
YORKSHIRE LILLY INVESTMENTS LIMITED
NOISE IMPACT ASSESSMENT REPORT
13-15 SOUTHGATE, HUDDERSFIELD HD1 1QX

Client: Yorkshire Lilly Investments Limited

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1 INTRODUCTION

1.1 Overview

1.1.1 By instruction from Yorkshire Lilly Investments Limited ('the client'), NoiseAir was commissioned to undertake a Noise Impact Assessment (NIA) in support of a preliminary planning application for a proposed residential conversion development at the location: 13-15 Southgate, Huddersfield HD1 1QX, herein referred to as the '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 development site is located at ground floor level, within a two-storey mixed use building within a wider mixed-use area of Huddersfield Town Centre. The ground floor of the aforementioned building is currently comprised of 2 no. commercial units located to the front of the property and residential use to the rear section and the upper second storey.

1.2.2 The application area is the 2 no. commercial units located to the east of the development site to the north by a commercial and a residential property, Esteem Dry Cleaners. To the west, the application area is bound by the existing residential use properties forming the larger part of the development site. To the south, the application area is bound by a residential property and to the east the development site is bound by Southgate (A62), a multi carriageway main A-road trafficked by vehicles governed by a 30 mile per hour (mph) speed limit.

1.2.3 It was observed that road traffic noise was the dominant source of noise at the development site.

1.2.4 **Figure 1** shows an aerial photograph of the development site boundary with respect to the local area and its context.



Figure 1: Development site aerial photograph.

1.3 Development Proposals

1.3.1 Proposals for the development site outline the conversion of the existing ground floor commercial units and part alteration to the existing cluster flat, in order to introduce 3 no. new residential rooms as part of the larger existing accommodation.

1.3.2 This assessment is based on the proposed site layout as presented in **Figure 2** overleaf.

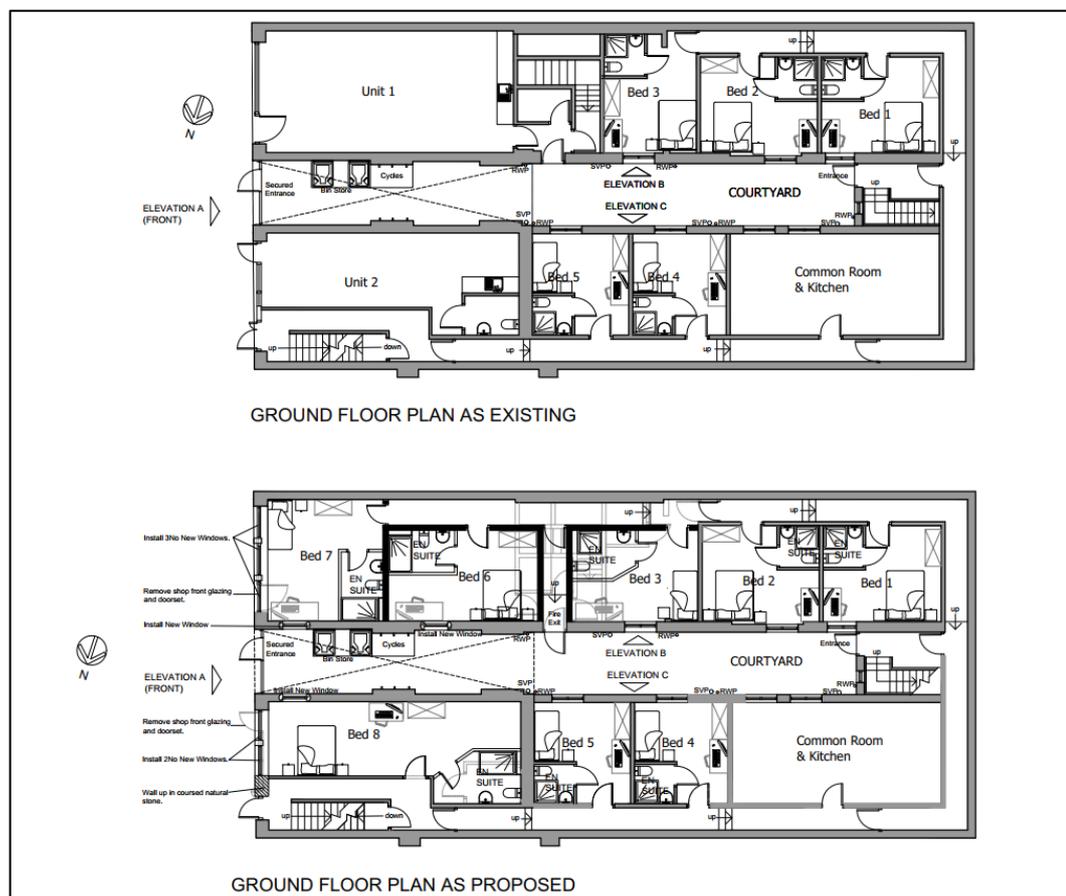


Figure 2: Proposed development site layout – Existing and Proposed Ground Floor.

2 ASSESSMENT METHODOLOGY AND SCOPE OF WORKS

2.1 National Planning Policy Framework [NPPF 2023]

2.1.1 The NPPF sets out the government's planning policies for England and how they are expected to be applied. It aims to achieve sustainable development and states that planning policies and decisions should prevent unacceptable levels of noise pollution from new and existing development while affirming that the National Policy Statements form part of the national planning policy framework and should be considered in planning decisions.

2.2 Noise Policy Statement for England (NPSE)

2.2.1 The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy is to "promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".

2.2.2 The NPSE sets out the government's overall policy on noise within the context of sustainable development. It introduces three concepts for noise management: avoid significant adverse effects; mitigate and minimise adverse effects; and where possible, contribute to improvements in health and quality of life.

2.2.3 It also establishes a hierarchy of noise management actions: avoid; reduce; remedy; mitigate; compensate.

2.2.4 The NPSE also introduces the below categories with respect to 'adverse impacts'.

'NOEL – No Observed Effect Level'

- This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

- This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

- This is the level above which significant adverse effects on health and quality of life occur'.

2.2.5 The NPSE states that significant adverse effects on health and quality of life should be avoided. Where the impact lies somewhere between LOAEL and SOAEL, it requires that all

reasonable steps are taken to mitigate and minimise the adverse effects of noise. In this regard, a certain degree of impact between LOAEL and SOAEL would be acceptable in terms of planning policy, provided that the impact has been mitigated and minimised by design.

2.3 Planning Practice Guidance - Noise [PPG 2019]

2.3.1 PPG 2019 provides guidance on how noise should be considered in planning decisions. It was published in 2014 and updated in 2019. The document advises on how to avoid, mitigate or minimise adverse effects of noise through good acoustic design and appropriate conditions or obligations.

2.3.2 **Table 1** summarises the noise exposure hierarchy outlined within the PPG.

Table 1: National Planning Practice Guidance Noise Exposure Hierarchy		
Perception	Increasing Effect Level	Action
Not noticeable	No Observed Effect	No specific measures required
Noticeable and not intrusive	No Observed Adverse Effect	No specific measures required
Lowest Observed Effect Level		
Noticeable and intrusive	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Effect Level		
Noticeable and disruptive	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Unacceptable Adverse Effect	Prevent

2.4 Consultation and Scope of Works

Consultation with Local Planning Authority

2.4.1 NoiseAir contacted Kirklees Council Environmental Health on 10th July 2024. In a phone call with Mr. Mohammed Nasim, Senior Technical Officer, it was advised that the assessment of residential suitability against the internal noise level criteria detailed in BS 8233:2014 was considered in line with the council's expectations for a residential conversion.

2.4.2 It was also advised that where proposed residential use and existing commercial use share a party wall, the council requires the performance of the separating wall to be +10 dB above the material change of use criteria in Approved Document E of the Building Regulations.

Where the commercial use is a licenced premises, the performance of the separating wall must be $55 \text{ dB } D_{nT,w} + C_{tr}$.

Scope of Works

- 2.4.3 It is considered that road traffic noise associated with Southgate (A62), (a main thoroughfare through the centre of Huddersfield) forms the dominant source of noise incident upon the development site. Therefore, it is reasoned that the NIA should consider noise primarily from road traffic noise.
- 2.4.4 The scope of this assessment includes consideration of internal noise ingress across facades of the development where noise sensitive areas are to be located.
- 2.4.5 It should be noted that external amenity does not form part of the proposal and therefore assessment in line with external amenity criteria is outside the scope of this report.
- 2.4.6 Additionally, consideration should be given to the transmission of noise through the party wall between the proposed residential use and the existing retail unit, Esteem Dry Cleaners, and any associated flanking paths.

2.5 Assessment Criteria

- 2.5.1 In order to achieve noise levels which are considered to be in alignment with the planning approaches and policies discussed in Section 2.1, it is considered that all efforts are made to ensure that future occupants are unlikely to be exposed to noise levels which might breach the LOEL criteria.
- 2.5.2 It should be noted, however, that planning guidance does not preclude development where the LOEL is likely to be breached in certain circumstances as long as reasonable efforts are made to mitigate and reduce such an effect.
- 2.5.3 As the proposed development is a conversion of commercial use to residential use, it is therefore considered that the noise assessment and subsequent criteria should be undertaken in accordance with BS 8233:2014, a summary of which is provided below.

British Standard 8233:2014 (BS 8233:2014)

- 2.5.4 British Standard 8233:2014 – Guidance on sound insulation and noise reduction for buildings (BS 8233:2014) provides guidance on internal ambient noise levels, resulting from break-in of external environmental noise that should not be exceeded in various locations within dwellings.

2.5.5 Guidelines for buildings in terms of internal noise level are reported in **Table 2**.

Table 2: Summary of Internal Noise Guidelines.			
Activity	Location	0700 – 2300 hours	2300 – 0700 hours
Resting	Living Room	35 dB L _{Aeq,16hour}	-
Dining	Dining room / area	40 dB L _{Aeq,16hour}	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq,16hour}	30 dB L _{Aeq,8hour}

2.5.6 The standard clarifies that these values are based on the existing guidelines issued by the World Health Organisation (WHO). In addition, it states that the internal noise levels may be relaxed by up to 5 dB whilst maintaining a reasonable living condition. Conversely, in terms of internal maximum levels to be achieved during the night, the standard does not recommend any limits for individual noise events. However, a guideline value may be set in terms of SEL or L_{AFmax}, depending on the type and the number of events per night.

3 ACOUSTIC SURVEY

3.1 Acoustic Survey Details

- 3.1.1 NoiseAir conducted unattended noise monitoring between 14th June 2024 and 17th June 2024 at the development site.
- 3.1.2 Noise monitoring was undertaken at one monitoring location (ML1), the approximate position of which is shown in **Figure 3** below.



Figure 3: Approximate noise monitoring location.

- 3.1.3 The microphone at ML1 was mounted to the building façade to the rear of the courtyard gate and maintained direct line of sight with vehicle traffic along Southgate.
- 3.1.4 Noise measurements were obtained 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 7445-1:2003¹, before and after the noise monitoring periods.
- 3.1.6 Details of the SLM and associated field calibration can be found in **Table 3**.

Table 3: Summary of SLM Used for Survey and Associated Field Calibration				
SLM (Serial No.)	Preamp (Serial No.)	Microphone (Serial No.)	Calibrator (Serial No.)	Drift
NOR140 (1402867)	NOR1209 (12113)	G.R.A.S 40AF (102533)	B&K4231 (2431761)	<0.5 dB

- 3.1.7 The weather conditions were noted to be as outlined in **Table 4** during each site visit.

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

Table 4: Summary of Weather Conditions Noted During Each Site Visit		
	14 th June 2024	17 th June 2024
Roads (Wet / Dry)	Dry	Dry
Temperature (°C)	15	16
Wind speed (m/s ⁻¹)	5.8 WSW	< 5 W
Cloud Cover (Approx. %)	100	100
Humidity (%)	74	65

3.1.8 A review of historic weather data has been conducted in order to establish any periods of adverse conditions that may have occurred across the survey period.

3.1.9 Where periods of adverse weather have been identified, time frames considered to be potentially destructive (regarding measured noise levels) have been removed from the data set, and such, subsequent noise impact assessment.

3.2 Measured Sound Levels

3.2.1 Data is shown in **Figure 4** detailing level vs time graphs of the recorded L_{Amax} , L_{Aeq} and L_{A90} sound level over 15-minute time periods obtained at ML1.

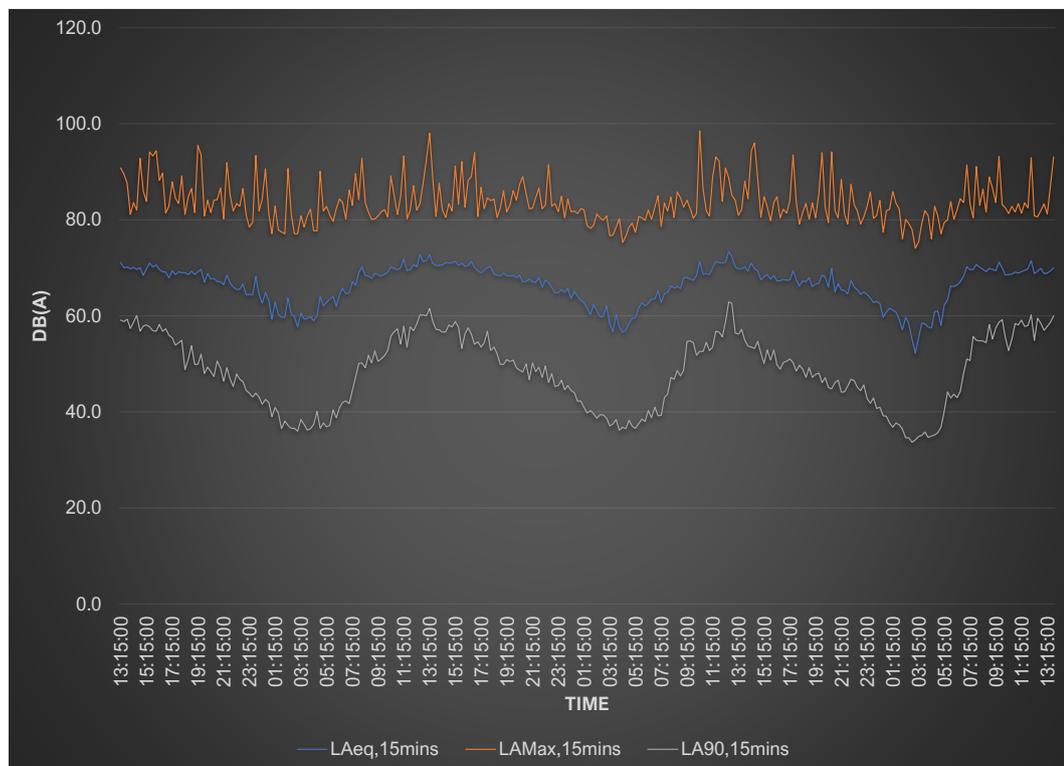


Figure 4: Level vs. time graph showing L_{Amax} , L_{Aeq} and L_{A90} sound levels – ML1

3.2.2 The results for the monitoring location during the daytime and night-time periods are presented in **Table 5** overleaf.

Table 5: Average Measured Daytime and Night-time Noise Levels		
Monitoring Location	Time	Measured Noise Level
		dB $L_{Aeq,16hour}$ / dB $L_{Aeq,8hour}$ / L_{AFmax}
ML1	07:00-23:00	67.9 – 69.6
	23:00-07:00	62.4 – 62.9
	23:00-07:00	83.0*

* Maximum night-time noise levels exceeded more than 10 times in a single night-time period.

4 NOISE IMPACT ASSESSMENT

4.1 Overview

4.1.1 As the development site is in close proximity to road traffic noise sources, the predicted internal noise levels of the development have been assessed against the criteria stated in BS 8233:2014.

4.2 BS 8233:2014 Assessment of Daytime Noise Levels in Living Rooms and Bedrooms

4.2.1 The predicted noise levels at the façades of the proposed building structure, for the daytime and night-time period, together with the level of attenuation required in accordance with the guidance presented within BS 8233:2014, are presented in **Table 6** below.

Table 6: Level of Attenuation Required to Achieve the Internal Noise Guideline Levels.				
Façade	Daytime ($L_{Aeq,16hours}$) / Night-Time ($L_{Aeq,8hours}$ / L_{Amax})	Worst Case Noise Level at the Façade of the Property (dB(A))	BS 8233:2014 Target Internal Level (dB(A))	Worst Case Level of Attenuation Required (dB(A))
All	Daytime $L_{Aeq,16hours}$	70	35	35
	Night-Time $L_{Aeq,8hours}$	63	30	33
	Night-Time L_{Amax}	83	45	38

4.3 Building Envelope Performance – Windows Open

4.3.1 The sound performance requirements for bedrooms, living and dining rooms at the development during the daytime and night-time in rooms with windows closed are summarised in Section 5.1.

4.3.2 However, with windows partially open, it is generally accepted that the attenuation provided by the façade will be approximately 15 dB(A). Based upon this façade attenuation, it is calculated that the recommended internal resting criteria is likely to be exceeded within proposed habitable rooms at the development during certain parts of a typical day/ night.

4.3.3 **Table 7** shows the level of exceedance for partially open windows at each façade.

Table 7: Summary of Internal Noise Levels with Windows Partially Open (based on a Partially Open Window Providing up to 15 dB(A) Attenuation).				
Façade	Room Type	Day / Night	Yes / No	Excess (dB)
All	All	Day	No	+20
		Night	No	+23

4.3.4 Where exceedances are likely to be greater than +5 dB, on occasions, this may be acceptable to a resident, but when quiet conditions are required, the resident should be able

to close the windows whilst maintaining adequate ventilation. It must be noted that any ventilation requirements are to be designed by others.

- 4.3.5 Due to the high noise levels incident on the development site façades, it is highly likely that in order to achieve target internal resting criteria, a scheme of sound insulation which allows for windows to remain closed (while not impinging on ventilation and overheating requirements) will need to be incorporated at the development site.

5 SOUND INSULATION SCHEME

5.1 Building Envelope Requirements – Windows Closed

- 5.1.1 Proposals for the development site at the time of writing outline residential use. Noise sensitive rooms are proposed to all facades of the application area. Therefore, internal noise levels are required to not exceed 35 dB L_{Aeq} during the daytime hours in all rooms and 30 dB L_{Aeq} and 45 dB L_{Amax} during the night-time hours in bedrooms.
- 5.1.2 When assessing sound levels in habitable areas of the proposed development, the sound attenuation provided by the overall building facade should be considered. To mitigate sound levels, the composition of the building facade can be designed to provide the level of attenuation required. Glazing and ventilation are generally the building elements which attenuate noise the least, so the proportion of glazing and ventilation penetrations in a building facade is an important consideration when assessing overall sound attenuation.
- 5.1.3 Based on the design details forwarded, worst case façade attenuation calculations have been undertaken in accordance with BS EN ISO 12354-3:2017.
- 5.1.4 Calculations adopting both a passive and active ventilation strategy have been undertaken and presented in this section. **Table 8** and **Table 9** below present a summary of the building envelope requirements.

Table 8: Summary of Building Envelope Performance Requirements - Passive Ventilation				
Façade	Room Type	Wall R_w+C_{tr} (dB)	Glazing R_w+C_{tr} (dB)	Ventilation $D_{n,e,w}+C_{tr}$ (2500 mm ² EA)
All	All	50	47	51
Note: If a greater mm ² EA is required then the acoustic ventilation performance will have to increase or mechanical ventilation may be more appropriate.				

Table 9: Summary of Building Envelope Performance Requirements - Active Ventilation			
Façade	Room Type	Wall R_w+C_{tr} (dB)	Glazing R_w+C_{tr} (dB)
All	All	50	47

- 5.1.5 It should be noted that the acoustic performance values stated are for guidance and based on information provided at the time of writing. Changes to location, size and orientation of rooms/ facades can have impacts on the calculated internal noise levels and subsequently the required acoustic performance criteria.

5.1.6 **Table 10** below provides a typical example summary for each element type outlined in **Table 8** and **Table 9** above.

Table 10: Summary of Building Element Type Typical Examples		
Element Type	Acoustic Performance	Typical Example
Wall	50 dB R_w+C_{tr}	Concrete / Brick exterior wall with min. 100 mm insulated (60 kg / m ³ rockwool) cavity constructed with timber studwork and resilient bars with min. 10 mm plasterboard lining
Window	Up to 46 dB R_w+C_{tr}	10.8 mm Pilkington Optiphon™/24 mm argon/16.8 mm Pilkington Optiphon™
Window	Up to 47 dB R_w+C_{tr}	12.8 Pilkington Optiphon™/20 mm argon/16.8 Pilkington Optiphon™
Acoustic Slot Vent (Wall)	51 dB $D_{n,e,w} + C_{tr}$ (4 no. per room)	Greenwood MA3051 (Passive) Acoustic Wall Ventilator

5.1.7 It should be noted that the examples provided in **Table 10** are for guidance only, however any adopted solution must achieve the acoustic performance values presented in **Table 8** and **Table 9**.

5.1.8 The glazing elements outlined in **Table 8** and **Table 9** are based on the performance of the glazing panes only. Advice should be sought from the manufacturer at detailed design stage to ensure that the window framing does not undermine the overall performance requirement recommended.

5.1.9 Due to the high noise levels incident on the eastern façade of the development, which overlooks Southgate (A62), it is recommended that any windows located along this façade are sealed closed.

5.1.10 For each habitable room along the eastern façade, the installation of a window has been proposed on the façade overlooking the courtyard. By acoustically sealing the existing courtyard gate, the windows overlooking the courtyard do not necessarily need to be sealed shut.

5.1.11 The building envelope final design should be confirmed through detailed design at the appropriate stage including the consultation of specialist manufacturers to confirm individual building element performance.

5.2 Ventilation Requirements

- 5.2.1 It is recommended that the acoustic ventilation proposed at the site should, as a minimum, comply with Building Regulations Approved Document F1 2021 Means of Ventilation and British Standard BS5925 1991: “Code of Practice for Ventilation Principles and Designing for Natural Ventilation”. Acoustic ventilation is only recommended for noise sensitive rooms, which are bedrooms and living/dining rooms.
- 5.2.2 The implementation of the recommended glazing and ventilation options would ensure that the required internal daytime and night-time noise limits are achieved.
- 5.2.3 It should be further noted that the glazing and ventilation configurations within this report are for guidance only. Similar products to those used in NoiseAir calculations may achieve a similar level of sound reduction, however this should be verified by the manufacturer.
- 5.2.4 As detailed in Section 4.3, it is likely that noise levels in the noise sensitive rooms of the proposed dwelling will likely rely on the windows being in the closed position and therefore appropriate ventilation design should be completed. Special consideration should be given to the ventilation design of the eastern façade due to the windows being sealed shut.
- 5.2.5 It is recommended that consideration is given to the inclusion of an active ventilation system to habitable rooms as noise levels are considered to be elevated. Such a system would allow future residents to enjoy acceptable internal noise levels while maintaining appropriate ventilation requirements. However, as **Table 8** demonstrates, adequate ventilation can be achieved with passive ventilation.
- 5.2.6 Any habitable rooms which include an active ventilation system **should not** incorporate any passive ventilation systems as this will undermine the performance of the building envelope.
- 5.2.7 Any mechanical ventilation adopted for the noise sensitive rooms should have a noise output which complies with NR25 noise rating curve.

5.3 Overheating

- 5.3.1 Building Regulations Approved Document O Overheating: 2021 describes two methods for an overheating assessment as follows:
- A simplified method; and,
 - Dynamic Thermal Modelling method.

5.3.2 The document discusses how windows are likely to be closed during sleeping hours if noise levels within bedrooms exceed $L_{Aeq,8hours}$ 40 dB and / or L_{AFMax} 55 dB more than 10 times a night. Therefore, the dynamic thermal modelling options becomes the requirement.

5.3.3 Given the levels at the proposed development exceed the aforementioned internal levels and acceptable internal noise levels will likely rely on windows being closed, dynamic thermal modelling is required for the development site and the windows will need to be considered as closed within any overheating assessment.

5.3.4 It should be noted that the assessment of overheating is outside the scope of this report.

5.4 Internal Noise Transfer – Neighbouring Commercial Premises

5.4.1 It is noted that the proposed future residential use development is located adjacent to an existing retail unit which currently operates as a dry cleaners.

5.4.2 It is considered that there is possibility of adverse noise impact at the development site from this location and in line with guidance from the local authority, appropriate sound insulation properties are required to ensure that noise transfer between the use adjacencies are controlled to an appropriate level.

5.4.3 Within the design of the development proposals, good acoustic design has been considered to minimise any possible noise transfer from commercial use to habitable rooms by locating an access corridor along the party wall.

5.4.4 Design proposals do not include habitable rooms sharing a wall partition with the existing retail unit. Therefore, it is considered that a sound reduction performance across the separating wall, which achieves (as a minimum) the residential conversion criteria in Approved Document E of the Building Regulations should be sufficient.

5.4.5 The local authority requires the performance of separating party walls between residential and commercial use to be designed to +10 dB above the material change of use criteria in Approved Document E of the Building Regulations.

5.4.6 Design of the party wall is outside the scope of this report and should be addressed at the detailed design stage, following any conditional planning consent. It is essential that flanking details are adequately addressed at the detailed design stage to ensure that the sound reduction performance of the overall partition is not undermined.

6 CONCLUSIONS

6.1 Overview

- 6.1.1 By instruction from Yorkshire Lilly Investments Limited, NoiseAir was commissioned to undertake a NIA in support of a preliminary planning application for a proposed residential conversion development at the location: 13-15 Southgate, Huddersfield HD1 1QX.
- 6.1.2 Proposals for the development site outline the conversion of the ground floor commercial units and existing cluster flat into 8 no. student apartments with a communal common room and kitchen.

6.2 Conclusions

- 6.2.1 Calculations show that to achieve a reasonable internal acoustic environment in habitable rooms as specified within BS 8233:2014, the building envelope constructions should be selected to meet the sound reduction index (SRI) values presented in **Table 8** and **Table 9**.
- 6.2.2 With windows partially open, the recommended internal noise limits are highly likely to be exceeded within the development site. It is recommended that consideration is given to the inclusion of an active ventilation system to habitable rooms as noise levels are considered to be elevated. However, as **Table 8** demonstrates, adequate ventilation can be achieved with passive ventilation.
- 6.2.3 Due to the high noise levels incident on the eastern facade of the development, which overlooks Southgate (A62), it is recommended that any windows located along this façade are sealed closed.
- 6.2.4 For each habitable room along the eastern façade, the installation of a window has been proposed on the façade overlooking the courtyard. By acoustically sealing the existing courtyard gate, the windows overlooking the courtyard do not necessarily need to be sealed shut.

APPENDIX A - REPORT LIMITATIONS

This report is presented to Yorkshire Lilly Investments 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.

Notwithstanding anything to the contrary contained in the report, NoiseAir Limited is obliged to exercise reasonable skill, care and diligence in the performance of the services required by Yorkshire Lilly Investments Limited and NoiseAir shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.

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The conclusions and recommendations contained in this report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from who it has been requested and that such information is accurate. Information obtained by NoiseAir Limited has not been independently verified by NoiseAir Limited unless otherwise stated in the report and should be treated accordingly.

Where assessments of works or costs identified in this report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

Where / if estimates and projects are made within this report, are made based on reasonable assumptions as of the date of this report, such statements however by their very nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. NoiseAir Limited specifically does not guarantee or warrant any estimates or projects contained in 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. <i>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.</i>
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. <i>NOTE: The ambient sound comprises the residual sound and the specific sound when present.</i>
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 <i>NOTE: The ambient sound level is a measure of the residual sound and the specific sound when present.</i>
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. <i>NOTE: The reference values used within the C_{tr} calculation are based on urban traffic noise.</i>
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 (m ²), 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. <i>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.</i>
Free-field level	Sound pressure level away from reflecting surfaces. <i>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.</i>

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. <i>NOTE: The location(s) within the room at which the ambient indoor noise is to be measured or calculated ought to be considered.</i>
Measurement time interval, T_m (BS 4142:2014)	Total time over which measurements are taken. <i>NOTE: This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.</i>
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. <i>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.</i>
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. <i>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.</i>
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,T_r}	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise. <i>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.</i>
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, that 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, $L_s = L_{Aeq,T_r}$ (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.
Groundborne 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. <i>NOTE Common sources of ground-borne noise include railways and heavy construction work on adjacent construction sites.</i>
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. <i>NOTE Common sources of structure-borne noise include building services plant, manufacturing machinery and construction or demolition of the structure.</i>
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. <i>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).</i>
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)
$L_{Ar,T}$	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)
$L_{Aeq,T}$	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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