PROFESSIONAL CONSULT
FUTURE ENVIRONMENTS

NOISE IMPACT ASSESSMENT

Proposed Mixed-use Development

Lane End Rd, Burnage

Issue Date: 29th January 2026

QUALITY ASSURANCE & REPORT INFORMATION

Report Version	R5	R5	R6	R7
Prepared by	John Goodwin MIOA	John Goodwin MIOA	John Goodwin MIOA	John Goodwin MIOA
Position	Director	Director	Director	Director
Reviewed by	Martyn Parker MIOA	Martyn Parker MIOA	Martyn Parker MIOA	Martyn Parker MIOA
Position	Principal Consultant	Principal Consultant	Principal Consultant	Principal Consultant
Issue Date	7 April 2025	7th April 2025	14th January 2026	29th January 2026
Comments	Planning comments	Update to Layout	Update to Layout	Update to Layout

Project: Proposed Mixed-use Development

Client: Magnitude Construction Consultants

Reference: 23.042.1.R7

This report has been prepared by Professional Consult Limited in accordance with the agreed terms and conditions of the appointment. Professional Consult Limited cannot accept any responsibility for use of, or reliance on, the contents of this report by any third party.

Professional Consult Limited is registered in England (11635570). Registered Office: 534 Edenfield Road, Rochdale, Lancashire OL12 7QJ

Professional Consult Limited

hello@professionalconsult.co.uk
www.professionalconsult.co.uk



EXECUTIVE SUMMARY

This Assessment has shown that, with regards to road traffic using the A34, internal noise levels within habitable rooms can be controlled through use of standard thermal glazing, upgraded glazing and various grades of alternative ventilation for various plots.

This Assessment has set mechanical and electrical plant noise emission limits, applicable for the closest residential dwellings, for any noise associated with any plant installed as part of the ground floor commercial use.

The future noise climate at the Development can be controlled through appropriate noise mitigation measures to meet acceptable noise levels in both internal and external amenity areas which will accord with the 'No Observed Adverse Effect Level' as detailed in the noise exposure hierarchy table as detailed in the PPG and as such, noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

TABLE OF CONTENTS

1	**INTRODUCTION**	**3**
2	**POLICY & GUIDANCE**	**4**
3	**NOISE SURVEYS**	**13**
4	**NOISE IMPACT ASSESSMENT**	**15**
5	**MITIGATION**	**18**
6	**CONCLUSION**	**19**
APPENDIX 1:	**LIMITATIONS**	**20**
APPENDIX 2:	**GLOSSARY OF ACOUSTIC TERMINOLOGY**	**21**
APPENDIX 3:	**SITE LOCATION PLAN**	**23**
APPENDIX 4:	**DAYTIME GRID NOISE MAP – ROAD TRAFFIC**	**24**
APPENDIX 5:	**NIGHT-TIME GRID NOISE MAP – ROAD TRAFFIC**	**25**
APPENDIX 7:	**DAYTIME FAÇADE NOISE LEVELS – ROAD TRAFFIC**	**26**
APPENDIX 8:	**NIGHT-TIME FAÇADE NOISE LEVELS – ROAD TRAFFIC**	**28**
APPENDIX 9:	**EXAMPLE ALTERNATIVE VENTILATION SYSTEMS**	**30**

1 INTRODUCTION

1.1 Appointment

1.1.1 Professional Consult Limited was instructed by Magnitude Construction Consultants to prepare a Noise Impact Assessment ('the Assessment') in support of a proposed mixed-use development ('the Development') on a parcel of land located off Lane End Road in Burnage, to be referred to hereafter as 'the Site'.

1.2 Purpose of Assessment

1.2.1 As the Development is both noise-sensitive and potentially noise-generating, it is expected that Manchester City Council will require a Noise Impact Assessment to accompany the scheme planning application.

1.2.2 Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts.

1.2.3 All acronyms used within this report are defined in the Glossary presented in Appendix 2.

1.3 The Development

1.3.1 The description of development is as follows:

1.3.2 The proposals comprise the demolition of existing structures and the subsequent construction of a residential-led, mixed use 4-storey development. This will comprise 56 apartments and four ground floor retail units, with associated landscaping and parking. The development description is as follows:

"Demolition of existing buildings and erection of a mixed-use development with retail (Use Class E) at the ground floor and residential development (Use Class C3) and roof terrace above, in addition to car parking, landscaping and associated infrastructure at the site."

1.4 The Site, Locality & Soundscape

1.4.1 The site is located on land off Lane End Road, Burnage, at approximate National Grid Reference (NGR): 385934, 391545. The Site is located in an urban setting and is bound by Lane End Road to the north, a hot-food takeaway and the Kingsway Medical Practice to the east, Fog Lane to the south and the A34 to the west.

1.4.2 To the south of Fog Lane there is an existing 4 storey apartment block. To the east of Burnage Lane there is 3 story apartment block with commercial uses on the ground floor. To the west of A34 and north of Lane End Road there are a number of ground existing shops with residential uses above.

1.4.3 The sound climate at the Site is dominated by road traffic noise associated with vehicles using the A34.

1.5 Limitations

1.5.1 The limitations of this report are presented in Appendix 1.

1.6 Confidentiality

1.6.1 Professional Consult has prepared this report solely for the use of the Client. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Professional Consult; a charge may be levied against such approval.

2 POLICY & GUIDANCE

2.1 National Planning Policy Framework & National Planning Practice Guidance

2.1.1 The Government updated the National Planning Policy Framework (NPPF) on 7th February 2025 and its associated National Planning Practice Guidance (NPPG) on 14th February 2024. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.

2.1.2 The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.

2.1.3 Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

2.1.4 Local planning authorities' plan-making and decision making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

2.1.5 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

2.1.6 The Observed Effect Levels are as follows:

- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

2.1.7 Table 1 summarises the noise exposure hierarchy, based on the likely average response.

Table 1. Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.1.8 The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

2.1.9 These factors include:

- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day - this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

2.1.10 More specific factors to consider when relevant:

- where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being

kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations; and

- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.2 BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Noise Criteria Limits

2.2.1 The scope of this standard is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

2.2.2 The standard suggests suitable internal noise levels within different types of buildings, including dwellings, as shown in Table 2.

Table 2. BS8233:2014 Internal Target Noise Levels

Criterion	Typical Situation	Design $L_{Aeq,T}$ (dB)
Suitable resting / sleeping conditions	Living Room	35
	Bedroom*	30
*For a Reasonable standard in bedrooms at night, individual noise evens (measured with fast time weighting) should not exceed 45dB L_{max}		

2.2.3 BS8233 goes on to recommend noise levels for gardens as follows:

> *"It is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors might be warranted".*

2.2.4 BS8233 goes on to say:

> *"In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited".*

2.2.5 With regards to external noise within balcony areas, BS8233: 2014 provides the following advice:

> *"Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels"*

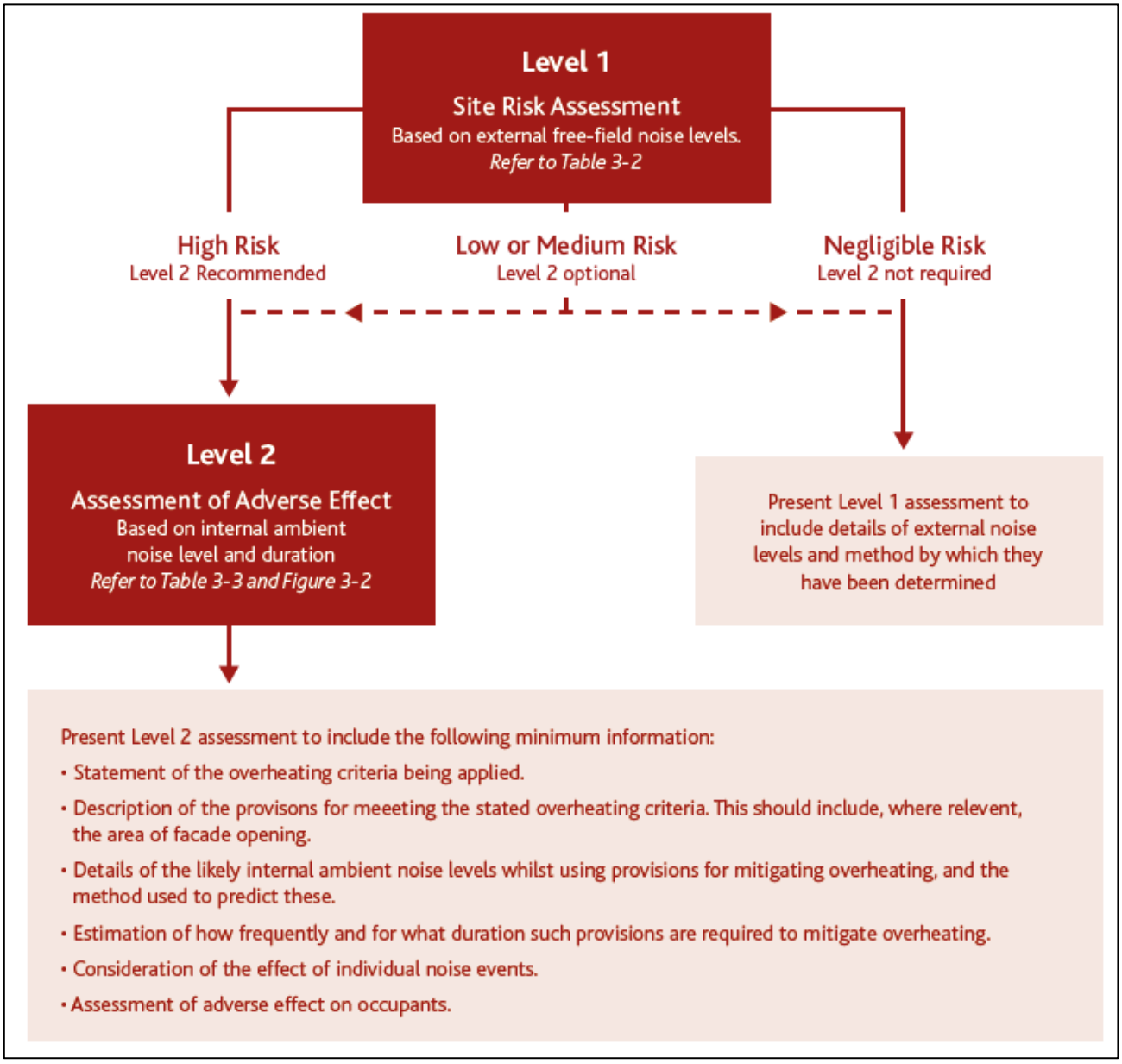
Ventilation Requirements

2.2.6 Where a partially open window cannot be relied upon to provide an adequate level of facade sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS8233 states:

> *"The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.*
>
> *Alternatively, acoustic ventilation units (see 7.7.2 below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans."*
>
> Section 7.7.2 states:
>
> *"NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level."*

2.3 INSTITUTE OF ACOUSTICS AND ASSOCIATION OF NOISE CONSULTANTS (2020) ACOUSTICS VENTILATION & OVERHEATING: RESIDENTIAL DESIGN GUIDE

2.3.1 The Acoustics Ventilation and Overheating (AVO) Residential Design Guide provides an approach as to how the competing aspects of thermal and acoustic comfort can be managed. The AVO Guide aims to assist designers to adopt an integrated approach to the acoustic design within the context of the ventilation and thermal comfort requirements. The AVO Guide provides a method for assessing the impact of opening windows and providing whole house ventilation due to the impact of noise via a two-level noise assessment procedure, as below:



2.3.2 A level 1 risk assessment is based on external free-field noise levels with the assumption of a partially opened window in use for mitigation of overheating. A level 1 assessment is appropriate for scenarios where the risk to a development is deemed 'Negligible'. 'Low' and 'Medium' risk sites only require a level 2 assessment on an optional basis in order to give further confidence in the suitability of internal noise conditions.

2.3.3 The noise levels suggested in Tables 3 and 4 assume steady road traffic noise source but can be adapted for other transport sources.

Table 3. Guidance for Level 1 Site Risk Assessment for Transportation Noise Sources Relating to Overheating Condition

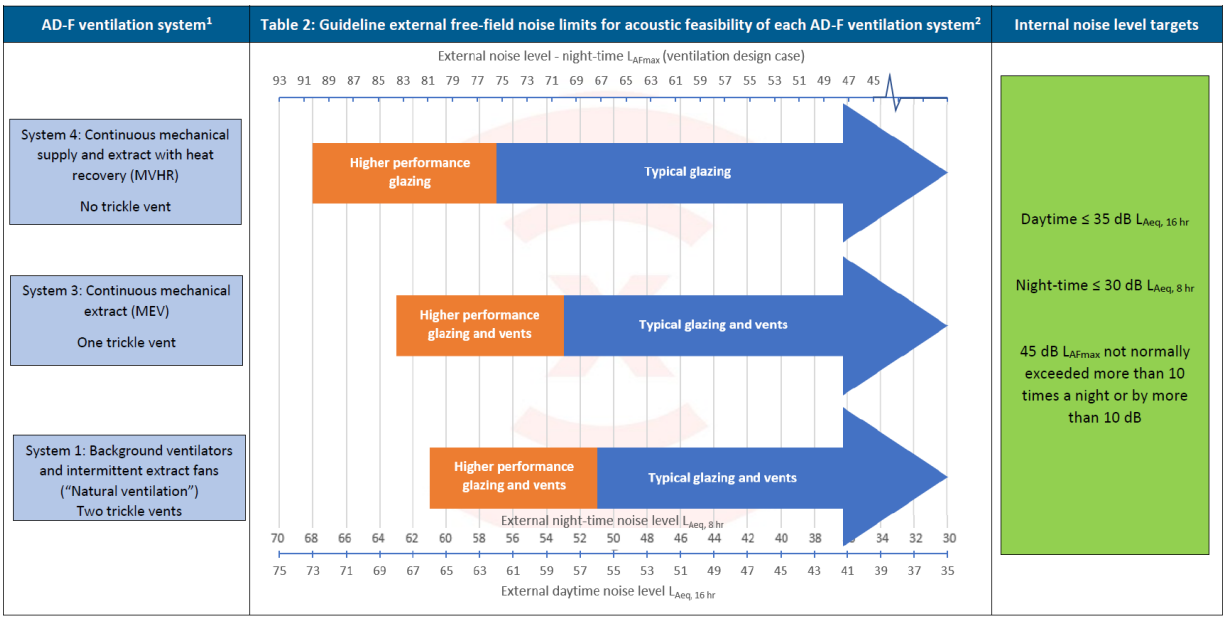
Risk Category for Level 1 Assessment - External		Risk Level	Potential Effect Without Mitigation	Recommendation for Level 2 Assessment
Daytime Noise Level, $L_{Aeq,t}$ (07:00 – 23:00)	Night-time Noise Level, $L_{Aeq,t}$ (23:00 – 07:00)			
≥65dB	≥55dB	High	Increasing risk of adverse effect	Recommended
>55dB & <63dB	>45 & <55dB	Medium		Optional
>50dB & <55dB		Low		
≤50dB	≤45dB	Negligible	Use of opening windows as means of mitigating overheating is not likely to result in in adverse effect	Not required

2.3.4 A level 2 assessment will be carried out when the risk of adverse effect is 'High' or it is deemed appropriate for a 'low' or 'medium' risk site. An increase in internal ambient noise level can cause a change in human behaviour. At high levels this creates situations where occupants can no longer open windows for ventilation due to high external noise levels. A level 2 assessment identifies these situations and allows for appropriate alternative ventilation systems to be recommended.

Table 4. Guidance for Level 2 Assessment of Noise from Transport Noise Sources Relating to Overheating Condition

Internal Ambient Noise Level			Example of Outcome
Daytime $L_{Aeq,t}$ (07:00 – 23:00)	Night-time $L_{Aeq,t}$ (23:00 – 07:00)	Individual Noise Events During 23:00 – 07:00	
>50dB	>42dB	Normally exceeds 65dB $L_{Af,max}$	Noise causes a material change in behaviour eg. having to keep windows closed most of the time
Increasing noise level			Increasing the likelihood of impact on reliable speech communication during the daytime or sleep disturbance at night

2.3.5 The Table below details guideline external free-field noise limits and determines the appropriate AD-F ventilation system (Systems 1 – 4).



Approved Document O of the Building Regulations 2022

2.3.6 This approved document supports Part O of Schedule 1 to the Building Regulations 2010 and took effect on 15th June 2022 for use in England.

2.3.7 Section 3 of the approved document details the requirements for noise ingress into a bedroom and states the following:

> *'In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*
>
> *Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.*
>
> *a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am); and*
> *b. 55dB L_{AFmax}, more than 10 times a night (between 11pm and 7am).'*

2.3.8 The above internal noise criteria levels are higher than those presented in BS8233:2014 and so the trigger point for alternative ventilation for bedrooms, where required, will be dictated primarily by the assessment which considers compliance with the BS8233:2014 internal noise criteria levels. Nevertheless, compliance with the above noise criteria levels will be observed where the internal average and maximum noise levels with a partially open window, or where recommended appropriate alternative ventilation for the bedroom, results in noise levels not exceeding the above noise criteria levels.

2.3.9 With regards to windows being opened, BS8233:2014 refers to a partially open window and so for the purposes of AD-O and Standard Assessment Procedure (SAP) calculations a 'partially open' window should be taken as being 'fully open' for SAP calculations.

2.4 BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

2.4.1 This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and,
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

2.4.2 The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is 'typical.'

2.4.3 The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00 - 23:00): 1 hour; and

- Night-time (23:00 - 07:00): 15 minutes.

2.4.4 There are a number of 'penalties' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subject method):

Tonality

- +2dB: where the tonality is just perceptible;
- +4dB: where the tonality is clearly perceptible; and
- +6dB: where the tonality is highly perceptible.

Impulsivity

- +3dB: where the impulsivity is just perceptible;
- +6dB: where the impulsivity is clearly perceptible; and
- +9dB: where the impulsivity is highly perceptible.

Intermittency

- +3dB: where the intermittency is readily distinctive against the acoustic environment.

2.4.5 Where the assessment is carried out using the objective method, the tonality penalty is either 0dB or 6dB and the impulsivity penalty can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.

2.4.6 In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment.

2.4.7 BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

2.4.8 Assessment of the rating level relative to the background noise level can yield the following commentary:

- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5dB 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

2.4.9 Whilst the amended 2019 Standard does make various references to it not being intended to assess noise impacts at indoor locations, section 1.1 does state 'The methods described in this British Standard use outdoor sound

levels 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'. Example 6 in the Standard states 'In addition to the rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'.

2.4.10 With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts at the building façade do not give rise to internal noise level which causes sleep disturbance in bedrooms, this Assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

2.5 Local Authority Guidance and Criteria – Manchester City Council's Environmental Health Department

2.5.1 Consultation was provided to Manchester City Council on 20th March 2024, which stated:

'We have been appointed by a client to undertake a Noise Impact Assessment in support of a proposed mixed-use development at Lane End Rd in Burnage to be referred to hereafter as 'the Site'.

Professional Consult will complete the following noise measurements:

- *Road Traffic Noise Survey: A road traffic noise measurement will be completed for the A34 in line with the guidance presented in Calculation of Road Traffic Noise during a weekday period;*
- *Commercial Noise Survey: A series of noise measurements will be taken for any noise associated with the neighbouring takeaways; and*
- *Background Sound Survey: A background sound survey will be completed in the absence of any commercial sound.*

Professional Consult will complete the following assessments:

- *Commercial Noise: The measured noise levels will be assessed in line with the guidance presented in BS4142:2014+A1:2019; and*
- *Road Traffic Noise: The measured road traffic noise levels from the A34 will be assessed in line with the noise criteria presented in BS8233:2014.*

Where exceedances of any criteria are identified Professional Consult will recommend appropriate and reasonable mitigation measures to ensure that adopted noise level criteria is not exceeded at the closest residential dwellings.'

2.5.2 A response was received on the same day which stated:

'Please can you load the below request on Flare as cat code ECK - many thanks.

John - I don't cover Burnage but your enquiry will be logged for the district officer Lisa Jones - copied in.'

3 NOISE SURVEYS

3.1 Road Traffic Noise Survey

3.1.1 It should be noted although there are road traffic movements along Lane End Rd, these were intermittent due to traffic lights with the A34 and Burnage Lane. As a result, road traffic noise associated vehicles on the A34 was dominant and so a road traffic noise measurement for Lane End Rd has not been undertaken.

3.1.2 Professional Consult has completed noise measurements for the A34 as follows:

- **Noise Measurement Position 1**: Located at 7.5m from the nearside kerbstone of the A34 between 12:30 – 15:30 on 19th March 2024 in free-field conditions. Noise sources at the measurement position comprised of road traffic movements.

3.1.3 Table 5 summarises the measured road traffic noise levels at the microphone location.

Table 5. Summary of Measured Road Traffic Noise Levels

Noise Measurement Position	Period	Measured Sound Pressure Level (dB)		
		$L_{Aeq,1hr}$	$L_{A10,1hr}$	$L_{Amax,fast}$
1	19/03/2024 12:30	76.2	74.0	89.9*
	19/03/2024 13:30	71.7	73.9	
	19/03/2024 14:30	72.0	73.7	
*10th highest $L_{Amax,fast}$				

3.2 Extract Stack Associated with Hot Food Takeaway

3.2.1 Professional Consult did previously undertake measurements of the extract stack associated with Machu Wok. It is now understood that the Manchu Wok building will be demolished as part of the development as such this has now not been considered as part of the assessment.

3.3 Background Sound Survey

3.3.1 Due to intermittent noise associated with the operation of the extract stack at the hot food takeaway, background sound measurements were not completed on Site. Instead, a suitable location was found approximately 600m to the south east of the Site at Heaton Mersey Common (SK4 3DE) which is an area unaffected by any commercial noise. In addition, road traffic noise levels at this location were at a lower noise level than on Site and hence will give rise to lower background noise levels and thus ensure a worst-case assessment.

3.3.2 Professional Consult has completed noise measurements as follows:

- **Noise Measurement Position 2**: Located at Heaton Mersey Common from 16:00 on 19th March – 16:00 on 20th March 2024. Noise sources at the measurement position comprised of distant road traffic noise and intermittent bird song. The sound climate at the measurement position was noticeably quieter than on Site.

3.3.3 Table 6 details the measured background sound levels for the daytime and night-time periods.

Table 6. Summary of Measured Background Sound Levels

Noise Measurement Position	Period	Measured Background Sound Level, $L_{A90,15mins}$ (dB)	
		Range	Typical (Mode Average)
NMP2	Daytime (07:00 – 23:00)	33 - 53	50
	Night-time (23:00 – 07:00)	38 - 46	41
Note: The typical (mode) background sound level when the hot food takeaway can operate (17:00 – 22:45) is 35dB $L_{A90,15mins}$			

3.4 Noise Survey Equipment

3.4.1 The following equipment was used for the noise surveys.

Table 7. Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No	Serial No.	Calibration Due Date
NMP1	Sound Level Meter	01dB Fusion	11755	29 June 2024
	Pre-amplifier	01dB PRE22	1707173	
	Microphone	GRAS 40CE	291693	
	Calibrator	01dB CAL-31	84086	27 June 2024
NMP2	Sound Level Meter	01dB Fusion	12038	14 March 2025
	Pre-amplifier	01dB PRE22	2113007	
	Microphone	GRAS 40CE	330801	
	Calibrator	01dB CAL-31	87280	02 July 2024

3.4.2 The sound level meters were field calibrated prior to and following the noise surveys and there was no drift beyond the allowable limit of 1dB.

3.4.3 Table 8 indicates a summary of the measured weather conditions.

Table 8. Range of Measured Wind Speeds

Period	Range of Measured Wind Speeds (m/s)	Rainfall Recorded?
All periods	0 – 3.4	No

4 NOISE IMPACT ASSESSMENT

4.1 Assessment Information

4.1.1 With regards to commercial noise impacts, it is understood that Manchester City Council require the rated level of commercial noise at a residential dwelling to be no greater than 5dB below the typical background sound level.

4.1.2 With regards to road traffic noise impacts, it is understood that Manchester City Council do not permit noise levels in external amenity space to exceed 55dB $L_{Aeq,16hr}$ however this criteria is not applicable to developments within the city or adjacent to busy roads. Internal noise levels cannot exceed 35dBdB $L_{Aeq,16hr}$ in living rooms and 30dB $L_{Aeq,8hr}$ / 45dB $L_{Amax,fast}$ in bedrooms.

4.2 Road Traffic Noise

4.2.1 For the purposes of this assessment, the daytime and night-time average ($L_{Aeq,T}$) noise levels have been calculated based on the shortened measurement procedure detailed in CRTN. The respective daytime and night-time noise levels have been derived using the following calculations:

- Calculation of the $L_{A10,18hr}$ noise level by using the following formula:

$$L_{10,18hr} = L_{10,3hr} - 1dB$$

- Calculation of the $L_{Aeq,16hr}$ noise level by using the following formula:

$$L_{eq,16hr} - L_{10,18hr} - 2dB$$

- Calculation of the night-time $L_{Aeq,8hr}$ noise level by using the following formula:

$$L_{night}\ (L_{eq,8hr}) = (0.90 \times L_{10,18hr}) - 3.77dB$$

4.2.2 Table 9 calculates the daytime and night-time noise levels.

Table 9. Calculation of Road Traffic Noise Levels

Measurement Position	Period	Calculated $L_{Aeq,t}$ (dB)	10th Highest Measured $L_{Amax,fast}$ (dB)	Distance from Centre of Road (m)
NMP1	Daytime (07:00 – 23:00)	70.9	-	7.5
	Night-time (23:00 – 07:00)	61.8	89.9	

4.2.3 For the purposes of this Assessment, Professional Consult has used noise modelling software CadnaA to determine the impact of noise from road traffic at the proposed residential dwellings. A noise model has therefore been constructed in order to calculate façade noise levels and external noise levels in amenity areas.

4.2.4 The following inputs have been included in the model:

- Proposed Scheme Layout;
- Site elevations have been taken as existing using 1m contours;
- Existing buildings or features that provide shielding from the road have been included in the model;

- Noise Measurement Position 1 has been used in order to calibrate the noise model;
- A floor height of 2.5m has been assumed for all proposed dwellings which is a standard separation distance between ground and first floors in a typical dwelling;
- A reflection order of 2 has been used in all calculations;
- Noise levels generated using ISO 9613-1 and ISO 9613-2 "Acoustics – Attenuation of sound during propagation outdoors" as incorporated into CadnaA software.

External Noise Impact in External Amenity Areas of Proposed Dwellings

4.2.5 It should be noted that there are no private external amenity areas (ie balconies) associated with the Development. Furthermore, the Development is located adjacent to the A34 and so the 55dB $L_{Aeq,16hr}$ noise criteria level is not applicable.

4.2.6 There are a couple of external garden areas located on the 4th floor and to the east of the main building on the 1st floor. The noise levels in the areas fall below the 55dB criteria for the majority of the external spaces.

4.2.7 Figure 1 of Appendix 4 shows the grid noise map.

Internal Noise Impact for Proposed Dwellings

4.2.8 With regards internal noise levels, BS8233:2014 suggests that standard thermal double glazing will afford 33dB R_w of sound reduction, however this is for the pink noise spectrum and the same configuration will afford 30dB R_w+C_{tr} for average noise levels from road traffic noise and so this value has been used to calculate internal noise levels. With regard to the maximum noise level ($L_{Amax,fast}$), the value of 33dB R_w has been used. The AVO Residential Design Guide states that a partially open window provides approximately 13dB of attenuation.

4.2.9 Professional Consult uses a library database of glazing configurations issued by Saint Gobain and the glazing configuration 6mm glass / 12mm air space / 6mm glass affords 30dB R_w+C_{tr} and 33dB R_w respectively.

4.2.10 Appendix 7 calculates the average daytime noise levels at the various facades of the plots and determines the requirement for upgraded glazing or alternative ventilation. Appendix 7 indicates that upgraded glazing will be required for a number of living rooms and the appropriate system of alternative ventilation has been specified. It should be noted that only dwellings with windows have been assessed.

4.2.11 Appendix 8 calculates the average night-time noise levels at the various facades of the plots and determines the requirement for upgraded glazing or alternative ventilation. Appendix 8 indicates that standard thermal double glazing will be adequate for all bedrooms and the appropriate system of alternative ventilation has been specified. It should be noted that only dwellings with windows have been assessed.

4.2.12 It is also necessary to consider maximum noise levels, for the night-time period for bedrooms only, in addition to the average noise levels.

4.2.13 Tables 10 calculates the internal noise level at the closest façade with windows closed and with a partially open window and compares the predicted noise level to the internal $L_{Amax,fast}$ noise criteria in BS8233 and Part O for Bedrooms.

Table 10. Calculation of Maximum Noise Levels within Bedrooms

Noise Source	Applicable Standard / Guidance Document	10th Highest Measured Max Noise Level	Measurement Distance to Centre (m)	Distance to Closest Proposed Dwelling (m)	Calculated Maximum Noise Level at Dwelling	Windows Closed / Open	Sound Reduction of Partially Open Window	Calculated Maximum Noise Level Inside Bedroom	Applicable Internal Noise Criteria Level	Difference +/- (dB)
A34	BS8233:2014	89.9	7.5	12	85.8	Open	13	72.8	45	+27.8
		89.9	7.5	12	85.8	Closed	33	52.8	45	+7.8
	Approved Document O	89.9	7.5	12	85.8	Open	13	72.8	55	+17.8
		89.9	7.5	12	85.8	Closed	33	52.8	55	-2.2

4.2.14 Table 10 indicates that standard thermal glazing will not be adequate in controlling maximum noise levels during the night-time period with windows closed and with windows open, there will be an exceedance of the noise criteria level and so the following section considers appropriate noise mitigation.

4.3 Proposed Ground Floor Commercial Use and Air Source Heat Pumps

4.3.1 At the time issuing this Assessment, there was no available detail with regards to any mechanical or electrical plant which may be installed as part of the ground floor commercial use and so it is necessary to set plant noise emission limits for the residential dwellings above. Table 18 calculates the plant noise emission limits. The limits are also applicable to any proposed plant associated with the residential scheme such as air source heat pumps.

Table 11. Calculation of Mechanical & Electrical Plant Noise Emission Limits

Period	Measured Typical Background Sound Level, $L_{A90,15mins}$ (dB)	Manchester City Council Noise Criteria, L_{A90} – 5dB
Daytime (07:00 – 23:00)	50	45
Night-time (23:00 – 07:00)	41	36

4.3.2 Table 11 indicates the plant noise emission limits which are applicable for the closest residential dwellings. It should be noted that the noise emission limits may include for character corrections for tonality, intermittency or impulsivity as stipulated in BS4142 and so the actual measured noise level at the closest dwelling may need to be lower than the noise levels presented above.

5 MITIGATION

5.1 Road Traffic

5.1.1 With regards to average noise levels in habitable rooms, Appendices 7 and 8 present the requirements for either standard thermal or upgraded glazing for various habitable rooms, together with a schedule of the appropriate ventilation system.

5.1.2 Maximum noise levels have also been considered, for bedrooms only during the night-time period and it has been shown that there will be an exceedance of up to 7.8dB for the closest bedrooms to the A34 and glazing affording 41dB R_w will be required in order to reduce this exceedance to zero. Table 12 indicates the distance at which standard thermal glazing will be acceptable for bedrooms facing the A34.

Table 12. Calculation of Maximum Noise Levels within Bedrooms

Noise Source	Applicable Standard / Guidance Document	10th Highest Measured Max Noise Level	Measurement Distance to Centre (m)	Distance to Closest Proposed Dwelling (m)	Calculated Maximum Noise Level at Dwelling	Windows Closed / Open	Sound Reduction of Partially Open Window	Calculated Maximum Noise Level Inside Bedroom	Applicable Internal Noise Criteria Level	Difference +/- (dB)
A34	BS8233:2014	89.9	7.5	30	77.9	Open	13	64.9	45	+19.9
		89.9	7.5	30	77.9	Closed	33	44.9	45	-0.1
	Approved Document O	89.9	7.5	30	77.9	Open	13	64.9	55	+9.9
		89.9	7.5	30	77.9	Closed	33	44.9	55	-10.1

5.1.3 Table 12 indicates that any apartment bedroom located at 30m or further from the A34 will not experience an exceedance using standard thermal glazing. For any bedrooms within 30m of the A34, upgraded glazing affording 41dB R_w sound reduction will be required.

5.1.4 With regards to an open window, the previous section has shown that there will be an exceedance of the noise criteria by 27.8dB, allowing 13dB sound reduction for a partially open window. Accordingly, it is recommended that an acoustic trickle ventilator is fitted to the window frame of any bedroom window which has full or partial line of sight to the A34 which has a minimum sound reduction of 41dB Rw.

5.1.5 These noise mitigation measures should be considered alongside the noise mitigation measures detailed in the Appendices and the highest performing mitigation measures should be adopted.

6 CONCLUSION

6.1.1 Professional Consult Limited was instructed by Magnitude Construction Consultants to prepare a Noise Impact Assessment in support of a proposed mixed-use development on a parcel of land located off Lane End Road in Burnage.

6.1.2 As the Development is both noise-sensitive and potentially noise-generating, it is expected that Manchester City Council will require a Noise Impact Assessment to accompany the scheme planning application.

6.1.3 The description of development is as follows:

6.1.4 Demolition of the existing buildings and erection of a mixed-use development with retail (Use Class E) at the ground floor and residential development (Use Class C3) and roof terrace above, in addition to car parking, landscaping, and associated infrastructure.

6.1.5 The site is located on land off Lane End Road, Burnage, at approximate National Grid Reference (NGR): 385934, 391545. The Site is located in an urban setting and is bound by Lane End Road to the north, a hot-food takeaway and the Kingsway Medical Practice to the east, Fog Lane to the south and the A34 to the west.

6.1.6 To the south of Fog Lane there is an existing 4 storey apartment block. To the east of Burnage Lane there is 3 story apartment block with commercial uses on the ground floor. To the west of A34 and north of Lane End Road there are a number of ground existing shops with residential uses above.

6.1.7 The sound climate at the Site is dominated by road traffic noise associated with vehicles using the A34.

6.1.8 This Assessment has shown that, with regards to road traffic using the A34, internal noise levels within habitable rooms can be controlled through use of standard thermal glazing, upgraded glazing and various grades of alternative ventilation for various plots.

6.1.9 This Assessment has set mechanical and electrical plant noise emission limits, applicable for the closest residential dwellings, for any noise associated with any plant installed as part of the ground floor commercial use.

6.1.10 The future noise climate at the Development can be controlled through appropriate noise mitigation measures to meet acceptable noise levels in both internal and external amenity areas which will accord with the ‘No Observed Adverse Effect Level’ as detailed in the noise exposure hierarchy table as detailed in the PPG and as such, noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

APPENDIX 1: LIMITATIONS

This report and its findings should be considered in relation to the terms of reference and objectives agreed between Professional Consult Limited and the Client.

The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

Professional Consult cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Professional Consult is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by Professional Consult in this connection without their explicit written agreement there to by Professional Consult.

APPENDIX 2: GLOSSARY OF ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 1: Typical Sound Pressure Levels

Sound Pressure Level (dB)	Location/Example
0	Threshold of hearing
20 - 30	Quiet bedroom at night
30 - 40	Living room during the day
40 - 50	Typical office
50 - 60	Inside a car
60 - 70	Typical high street
70 - 90	Inside factory
100 - 110	Burglar alarm at 1m away
110 - 130	Jet aircraft on take off
140	Threshold of pain

Table 2: Terminology

Descriptor	Explanation
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} & L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	2A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

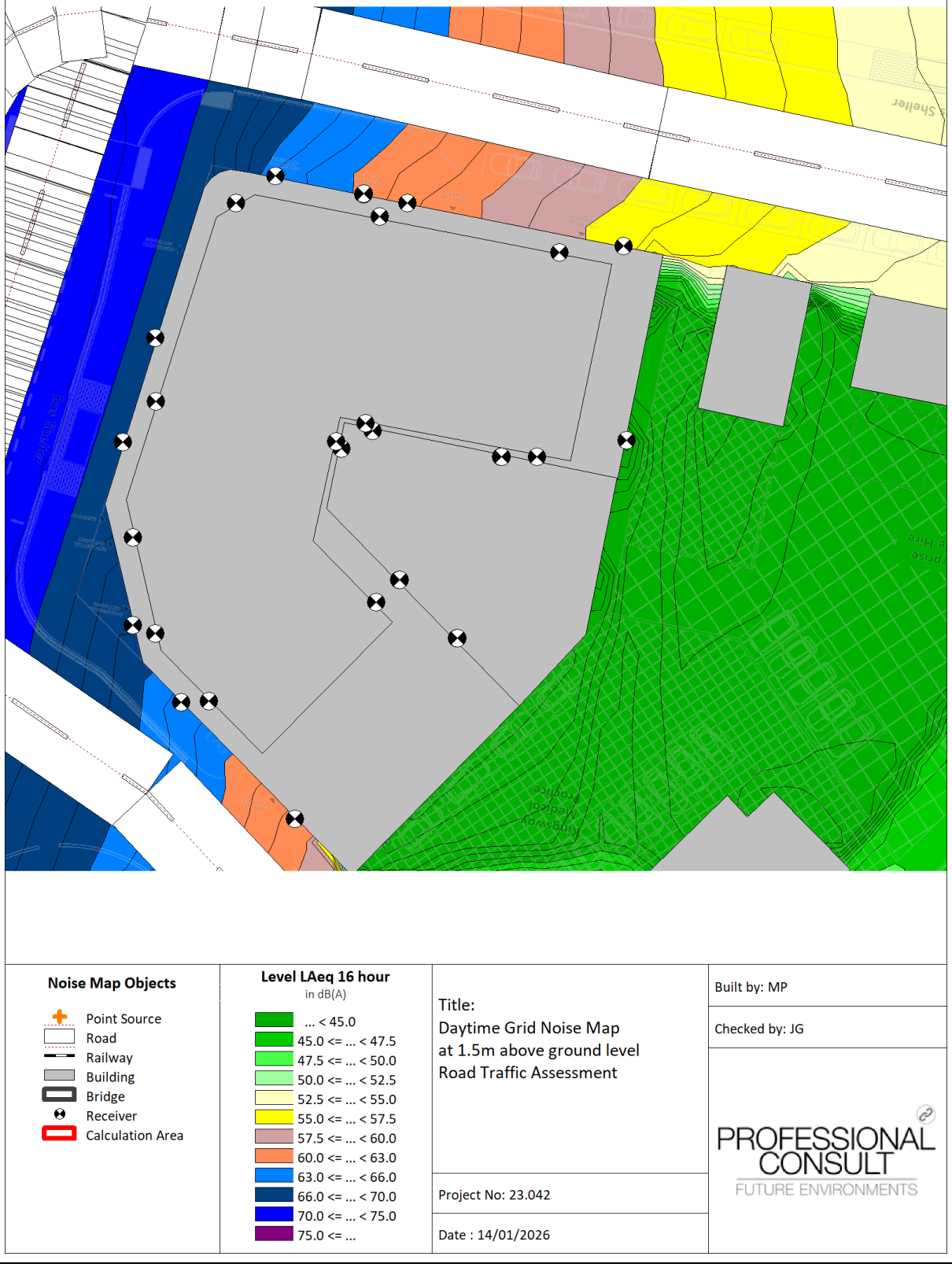
APPENDIX 3: SITE LOCATION PLAN

Figure 1 **Proposed Site Plan**



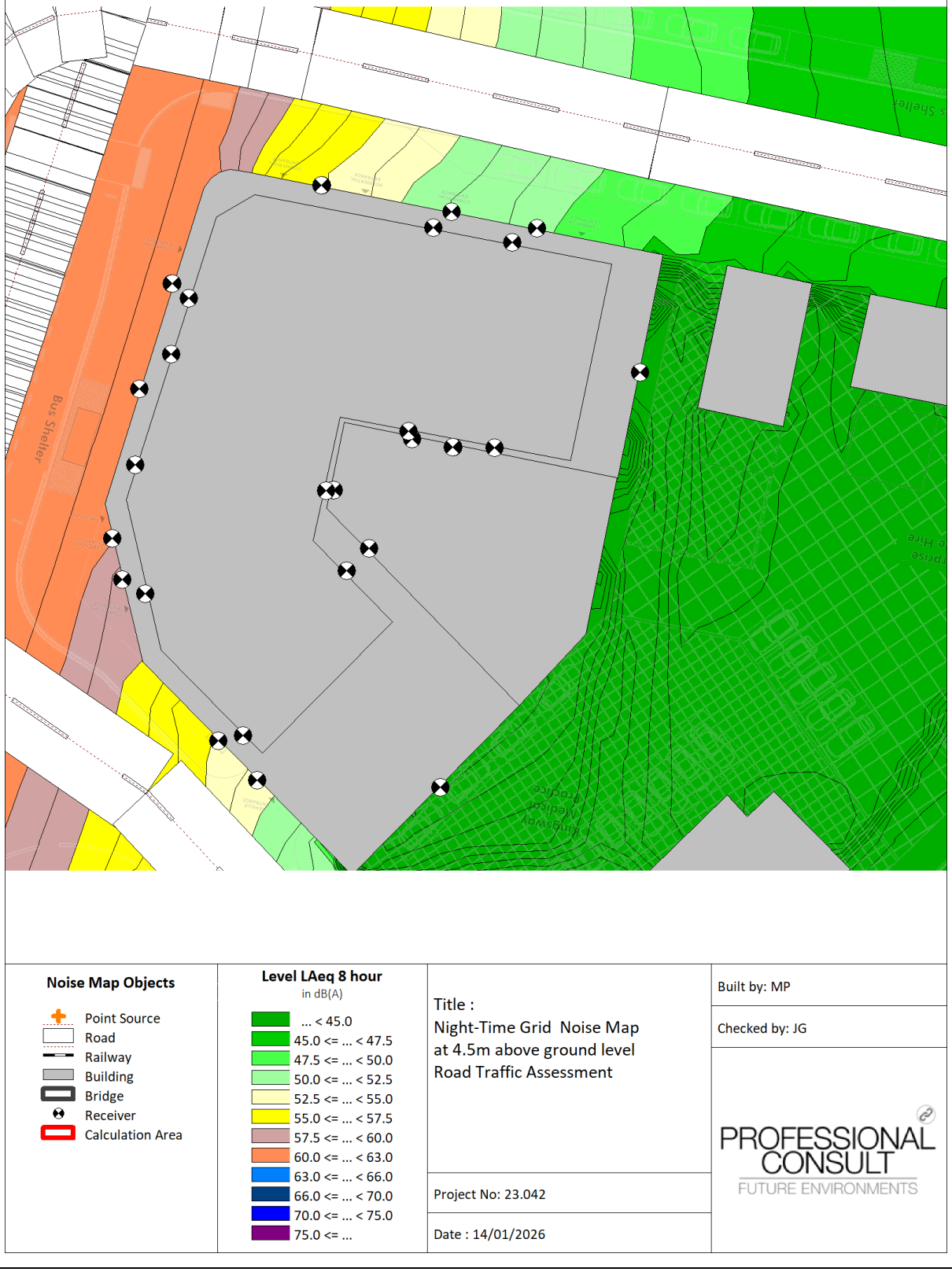
APPENDIX 4: DAYTIME GRID NOISE MAP – ROAD TRAFFIC

Figure 1 **Daytime Grid Noise Map**



APPENDIX 5: NIGHT-TIME GRID NOISE MAP – ROAD TRAFFIC

Figure 1 **Night-time Grid Noise Map**



APPENDIX 7: DAYTIME FAÇADE NOISE LEVELS – ROAD TRAFFIC

Plot	Calculated LAeq,16hr at Façade (dB)	Glazing Sound Reduction Index (Rw +Ctr) (Standard Thermal) (dB)	Calculated Noise Level Inside Room (dB)	Criteria (dB)	Difference +/- (dB)	Required Sound Insultation Performance for Glazing (Rw +Ctr) (dB)	Commentary on Required Glazing	Calculated Internal Noise Level with a Partially Open Window (dB)	Alternative Ventilation Required?	Required Sound Insultation Performance for Alternative Vent (if Required) (Rw +Ctr) (dB)	Acoustics Ventilation & Overheating Assessment - Appropriate AD-F System	Eg. Alt' Ventilation Scheme
Apart 1.1 Living Room	37.3	30	7.3	35	-27.7	2	Standard thermal glazing	24.3	No	2.0	N/A	Alt. Vent. not Required
Apart 1.2 Living Room	37.5	30	7.5	35	-27.5	3	Standard thermal glazing	24.5	No	3.0	N/A	Alt. Vent. not Required
Apart 1.3 Living Room	37.7	30	7.7	35	-27.3	3	Standard thermal glazing	24.7	No	3.0	N/A	Alt. Vent. not Required
Apart 1.4 Living Room	38	30	8	35	-27	3	Standard thermal glazing	25	No	3.0	N/A	Alt. Vent. not Required
Apart 1.5 Living Room	37.4	30	7.4	35	-27.6	2	Standard thermal glazing	24.4	No	2.0	N/A	Alt. Vent. not Required
Apart 1.6 Living Room	37.8	30	7.8	35	-27.2	3	Standard thermal glazing	24.8	No	3.0	N/A	Alt. Vent. not Required
Apart 1.7 Living Room	61.1	30	31.1	35	-3.9	26	Standard thermal glazing	48.1	**Yes**	26.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 1.8 Living Room	64.6	30	34.6	35	-0.4	30	Standard thermal glazing	51.6	**Yes**	30.0	ADF System 4	MVHR without T.V.
Apart 1.9 Living Room	67	30	37	35	2	32	Upgraded glazing required	54	**Yes**	32.0	ADF System 4	MVHR without T.V.
Apart 1.10 Living Room	69.2	30	39.2	35	4.2	34	Upgraded glazing required	56.2	**Yes**	34.0	ADF System 4	MVHR without T.V.
Apart 1.11 Living Room	69.2	30	39.2	35	4.2	34	Upgraded glazing required	56.2	**Yes**	34.0	ADF System 4	MVHR without T.V.
Apart 1.12 Living Room	65	30	35	35	0	30	Standard thermal glazing	52	**Yes**	30.0	ADF System 4	MVHR without T.V.
Apart 1.13 Living Room	62.9	30	32.9	35	-2.1	28	Standard thermal glazing	49.9	**Yes**	28.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 1.14 Living Room	61.9	30	31.9	35	-3.1	27	Standard thermal glazing	48.9	**Yes**	27.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 1.15 Living Room	58.1	30	28.1	35	-6.9	23	Standard thermal glazing	45.1	**Yes**	23.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 2.1 Living Room	39.1	30	9.1	35	-25.9	4	Standard thermal glazing	26.1	No	4.0	N/A	Alt. Vent. not Required
Apart 2.2 Living Room	39.1	30	9.1	35	-25.9	4	Standard thermal glazing	26.1	No	4.0	N/A	Alt. Vent. not Required
Apart 2.3 Living Room	38.9	30	8.9	35	-26.1	4	Standard thermal glazing	25.9	No	4.0	N/A	Alt. Vent. not Required
Apart 2.4 Living Room	38.7	30	8.7	35	-26.3	4	Standard thermal glazing	25.7	No	4.0	N/A	Alt. Vent. not Required
Apart 2.5 Living Room	39.1	30	9.1	35	-25.9	4	Standard thermal glazing	26.1	No	4.0	N/A	Alt. Vent. not Required
Apart 2.6 Living Room	39.8	30	9.8	35	-25.2	5	Standard thermal glazing	26.8	No	5.0	N/A	Alt. Vent. not Required
Apart 2.7 Living Room	61.2	30	31.2	35	-3.8	26	Standard thermal glazing	48.2	**Yes**	26.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 2.8 Living Room	64.5	30	34.5	35	-0.5	30	Standard thermal glazing	51.5	**Yes**	30.0	ADF System 4	MVHR without T.V.
Apart 2.9 Living Room	66.7	30	36.7	35	1.7	32	Upgraded glazing required	53.7	**Yes**	32.0	ADF System 4	MVHR without T.V.
Apart 2.10 Living Room	68.7	30	38.7	35	3.7	34	Upgraded glazing required	55.7	**Yes**	34.0	ADF System 4	MVHR without T.V.
Apart 2.11 Living Room	68.7	30	38.7	35	3.7	34	Upgraded glazing required	55.7	**Yes**	34.0	ADF System 4	MVHR without T.V.
Apart 2.12 Living Room	64.7	30	34.7	35	-0.3	30	Standard thermal glazing	51.7	**Yes**	30.0	ADF System 4	MVHR without T.V.
Apart 2.13 Living Room	62.8	30	32.8	35	-2.2	28	Standard thermal glazing	49.8	**Yes**	28.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 2.14 Living Room	62	30	32	35	-3	27	Standard thermal glazing	49	**Yes**	27.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 2.15 Living Room	58.4	30	28.4	35	-6.6	23	Standard thermal glazing	45.4	**Yes**	23.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 3.1 Living Room	42	30	12	35	-23	7	Standard thermal glazing	29	No	7.0	N/A	Alt. Vent. not Required
Apart 3.2 Living Room	41.5	30	11.5	35	-23.5	7	Standard thermal glazing	28.5	No	7.0	N/A	Alt. Vent. not Required

Apart 3.3 Living Room	41.3	30	11.3	35	-23.7	6	Standard thermal glazing	28.3	No	6.0	N/A	Alt. Vent. not Required
Apart 3.4 Living Room	40.9	30	10.9	35	-24.1	6	Standard thermal glazing	27.9	No	6.0	N/A	Alt. Vent. not Required
Apart 3.5 Living Room	41.5	30	11.5	35	-23.5	7	Standard thermal glazing	28.5	No	7.0	N/A	Alt. Vent. not Required
Apart 3.6 Living Room	42.8	30	12.8	35	-22.2	8	Standard thermal glazing	29.8	No	8.0	N/A	Alt. Vent. not Required
Apart 3.7 Living Room	61.5	30	31.5	35	-3.5	27	Standard thermal glazing	48.5	**Yes**	27.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 3.8 Living Room	64.3	30	34.3	35	-0.7	29	Standard thermal glazing	51.3	**Yes**	29.0	ADF System 4	MVHR without T.V.
Apart 3.9 Living Room	66.4	30	36.4	35	1.4	31	Upgraded glazing required	53.4	**Yes**	31.0	ADF System 4	MVHR without T.V.
Apart 3.10 Living Room	68.2	30	38.2	35	3.2	33	Upgraded glazing required	55.2	**Yes**	33.0	ADF System 4	MVHR without T.V.
Apart 3.11 Living Room	68.2	30	38.2	35	3.2	33	Upgraded glazing required	55.2	**Yes**	33.0	ADF System 4	MVHR without T.V.
Apart 3.12 Living Room	64.4	30	34.4	35	-0.6	29	Standard thermal glazing	51.4	**Yes**	29.0	ADF System 4	MVHR without T.V.
Apart 3.13 Living Room	62.8	30	32.8	35	-2.2	28	Standard thermal glazing	49.8	**Yes**	28.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 3.14 Living Room	62	30	32	35	-3	27	Standard thermal glazing	49	**Yes**	27.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 3.15 Living Room	58.6	30	28.6	35	-6.4	24	Standard thermal glazing	45.6	**Yes**	24.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 4.1 Living Room	48.8	30	18.8	35	-16.2	14	Standard thermal glazing	35.8	**Yes**	14.0	ADF Systems 1 or 2	Acoustic-grade T.V.
Apart 4.2 Living Room	45.6	30	15.6	35	-19.4	11	Standard thermal glazing	32.6	No	11.0	N/A	Alt. Vent. not Required
Apart 4.3 Living Room	45.3	30	15.3	35	-19.7	10	Standard thermal glazing	32.3	No	10.0	N/A	Alt. Vent. not Required
Apart 4.4 Living Room	45.6	30	15.6	35	-19.4	11	Standard thermal glazing	32.6	No	11.0	N/A	Alt. Vent. not Required
Apart 4.5 Living Room	61.6	30	31.6	35	-3.4	27	Standard thermal glazing	48.6	**Yes**	27.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 4.6 Living Room	63.1	30	33.1	35	-1.9	28	Standard thermal glazing	50.1	**Yes**	28.0	ADF System 4	MVHR without T.V.
Apart 4.7 Living Room	63	30	33	35	-2	28	Standard thermal glazing	50	**Yes**	28.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 4.8 Living Room	63.2	30	33.2	35	-1.8	28	Standard thermal glazing	50.2	**Yes**	28.0	ADF System 4	MVHR without T.V.
Apart 4.9 Living Room	61	30	31	35	-4	26	Standard thermal glazing	48	**Yes**	26.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 4.10 Living Room	60.6	30	30.6	35	-4.4	26	Standard thermal glazing	47.6	**Yes**	26.0	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 4.11 Living Room	57.6	30	27.6	35	-7.4	23	Standard thermal glazing	44.6	**Yes**	23.0	ADF Systems 1 or 2	Acoustic-grade T.V.

APPENDIX 8: NIGHT-TIME FAÇADE NOISE LEVELS – ROAD TRAFFIC

Plot	Calculated LAeq,8hr at Façade (dB)	Glazing Sound Reduction Index (Rw +Ctr) (Standard Thermal) (dB)	Calculated Noise Level Inside Room (dB)	Criteria (dB)	Difference +/- (dB)	Required Sound Insultation Performance for Glazing (Rw +Ctr) (dB)	Commentary on Required Glazing	Calculated Internal Noise Level with a Partially Open Window (dB)	Alternative Ventilation Required?	Required Sound Insultation Performance for Alternative Vent (if Required) (Rw +Ctr) (dB)	Do Average Night-time Internal Noise Levels Achieve Compliance with AD-O?	Acoustics Ventilation & Overheating Assessment - Appropriate AD-F System	Eg. Alt' Ventilation Scheme
Apart 1.2 Bedroom	28.4	30	-1.6	30	-31.6	-2	Standard thermal glazing	15.4	No	-2.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 1.3 Bedroom	28.5	30	-1.5	30	-31.5	-2	Standard thermal glazing	15.5	No	-2.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 1.4 Bedroom	28.9	30	-1.1	30	-31.1	-2	Standard thermal glazing	15.9	No	-1.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 1.5 Bedroom	28.5	30	-1.5	30	-31.5	-1	Standard thermal glazing	15.5	No	-2.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 1.6 Bedroom	33.4	30	3.4	30	-26.6	-2	Standard thermal glazing	20.4	No	3.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 1.7 Bedroom	53.4	30	23.4	30	-6.6	3	Standard thermal glazing	40.4	**Yes**	23.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 1.8 Bedroom	54.6	30	24.6	30	-5.4	23	Standard thermal glazing	41.6	**Yes**	25.0	**Yes**	ADF System 4	MVHR without T.V
Apart 1.9 Bedroom	58.5	30	28.5	30	-1.5	25	Standard thermal glazing	45.5	**Yes**	29.0	**Yes**	ADF System 4	MVHR without T.V
Apart 1.10 Bedroom	59	30	29	30	-1	29	Standard thermal glazing	46	**Yes**	29.0	**Yes**	ADF System 4	MVHR without T.V
Apart 1.11 Bedroom	60.2	30	30.2	30	0.2	29	Standard thermal glazing	47.2	**Yes**	30.0	**Yes**	ADF System 4	MVHR without T.V
Apart 1.12 Bedroom	60.2	30	30.2	30	0.2	30	Standard thermal glazing	47.2	**Yes**	30.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 1.13 Bedroom	54.9	30	24.9	30	-5.1	30	Standard thermal glazing	41.9	**Yes**	25.0	**Yes**	ADF Systems 1 or 2	Acoustic-grade T.V.
Apart 1.14 Bedroom	52	30	22	30	-8	25	Standard thermal glazing	39	**Yes**	22.0	**Yes**	ADF Systems 1 or 2	Acoustic-grade T.V.
Apart 1.15 Bedroom	50.5	30	20.5	30	-9.5	22	Standard thermal glazing	37.5	**Yes**	21.0	**Yes**	ADF Systems 1 or 2	Acoustic-grade T.V.
Apart 2.1 Bedroom	30.3	30	0.3	30	-29.7	21	Standard thermal glazing	17.3	No	0.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 2.2 Bedroom	29.8	30	-0.2	30	-30.2	0	Standard thermal glazing	16.8	No	0.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 2.3 Bedroom	29.9	30	-0.1	30	-30.1	0	Standard thermal glazing	16.9	No	0.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 2.4 Bedroom	29.7	30	-0.3	30	-30.3	0	Standard thermal glazing	16.7	No	0.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 2.5 Bedroom	30	30	0	30	-30	0	Standard thermal glazing	17	No	0.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 2.6 Bedroom	36.6	30	6.6	30	-23.4	0	Standard thermal glazing	23.6	No	7.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 2.7 Bedroom	53.5	30	23.5	30	-6.5	7	Standard thermal glazing	40.5	**Yes**	24.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 2.8 Bedroom	54.6	30	24.6	30	-5.4	24	Standard thermal glazing	41.6	**Yes**	25.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 2.9 Bedroom	58.1	30	28.1	30	-1.9	25	Standard thermal glazing	45.1	**Yes**	28.0	**Yes**	ADF System 4	MVHR without T.V
Apart 2.10 Bedroom	58.5	30	28.5	30	-1.5	28	Standard thermal glazing	45.5	**Yes**	29.0	**Yes**	ADF System 4	MVHR without T.V
Apart 2.11 Bedroom	59.7	30	29.7	30	-0.3	29	Standard thermal glazing	46.7	**Yes**	30.0	**Yes**	ADF System 4	MVHR without T.V
Apart 2.12 Bedroom	59.7	30	29.7	30	-0.3	30	Standard thermal glazing	46.7	**Yes**	30.0	**Yes**	ADF System 4	MVHR without T.V
Apart 2.13 Bedroom	54.7	30	24.7	30	-5.3	30	Standard thermal glazing	41.7	**Yes**	25.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 2.14 Bedroom	52.2	30	22.2	30	-7.8	25	Standard thermal glazing	39.2	**Yes**	22.0	**Yes**	ADF Systems 1 or 2	Acoustic-grade T.V.
Apart 2.15 Bedroom	50.7	30	20.7	30	-9.3	22	Standard thermal glazing	37.7	**Yes**	21.0	**Yes**	ADF Systems 1 or 2	Acoustic-grade T.V.
Apart 3.1 Bedroom	33.3	30	3.3	30	-26.7	21	Standard thermal glazing	20.3	No	3.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 3.2 Bedroom	32	30	2	30	-28	3	Standard thermal glazing	19	No	2.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 3.3 Bedroom	32.2	30	2.2	30	-27.8	2	Standard thermal glazing	19.2	No	2.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 3.5 Bedroom	32.3	30	2.3	30	-27.7	2	Standard thermal glazing	19.3	No	2.0	**Yes**	N/A	Alt. Vent. Not Required

Apart 3.6 Bedroom	40.8	30	10.8	30	-19.2	11	Standard thermal glazing	27.8	No	11.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 3.7 Bedroom	53.6	30	23.6	30	-6.4	24	Standard thermal glazing	40.6	**Yes**	24.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 3.8 Bedroom	54.5	30	24.5	30	-5.5	25	Standard thermal glazing	41.5	**Yes**	25.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 3.9 Bedroom	57.7	30	27.7	30	-2.3	28	Standard thermal glazing	44.7	**Yes**	28.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 3.10 Bedroom	58	30	28	30	-2	28	Standard thermal glazing	45	**Yes**	28.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 3.11 Bedroom	59.2	30	29.2	30	-0.8	29	Standard thermal glazing	46.2	**Yes**	29.0	**Yes**	ADF System 4	MVHR without T.V
Apart 3.12 Bedroom	59.1	30	29.1	30	-0.9	29	Standard thermal glazing	46.1	**Yes**	29.0	**Yes**	ADF System 4	MVHR without T.V
Apart 3.13 Bedroom	54.6	30	24.6	30	-5.4	25	Standard thermal glazing	41.6	**Yes**	25.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 3.14 Bedroom	52.2	30	22.2	30	-7.8	22	Standard thermal glazing	39.2	**Yes**	22.0	**Yes**	ADF Systems 1 or 2	Acoustic-grade T.V.
Apart 3.15 Bedroom	50.8	30	20.8	30	-9.2	21	Standard thermal glazing	37.8	**Yes**	21.0	**Yes**	ADF Systems 1 or 2	Acoustic-grade T.V.
Apart 3.4 Bedroom	31.9	30	1.9	30	-28.1	2	Standard thermal glazing	18.9	No	2.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 4.1 Bedroom	39.6	30	9.6	30	-20.4	10	Standard thermal glazing	26.6	No	10.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 4.2 Bedroom	36.6	30	6.6	30	-23.4	7	Standard thermal glazing	23.6	No	7.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 4.3 Bedroom	36.3	30	6.3	30	-23.7	6	Standard thermal glazing	23.3	No	6.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 4.4 Bedroom	36.7	30	6.7	30	-23.3	7	Standard thermal glazing	23.7	No	7.0	**Yes**	N/A	Alt. Vent. Not Required
Apart 4.5 Bedroom	52.1	30	22.1	30	-7.9	22	Standard thermal glazing	39.1	**Yes**	22.0	**Yes**	ADF Systems 1 or 2	Acoustic-grade T.V.
Apart 4.6 Bedroom	54.2	30	24.2	30	-5.8	24	Standard thermal glazing	41.2	**Yes**	24.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 4.7 Bedroom	54.5	30	24.5	30	-5.5	25	Standard thermal glazing	41.5	**Yes**	25.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 4.8 Bedroom	54.1	30	24.1	30	-5.9	24	Standard thermal glazing	41.1	**Yes**	24.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 4.9 Bedroom	54.2	30	24.2	30	-5.8	24	Standard thermal glazing	41.2	**Yes**	24.0	**Yes**	ADF System 3	MEV System & Acoustic-grade 'T.V.'
Apart 4.10 Bedroom	50.7	30	20.7	30	-9.3	21	Standard thermal glazing	37.7	**Yes**	21.0	**Yes**	ADF Systems 1 or 2	Acoustic-grade T.V.
Apart 4.11 Bedroom	49.4	30	19.4	30	-10.6	19	Standard thermal glazing	36.4	**Yes**	19.0	**Yes**	ADF Systems 1 or 2	Acoustic-grade T.V.

APPENDIX 9: EXAMPLE ALTERNATIVE VENTILATION SYSTEMS

System	Description	Example Product*
1 / 2	Window-frame mounted trickle ventilator.	**Greenwoods DN Vent** Can be used where a sound reduction performance of up to 36dB Rw +Ctr is required. **Greenwoods Acoustic Trickle Ventilator EAQ42W.** Can be used where a sound reduction performance of up to 42dB Rw +Ctr is required.
	Through-wall ventilator.	**Greenwoods Wall Ventilator MA3051.** Provides a sound reduction performance of 55dB $D_{n,e,w}+C_{tr}$ in its open position. Highest performing acoustic wall ventilator in the UK - the MA3051 is ideal for new build applications where noise planning restrictions are in place. Providing up to 55dB reduction and suitable for wall thicknesses of 140mm and above
3	Continuous Mechanical Extract Ventilation (MEV) system. Centralised Mechanical Extract Ventilation (cMEV) is a whole-house extract system should be installed in conjunction with acoustic trickle ventilators which provide the air inlet.	**Greenwoods CMEV.4e/CMEV.4eHT** The low energy continuously running whole house extract system is ideal for apartments and houses. The HT model is available with additional SMART technology for humidity and timer sensor controls.
	Positive Input Ventilation (PIV) system. De-centralised PIV system is a room-by-room (bedroom / living room) wall mounted ventilation input fan. Can be installed in conjunction with acoustic trickle ventilators which provide air expulsion.	**Blauberg Fresher 50 PIV** Self-contained. low energy, acoustic positive input filtered supply air ventilation input fan. The unit provides a sound reduction performance of 41dB(A) with an internal (motor) noise level of 29dB(A) at 1m.
4	Mechanical Ventilation Heat Recovery (MVHR).	**Zehnder ComfoAir Q350 ST** Wall or floor mounted mechanical supply and extract ventilation with heat recovery (MVHR) with humidity sensor. **Nuaire MRXBOXAB-ECO2B**
*Example products detailed; other products are available.		