Martec Environmental Consultants Ltd.
Waterbrow Wood, Gressingham, LANCASTER LA2 8LX
Tel: 01524 222000
Email: info@martecenviro.co.uk
Website: www.martecenviro.co.uk

SOUND INSULATION AND

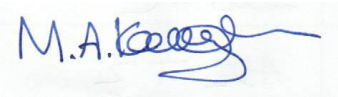
BACKGROUND NOISE REPORT

152 Oxford Road, Reading RG1 7PJ

MARTEC ENVIRONMENTAL CONSULTANTS LTD

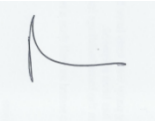
ANC REGISTERED TESTERS NO.134

Prepared by: M A Kenyon MSc BSc MIOA



Measurements by: S B Mellor MA CMIOSH MIOA

Checked by: P M Dyson BSc Dip Acoustics MIOA



Loughborough Office:
8 Bayliss Close, Quorn, Loughborough LE12 8PF

Staffordshire / Cheshire Office:
2, Betley Hall Gardens, Betley, Crewe CW3 9BB

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1.0 INTRODUCTION

Martec Environmental Consultants Ltd were instructed to carry out sound insulation tests and overnight background noise measurements, at 152 Oxford Road, Reading RG1 7PJ; the purpose of the tests was to determine the sound insulation performance of the existing structures, as well as establishing the noise criteria for external plant and to make recommendations for improvements where appropriate.

Currently the premises are commercial on the ground floor and residential on first floor; the application with Reading Borough Council [PL/24/0938] is for:

"Change of Use from Estate Agent to Hot food takeaway"

It is understood that there would be no music in the venue, nor would there be any external seating areas. Given the wording of the local authority's concerns [See Appendix 3] external "people" noise has not been considered further; however, external background noise measurements have been made to assist in formulating a condition suitable for any externally mounted chillers, extract plant etc.

Appendix 1 is a description of acoustic terms, Appendix 2 contains the author's qualifications and experience, Appendix 3 contains a copy of Reading BC,s Environmental Health consultation on the application and Appendix 4 contains the recommended sound insulation treatment.

2.0 CONSTRUCTION OF SEPARATING STRUCTURES

It is understood that the existing separating floor is timber based, with what appears to be a plasterboard ceiling [probably a single layer]. The side walls appear to be solid masonry 9” brickwork, given the likely age of the building.

Figure 1: Proposed Layout [Wellbuilt Drwng 208/ORR/PL1]

3.0 CRITERIA

3.1 Sound Insulation

Appendix 3 contains the Environmental Health Consultation on this application. Under proposed condition N24, the sound insulation performance of the floor/ceiling in this existing building would have to achieve 55dB $D_{nT,w}+C_{tr}$ or more.

It is important to note that a performance of 55dB $D_{nT,w}+C_{tr}$ or more, is an exceptionally high standard and the author is not aware of any document that supports this criterion. As an example, achieving any given level of sound insulation in a new building is significantly easier than in an existing building [e.g. Building Regulations standards which are lower for conversions than in new builds.] Robust Standard Details provide recommended constructions for new-builds to achieve given levels of sound insulation performance and the only new-build floor constructions that can achieve 53dB $D_{nT,w}+C_{tr}$ are concrete or steel constructions i.e. no new-build **timber** floor is recommended to achieve even 53dB $D_{nT,w}+C_{tr}$. In fact, the best new-build timber floors are only rated to achieve 50dB $D_{nT,w}+C_{tr}$.

Consequently, it can be seen that it is very difficult for a timber floor in an **existing building** [as here] to achieve even 50dB $D_{nT,w}+C_{tr}$ let alone 55dB $D_{nT,w}+C_{tr}$. Given that there are many thousands of timber floors that separating ground floor commercial uses from first floor residential uses.

This indicates that a criterion of 55dB $D_{nT,w}+C_{tr}$ for an existing timber floor may be unnecessary and not achievable and hence unreasonable.

3.2 External Plant

From the Environmental Health Consultation in Appendix 3, under proposed condition N24, the rating level [as per BS4142+A1:2019] would be limited to 10dB **below** the pre-existing background sound level.

For the avoidance of doubt, this is a very stringent criteria, which would effectively mean that there was no permissible increase in ambient noise levels; there would be very little development of any sort if this criterion were to be widely applied. By contrast a typical noise condition would limit increases to no more than 5 or 10dB **above** the background noise level.

4.0 MEASUREMENTS

4.1 Sound Insulation Tests

Approximate room dimensions were measured on site. Where cupboards were located on walls, they were opened during the measurements. In addition, all the procedures described in Annex B of Approved Document E of the Building Regulations have been followed except where stated otherwise.

For Airborne Sound Insulation Tests

The airborne sound insulation of the separating structures was tested in full accordance with the methodology of ISO 140:1998 Part 4 and single number values for $D_{nT,w}$ & $D_{nT,w}+C_{tr}$ were calculated using the methodology of ISO 717: 1996 part 1.

The source level for each room was determined according to the following method. The sound sources were placed on stands in the larger of the two rooms and the second source position was at least 1.4m from the first, with neither speaker facing towards the partition tested; the minimum distance from each speaker to any room boundary was at least 500mm and the minimum difference in those distances was 100mm. The speakers operated simultaneously using separate, uncorrelated, pink noise sources.

A preliminary sweep measurement was made over the course of at least 30 seconds and any differences between adjacent 1/3 octaves, greater than 6 dB, were eliminated by a combination of adjusting the source settings, moving the loudspeakers or by moving diffusers (or furniture). Subsequently 10 second measurements were made at six microphone positions for both the source and receiver rooms (received levels and background noise measurements), i.e. an average over 1 minute.

No microphone position was closer than 0.5m from the room boundaries. In smaller rooms (<25m3) five microphone positions may have been used

for 12 seconds at each position; however, the separation distance requirements were complied with.

Instrumentation

Details of the measuring instrumentation used for the sound insulation measurements are shown below:

Instrument	Type	Serial No.	Calibration Cert. No.	Date of Due Calibration
Svan 977	Sound Level Meter	36870	1502651-1	21/05/2025
Svan SV12L	Preamp	71675	1502651-1	21/05/2025
Aco Pacific 7052E	Microphone	70160	1502651-1	21/05/2025
Avante A12	Active Speaker	1689600620	n/a	n/a
Avante A12	Active Speaker	1689600531	n/a	n/a
Stereo Recording of pink noise played on iPhone				
Svan SV33B	Calibrator	112680	1502651-2	21/05/2025
Sound Solutions	Tapping Machine	TP02003	TP02003/10/18	13/10/2024

Table 1: Instrumentation

Reverberation Time Measurements

The reverberation times were determined by using the sound level meter and its internal software or external PC software. The average value of T20 for six starting pistol impulses at six different source and receiver positions was used, except where receiver rooms were small (<10m3) where the average of three impulses at each of two positions was used. Reverberation time calculations were made using the “reverse-Schroeder integration method”.

4.2 Background Noise Measurements

Instrumentation was installed on Wednesday 23rd October 2024 1m

outside the rear first floor window of the property and left gathering data overnight.

The meter [Svan 977A s/n 69280] was mounted on a pole at 1m from the first-floor rear window and fitted with a RION WS02 “all weather” windmuff; the meter field-calibrated correctly before and after the measurements using the calibrator detailed in Table 1 above.

5.0 RESULTS

5.1 Sound Insulation Measurements

The full results appear at the rear of the report. The single figure rating values are presented below:

Table 2: Airborne Sound Insulation Results [dB] - 24/10/2024						Results		
ANC Test	Source	Vol (m3)	Receiver	Vol (m3)	Element	$D_{nT,w}$ (dB)	C_{tr} (dB)	$D_{nT,w}+C_{tr}$
N/A	GF Proposed Take-aw ay	64	FF Front Room (Living)	32	Floor	42	-7	35
N/A	GF Proposed Take-aw ay	64	FF Kitchen	19	Floor	40	-8	32

5.2 Background Noise Measurements

The background noise readings are shown in Table 3 below

Start date & time	Duration	LAeq	LAF,max	LAF,min	L01	L10	L50	L90
23/10/2024 19:00:00	01:00:00.000	51.1	72.4	45.4	60.2	52.5	48.9	47.3
23/10/2024 20:00:00	01:00:00.000	53.6	81.5	43.5	61.6	51.6	48.5	46.2
23/10/2024 21:00:00	01:00:00.000	48.1	69.1	42.9	54.1	49.5	46.8	44.8
23/10/2024 22:00:00	01:00:00.000	47.8	71.0	42.6	54.0	49.3	46.5	44.4
23/10/2024 23:00:00	01:00:00.000	46.6	62.6	41.9	50.8	48.4	46.1	44.1
24/10/2024 00:00:00	01:00:00.000	47.4	60.0	44.2	52.1	49.1	46.6	45.4
24/10/2024 01:00:00	01:00:00.000	48.4	73.3	44.1	54.2	49.3	46.0	45.0
24/10/2024 02:00:00	01:00:00.000	46.4	54.9	44.2	50.2	47.5	46.0	45.1
24/10/2024 03:00:00	01:00:00.000	43.0	59.1	36.3	53.1	45.3	40.3	38.4
24/10/2024 04:00:00	01:00:00.000	45.4	63.2	37.1	54.5	48.0	42.1	39.6
24/10/2024 05:00:00	01:00:00.000	46.9	65.2	38.2	55.9	48.8	44.2	40.9
24/10/2024 06:00:00	01:00:00.000	49.8	74.8	41.9	57.4	51.6	47.8	44.7
24/10/2024 07:00:00	01:00:00.000	50.3	70.6	43.6	57.3	51.9	48.8	46.6
24/10/2024 08:00:00	01:00:00.000	49.7	68.5	43.9	56.4	51.6	48.5	46.3
24/10/2024 09:00:00	01:00:00.000	50.5	73.2	42.2	58.6	52.0	48.3	45.5
24/10/2024 10:00:00	01:00:00.000	51.9	76.4	39.9	61.2	51.5	48.0	45.0
24/10/2024 11:00:00	01:00:00.000	53.0	83.5	43.4	64.0	53.3	49.2	46.8

Table 3: Background Noise Readings [dBA]

The nighttime background noise levels can be plotted as shown in Figure2 below:

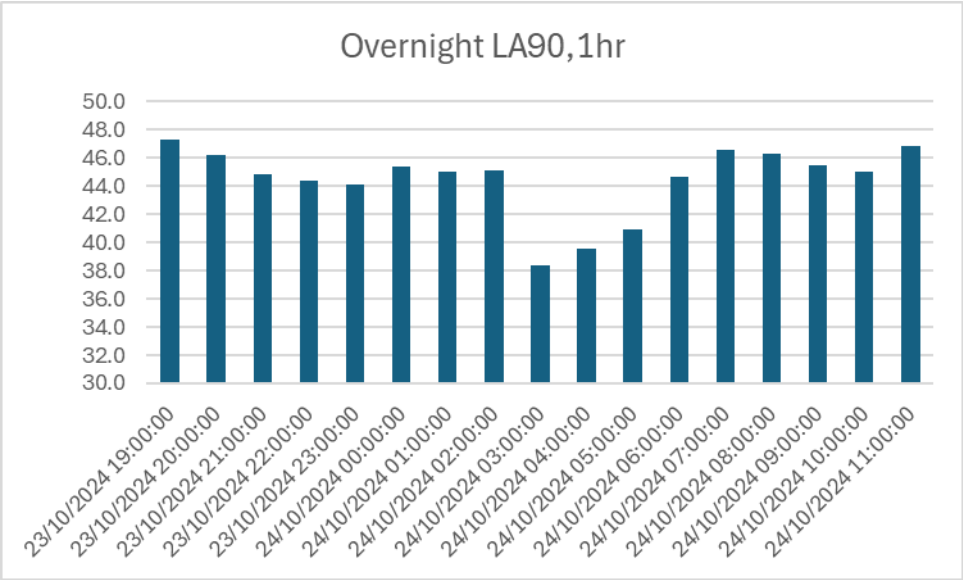


Figure 2: Nighttime Background [dB Facade]

There is a weather station nearby [IREADI173], that reported its results for the monitoring period on www.wunderground.com, and during the monitoring period the reported windspeed was zero to 5 kph from the east, temperatures of 5 to 10 degrees Centigrade and no precipitation. It is not considered that these conditions would have significantly affected the readings.

6.0 ASSESSMENT

6.1 Sound Insulation

From Section 2, the existing construction, it was not expected that the measured performances would meet the local authority's requirements. It can be seen from Table 2 that the measured results in the low thirties $D_{nT,w}+C_{tr}$ which is consistent with the 'understood details' of the construction.

A common form of remedial treatment, under these circumstances, would be to install 'Floor Treatment 1' from Approved Document E, which involves the installation of a secondary ceiling; however, whilst this should reliably meet Building Regulations requirements, from experience it would fall short of the 55 dB $D_{nT,w}+C_{tr}$ criterion; so it will be necessary to increase the specification [See Appendix 4].

These recommendations are offered on the basis that there are the best practicable recommendations; however, it is not clear whether the local authorities criterion can be achieved.

It should be noted that sound can travel along any 'lightweight' walls, and thereby flank around separating floors; here 'lightweight' means a continuous wall which is not at least 9 inch brickwork or similar; therefore, any continuous walls that are say 4 inch brickwork or 100mm blockwork are likely to need treatment to prevent this flanking sound becoming an issue [See Appendix 4].

6.2 Background Noise Levels

From Figure 2, it can be seen that starting at 3am background noise levels dropped from 44-45 dB LA90 drown to 38 dB LA90 and then slowly rose to the morning rush hour level around 46dB LA90; consequently, it appears that there was a reasonably constant noise source that turned off at 3am. Whilst there is a petrol station next door, from Google Street View 'Perfect Fried Chicken' is just three doors down and again from Google it is stated as operating until 3am on Wednesday and later at the weekend. From Bing Maps 'Birds Eye View' there is a large extract flue at the rear of the building, which was not visible from the background monitoring location.

It seems a reasonable assumption that nighttime background noise levels in the immediate vicinity are controlled by the kitchen extract fan of 'Perfect Fried Chicken' until 3 or 4 am.

It is understood that these premises would operate until midnight and therefore the relevant background noise level would be with the 'Perfect Fried Chicken' system operating, i.e. 44 dB LA90 [façade].

7.0 CONCLUSIONS

It is considered that with suitably worded conditions the noise impact should not bar the grant of planning consent for the development.

7.1 Sound Insulation

With regard to the sound insulation between the ground floor premises and the apartment above, it is considered that consent should be granted subject to the installation of a scheme of sound insulation as shown in Appendix 4 of this report.

7.2 External Plant

With reference to BS:4142+A1:2019, any mechanical plant shall be designed such that the predicted specific noise level [LAeq,TR], , as measured at a point 1 meter external to the nearest noise-sensitive façade shall be at least 10dB below the pre-existing background noise

levels, which has been determined to be 44dB LA90. In addition, the predicted rating level shall not exceed the same background noise level.

The plant shall thereafter only be installed in accordance with the assessment and shall thereafter be maintained so that it operates to the same standard.

APPENDIX 1

EXPLANATION OF ACOUSTIC TERMS

The dB or the decibel, is the unit of noise. The number of decibels or the level, is measured using a sound level meter. It is common for the sound level meter to filter or 'weight' the incoming sound so as to mimic the frequency response of the human ear. Such measurements are designated **dB(A)**.

A doubling of the sound is perceived, by most people, when the level has increased by 10 dB(A). The least discernible difference is 2 dB(A). Thus most people cannot distinguish between, say 30 and 31 dB(A).

The Background level of noise is most commonly represented by the level which is exceeded for 90% of the time i.e. the LA90.

If a noise varies over time then the **equivalent continuous level, or LAeq**, is the notional constant level of noise which would contain the same amount of acoustic energy as the time varying noise.

The following table gives an indication of the comparative loudness of various noises expressed in terms of the A weighted scale:

Source of noise	dB(A)	Nature of Noise
Inside Quiet bedroom at night	30	Very Quiet
Quiet office	40	
Rural background noise	45	
Normal conversational level	60	
Busy restaurant	65	
Typewriter @ 1m	73	
Inside suburban electric train	76	
Alarm clock ringing @ .5m	80	
Hand clap @ 1m	80	
HGV accelerating @ 6m	92	Very Loud

APPENDIX 2

QUALIFICATIONS AND EXPERIENCE OF M. A. KENYON

My full name is Melville Alexander Kenyon. I am the principal of the firm of Martec Environmental Consultants Ltd, a consultancy company that specialises in environmental noise assessment and control. I graduated in 1982 with a Bachelor's degree in Engineering and subsequently a Master's degree in Environmental Acoustics. I have been a corporate member of the professional body for noise and vibration specialists, the Institute of Acoustics, since 1988, and have sat on the British Standards Committee dealing with noise in buildings [BS.8233:1999].

I have lectured at Liverpool John Moores University on the Diploma of Acoustics course and at Manchester Metropolitan University on their Environmental Health degree course.

The firm of Martec Environmental Engineering was formed in the 1970's and has been a member of The Association of Noise Consultants since 1996. Since that time we have advised many groups of both residents and developers about the problems of noise and vibration in the environment.

APPENDIX 3 – EH CONSULTATION

152 Oxford Rd ref 240938

Moon, Rebecca <Rebecca.Moon@reading.gov.uk>
Mon 09/09/2024 14:35
To:Rejwerska, Marcelina <Marcelina.Rejwerska@reading.gov.uk>

Internal Memorandum

To:	Ms Marcelina Rejwerska	Your Ref:	PL/24/0938
From:	Rebecca Moon - Environmental Health Officer	My Ref:	EP /779180
Date consultation received: 30/07/2024		Date: 9 September 2024	

Application Number: PL/24/0938
Premises Address: 152 Oxford Road Reading RG1 7PJ
Application For: Change of Use from Estate Agent to Hot food takeaway

Environmental Protection concerns

- **Noise arising from development**
- **Delivery hours/waste collections/opening hours**
- **Odour and noise – kitchen extraction**
- **Bin storage - rats**

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

I have concerns about noise from the proposed commercial use affecting the residents above as the noise from a hot food takeaway use is likely to impact residents significantly more than an estate agent use – due to activities taking place inside the kitchen, and also due to the hours of operation. The following condition is recommended, or an assessment to be provided prior to consent being given.

- **N24 NOISE MITIGATION SCHEME (INTERNAL) - MIXED USE (TO BE SUBMITTED)**

No development shall commence on site until a detailed scheme for protecting the dwellings from noise emissions from the commercial use hereby approved and informed by an assessment of the likely noise emissions from the approved commercial use, has been submitted to and approved in writing by the Local Planning Authority. 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.

Thereafter, the development shall not be carried out other than fully in accordance with the approved scheme which shall be completed before any part of the accommodation hereby approved is first occupied and shall be retained and maintained as such at all times thereafter.

REASON: In order to safeguard the amenity of occupiers of the residential accommodation in accordance with Policies CC8 and EN16 of the Reading Borough Local Plan 2019.

Noise – opening hours

I have concerns about the potential for noise disturbance due to commercial operations on occupants of nearby residential properties, particularly late at night and early morning, so a restriction on permitted hours for these activities is recommended. Suitable hours to be proposed by the planner.

- ***N16 HOURS OF OPENING/OPERATION***

The premises shall not be used by members of the public outside the hours of [INSERT START TIME] to [INSERT FINISH TIME] on Mondays to Saturdays and [INSERT START TIME] to [INSERT FINISH TIME] on Sundays or Bank Holidays.
REASON: In order to protect local residents from unreasonable disturbance arising from the use in accordance with Policy CC7 and CC8 of the Reading Borough Local Plan 2019.

Noise generating development – mechanical plant or commercial activities

Applications which include noise generating plant or commercial activities when there are nearby noise sensitive receptors should be accompanied by an acoustic assessment carried out in accordance with BS4142:2014+A1:2019 methodology.

For mechanical plant noise

A noise assessment has not been submitted:

A noise assessment has not been submitted with the application and therefore I cannot determine the likely noise impact of the proposal and whether the proposals are acceptable. I therefore recommend refusal unless a noise assessment can be submitted and considered by us before the application is determined.
Alternatively the following condition could be attached to consent, however it is possible that the criteria would not be met with the plant specifications proposed in this application and a new application may need to be made at a later date for alternative plant / location.

- ***N2 MECHANICAL PLANT (NOISE ASSESSMENT REQUIRED)***

No mechanical plant shall be installed until a noise assessment of the proposed mechanical plant has been submitted and approved by the Local Planning Authority. The assessment shall be carried out for in accordance with BS4142:2014+A1:2019 methodology. The predicted specific sound level (LAeq,TR) (with reference to BS:4142) as measured at a point 1 metre external to the nearest noise-sensitive facade shall be at least 10dB below the pre-existing background sound level, LA90,T when all plant/equipment (or any part of it) is in operation. The predicted rating level, LAr,Tr (specific sound level plus any adjustment for the characteristic features of the sound) as measured at a point 1 metre external to the nearest noise-sensitive façade (habitable window of a dwelling) shall not exceed the pre-existing background sound level, LA90,T when all plant/equipment (or any part of it) is in operation. The plant shall thereafter only be installed in accordance with the assessment and shall thereafter be maintained so that it operates to the same standard.
REASON: To safeguard the amenities of the adjoining premises and the area generally, in accordance with Policy CC8 and EN17 of the Reading Borough Local Plan 2019.

Kitchen Extraction – odour
In addition to concerns about noise (as discussed above), cooking odour is often a significant problem in commercial kitchens and therefore the applicants must provide an assessment of the likelihood of odours based on the proposed cuisine and a statement of how the proposals will ensure that odour nuisance will be prevented. Reference must be made to the EMAQ guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems (Sept 2018) or the (withdrawn) DEFRA version (Jan 2005).

The following condition could be attached to the consent, however it is possible that the criteria cannot be met with the plant specifications proposed in this application and a new application may need to be made at a later date for alternative plant / location.

- ***N11 VENTILATION & EXTRACTION (TO BE SUBMITTED)***

No development shall commence on site until an odour assessment has been carried out and a detailed odour management plan to include scaled plans, odour control specifications and a maintenance plan has been submitted to and approved in writing by the Local Planning Authority. Reference shall be made to the EMAQ guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems (Sept 2018) or the (withdrawn) DEFRA version (Jan 2005) when assessing potential odours and selecting appropriate odour control methods. When assessing potential odours, the assessment shall consider the full range of cooking types that may be

9/10/24, 9:04 AM Email - Rejwerska, Marcelina - Outlook

conducted under the permitted use. Thereafter, the development shall not be carried out other than in accordance with the approved scheme unless otherwise agreed in writing by the Local Planning Authority.
REASON: These details are required due to insufficient information being contained within this submission and to safeguard the amenity of adjoining properties and to protect the general environment in accordance with Policy CC8 of the Reading Borough Local Plan 2019.

Bin storage – rats

There is a widespread problem in Reading with rats as the rats are being encouraged by poor waste storage which provides them with a food source. Where developments involve shared bin storage areas e.g. flats and hotels there is a greater risk of rats being able to access the waste due to holes being chewed in the base of the large wheelie bins or due to occupants or passers not putting waste inside bins, or bins being overfilled. Where developments involve a food related business then there is a greater risk of rats being attracted to the waste. It is therefore important for the bin store to be vermin proof to prevent rats accessing the waste. I recommend the following condition.

- **Condition - Details of bin stores**

No [dwelling/development] hereby permitted shall be first occupied until details of refuse and recycling bin stores have been submitted to and approved in writing by the Local Planning Authority. The details shall include measures to prevent pests and vermin accessing the bin store(s). The approved bin storage, including pest and vermin control measures, shall be provided in accordance with the approved details prior to first occupation of any permitted [dwelling/development] and shall not be used for any purpose other than bin storage at all times thereafter.

Reason: To ensure that adequate provision is made for the storage and collection of refuse in accordance with Policy CS2 of the Reading Borough LDF Core Strategy 2008 (Altered 2015) and Policy DM12 of the Reading Borough LDF Sites and Detailed Policies Document 2012 (Altered 2015).

If you have any queries please contact me.

Kind regards,

Rebecca Moon - Environmental Health Officer

Rebecca Moon
Principal Environmental Health Officer
Environmental Protection & Nuisance Team
Public Protection|Directorate of Economic Growth & Neighbourhood Services

Reading Borough Council
Civic Centre
Bridge Street
Reading
RG1 2LU

0118 9372325 (72325)
Working days Monday| Tuesday| Wednesday |Thursday

Website | Facebook | Twitter | YouTube

APPENDIX 4

PROPOSED SEPARATING FLOOR AND FLANKING TREATMENTS

Extracts from Approved Document E 2004 of The Building Regulations, with modifications from Martec in red. In the case of any conflict or confusion, consult the original document.

4.7 **Floor treatment 1 *Independent ceiling with absorbent material***

The resistance to airborne and impact sound depends on the combined mass of the existing floor and the independent ceiling, the absorbent material, the isolation of the independent ceiling and the airtightness of the whole construction.

4.10 In all cases it may be necessary to control flanking transmission in order to achieve the performance standards... ...See Junction requirements for material change of use - see paragraphs 4.43 and 4.44 below.

4.11 Special attention needs to be given to situations where flanking walls or floors are continuous across separating walls or floors as a result of the conversion work. In such instances additional treatments may be required to control flanking transmission along these continuous elements. Specialist advice may be needed.

4.14 Wall and floor treatments will impose additional loads on the existing structure. The structure should be assessed to ensure that the additional loading can be carried safely, with appropriate strengthening applied where necessary.

4.15 Floor or wall penetrations, such as ducts or pipes, passing through separating elements in conversions can reduce the level of sound insulation. Guidance on the treatment of floor penetrations is given below.

Work to existing construction

4.16 Before a floor treatment is applied appropriate remedial work to the existing construction should be undertaken as described in paragraphs 4.17 and 4.18.

4.17 If the existing floor is timber then gaps in floor boarding should be sealed by overlaying with hardboard or filled with sealant.

a. Where floorboards are to be replaced, boarding should have a minimum thickness of 12mm, and mineral wool (minimum thickness 100mm, minimum density 10kg/m^3) should be laid between the joists in the floor cavity.

b. If the existing floor is concrete and the mass per unit area of the concrete floor is less than 300kg/m^2, or is unknown, then the mass of the floor should be increased to at least 300kg/m^2. Any air gaps through a concrete floor should be sealed. A regulating screed may also be required.

c. If there is an existing lath and plaster ceiling it should be retained as long as it satisfies Building Regulation Part B - Fire safety.

d. Where the existing ceiling is not lath and plaster it should be upgraded as necessary to provide at least two layers of plasterboard with joints staggered, total mass per unit area 20kg/m2. *e.g. 2x12.5mm Soundbloc Plasterboard is 21 kg/m^2 or 2x15mm Wallboard is 20 kg/m^2.*

4.18 Extensive remedial works to reduce flanking transmission may also be necessary to achieve the performance... This may involve wall linings, see paragraphs 4.43 and 4.44.

New Secondary Ceiling Construction

4.26 The resistance to airborne and impact sound depends on the combined mass of the existing floor and the independent ceiling, the absorbent material, the isolation of the independent ceiling and the airtightness of the whole construction.

4.27 Independent ceiling with absorbent material (see Diagram 4.3)

- at least 2 layers of plasterboard with staggered joints, minimum total mass per unit area 20kg/m^2;
- The lower plasterboard layer should be applied using "Green Glue" or "Quiet Glue Pro" **and no others** following the manufacturer's instructions
- an absorbent layer of mineral wool laid on the ceiling, minimum thickness 100mm, minimum density 10kg/m^3.
- The ceiling should be supported by one of the following methods:
    - independent joists fixed only to the surrounding walls. A clearance of at least 25mm should be left between the top of the independent ceiling joists and the underside of the existing floor construction; or
    - independent joists fixed to the surrounding walls with additional support provided by resilient *(acoustic)* hangers attached directly to the existing floor base.

Note: This construction involves a separation of at least 125mm between the upper surface of the independent ceiling and the underside of the existing floor construction. However, structural considerations

determining the size of ceiling joists will often result in greater separation. Care should be taken at the design stage to ensure that adequate ceiling height is available in all rooms to be treated.4.28 Where a window head is near to the existing ceiling, the new independent ceiling may be raised to form a pelmet recess. See Diagram 4.4.

4.29 For the junction detail between floor treatment 1 and wall treatment 1, see Diagram 4.5.

4.30 Points to watch:

DO

a. Do remember to apply appropriate remedial work to the existing construction*, e.g. patch any holes in the existing ceiling.*

b. Do seal the perimeter of the independent ceiling with tape or sealant.

DO NOT

a. Do not create a rigid or direct connection between the independent ceiling and the floor base, *e.g. use too many acoustic hangers - you must follow manufacturer's recommendations.*

b. Do not tightly compress the absorbent material (*mineral wool layer*) as this may bridge the cavity.

c. *Do not forget flanking walls, especially in buildings with cavity masonry external walls.*

d. Do not use rigid insulation such as Polystyrene, Celotex or Kingspan instead of the mineral wool insulation.

New Floor Construction

4.31 The resistance to airborne and impact sound depends on the total mass of the floor, the effectiveness of the resilient layer and the absorbent material.

Resilient Batten

It is recommended that a resilient batten floor is installed as follows:

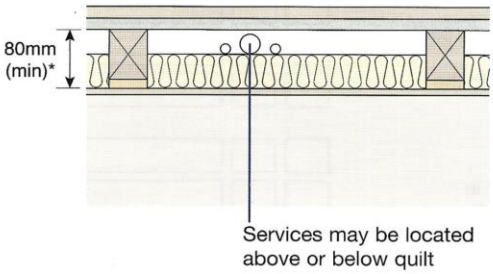
a) Any height difference between sections should be addressed to ensure a level surface to build off.
b) If there are holes, gaps or cracks, overlay a layer of 6mm or 8mm ply.
c) A raised floating platform floor to be installed on top of the levelled floor comprising:
    a. Resilient battens floating on existing floor (or ply layer if applied) infilled with 50mm mineral wool batts (10-36kg/m^3 minimum density).
    b. 22mm T&G chipboard [top layer] then 19mm Gyproc plank on 80mm resilient battens.

Floating floor treatment:

a) Must achieve a minimum laboratory performance of rd$\Delta R_w + C_{tr}$=13dB, rdΔR_w=17dB and rdΔL_w=16dB - see Appendix C.

b) Must be installed in accordance with the manufacturer's instructions.

c) Require 5mm (min) resilient flanking strips around the perimeter of the flooring board to isolate floor from walls and skirting.



d) For further guidance on floating floor treatments and flanking strips, please refer to Appendix A.

*** Note - 80mm void dimension indicated is when floor is loaded to 25 kg/m².**

FFT80™ – Resilient composite deep batten system for E-FT-8™

- 22 mm (min) t&g flooring board - 600 kg/m³ (min)
- gypsum-based board nominal 13.5 kg/m²
- FFT80™ resilient composite deep battens
- resilient layer must be continuous and pre-bonded to batten
- battens may have the resilient layer at the top or the bottom
- 50mm (min) 10-36 kg/m³ mineral wool quilt laid between battens
- ensure any services do not bridge the resilient layer

Figure 3: From RSD E-FT-8 Details

Overall, first floor height would be expected to rise by some 120mm above the levelled floor height.

If accessible, add 100mm mineral wool quilt (10kg/m^3 minimum density) between joists to add additional performance.

4.41 The perimeter of the new ceiling should be sealed with tape or caulked with sealant.

4.42 *If you have independently lined the adjoining walls as a flanking treatment relevant junction details are shown in Diagram 4.5.*

Junction requirements for material change of use

Junctions with external or load-bearing walls - FLANKING

4.43 Where there is significant flanking transmission along adjoining walls then improved sound insulation can be achieved by lining all adjoining masonry walls with an independent layer of plasterboard on a separate timber or metal stud with mineral wool batts in the void.

4.44 Where the floor is timber and an adjoining masonry wall has a mass per unit area greater than 375kg/m^2 **(*approx. equivalent to a 9 inch brick wall or a 215mm very dense blockwork wall - plastered both sides*)** then such lining may not be necessary, as it may not give a significant improvement. Similarly where the floor is concrete and an adjoining masonry wall has a mass per unit area greater than 120kg/m^2 excluding any finish, then lining may not be necessary.

Junctions with floor penetrations

4.45 Piped services (excluding gas pipes) and ducts which pass through separating floors in conversions should be surrounded with sound absorbent material for their full height and enclosed in a duct above and below the floor (Diagram 4.9)

DO

a. Do seal the joint between casings and ceiling with tape or sealant.

b. Do leave a nominal gap (approx. 5mm) between the casing and any floating layer and fill with sealant.

4.46 Pipes and ducts that penetrate a floor separating habitable rooms in different flats should be enclosed for their full height in each flat.

4.47 The enclosure should be constructed of material having a mass per unit area of at least 15kg/m^2.

4.48 Either line the enclosure, or wrap the duct or pipe within the enclosure, with 25mm unfaced mineral wool.

4.50 Penetrations through a separating floor by ducts and pipes should have fire protection to satisfy Building Regulation Part B - Fire safety. Fire stopping should be flexible and also prevent rigid contact between the pipe and floor.

Note: There are requirements for ventilation of ducts at each floor where they contain gas pipes. Gas pipes may be contained in a separate ventilated duct or they can remain unducted. Where a gas service is installed, it shall comply with relevant codes and standards to ensure safe and satisfactory operation. See The Gas Safety (Installation and Use) Regulations 1998, SI 1998/2451

Diagram 4.3 **Floor treatment 1**

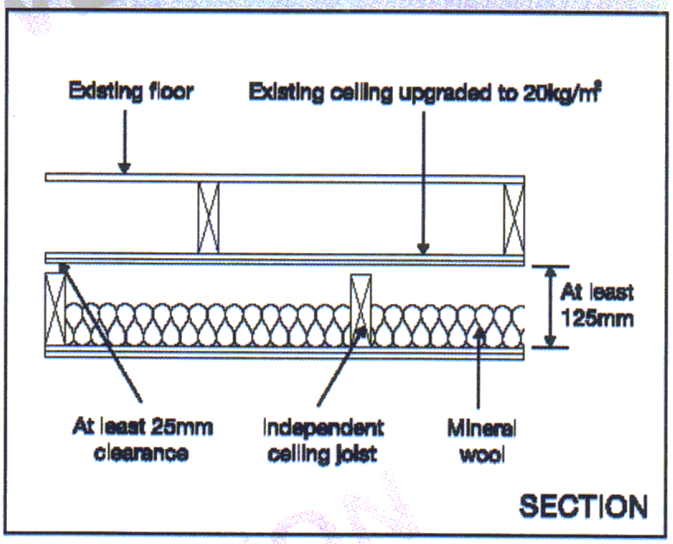


Diagram 4.5 **Floor treatment 1 – wall treatment 1**

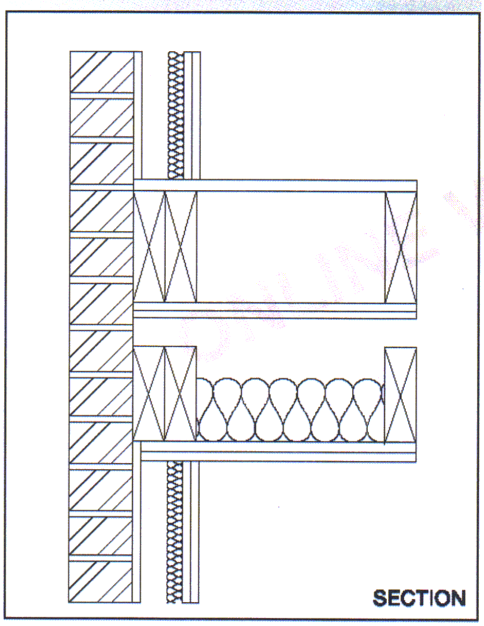


Diagram 4.9 **Floor penetrations**

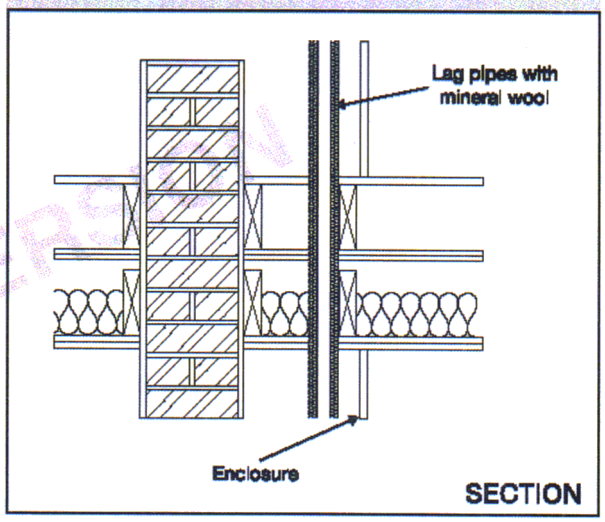
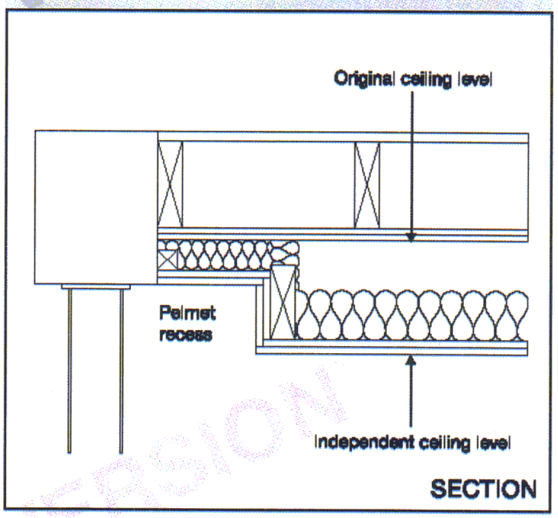



Diagram 4.4 **Floor treatment 1 – high window head detail**