was calibrated to comply with Section 4.2 of BS 7445-1:2003[1], before and after the noise monitoring periods. The results are summarised in **Table 1**.

Table 1: Summary of SLM used for survey and associated field calibration

SLM (Serial No.)	Preamp (Serial No.)	Microphone (Serial No.)	Calibrator (Serial No.)	Start Calibration	End Calibration	Drift
NOR 140 (1405677)	NOR 1209 (12308)	NOR 1225 (33192)	B&K 4231 (2482550)	-26.0	-25.7	0.3

3.1.6 The weather conditions were noted to be as outlined in **Table 2** during the site visits at the start and end of the monitoring period.

[1] BS 7445-2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures.

Table 2: Summary of Weather Conditions Noted at the Start and End of the Monitoring Duration.		
	19th September 2025	22nd September 2025
Roads (Wet / Dry)	Dry	Dry
Temperature (˚C)	16	10
Wind direction and speed (ms^{-1})	4.5 NW	1 NW
Cloud Cover (Approx. %)	100	0
Humidity (%)	64	71

3.2 Measured Sound Levels

3.2.1 The data shown in **Figure 4** details a level vs time graph of the recorded L_{Amax}, L_{Aeq} and L_{A90} sound levels over 15-minute time periods for the entire measurement duration at ML1.

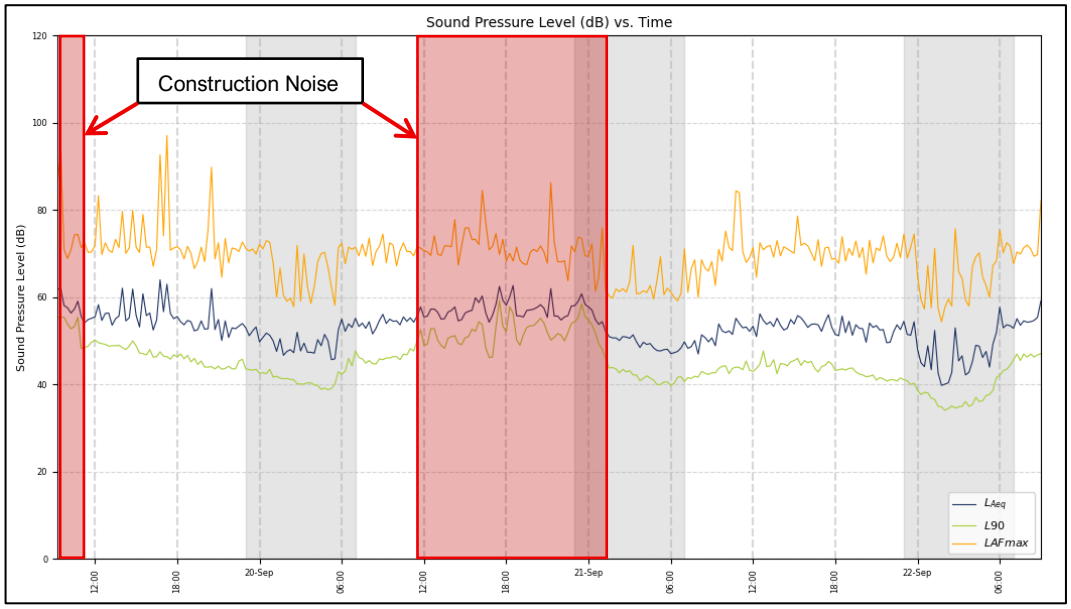


Figure 4: Level vs. time graph showing L_{Amax}, L_{Aeq} and L_{A90} sound levels – ML1

3.2.2 Construction noise has identified at the beginning of the assessment, as well as on the 20th of September has been excluded to ensure a representative dataset for the analysis of the background noise environment. This approach also provides a conservative assessment of background noise levels.

3.2.3 The results for each of the monitoring locations during the daytime and night-time periods are presented in **Table 3** below.

Table 3: Average Measured Daytime and Night-time Noise Levels		
Monitoring Location	Time	Measured Noise Level
		dB $L_{Aeq,T}$ / dB $L_{Aeq,T}$
ML1	17:45-23:00	53.1 – 56.9
	23:00-23:45	49.6 – 50.7

3.3 Background Sound Levels

3.3.1 The client has advised that the proposed opening hours for the sandwich bar will be limited to daytime only. Accordingly, the noise impact assessment has focused exclusively on daytime periods.

3.3.2 A histogram showing the distribution of existing $L_{A90,15min}$ sound levels at ML1 for the daytime and night-time periods over the entire measurement duration is presented in **Figure 5** and **Figure 6** below.

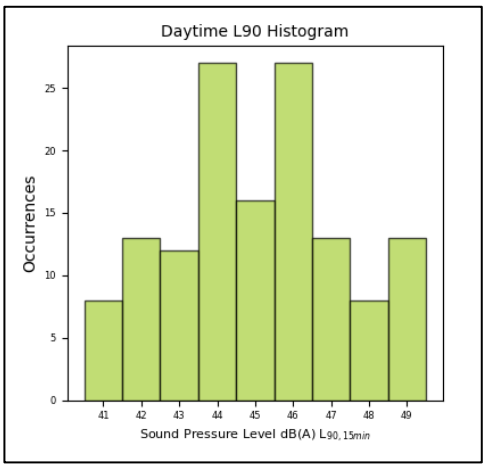


Figure 5: $L_{A90,15mins}$ noise readings at ML1 Daytime.

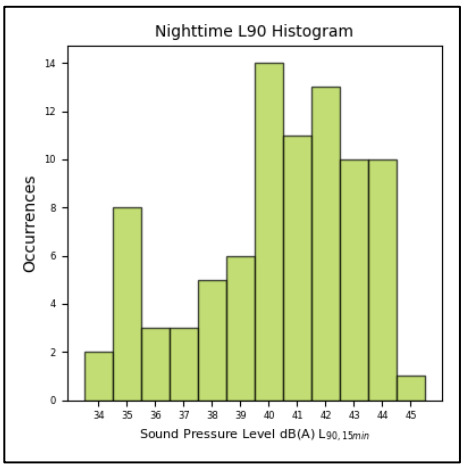


Figure 6: $L_{A90,15mins}$ noise readings at ML1 Night-time.

3.3.3 For ML1, L_{A90} background sound levels of 44 dB(A) and 35 dB(A) have been adopted for the daytime and night-time periods respectively.

4 3D SOUND MODEL

4.1 Overview

4.1.1 3D sound models have been constructed in SoundPLAN™ to calculate the predicted sound pressure levels at selected potential receiver facades. The model uses the calculation method from ISO 9613-2:1996[2] to account for the distance between the source and receiver and any screening or reflections provided by the surrounding buildings.

4.2 3D Sound Model

4.2.1 A 3D sound model has been developed using measurements from a kitchen extraction system previously assessed by NoiseAir. These measurements are considered representative of the typical acoustic profile associated with such systems.

4.2.2 **Table 4** presents the measured noise levels across octave frequency bands for a typical kitchen extraction system.

Table 4: Kitchen Extraction System – Measured Noise Levels dB L_p

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Broadband Level dB(A)
48	55	59	63	65	65	60	52	70

4.2.3 These measured levels have been converted to representative sound power of **78 dB(A)** and subsequently used to assess the potential noise impact.

4.2.4 A noise contour plot illustrating the propagation of the sound from source to receptor is given in **Figure 7**.

[2] ISO9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"

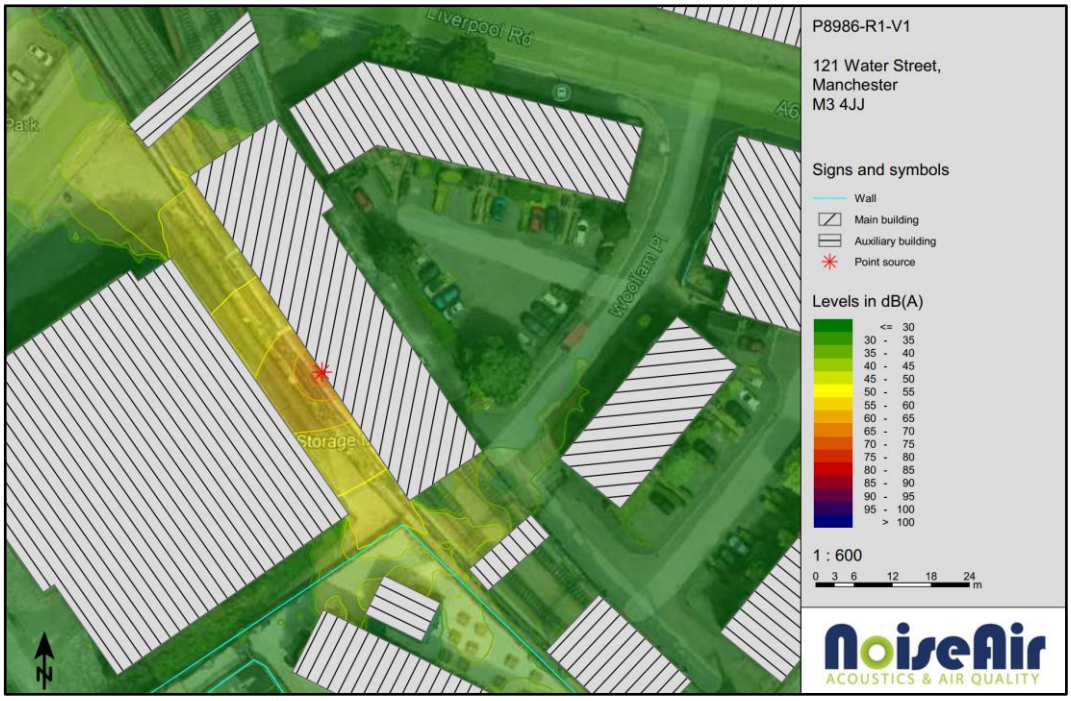


Figure 7: Noise contour plot

4.2.5 Receptor locations used in the noise model are presented below in **Figure 8**.

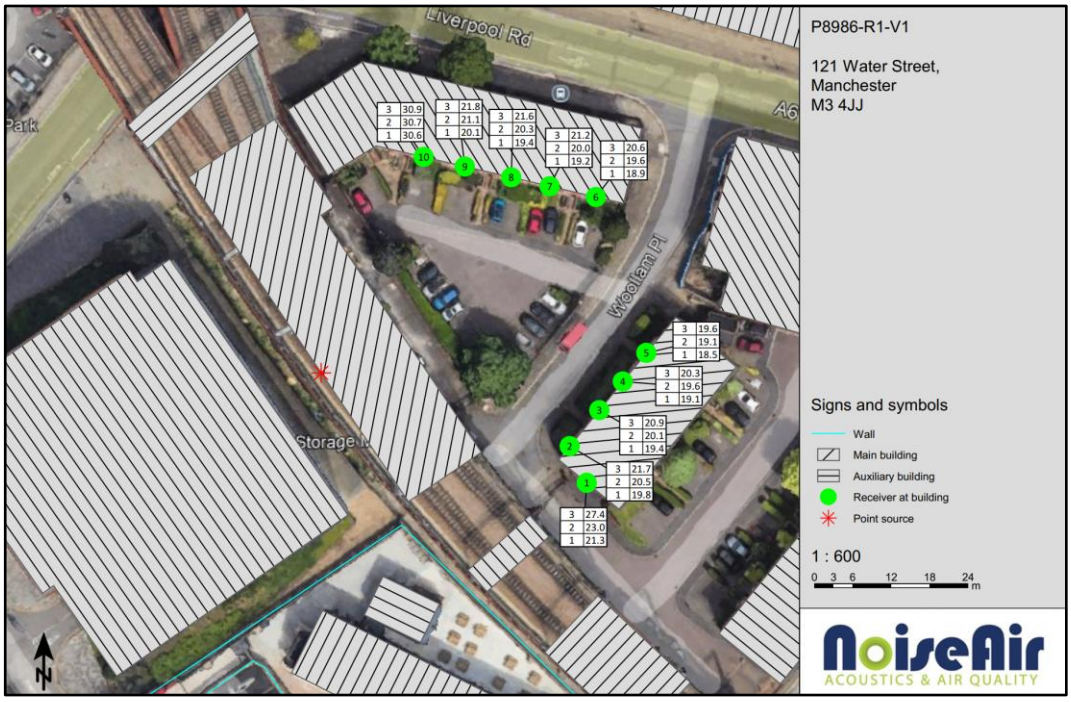


Figure 8*:* Illustration of the 3D sound model Receptor Locations

4.2.6 **Table 5** details the predicted noise levels as calculated at the nearby noise sensitive receptors.

Table 5: Predicted Receptor Noise Levels			
Receptor Number	**dB $L_{Aeq,T}$**		
	GF	**1.FL**	**2.FL**
1	21.3	23.0	27.4
2	19.8	20.5	21.7
3	19.4	20.1	20.9
4	19.1	19.6	20.3
5	18.5	19.1	19.6
6	18.9	19.6	20.6
7	19.2	20.0	21.2
8	19.4	20.3	21.6
9	20.1	21.1	21.8
10	30.6	30.7	30.9

5 BS 4142:2014 + A1:2019 ASSESSMENT

5.1 Overview

5.1.1 A BS 4142:2014 assessment has been undertaken considering noise breakout from the proposed kitchen extraction system with respect to the closest identified noise sensitive receptors in the local area. The assessment has been undertaken for daytime periods only.

5.2 Background Sound Level

5.2.1 For ML1, an L_{A90} background sound level of 44 dB(A) has been adopted for the daytime.

5.3 Specific Sound Level

5.3.1 The worst-case specific sound level calculated to nearby receiver façades is 31 dB(A).

5.4 Character Corrections

5.4.1 Character Corrections applied to the Specific Sound Level are outlined below.

- **Tonality**: +2 dB(A) has been applied based on subjective determination that kitchen extracts have the potential to have modest tones at mid band and low frequencies, however due to the large distance between sound source and receptor, such character will likely be reduced to 'just perceptible' at worst.
- **Intermittency**: No correction for intermittency has been applied.
- **Impulsivity**: No correction for impulsivity has been applied.

5.5 Initial Assessment

5.5.1 The BS 4142:2014 initial assessment for the calculated noise breakout levels for all noise sources is presented in **Table 6**.

Table 6: BS 4142:2014 Assessment to Determine the Likelihood of Adverse Impacts on the Worst Affected Noise Sensitive Receptors dB(A)

Quantity	Daytime	Night-time
Specific Sound Level	31	
Acoustic Feature Correction	+2	
Rating Level	33	33
Background Sound Level dB L_{A90}	44	34
Excess of Rating Level over Background Sound Level	**-11**	**-1**
Initial Indication of Potential Impact	**Low Impact**	

5.6 BS 4142:2014 Assessment and Context

5.6.1 The initial assessment demonstrated that, if a broadband sound pressure level of 31 dB(A) is maintained to nearby receiver façades, then a **'low impact'** is likely to nearby residential receptors for both daytime and night-time periods.

5.6.2 The proposed flue termination point is located at the rear of the development site, facing away from residential properties and benefitting from additional screening provided by the existing railway line structure.

5.6.3 3D noise modelling demonstrates that, with a sound power level of 81 dB(A) at the flue termination point, the predicted noise levels at the façades of nearby residential properties will likely comply with the 31 dB(A) criterion.

5.7 Plant Noise Limits & Recommendations

5.7.1 Based on the above, it is recommended that the kitchen extraction system to be installed at the development site be designed and sited as to not exceed a specific noise level of 31 dB(A) as measured at the nearest noise sensitive receptor (NSR).

5.7.2 Alternatively, compliance can be demonstrated by ensuring that the sound power level at the flue termination point does not exceed 81 dB(A).

5.7.3 It is recommended that any future mechanical plant to be installed at the site should be located to the rear façade and adhere to the same noise limits as outlined above.

5.8 Uncertainty

5.8.1 Uncertainty of measurements can have a significant effect on the outcome and findings of an assessment and therefore such constraints are documented and discussed below.

5.8.2 The SLM used was a Norsonic Class 1 SLM, it is generally recognised that Class 1 SLM's offer an uncertainty of ±1.0 dB. The instrumentation used for the survey has been calibrated by UKAS approved laboratories.

5.8.3 The sound levels measured (which include busier and quieter periods) are considered typical for the area.

5.8.4 Wind speeds during the survey visits were typically less than 5 ms-1 and the effect of wind generated noise is not considered to have a significant impact on this assessment.

5.8.5 It is therefore considered that, in this instance, the uncertainty of the calculations is not likely to have any influence on the outcome of the assessment.

6 CONCLUSIONS

6.1 Overview

6.1.1 By instruction from Grano Santo Limited, NoiseAir was commissioned to undertake a noise impact assessment in order support a planning proposing a change of use from disused warehouse to an artisan bakery with a small retail counter and seating area for café use. This includes the installation of a new kitchen extraction system at 122 Water Street, Manchester M3 4JW.

6.1.2 An unattended noise survey was conducted at the site from the on the 19th of September 2025 to the 22nd of September 2025 in order to establish the existing ambient sound environment at the development site and determine a representative background sound level.

6.2 Conclusions

6.2.1 A BS 4142:2014 assessment has been undertaken in order to ascertain the likelihood of adverse impact due to mechanical noise breakout from proposed kitchen extraction system to nearby noise sensitive receptors and establish plant noise limits.

6.2.2 Given a character correction of +2 for tonality, the kitchen extraction system associated with the development site should not exceed a specific noise level of 31 dB(A) as measured at the nearest noise sensitive receptor (NSR).

6.2.3 The initial assessment indicates that this will likely achieve a **'low impact'** during both the daytime and night-time periods.

6.2.4 Alternatively, compliance can be demonstrated by ensuring that the sound power level at the flue termination point does not exceed 81 dB(A).

6.2.5 It is recommended that any future mechanical plant to be installed at the site should be located to the rear façade and adhere to the same noise limits as outlined above.

APPENDIX A - REPORT LIMITATIONS

This Report is presented to Grano Santo Limited and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this report.

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APPENDIX B – GLOSSARY

A-weighted sound pressure, p_A	Value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network. *NOTE: The A-weighting network modifies the electrical response of a sound level meter with frequency in approximately the same way as the sensitivity of the human hearing system.*
A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure in decibels (dBA).
Acoustic environment	Sound from all sound sources as modified by the environment [BS ISO 12913-1:2013].
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. *NOTE: The ambient sound comprises the residual sound and the specific sound when present.*
Ambient sound level, $L_a = L_{Aeq,T}$ (BS 4142:2014)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T *NOTE: The ambient sound level is a measure of the residual sound and the specific sound when present.*
Background sound	Underlying level of sound over a period, *T*, which might in part be an indication of relative quietness at a given location.
Background sound level, $L_{A90,T}$ (BS 4142:2014)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Break-in	Noise transmission into a structure from outside.
Break-out	Noise transmission from inside a structure to the outside.
Cross-talk	Noise transmission between one room and another room or space via a duct or other path.
C_{tr}	Correction term applied against the sound insulation single-number values (R_w, D_w, and $D_{nT,w}$) to provide a weighting against low frequency performance. *NOTE: The reference values used within the C_{tr} calculation are based on urban traffic noise.*
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared sound pressure as the sound under consideration that varies with time.
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ (BS 4142:2014)	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time.
Equivalent sound absorption area of a room, A	Hypothetical area of a totally absorbing surface without diffraction effects, expressed in square metres (m2), which, if it were the only absorbing element in the room, would give the same reverberation time as the room under consideration
Facade level	Sound pressure level 1 m in front of the façade. *NOTE: Facade level measurements of L_{pA} are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the facade.*
Free-field level	Sound pressure level away from reflecting surfaces. *NOTE: Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the*

	source). Estimates of noise from aircraft overhead usually include a correction of 2 dB to allow for reflections from the ground.
Impact sound pressure level, L_i	Average sound pressure level in a specific frequency band in a room below a floor when it is excited by a standard tapping machine or equivalent.
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants. *NOTE: The location(s) within the room at which the ambient indoor noise is to be measured or calculated ought to be considered.*
Measurement time interval, T_m (BS 4142:2014)	Total time over which measurements are taken. *NOTE: This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.*
Noise criteria	Numerical indices used to define design goals in a given space.
Noise rating, NR	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves.
Normalised impact sound pressure level, L_n	Impact sound pressure level normalized for a standard absorption area in the receiving room. *NOTE: Normalised impact sound pressure level is usually used to characterize the insulation of a floor in a laboratory against impact sound in a stated frequency band.*
Octave band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit.
Percentile level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting "F," which is exceeded for *N*% of a specified time interval.
Reference time interval, T_r (BS 4142:2014)	Specified interval over which the specific sound level is determined. *NOTE: This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h.*
Residual sound (BS 4142:2014)	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual sound level, $L_r = L_{Aeq,T}$ (BS 4142:2014)	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
Rating level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise. *NOTE: This is used in BS 7445 and BS 4142 for rating industrial noise, where the noise is the specific noise from the source under investigation.*
Reverberation time, *T*	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped.
Sound exposure level, *L*AE	Level of a sound, of 1 s duration, which has the same sound energy as the actual noise event considered.
Sound level difference, *D*	Difference between the sound pressure level in the source room and the sound pressure level in the receiving room.
Sound pressure, *p*	Root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound.

Sound pressure level, L_p	Quantity of sound pressure, in decibels (dB).
Sound reduction index, *R*	Laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.
Specific sound level, $L_s = L_{Aeq,Tr}$ (BS 4142:2014)	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
Specific sound source (BS 4142:2014)	Sound source being assessed.
Standardised impact sound pressure level, L'_{nT}	Impact sound pressure level normalized to a reverberation time in the receiving room of 0.5 s.
Standardised level difference, D_{nT}	Difference in sound level between a pair of rooms, in a stated frequency band, normalized to a reference reverberation time of 0.5 s for dwellings.
Ground borne noise	Audible noise caused by the vibration of elements of a structure, for which the vibration propagation path from the source is partially or wholly through the ground. *NOTE Common sources of ground-borne noise include railways and heavy construction work on adjacent construction sites.*
Structure-borne noise	Audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements. *NOTE Common sources of structure-borne noise include building services plant, manufacturing machinery and construction or demolition of the structure.*
Third octave band	Band of frequencies in which the upper limit of the band is 2% times the frequency of the lower limit.
Weighted level difference, D_w	Single-number quantity that characterizes airborne sound insulation between rooms, but which is not adjusted to reference conditions. *NOTE Weighted level difference is used to characterize the insulation between rooms in a building as they are. Values cannot normally be compared with measurements made under other conditions (see BS EN ISO 717-1).*
Weighted normalised impact sound pressure level, $L'_{n,w}$	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or
Weighted standardised impact sound pressure level $L'_{nT,w}$	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Weighted standardised level difference, $D_{nT,w}$	Single-number quantity that characterizes the airborne sound insulation between rooms.

Symbols

D_w	Weighted level difference (dB)
D_{nT}	Standardized level difference (dB)
$D_{nT,w}$	Weighted standardized level difference (dB)
L_{Amax}	Maximum noise level (dB)
$L_{Ar,Tr}$	Rating level (dB)
L_n	Normalised impact sound pressure level (dB)
L'_{nT}	Standardised impact sound pressure level (dB)
$L'_{nT,w}$	Weighted standardised impact sound pressure level (dB)
$L'_{n,w}$	Weighted normalised impact sound pressure level (dB)
L_p	Sound pressure level (dB)
L_{pA}	A-weighted sound pressure level (dB)
$L_{AN,T}$	Percentile level (dB)
L_{AE}	Sound exposure level (dB)
$LAeq,T$	Equivalent continuous A-weighted sound pressure level (dB)
p	Sound pressure (Pa)
p_A	A-weighted sound pressure (dB)
$p_{A(t)}$	Instantaneous A-weighted sound pressure (Pa)

R	Sound reduction index (dB)
R_w	Weighted sound reduction index (dB)
T	Time interval (also used for reverberation time) (s)
t_0	Reference time interval (s)

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