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339/339A Finchley Road London

Noise Impact Assessment Report
Report 27179.NIA.01. Rev A

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Report 27179.NIA.01 Revision History			
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A	17/10/2023 – Report revised to consider amplified music system. General amendments made.	D	
B		E	
C		F	

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1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Pastor Sola Fola-Alade, The Liberty Church London, 17 Beechcroft Avenue, Harrow, HA2 7JD, to assess the suitability of the site at 339 / 339A Finchley Road, Finchley, London, NW3 6EP, for the development of a place of worship, in accordance with the provisions of the National Planning Policy Framework and the Noise Policy Statement for England (NPSE).

This report presents the results of the noise breakout assessment undertaken, in order to determine the level of noise breakout and direct transfer upon the adjoining receivers, and outlines any necessary mitigation measures.

2.0 SOUND INSULATION INVESTIGATION

In order to assess direct noise transfer from the proposed place of worship to the existing residential units above, as well as noise breakout from the building, a sound insulation investigation was undertaken as described below.

2.1 Procedure

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 existing residential area directly above the proposed place of worship space, as well as several noise breakout positions at 1m from the façade of the space.

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*'.

2.2 Equipment

The instrumentation used during the sound insulation investigation is shown in Table 2.1 below.

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 1 Pink Noise Source	NTi Audio Minirator MR-PRO	G2P-RACDR-G0
CAL1 Calibrator 1	Larson Davis CAL200 Calibration No: UCRT23/1363 Calibration Date: 21/03/2023 Calibration Due: 20/03/2024	17148
LM12 Laser Meter	DTAPE DT50	2022103024265

Table 2.1 Instrumentation used during testing

3.0 RESULTS

3.1 Sound Insulation Investigation

The main parameter used throughout this document to express airborne sound insulation of separating constructions is D_w. All specifications in this report will therefore be given with respect to this descriptor. Summarised results of the airborne tests are shown in Table 3.1.

Test Element	Source	Receiver	D_w Performance dB
Floor	Proposed Place of Worship	Existing 1st Floor Residential	D_w 58dB
Facade	Proposed Place of Worship	1m from existing front façade outside	D_w 31dB
Facade	Proposed Place of Worship	1m from existing side façade outside	D_w 35dB

Table 3.1 Airborne test results

4.0 NOISE ASSESSMENT GUIDANCE

4.1 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.

4.2 Noise Assessment Criteria

In order to present robust internal noise criteria to ensure the amenity of the neighbouring residents would be protected, we would propose the use of an absolute criterion using an appropriate Noise Rating Curve (NR Curve), considering both L_{Aeq} and L_{Amax} acoustic descriptors. Noise Rating Curves (NR Curves) are commonly used by consultants and Local Authorities as they provide an absolute limit value in each single octave frequency band to ensure that a detailed analysis of sound transfer is considered.

The NR targets for this assessment are as shown in Table 4.1.

NR Curve	Octave band centre frequency, dB								Overall dB(A)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
NR15 L_{Aeq}	47	35	26	19	15	12	9	7	25.5

Table 4.1 NR noise rating curve

For reference, recommended internal noise levels for residential spaces are presented as L_{Aeq} levels in BS8233:2014 *'Sound insulation and noise reduction for buildings',* shown in Table 4.2.

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 4.2 BS8233 internal background noise levels

WHO Guidelines for Community Noise (1999) recommends that internal noise levels for individual events should not exceed 45dB L_{Amax} more than 10-15 times per night.

As BS823 identifies criteria for external noise intrusion due to anonymous sources, we would consider a criterion approximately 5dB below this to be suitable for non-anonymous noise sources.

Therefore, the NR criteria presented in Table 6.1 are sufficiently below the typically accepted standards for internal noise levels such that residential amenity would be protected.

5.0 NOISE TRANSFER AND BREAKOUT PREDICTIONS

5.1 Noise Profile of Place of Worship

In the main room it is understood that speech and music will occur through an amplified system. It is understood that the place of worship may accommodate up to approximately 150 attendees at a time.

The floor plan of the proposed place of worship is shown below in Figure 5.1.

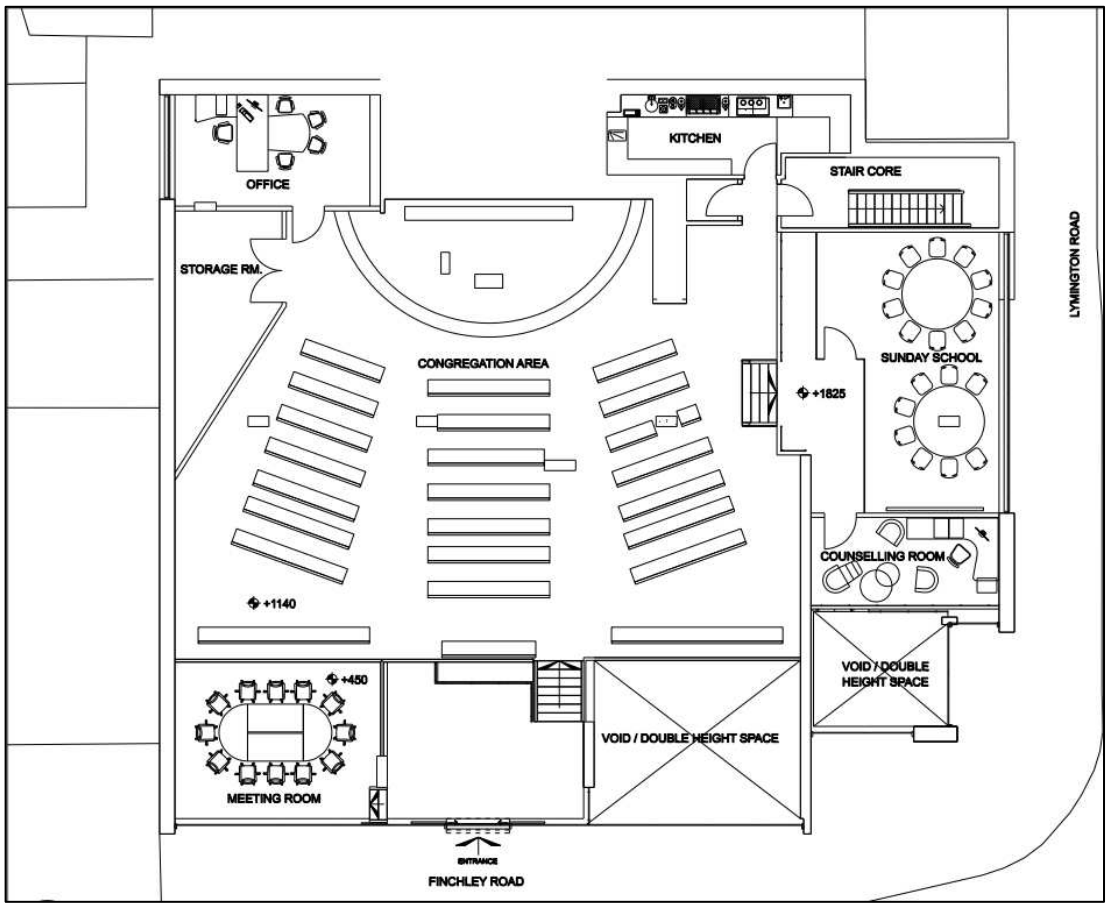

Figure 5.1 Proposed Floor Plan (Image Source: Powell Skeete Associates Limited)

Based on the proposed use of the place of worship, library noise data of a similar site will be used, consisting of speech and music through an amplified system.

The library noise data presents a spectrum of the highest measured L_{Aeq} event with attendees being present, as shown in Table 5.1 below.

Internal Noise Measurement	Octave band centre frequency SRI, dB								Overall SPL @1m
	63	125	250	500	1k	2k	4k	8k	
Worst case $L_{Aeq\ 5\ min}$ of place of worship with amplified music	60	70	75	75	75	75	70	80	80

Table 5.1 Worst case internal noise activity, L_{Aeq}

The internal noise levels presented above would be considered to be fully representative of worst-case activity noise within the proposed place of worship.

5.2 Direct Noise Transfer to First Floor from Place of Worship

Using a typical source level of 80dB(A) to represent worst case source noise levels within the proposed place of worship, and taking into account the measured D_w rating of the separating floor, Table 5.2 shows predicted sound pressure levels within the existing 1st floor residential bedrooms, compared with the recommended NR15 noise criterion. Full calculations are shown in Appendix B1.

Descriptor	Unweighted Octave Frequency Band (Hz)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Calculated noise level within first floor residential bedrooms due to direct noise transfer	22	26	23	14	4	2	-5	0	17
NR15 Criterion	47	35	26	19	15	12	9	7	26
+/-	-25	-10	-4	-5	-11	-10	-14	-7	-9

Table 5.2 Noise levels due to direct noise transfer from place of worship to within first floor residential bedrooms

As shown in Table 5.2 above, and within the attached Appendix B1, the noise transfer between the proposed place of worship and the adjoining residential receivers, due to noise direct transfer through the shared party floor, would be below the noise criterion. Therefore, any sound transfer would be considered unlikely to cause noise nuisance to the residential occupiers above.

5.3 Noise Breakout to First Floor Windows from Place of Worship

Using a typical source level of 80dB(A) to represent worst case source noise levels within the proposed place of worship, and taking into account the measured D_w rating of the front and side façades, in addition to the standard attenuation provided by a partially open receiver window, Table 5.3 and 5.4 shows the predicted sound pressure level within the existing 1st floor residential bedrooms on the front and side facades respectively, compared with the recommended NR15 noise criterion. Full calculations are shown in Appendix B2.

Descriptor	Unweighted Octave Frequency Band (Hz)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Calculated noise level within first floor residential bedrooms on front façade due to noise breakout	11	19	26	23	21	21	12	20	27
NR15 Criterion	47	35	26	19	15	12	9	7	26
+/-	-36	-16	0	4	6	9	3	13	1

Table 5.3 Noise levels due to noise breakout from place of worship to within first floor residential bedrooms on front façade

Descriptor	Unweighted Octave Frequency Band (Hz)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Calculated noise level within first floor residential bedrooms on side façade due to noise breakout	1	17	8	15	19	14	0	-5	21
NR15 Criterion	47	35	26	19	15	12	9	7	26
+/-	-46	-18	-18	-4	4	2	-9	-12	-5

Table 5.4 Noise levels due to noise breakout from place of worship to within first floor residential bedrooms on side façade

As shown in Tables 5.3 and 5.4 above, and within the attached Appendix B2, the noise transfer between the proposed place of worship and the adjoining residential receivers, due to noise breakout through the existing glazed façade of the development site, would generally be below the noise criterion, however within some notable exceedances above 500Hz. Therefore, noise breakout could cause noise nuisance to the future residential occupiers above, in the current arrangement,

Mitigation proposals are outlined in Section 6.0 in order to ensure that noise breakout is controlled to within acceptable levels.

6.0 NOISE MITIGATION PROPOSALS

Further to the findings outlined in Section 6.0, the external glazed facades of the development site should be upgraded to ensure that noise generated within the place of worship does not have any negative effect on the amenity of the existing residential bedrooms located over the First, Second and Third Floors.

6.1 Glazed Façade of Development Site

It was observed during the testing of the front and side external glazed facades on site, that a significant level of flanking noise was present, due to the currently installed doors and windows.

Typically, the primary issue with flanking through doors and windows is the suitability of seals installed around the perimeter and at the threshold/point of opening.

In order to improve the performance of the front door, it would be recommended that a raised, smooth threshold plate is installed beneath the door. A good quality drop seal should then be installed, such as Norseal NOR815, or similar, and adjusted to provide a complete seal when closed.

The door jams and head should then also be upgraded by means of a proprietary acoustic seal incorporating an air pocket design, such as Sealmaster Delta seal, or similar.

Further improvement could also be achieved through means of upgrading the doorset, as per the guidance provided in Table 6.1 below.

Door Specification	Typical Construction
R_W 35 dB	50mm solid-core door with high-quality drop seals and gaskets
R_W 40 dB	Specialist acoustic doorset with perimeter and threshold seals

Table 6.1 Typical door constructions

To improve the windows we would recommend the installation of a proprietary seal around the perimeter of the window to ensure a complete seal when closed. The above could also be achieved through remedial measures to improve the existing seal, such as the installation of additional layers of a suitable mastic/sealant.

Implementation of the above upgrade measures would ensure a reduced level of noise breakout, ensuring full compliance with the specified noise criterion.

6.2 Noise Limiter

Table 6.2 below presents maximum limiter settings to ensure the internal background level criterion within the adjacent receiver spaces is not exceeded.

The spectral limiter levels within the place of worship are presented in Table 6.2 below, full calculations are presented within the attached Appendix B3.

Source	Descriptor	Octave Frequency Band (Hz)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
Place of Worship	Maximum Spectral Limiter Levels	96	86	75	71	69	66	67	67	77

Table 6.2 Limiter calibration levels

6.3 Externally Generated Noise - Noise Management Plan

It is shown in the sections above that noise from activity within the proposed structure would not cause excessive noise transfer to nearby noise-sensitive receivers. To ensure noise from access to the site does not cause disturbance, the following advice should be followed.

A high percentage of the attendees are from the local community, meaning that vehicular transport would be avoided in many cases. Therefore, increased noise levels due to vehicular activity would be unlikely to cause any significant adverse effects.

The existing environmental noise profile of the area would largely mask any typical speech at the entrance of the place of worhsip, and therefore patron noise would not negatively impact the amenity of the closest residents.

Furthermore, users of the place of worship would be considered peaceful people who would not use raised voice upon entry or exit from the premises. It is likely that users would not be arriving in large groups and would be expected to be individuals or small groups. Even considering a worst-case scenario of this group of people having a low-level conversation upon entry to the place of worhsip, it would not be significant enough as to cause disturbance to the neighbouring properties. Furthermore, it is understood that conversation does not involve multiple people talking at once, and as such generally one person would be talking at a time at a normal speech level i.e. not raised voice or shouting.

It should be noted that the levels generated would be in the category of ‘Noticeable and not intrusive’, as stipulated in the National Planning Policy Guidance as shown in Table 6.3 below, and therefore falls within the No Observed Adverse Effect category.

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

Table 6.3 Noise exposure hierarchy based on likely average response (NPP Guidance)

Noise complaints are not expected to occur due to the proposed place of worhsip operations, however, in order to minimise the possibility of any complaints due to noise from attendees entering and exiting the premises, we would highly recommend the adoption of the following conditions to be considered as the noise management plan for the proposed site. The key considerations are shown below:

- Deliveries and servicing operations are not allowed outside of the daytime hours (between 07:00 and 23:00).

- Ensure that deliveries and servicing are undertaken by suppliers, transport operators and any other vehicles that follow good practice guidance for quiet deliveries. Good practice guidance can be found in the TFL code of practice for quiet deliveries: http://content.tfl.gov.uk/codeofpractice.pdf.
- It is understood that in regard to noise generated due to attendees entering and exiting the premises, most attendees would be accessing the site individually and therefore high levels of speech would not be prevalent. However, to minimize the impact on the amenity of the closest residents as much as is practically possible, it is recommended that the attendees should not gather outside of the site.
- In order to minimise the risk of any noise disturbance caused by the attendees or other members of the public, clear signage should be displayed in the area requesting all who use the space to respect local residents and use the premises in a quiet and respectful manner.
- Should signage not have the desired effect on customer behaviour, staff interaction would be necessary, requesting that attendees avoid unnecessary noise (such as shouting or uses of raised voices).
- All external doors shall be kept closed except for access and egress.
- A high percentage of the attendees are from the local community, meaning that vehicular transport will be avoided in many cases. However, the worshippers who use vehicular transport should be instructed by members of staff to park quietly and respectfully, for instance, avoiding slamming car doors, switch off the radio, or any music when open the car doors, using external bells or horns, and not shout or whistle to get the attention of other worshippers.

Given the above noise-management plan conditions it is expected that the access and egress of worshippers, deliveries and general operations during the daytime period would not have an impact on the amenity of the closest residential receivers.

7.0 CONCLUSION

A noise impact assessment has been undertaken at 339 / 339A Finchley Road, Finchley, London, NW3 6EP, in order to determine the degree of impact of noise breakout and direct noise transfer upon the adjoining receivers.

Sound upgrade solutions for the external glazed facades have been proposed, which would provide internal noise levels for all residential environments of the development commensurate to the recommendations of the Noise Policy Statement for England 2021.

No further mitigation measures should be required in order to protect the existing residential units from internal and external noise intrusion, due to the operations of the proposed Place of Worship.

APPENDIX A

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*.

APPENDIX A

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 B1

339/339A Finchley Road, London

DIRECT NOISE TRANSFER CALCULATIONS

Source: Proposed place of worship **Receiver: First floor bedrooms**	***Frequency, Hz***								***dB(A)***	
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***		
Sound Pressure level of worst case activity within Place of Worship, dB	60	70	75	75	75	75	70	80	80	
On site SRI of separating floor, dB	-38	-45	-53	-61	-71	-73	-75	-80		
Sound Pressure Level within receiver room	**22**	**26**	**23**	**14**	**4**	**2**	**-5**	**0**	**17.0**	**11**
Target NR 15 Noise Rating Curve	**47**	**35**	**26**	**19**	**15**	**12**	**9**	**7**	**25.5**	**15**

APPENDIX B2

339/339A Finchley Road, London

NOISE BREAKOUT CALCULATIONS

Source: Proposed place of worship Receiver: First floor bedrooms on front façade	Frequency, Hz 63	125	250	500	1k	2k	4k	8k	dB(A)	
Sound Pressure level of worst case activity within Place of Worship, dB	60	70	75	75	75	75	70	80	80	
On site composite SRI of façade, dB	-30	-32	-30	-33	-35	-35	-39	-41		
Correction for distance (2m), dB	-6	-6	-6	-6	-6	-6	-6	-6		
Correction due to partially open receiver window, dB	-13	-13	-13	-13	-13	-13	-13	-13		
Sound Pressure Level within receiver room	**11**	**19**	**26**	**23**	**21**	**21**	**12**	**20**	**27.3**	**27**
Target NR 15 Noise Rating Curve	**47**	**35**	**26**	**19**	**15**	**12**	**9**	**7**	**25.5**	**15**

Source: Proposed place of worship Receiver: First floor bedrooms on side façade	Frequency, Hz 63	125	250	500	1k	2k	4k	8k	dB(A)	
Sound Pressure level of worst case activity within Place of Worship, dB	60	70	75	75	75	75	70	80	80	
On site composite SRI of façade, dB	-40	-34	-48	-41	-37	-42	-51	-66		
Correction for distance (2m), dB	-6	-6	-6	-6	-6	-6	-6	-6		
Correction due to partially open receiver window, dB	-13	-13	-13	-13	-13	-13	-13	-13		
Sound Pressure Level within receiver room	**1**	**17**	**8**	**15**	**19**	**14**	**0**	**-5**	**21.1**	**19**
Target NR 15 Noise Rating Curve	**47**	**35**	**26**	**19**	**15**	**12**	**9**	**7**	**25.5**	**15**

APPENDIX B3

339/339A Finchley Road, London

NOISE LIMITER CALCULATIONS

Source: Proposed place of worship **Receiver: First floor bedrooms on front façade**	***Frequency, Hz***								***dB(A)***
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	
Calculated Sound Pressure Level within receiver room	11	19	26	23	21	21	12	20	27
Target NR 15 Noise Rating Curve	47	35	26	19	15	12	9	7	26
Sound Pressure level of worst case activity within Place of Worship, dB	60	70	75	75	75	75	70	80	80
Level difference +/- over Noise Rating Curve	36	16	0	-4	-6	-9	-3	-13	
Maximum limiter setting to achieve criterion on Front Facade, dB	**96**	**86**	**75**	**71**	**69**	**66**	**67**	**67**	**77**

Source: Proposed place of worship **Receiver: First floor bedrooms on side façade**	***Frequency, Hz***								***dB(A)***
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	
Sound Pressure Level within receiver room	1	17	8	15	19	14	0	-5	21
Target NR 15 Noise Rating Curve	47	35	26	19	15	12	9	7	26
Sound Pressure level of worst case activity within Place of Worship, dB	60	70	75	75	75	75	70	80	80
Level difference +/- over Noise Rating Curve	46	18	18	4	-4	-2	9	12	
Maximum limiter setting to achieve criterion on Side Facade, dB	**106**	**88**	**93**	**79**	**71**	**73**	**79**	**92**	**92**

	Frequency, Hz								***dB(A)***
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	
Maximum limiter setting to achieve criterion on Front Facade, dB	96	86	75	71	69	66	67	67	77
Maximum limiter setting to achieve criterion on Side Facade, dB	106	88	93	79	71	73	79	92	92
Maximum limiter setting to achieve criterion at all recievers, dB	**96**	**86**	**75**	**71**	**69**	**66**	**67**	**67**	**77**