



14 Wokingham
Road,
Reading,
RG6 1JG

Noise Impact Assessment

March 2025



Ref: 25-14781
NIA Rev A

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	5
2. INTRODUCTION	6
3. LEGISLATION AND POLICY	8
4. GUIDANCE DOCUMENTS	10
5. COMMERCIAL NOISE.....	12
6. CONCLUSION	15
7. APPENDIX 1: GLOSSARY OF ACOUSTIC TERMINOLOGY	16
8. APPENDIX 2: PROFESSIONAL STATEMENT.....	17

Quality Standards Control

The signatories below verify that this document has been prepared in accordance with our quality control requirements. These procedures do not affect the content and views expressed by the originator.

This document must only be treated as a draft unless it has been signed by the originators and approved by a director.

Revision	-	Rev A	Rev B
Date	14/03/2025	17/03/2025	18/03/2025
Prepared by	D. Yates MIOA	D. Yates MIOA	D. Yates MIOA
Checked by	F. Bolton	-	-
Authorised by	D. Yates MIOA	D. Yates MIOA	D. Yates MIOA

Limitations

Syntegra Consulting Ltd ("SC") has prepared this report for the sole use of the client in accordance with the agreement under which our services were performed. No other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by SC.

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 whom it has been requested and that such information is accurate. Information obtained by SC has not been independently verified by SC, unless otherwise stated in the report.

The methodology adopted and the sources of information used by SC in providing its services are outlined in this report. The work described in this report was undertaken in **February and March 2025** and is based on the conditions encountered and the information available during the said period of time. The scope of this report and the services are accordingly factually limited by these circumstances.

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.

SC disclaim any undertaking or obligation to advise any person of any change in any matter affecting the report, which may come or be brought to SC's attention after the date of the report.

Certain statements made in the report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. SC specifically does not guarantee or warrant any estimate or projections contained in this report.

Costs may vary outside the ranges quoted. Whilst cost estimates are provided for individual issues in this report these are based upon information at the time which can be incomplete. Cost estimates for such issues may therefore vary from those provided. Where costs are supplied, these estimates should be considered in aggregate only. No reliance should be made in relation to any division of aggregate costs, including in relation to any issue, site or other subdivision.

No allowance has been made for changes in prices or exchange rates or changes in any other conditions which may result in price fluctuations in the future. Where assessments of works or costs necessary to achieve compliance have been made, these are based upon measures which, in SC's experience, could normally be negotiated with the relevant authorities under present legislation and enforcement practice, assuming a proactive and reasonable approach by site management.

Forecast cost estimates do not include such costs associated with any negotiations, appeals or other non-technical actions associated with the agreement on measures to meet the requirements of the authorities, nor are potential business loss and interruption costs considered that may be incurred as part of any technical measures.

Copyright

© This report is the copyright of SC. Any unauthorised reproduction or usage by any person other than the addressee is strictly prohibited.

1. Executive Summary

An assessment has been carried out of the present noise climate at **14 Wokingham Road, Reading RG6 1JG** and the impact of that noise on the proposed permitted development application to convert the existing first floor commercial space to a residential property.

The permitted development regulations require the assessment of commercial noise only and in this respect we have provided the following advice in order to control internal noise levels:

- **Replace the existing small, high level rear window with a double glazed unit and seal the unit so that it cannot be opened. An alternative means of ventilating the property, such as acoustic trickle vents or a through-wall ventilator should therefore be provided.**
- **Upgrade the sound insulation of the existing floor by removing the existing suspended ceiling and replacing with an independently mounted ceiling as detailed in Table 5.1 of this report and below:**
 - **1 x 15mm Soundblock plasterboard mounted directly to joists.**
 - **Independent ceiling of 2 x 15mm Soundblock plasterboard mounted a minimum 90mm below existing ceiling. Cavity part filled with mineral wool type sound insulation (minimum mass 10 kg/m²).**

It is important to note that, as with any construction project, the ability to meet the specification will rely upon the quality of the built structure. As such the works should be carried out to a high standard of workmanship to ensure that any sound insulation measures are not breached, for example by installing a rigid connection across an isolated connection (such as resilient bars). Additionally, any joints between different walls and the party wall and the ceiling/floor should be carefully filled with acoustic mastic.

2. Introduction

This report has been prepared to support the permitted development application for the proposed development at **14 Wokingham Road, Reading, RG6 1JG**. The proposed scheme involves conversion of the first floor of the property from a beauty salon to 1No. residential flat.

The report assesses, through on-site noise measurements, the impact of the surrounding commercial uses and existing noise climate on the proposed development.

A glossary of acoustic terminology is provided in **Appendix 1**.

The site is located in a mixed commercial and residential area on Wokingham Road, close to the junction with London Road, known locally as Cemetery Junction. The location of the proposed development site is provided in **Figure 2.1**.

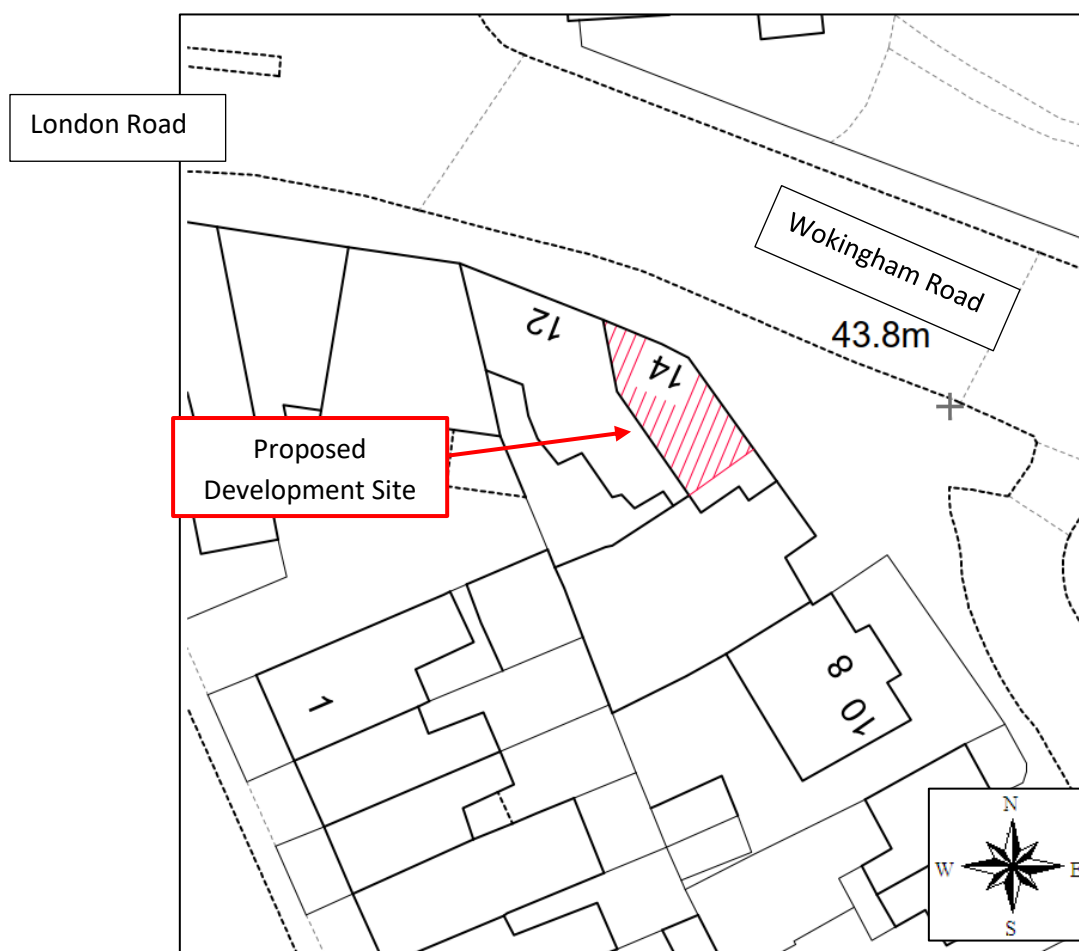


Figure 2.1: Site Location

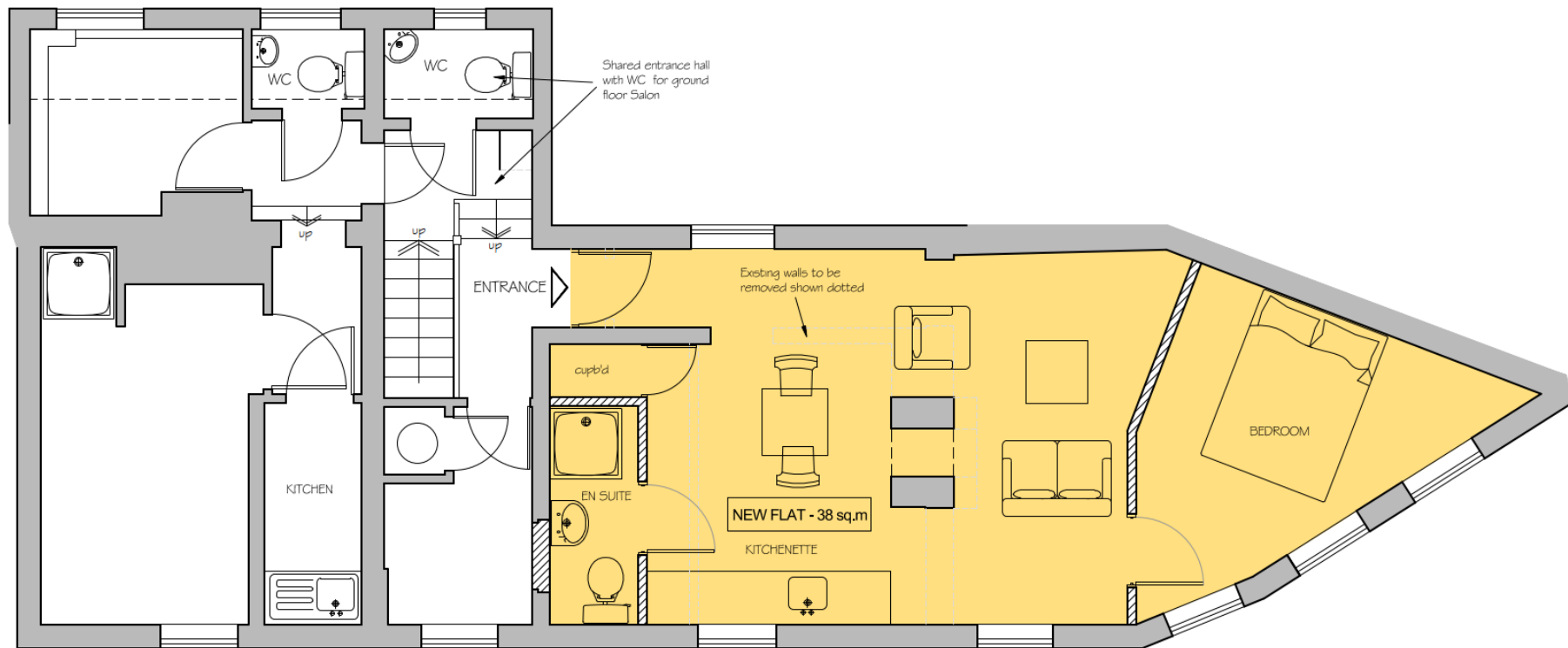


Figure 2.2: Proposed First Floor Layout (Residential Area Highlighted Orange)

3. Legislation and Policy

3.1. Permitted Development Legislation

The application for the conversion of first floor Beauty Salon to 1No. 1 bedroom flat has been submitted for prior approval under Town and Country Planning (General Permitted Development) (England) Order 2015 (as amended) - Schedule 2, Part 3, Class G, which states:

*“G. Development consisting of a change of use of a building—
(a)from a use within Class E (commercial, business and service) of Schedule 2 to the Use Classes Order, to a mixed use for any purpose within that Class and as up to 2 flats;*

...

Conditions

G.1 Development permitted by Class G is subject to the following conditions—

...

(d)before beginning development, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—

...

(iii)impacts of noise from commercial premises on the intended occupiers of the development;

...”

3.2. Local Authority Policy

The site is located within the administrative boundary of Reading Borough Council, who provided the following advice in respect of the proposals:

“Noise impact on development

This flat is likely to be affected by commercial noise from the ground floor use, within the building and also as a result of noise from any external mechanical plant therefore a noise assessment is required.

The noise assessment will be assessed against the recommendations for internal noise levels within dwellings and external noise levels within gardens / balconies in accordance with BS 8233:2014 and WHO guidelines for Community Noise. The report should identify any mitigation measures that are necessary to ensure that the recommended standard is met.

The noise assessment data should also include noise events (LAMax) and the design should aim to prevent noise levels from noise events exceeding 45dB within bedrooms at night, as this is linked with sleep disturbance.

Internal noise criteria (taken from BS8233:2014)

Room	Design criteria	Upper limit
Bedrooms (23:00 to 07:00)	<30dBLAeq,8hour	
Living rooms (07:00 – 23:00)	<35dBLAeq,16hour	
Gardens & Balconies	<50dB LAeq,T	<55dB LAeq,T

Where the new residential use may be affected by noise from commercial premises, the assessment should also include consideration of the impact of the commercial noise sources using BS4142:2014 A 2019 methodology and/or other relevant guidance for particular noise sources such as music noise, as penalties may need to be applied to the acceptable internal noise levels to take into account non anonymous noise sources.

The noise assessment will need to identify the external noise levels impacting on the proposed site.

Noise mitigation is likely to focus on the weak point in the structure; glazing. Given that the acoustic integrity would be compromised should the windows be opened, ventilation details must also be provided, where mitigation relies on closed windows. Ventilation measures should be selected which do not allow unacceptable noise ingress and should provide sufficient ventilation to avoid the need to open windows in hot weather, however non-openable windows are not considered an acceptable solution due to the impact on living standards.

Noise within mixed use scheme (e.g. commercial use on the ground floor and flats above)

There are concerns about noise from the proposed commercial use affecting the proposed residents.

NOISE MITIGATION SCHEME - Please provide a detailed scheme for protecting the dwelling from noise emissions from the commercial use and informed by an assessment of the likely noise emissions from the commercial use. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the separating floor/ceiling between the uses achieves a minimum airborne sound insulation performance of greater than or equal to 55 dB (Dntw +Ctr) and ensures that the noise levels within the property do not exceed the values specified in BS8233:2014 with appropriate penalties and adjustments for the character of the noise. The scheme shall make suitable provision for insulation from structure borne noise."

4. Guidance Documents

4.1. British Standard BS 8233:2014

BS 8233: *Sound Insulation and Noise Reduction for Buildings – Code of Practice* has a number of design criteria and limits for intrusive external noise. The guidelines are designed to achieve reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms and the most appropriate to the residential environment are reproduced in **Table 4.1**.

Activity	Location	07:00 – 23:00	23:00 – 07:00
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 $L_{Aeq,8hour}$

Table 4.1: Indoor Ambient Noise Levels for Dwellings

4.2. World Health Organization Guidelines for Community Noise

The World Health Organization (WHO) has developed guidelines designed to minimise the adverse effects of noise. The guidelines relevant to residential noise exposure are detailed in **Table 4.2**. For each specific environment the stated noise levels are the maximum noise levels to avoid the health effect noted.

Specific Environment	Critical health effect(s)	L_{Aeq} dB	Time Base (hours)	L_{Amax} (fast) dB
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45

Table 4.2: WHO Community Noise Guideline Values

The WHO guidelines state, with respect to the L_{Amax} threshold, that ‘for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10 – 15 times per night (Vallet and Vernet 1991)’.

4.3. Acoustics, Ventilation and Overheating Residential Design Guide

The Acoustics, Ventilation and Overheating Residential Design Guide (AVOG) was published in January 2020 by the Association of Noise Consultants (ANC). The document has been produced to provide practitioners with guidance on how to determine the impact of internal noise levels during both normal (background) ventilation conditions and during overheating conditions. It is recognised that a slightly relaxed set of noise criteria is appropriate during periods of overheating and this is readily accepted by residents of dwellings to counter-balance the discomfort of overheating and exposure to noise through opening windows. The document suggests a balanced approach, protecting against significant impacts of noise exposure whilst allowing for slightly relaxed criteria. This in practice means that windows can be opened on more occasions to mitigate overheating (when compared to normal background ventilation conditions) without creating an unacceptable significant impact from exposure to noise.

4.4. Approved Document F

The Building Regulations Approved Document F (ADF) is concerned with ventilation in dwellings. Three types of ventilation are covered in the document, which are listed below and their interaction with the internal noise level criteria presented in Tables 3.3, 3.4 and 3.6 are presented:

- Whole dwelling (background) ventilation – the internal noise level criteria should be achieved with the ventilation system in operation (e.g. window or trickle vent open, or mechanical ventilation system operational).
- Extract ventilation to remove water vapour and indoor air pollutants where they are produced in significant quantities (e.g. kitchens, utility rooms and bathrooms) – internal noise level criteria are only appropriate for habitable rooms (e.g. living rooms and bedroom) so are not normally applicable.
- Purge ventilation to rapidly dilute air pollutants and water vapour when necessary, in habitable rooms – this is normally only for a very short period of time as required and internal noise level criteria are therefore not applicable.

4.5. Approved Document O

The Building Regulations Approved Document O (ADO) is a new Approved Document (coming into force June 2022) concerned with overheating in dwellings. In terms of noise criteria, the document suggests that when internal noise levels at night would be above a certain level, open windows would not be suitable for mitigating overheating. These levels are:

- 40 dB $L_{Aeq,8hrs}$ (2300 hrs – 0700 hrs)
- 55 dB L_{AFmax} more than 10 times per night (2300 hrs – 0700 hrs).

4.6. British Standard 4142:2014

British Standard 4142:2014 “Methods for rating and assessing industrial and commercial sound” provides a method for the measurement and rating of industrial type noise sources and background noise levels outside dwellings. The rating level (defined in the BS) is used to rate the noise source outside residential dwellings (this is defined as the “specific sound level”).

The rating level is determined by assessing the character of the noise and applying an acoustic feature correction if appropriate. Corrections are applied for the tonality and intermittency of the noise source which can both make noise more noticeable.

The initial assessment described in BS 4142 to determine whether an adverse impact is likely is based on establishing the difference between the rating level and the background noise level outside the residential property of interest. The British Standard states that the following points should be considered:

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

5. Commercial Noise

It has been identified in **Section 3.1** that under permitted development, and in terms of noise, only commercial noise is required to be considered on the proposed development.

5.1. Plant Noise

There are commercial plant units including extract fans and condenser units located around the courtyard to the rear of the proposed flat. However, the only window facing the rear is a small, high level window with no line of sight to any plant. This is evidenced in **Figures 5.1** to **5.3** below.

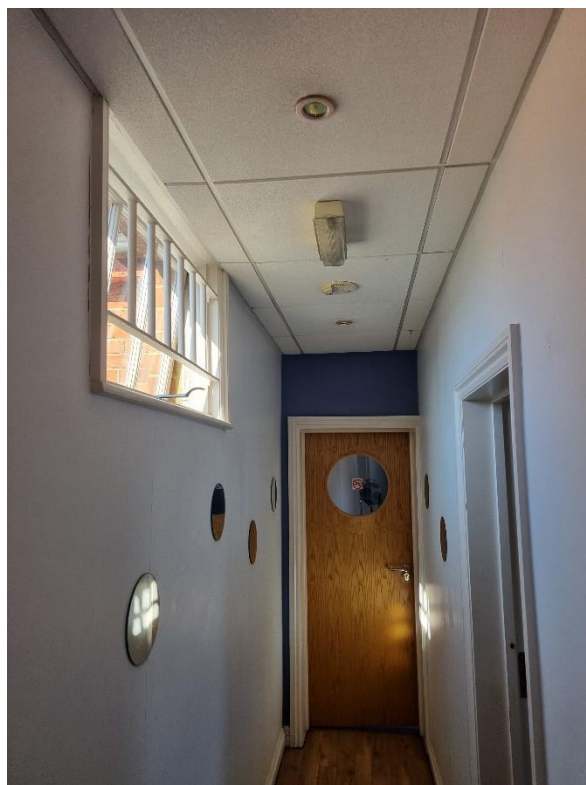


Figure 5.1: Existing Rear Window Internal View



Figure 5.2: View to Left of Rear Window

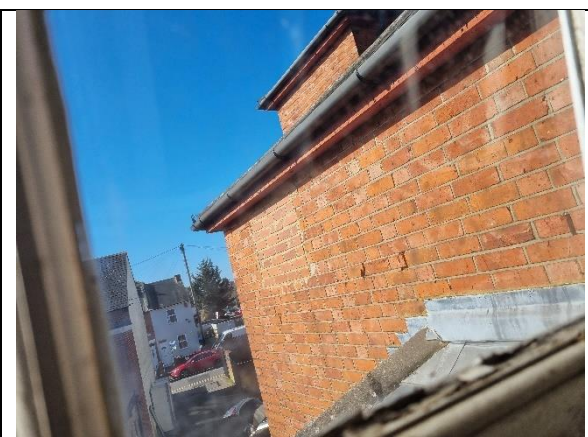


Figure 5.3: View to Right of Rear Window

Due to this access it was not possible to measure noise levels over an extended period of time at the rear of the site. However, with no line of sight to any plant and given the size of the window it is considered that adverse impacts from plant noise is very unlikely.

Nevertheless, in order to ensure that any plant noise does not cause any adverse impacts, it is advised by Syntegra that the window is replaced with a double glazed unit and sealed so that it cannot be opened. An alternative means of ventilating the property, such as acoustic trickle vents or a through-wall ventilator should therefore be provided.

5.2. Sound Insulation between the Ground and First Floors

5.2.1. Sound Insulation Testing of Existing Structure

Sound insulation testing was carried out between the ground floor commercial area and the area for the bedroom of the proposed flat on the first floor. The tests were carried out on 28th February 2025 in accordance with BS EN ISO 140-4:1998 *“Field measurements of airborne sound insulation between rooms”* and BS EN ISO 16283 *“Acoustics. Field measurement of sound insulation and building elements”* Part 1:2014+A1:2017 *“Airborne sound insulation”*.

Airborne noise transmission between rooms is assessed by measuring the difference of the level of a constant noise source in one room (the source room) and the receiving room.

The source noise signal was generated by an analogue noise source (broad band pink noise), which was amplified and fed through a dodecahedron speaker. The sound pressure levels in both the source and receiver room were then measured using a real time analyser. The sound pressure levels being a value of L_{eq} , with measurements recorded in third octave bands from 100 Hz to 3150 Hz. The receiver room levels were corrected for background noise levels, measured using a single position for 30 seconds, and subtracted from the source room levels to determine the level difference, D . For each test, two separate source positions were used and noise levels within both the source and receiver rooms were measured for a 30 second period using the moving microphone method for each source position. This is then used to calculate two partition level differences, calculated using both source positions. These are then arithmetically averaged and standardised to a constant reverberation time to calculate the standardised level difference $D_{n,T}$. The attended source and receiver room method of measurement (as defined in ISO 140-4 Section 6.3.2), with static microphone positions was used with the tester remaining still and present within the room for the duration of the measurements.

The reverberation time was measured in the receiving room in accordance with BS EN ISO 140-4:1998 to 0.01s precision using the interrupted source method. Six decays in total were recorded at three different positions within the receiver room and subsequently averaged.

The sound pressure level is then standardised to a reference value of reverberation time in the receiving room. The standardised level (D_{nT}) is then used to evaluate the weighted value ($D_{nT,w}$). This single figure rating is obtained by application of a reference curve to the third octave level difference band data, the reference curve being shifted in single decibel steps until the sum of the unfavourable deviations is as large as possible, but not more than 32.0 dB – the value of the reference curve at 500 Hz is then taken as the standardised weighted airborne sound pressure level. Performance is rated in terms of the weighted standardised level difference, $D_{nT,w}$ and spectrum adaptation term C_{tr} , in accordance with BS EN ISO 717-1:1997.

The measured sound insulation was 41 dB $D_{nT,w} + C_{tr}$.

5.2.2. Existing and Future Construction

The existing floor has been modelled utilising the INSUL software programme and standard acoustic formulae, with the following assumed construction based on the results of the sound insulation testing and on-site observations:

- Hard vinyl or tile floor on top of standard chipboard flooring
- Nominal 200mm wooden joists, partly filled with mineral wool type sound insulation
- Ceiling tiles mounted on a suspended light steel grid.

In order to increase the sound insulation, it is necessary to add mass and acoustic resilience to the structure. It is understood that the existing suspended ceiling will be removed and replaced. Accordingly, Syntegra have devised a proposed construction utilising the INSUL software programme and standard acoustic formulae to achieve the requirements of the Local Authority ($55 D_{nT,w} + C_{tr}$), which is provided in **Table 5.1**.

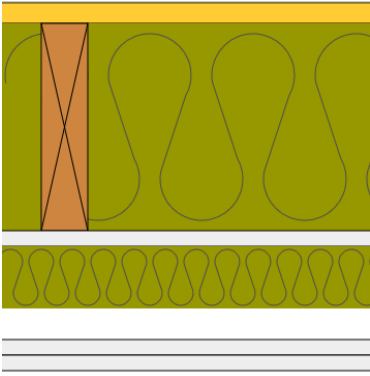
Plan of Partition	Description of Partition	$R_w [C_{tr}]$ (dB)	Ground to First Floor $D_{nT,w} + C_{tr}$ (dB)
	• 18mm chipboard. • Nominal 200mm wooden joists, filled with mineral wool type sound insulation (minimum mass 10 kg/m^2). • 1 x 15mm Soundblock plasterboard mounted directly to joists. • Independent ceiling of 2 x 15mm Soundblock plasterboard mounted a minimum 90mm below existing ceiling. Cavity part filled with mineral wool type sound insulation (minimum mass 10 kg/m^2).	73 [-12]	58

Table 5.1: Sound Insulation Properties – Proposed Floor Construction

It is important to note that, as with any construction project, the ability to meet the specification will rely upon the quality of the built structure. As such the works should be carried out to a high standard of workmanship to ensure that any sound insulation measures are not breached, for example by installing a rigid connection across an isolated connection (such as resilient bars). Additionally, any joints between different walls and the party wall and the ceiling/floor should be carefully filled with acoustic mastic.

6. Conclusion

An assessment has been carried out of the present noise climate at **14 Wokingham Road, Reading RG6 1JG** and the impact of that noise on the proposed permitted development application to convert the existing first floor commercial space to a residential property.

The permitted development regulations require the assessment of commercial noise only and in this respect we have provided the following advice in order to control internal noise levels:

- **Replace the existing small, high level rear window with a double glazed unit and seal the unit so that it cannot be opened. An alternative means of ventilating the property, such as acoustic trickle vents or a through-wall ventilator should therefore be provided.**
- **Upgrade the sound insulation of the existing floor by removing the existing suspended ceiling and replacing with an independently mounted ceiling as detailed in Table 5.1 of this report and below:**
 - **1 x 15mm Soundblock plasterboard mounted directly to joists.**
 - **Independent ceiling of 2 x 15mm Soundblock plasterboard mounted a minimum 90mm below existing ceiling. Cavity part filled with mineral wool type sound insulation (minimum mass 10 kg/m²).**

It is important to note that, as with any construction project, the ability to meet the specification will rely upon the quality of the built structure. As such the works should be carried out to a high standard of workmanship to ensure that any sound insulation measures are not breached, for example by installing a rigid connection across an isolated connection (such as resilient bars). Additionally, any joints between different walls and the party wall and the ceiling/floor should be carefully filled with acoustic mastic.

7. Appendix 1: Glossary of Acoustic Terminology

Term	Description
'A'-Weighting	<i>This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.</i>
Decibel (dB)	<i>This is a tenth (deci) of a bel. The decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.</i>
$L_{Aeq,T}$	<i>The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.</i>
L_{A10}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 10 per cent of a given time and is the L_{A10T}. The L_{A10} is used to describe the levels of road traffic noise at a particular location.</i>
L_{A50}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 50 per cent of a given time and is the L_{A50T}.</i>
L_{A90}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time and is the L_{A90T}. The L_{A90} is used to describe the background noise levels at a particular location.</i>
L_{Amax}	<i>The 'A'-weighted maximum sound pressure level measured over a measurement period.</i>

8. Appendix 2: Professional Statement

David Yates BSc (Hons) MIOA

David Yates is a full member of the Institute of Acoustics (MIOA) and has over 15 years of experience in acoustic consultancy. David has particular expertise in environmental noise providing acoustic consultancy for residential and mixed-use planning applications, plant noise and vibration, construction noise and the design of acoustic, noise and vibration control. David is also experienced in providing sound insulation testing and design advice. David is familiar with the application of all relevant standards associated with his work, including but not limited to, BS 4142, BS 8233, BS 7445, BS 6472, BS 5228, BS 140 series, BS 16283 series and BS 717 series. David manages the acoustic department and is responsible for maintaining Syntegra's ANC membership