

1 Moorfield Road West Didsbury, Manchester



Noise Impact Assessment
Report 27039.NIA.01

Roger Dean Property management ltd
1 Moorfield Road,
West Didsbury, Manchester

Report 27039.NIA.01					
Revision History					
First Issue Date: 14/08/2023					
A			D		
B			E		
C			F		
Written by:		Checked by:		Approved by:	
Harry Coles Graduate Acoustic Consultant		Gonçalo Lemos MIEEnvSc MIOA Principal Acoustic Consultant		Steven Leslie MIOA Consultancy Manager	
Disclaimer KP Acoustics Ltd. has used reasonable skill and care to complete this technical document, within the terms of its brief and contract with the resources devoted to it by agreement with the client. We disclaim any responsibility to the client and others in respect of any matters outside the stated scope. This report is confidential to the client and we accept no responsibility to third parties to whom this report, or any part thereof, is made known. KP Acoustics Ltd. accepts no responsibility for data provided by other bodies and no legal liability arising from the use by other persons of data or opinions contained in this report. KP Acoustics Ltd. 2023					

Contents

1.0	INTRODUCTION	1
2.0	SITE DESCRIPTION	1
3.0	SOUND INSULATION INVESTIGATION	2
3.1	Airborne Tests	2
3.2	Reverberation Time	3
3.3	Background Noise	3
3.4	Equipment	3
3.5	Test Rooms	3
3.6	Sound Insulation Investigation	4
4.0	NOISE ASSESSMENT GUIDANCE	5
4.1	Planning Conditions	5
4.2	Noise Policy Statement for England 2021	5
4.3	BS8233:2014	7
5.0	NOISE TRANSFER PREDICTIONS	7
5.1	Direct Noise Transfer to First Floor Residential from Proposed Ground Floor Office	7
6.0	NOISE CONTROL MEASURES	8
6.1	Ground Floor Wall between Proposed Office Space and Adjacent Kitchen	8
6.2	Junction Detailing	8
7.0	CONCLUSION	9

List of Attachments

Appendix A	Glossary of Acoustics Terminology
Appendix B	Direct Transfer Calculations

1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Roger Dean Property management Ltd, 1 Moorfield Road, West Didsbury, Manchester to assess the suitability of the site at 1 Moorfield Road, West Didsbury, Manchester for a change of use to from residential to office use in accordance with the provisions of the National Planning Policy Framework and the Noise Policy Statement for England (NPSE).

An assessment has been conducted to evaluate the direct noise transfer to the existing residential flats from the proposed office units.

2.0 SITE DESCRIPTION

The site is bounded by Barlow Moor Rd to the south, Moorfield Road to the east and residential properties to the north and west. The existing first floor and ground floor layouts are shown in Figures 2.1 and 2.2 below.

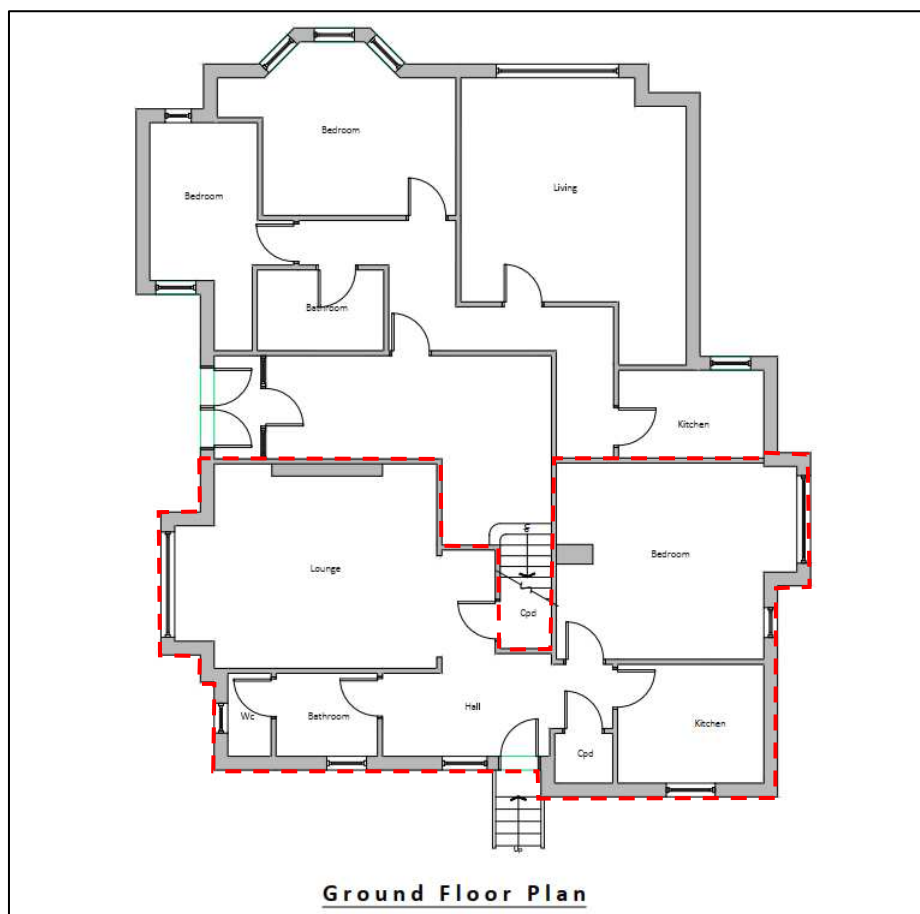


Figure 2.1 Proposed Ground Floor Office location (Drawing source: BluRoom Architecture)

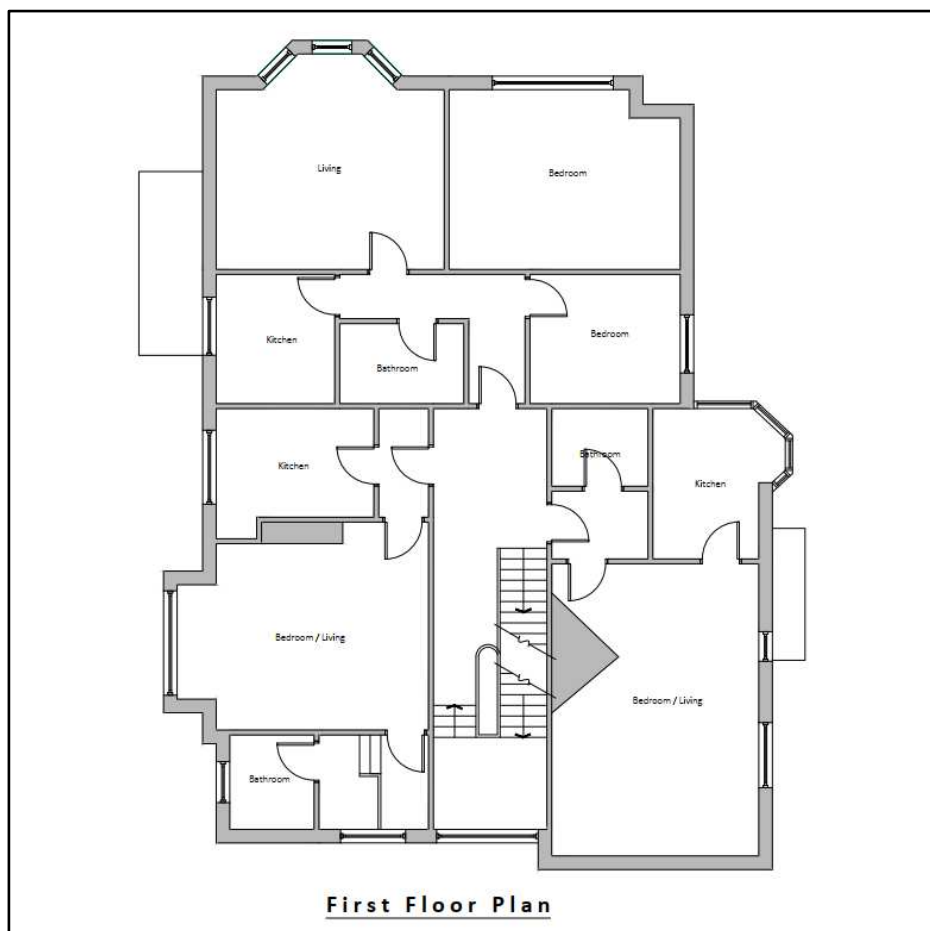


Figure 2.2 Existing First Floor Residential layout (Drawing source: BluRoom Architecture)

3.0 SOUND INSULATION INVESTIGATION

In order to assess direct noise transfer from the proposed ground floor office to the proposed residential units adjacent and above, as well as noise breakout from the building, a sound insulation investigation was undertaken as described below.

3.1 Airborne Tests

High volume 'pink' noise was generated from one loudspeaker in the source room, positioned to obtain a diffuse sound field. A spatial average of the resulting one-third octave band noise levels between 100 Hz and 3150 Hz was obtained by using a moving microphone technique over a minimum period of 30 seconds. The same measurement procedure was used in the receiver room. The procedure was then repeated for a second loudspeaker position within the source room, as required by the Standard.

The results of the tests were rated in accordance with BS EN ISO 717-1: 1997 '*Rating of sound insulation in buildings and of building elements. Part 1 Airborne sound insulation*'.

3.2 Reverberation Time

Reverberation time measurements were taken following the procedure described below in order to correct the receiver levels for room characteristics. The source was moved to the receiver room and 'pink' noise was generated and stopped instantaneously in order to measure the reverberation time in each of the one-third octave bands between 100 Hz and 3150 Hz. The internal programme of the meter was used to measure the decay time of the sound in the room. This was repeated six times in each room in order to obtain an average result.

3.3 Background Noise

The background noise levels in the receiver rooms were measured during the tests and the receiving room levels corrected in accordance with BS EN ISO 140 Part 4.

The dominant source of background noise observed during the tests was dominated by road traffic noise from Barlow Moor Rd.

3.4 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 3.1.

Instrument	Manufacturer and Type	Serial Number
SLM5 Precision integrating sound level meter & analyser	NTi Audio, XL2-TA Calibration No: UCRT22/1244, 1239 &1242 Calibration Dates: 16/02/2022 Calibration Due: 15/02/2024	A2A-17287-E0
LS10 Active Loudspeaker	RCF ART 310A	VBCS01219
GEN 12 Pink Noise Source	NTi Audio Minirator MR-PRO	G2P-RAOPI-G1
CAL2 Calibrator 2	B&K Type 4231 Calibration No: UCRT23/1739 Calibration Date: 05/06/2023 Calibration Due: 04/06/2024	2147411
LM12 Laser Meter	DTAPE DT50	2022103024265

Table 3.1 Measurement instrumentation

3.5 Test Rooms

Details of the rooms tested are shown in Table 3.1 below. All the rooms tested were in a finished state, with doors fitted, walls painted and all sockets installed.

Test Element	Room 1	Room 2	Construction
Wall 1	Proposed office space: Existing bedroom (60m ³)	Ground floor kitchen of adjacent flat (16m ³)	Unknown at time of test
Floor 1	Proposed office space: Existing bedroom (60m ³)	First Floor bedroom (77m ³)	Unknown at time of test
Floor 2	Proposed office space: Existing lounge (68m ³)	First Floor Bedroom (50m ³)	Unknown at time of test

Table 5.1 Room details

3.6 Sound Insulation Investigation

In order to determine the impact of direct noise transfer between the proposed office space and the existing adjacent receiver spaces, the results of the sound insulation testing have been used to calculate the attenuation provided by the existing separating wall and floors.

The level difference between rooms, as provided by the existing shared partitions, is presented below in Table 3.4.

Test Element	Level Difference (dB) in each Octave Frequency Band							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Wall 1	-35	-38	-41	-43	-48	-50	-51	-56
Floor 1	-32	-36	-46	-59	-65	-71	-71	-67
Floor 2	-24	-30	-38	-51	-61	-67	-70	-67

Table 3.4 Airborne test results

For indicative purposes only, the test results have also been compared to minimum sound insulation requirement for the 'Change of Use' category of Approved Document E (2003 Edition) of the Building Regulations 2010. For 'Change of Use' ADE specifies minimum airborne performance of 43 dB $D_{nT,w} + C_{tr}$. The test results are shown in Table 3.5 below.

Test Element	Source	Receiver	Test Result	Pass/Fail
Wall 1	Proposed office space: Existing bedroom (60m ³)	Ground floor kitchen of adjacent flat (16m ³)	$D_{nT,w} + C_{tr}$ 49dB	Pass
Floor 1	Proposed office space: Existing bedroom (60m ³)	First Floor bedroom (77m ³)	$D_{nT,w} + C_{tr}$ 45dB	Pass
Floor 2	Proposed office space: Existing lounge (68m ³)	First Floor Bedroom (50m ³)	$D_{nT,w} + C_{tr}$ 43dB	Pass

Table 3.5 Airborne test results compared to the minimum sound insulation requirement for the 'Change of Use' category of Approved Document E (2003 Edition)

As noted in Table 3.5, the test results comply with the minimum requirements for the 'Change of Use' category of Approved Document E (2003 Edition) of the Building Regulations 2010.

4.0 NOISE ASSESSMENT GUIDANCE

4.1 Planning Conditions

It is understood that the following planning condition has been issued for application 136234/FO/2023 regarding the change of use of apartment to form an office:

"5) a) The premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority. "

4.2 Noise Policy Statement for England 2021

The National Planning Policy Framework (NPPF) has superseded and replaces Planning Policy Guidance Note 24 (PPG24), which previously covered issues relating to noise and planning in England. Paragraph 174 of NPPF 2021 states that planning policies and decisions should aim to:

- preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans

In addition, Paragraph 185 of the NPPF states that *‘Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should’:*

- Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life
- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason

The Noise Policy Statement for England (NPSE) was developed by DEFRA and published in March 2010 with the aim to ‘Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development.’

Noise Policy Statement England (NPSE) noise policy aims are as follows:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life*

The Noise Policy Statement England (NPSE) outlines observed effect levels relating to the above, as follows:

- 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.

As stated in The Noise Policy Statement England (NPSE), it is not currently possible to have a single objective based measure that defines SOAEL that is applicable to all sources of noise in all situations. Specific noise levels are not stated within the guidance for this reason, and allow flexibility in the policy until further guidance is available.

4.3 BS8233:2014

BS8233:2014 '*Sound insulation and noise reduction for buildings*' describes recommended internal noise levels for residential spaces. These levels are shown in Table 5.1.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB(A)	-
Dining	Dining Room/area	40 dB(A)	-
Sleeping (daytime resting)	Bedrooms	35 dB(A)	30 dB(A)

Table 5.1 BS8233 recommended internal background noise levels

We recommend that the referenced recommended internal noise levels are considered as criteria for the transfer of noise from the proposed office spaces to ensure that the amenity of the existing residential habitable areas is protected.

5.0 NOISE TRANSFER PREDICTIONS

5.1 Direct Noise Transfer to First Floor Residential from Proposed Ground Floor Office

Further to discussions with the client, it is understood that a total of 5 desks will be positioned within the proposed office space. It is understood that the proposed operational hours of the office unit will be 09:00 – 17:00. To consider a worst-case source level, the level of 5 raised voices speaking simultaneously, as specified within ANSI 3.5-1997 Methods for Calculation of the Speech Intelligibility Index, will be used to represent a worst-case source noise level within the proposed ground floor office, and taking into account the measured level difference of the existing separating wall and floor, Table 5.1 shows predicted sound pressure levels within the existing First Floor residential bedrooms and Ground Floor kitchen. Full calculations are shown in Appendix B.

Test Element	Receiver	BS8233:2014 Requirement	Predicted Noise Levels Within Proposed First Floor Bedrooms
Wall 1	Ground floor kitchen of adjacent flat (16m ³)	35 dB(A) (07:00-23:00)	38 dB(A)
Floor 1	First Floor bedroom (77m ³)	35 dB(A) (07:00-23:00)	25 dB(A)
Floor 2	First Floor Bedroom (50m ³)	35 dB(A) (07:00-23:00)	32 dB(A)

Table 5.1 Predicted noise levels due to the proposed ground floor office operation

As shown in Table 5.1 and Appendix B, the direct noise transfer through the separating floors with the existing construction would be below the criterion stipulated in BS8233. Therefore, with the current construction, it is not expected that direct sound transfer would cause noise nuisance to the residential occupiers via this path.

However, direct noise transfer through the existing separating wall on the ground floor would exceed the internal noise criterion within the adjacent receiver space, as per the guidance of BS823. We would therefore recommend the implementation of further remedial noise control measures, detailed within Section 6.0 below.

6.0 NOISE CONTROL MEASURES

6.1 Ground Floor Wall between Proposed Office Space and Adjacent Kitchen

In order to improve the performance of the existing party wall, we would recommend the installation of additional layers on the existing wall lining, as below:

- Existing wall lining
- RB1 Resilient Bars
- 1x15mm SoundBloc Plasterboard

Implementation of the above measures will ensure an increased performance, resulting in a reduction in direct noise transfer between the proposed office use space and the existing residential flat on the ground floor.

6.2 Junction Detailing

In order to ensure the separating wall is performing as expected, special attention should be given to workmanship regarding the proper sealing of junctions and penetration details. Where any gaps between external (flanking) walls and floors exist, they should be caulked

with sealant or similar type material. It should be also noted that flanking strips (Yelofon ES5/100) should be installed around the perimeter of the floor to isolate the floor from walls and skirtings. The strip should be turned up so that the skirting boards rest on them and any excess cut away.

7.0 CONCLUSION

Sound Insulation tests were undertaken at 1 Moorfield Road, West Didsbury, Manchester. Rating of the airborne sound insulation of the floors and walls tested has been calculated in accordance with the measurement and rating procedures defined in BS EN ISO 140 Part 4 and BS EN ISO 717 Part 1, respectively.

An assessment has been completed assessing the direct noise transfer to the existing residential bedrooms from the proposed office units within typical daytime operational hours. It has been concluded that direct sound transfer from the adjacent office through the existing party floor would not be expected to cause a negative impact on residential amenity to the adjacent residential units.

Guidelines to improve the party walls' sound insulation performance have been proposed which, should they be followed, would provide a benefit for the tenants of each apartment by means of a reduction in airborne noise transmission.

No further mitigation measures should be required in order to protect the neighbouring habitable spaces from external noise intrusion.

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq} . The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

L_{90}

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPLIED ACOUSTIC TERMINOLOGY

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.

APPENDIX B

1 Moorfield Road, West Didsbury, Manchester

DIRECT NOISE TRANSFER CALCULATIONS

Source: Proposed office space: Existing bedroom (60m ³) Receiver: Ground floor kitchen of adjacent flat (16m ³)	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Typical raised voice noise level, (ANSI 3.5-1997) L _w , dB	48	59	69	75	72	64	57	48	
Correction for 5 people, dB	7	7	7	7	7	7	7	7	
Measured level difference of separating wall, dB	-35	-38	-41	-43	-48	-50	-51	-56	
Sound Pressure Level at Within Receiver Space	20	28	35	39	31	21	13	0	38

Direct Transfer Noise Criterion

35

Source: Proposed office space: Existing bedroom (60m ³) Receiver: First Floor bedroom (77m ³)	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Typical raised voice noise level, (ANSI 3.5-1997) L _w , dB	48	59	69	75	72	64	57	48	
Correction for 5 people, dB	7	7	7	7	7	7	7	7	
Measured level difference of separating wall, dB	-32	-36	-46	-59	-65	-71	-71	-67	
Sound Pressure Level at Within Receiver Space	23	30	30	23	14	0	0	0	25

Direct Transfer Noise Criterion

35

Source: Proposed office space: Existing lounge (68m ³) Receiver: First Floor bedroom (50m ³)	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Typical raised voice noise level, (ANSI 3.5-1997) L _w , dB	48	59	69	75	72	64	57	48	
Correction for 5 people, dB	7	7	7	7	7	7	7	7	
Measured level difference of separating wall, dB	-24	-30	-38	-51	-61	-67	-70	-67	
Sound Pressure Level at Within Receiver Space	31	36	38	31	18	4	0	0	32

Direct Transfer Noise Criterion

35