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Noise Impact Assessment Report to Address Condition NSE4(b) (Residential Sound Insulation & Overheating)

161 Old Hall Lane, Manchester M14 6HJ

Report Reference 22050.NIA-RPT.01

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ES Acoustics is part of Environmental Sensors (Registered in England Company No. 12699902)

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Report Title	Noise Impact Assessment Report to Address Condition NSE4(b) (Residential Sound Insulation & Overheating)
Prepared For	Dr. M Siddiqui
Report Reference Number	22050.NIA-RPT.01
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EXECUTIVE SUMMARY

ES Acoustics Ltd (ESA) have been commissioned by Dr. M Siddiqui to prepare a noise impact assessment to discharge Condition 6 of Planning Application Reference P2022/2987/FUL, which reads:

*"**NSE4(b) (Residential sound insulation AND overheating)***

a) Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Old Hall Lane shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises.

The potential for overheating shall also be assessed and the noise insulation scheme shall take this into account. The approved noise insulation and ventilation scheme shall be completed before any of the dwelling units are occupied.

Noise survey data shall include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary. The following noise criteria shall be required to be achieved when providing adequate ventilation as defined by Approved Document F of the Building Regulations (whole dwelling ventilation):

- ***Bedrooms (night time - 23.00 - 07.00) – 30 dB L_{Aeq} (individual noise events shall not exceed 45 dB $L_{Amax,F}$ by more than 10 times)***
- ***Living Rooms (daytime - 07.00 - 23.00) – 35 dB L_{Aeq}***
- ***Gardens and terraces (daytime) – 55 dB L_{Aeq}***

Higher internal noise levels than those specified above may be allowed when higher rates of ventilation are required in relation to the overheating condition.

b) Prior to first occupation of the residential units, a verification report shall be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post-completion testing to confirm that the internal noise criteria have been met. Any instances of non-conformity with the recommendations in the verification report shall be detailed along with any measures required to be undertaken prior to first occupation of the residential units to ensure compliance with the internal noise criteria.

***Reason: To secure a reduction in noise from traffic or other sources in order to protect future residents from noise disturbance and to reduce the potential for overheating.**"*

Internal noise surveys have been undertaken for the Proposed Residential Development at 161 Old Hall Lane, Manchester M14 6HJ.

The development consists of a 3-storey single occupancy residential property, which currently has all external building fabric elements completed, including the glazing system. An initial appraisal of the site determined road traffic noise from Old Hall Lane to be the dominant source affecting the site.

As the external fabric of the development is completed, with all windows already fitted, a combination of external and internal noise surveys have been undertaken to determine the likelihood of compliance with Local Authority requirements.

Predicted Internal noise levels within each living space within the property, based on internal noise levels measured on site during the surveys and the predicted building services noise within each room, are shown below:

Floor	Room	Ambient Internal Sound Level during Daytime $L_{Aeq,T}$ (dB)	Predicted Building Services Noise L_{Aeq} (dB)	Internal Noise Level Criteria L_{Aeq} (dB)	Predicted Noise Level Within Room L_{Aeq} (dB)
Ground	Living Room	30	18	35	30
	Family Room	31	19	35	31
	Spare Bedroom	31	16	35	31
1st	Master Bedroom	31	16	35	31
	Bedroom 2	31	17	35	31
	Bedroom 3	31	17	35	31
	Bedroom 4	31	19	35	31
2nd	Office	31	15	35	31
	Prayer Room	31	16	35	31
	Bedroom 6	31	16	35	31
	Cinema Room	31	16	35	31

Floor	Room	Ambient Internal Sound Level during Night-time $L_{Aeq,T}$ (dB)	Predicted Building Services Noise L_{Aeq} (dB)	Internal Noise Level Criteria L_{Aeq} (dB)	Predicted Noise Level Within Room L_{Aeq} (dB)
Ground	Spare Bedroom	24	16	30	25
1st	Master Bedroom	24	16	30	25
	Bedroom 2	24	17	30	25
	Bedroom 3	24	17	30	25
	Bedroom 4	24	19	30	25
2nd	Bedroom 6	24	16	30	25

Based on the results shown in the tables above, the performance of the installed external glazed elements and proposed ventilation and overheating control system would demonstrate compliance with the internal noise level criteria, as stipulated within the planning condition.

An external amenity area assessment has been undertaken, as per the requirements of the planning condition. The expected noise levels within the amenity spaces based on the environmental noise levels measured at the rear of the site are presented in the table below.

External Amenity Space	Period	Measured Noise Level, dB $L_{Aeq,T}$
Rear Garden	Daytime 07:00-23:00	43

As shown in the table above, noise levels within the proposed external amenity areas on site would demonstrate compliance with the external noise level criteria, as stipulated within the planning condition.

CONTENTS

1 INTRODUCTION 1
2 PROPOSED DEVELOPMENT 3
2.1 Site Description 3
3 NOISE SURVEYS 4
3.1 Measurement Location and Procedure 4
3.1.1 Internal Noise Surveys 4
3.1.2 External Noise Surveys 5
3.2 Measurement Equipment 6
3.3 Weather Conditions 7
3.4 Survey Results 7
3.4.1 Internal Noise Surveys 7
3.4.2 External Noise Surveys 7
4 NOISE IMPACT ASSESSMENT 9
4.1 Internal Noise Surveys 9
4.2 Ventilation and Overheating 9
4.3 Predicted Noise Levels Within Rooms due to External Noise Ingress and Ventilation/Overheating Control . 10
4.4 External Amenity Area Assessment 11
5 CONCLUSION 12

LIST OF ATTACHMENTS

Appendix A	Acoustic Terminology
Appendix B1-3	Environmental Noise Time History Graphs
Appendix C	Building Services Plans and Predicted Noise Levels

1 INTRODUCTION

ES Acoustics Ltd (ESA) have been commissioned by Dr. M Siddiqui to prepare a noise impact assessment to address Condition 6 of Planning Application Reference P2022/2987/FUL, which reads:

*"**NSE4(b) (Residential sound insulation AND overheating)***

a) Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Old Hall Lane shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises.

The potential for overheating shall also be assessed and the noise insulation scheme shall take this into account. The approved noise insulation and ventilation scheme shall be completed before any of the dwelling units are occupied.

Noise survey data shall include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary. The following noise criteria shall be required to be achieved when providing adequate ventilation as defined by Approved Document F of the Building Regulations (whole dwelling ventilation):

- ***Bedrooms (night time - 23.00 - 07.00) – 30 dB L_{Aeq} (individual noise events shall not exceed 45 dB $L_{Amax,F}$ by more than 10 times)***
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Higher internal noise levels than those specified above may be allowed when higher rates of ventilation are required in relation to the overheating condition.

b) Prior to first occupation of the residential units, a verification report shall be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post-completion testing to confirm that the internal noise criteria have been met. Any instances of non-conformity with the recommendations in the verification report shall be detailed along with any measures required to be undertaken prior to first occupation of the residential units to ensure compliance with the internal noise criteria.

Reason: To secure a reduction in noise from traffic or other sources in order to protect future residents from noise disturbance and to reduce the potential for overheating.*"*

The purpose of this report is to address the requirements of the condition by:

- Presenting the measured noise levels incident on the Proposed Development site via environmental noise surveys;
- Presenting the measured internal noise levels within the development to confirm the performance achieved by the installed building fabric; and
- Presenting the measured external noise levels within external amenity spaces to confirm the performance as per the requirements of the provided condition.

2 PROPOSED DEVELOPMENT

2.1 Site Description

The application site is a newly built property located on Old Hall Lane in the Fallowfield area of Manchester. The site is bounded by Old Hall Lane to the north and residential properties to all other cardinal directions.

The site boundary is outlined in Figure 1 below:

Figure 1 Proposed development site

Although ES Acoustics were not involved in the pre-commencement design stage of the project, we have been advised by the client and architect that the building was designed in order to achieve the internal noise criteria specified within part A of the provided condition.

The following report and assessment evaluates the performance of the installed external building fabric elements to ensure compliance with the criteria outlined in Part A of the condition. Additionally, the report will verify the performance of the external building fabric elements in accordance with Part B of the condition.

3 NOISE SURVEYS

3.1 Measurement Location and Procedure

Internal and external noise surveys have been undertaken on-site, as detailed below.

The internal measurement procedure complied with British Standard 7445-1:2003 *'**Description and measurement of environmental noise**'*, and the ANC Guidelines for 'Measurement Of Sound Levels In Buildings' from June 2020.

The external measurement procedure complied with ISO 1996-2:2017 Acoustics '***Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise** levels'*.

Automated monitoring was undertaken between 12:00 on 18/03/2025 to 12:00 on 19/03/2025.

The key acoustic descriptors measured for this assessment are as follows:

- ***$L_{Aeq,T}$ (the continuous equivalent A-weighted noise level over a given time period, T); and***
- ***$L_{AFMax,T}$, the maximum sound level over each measurement period.***

3.1.1 Internal Noise Surveys

Internal noise surveys were undertaken on site in order to confirm the performance achieved by the installed building fabric.

Surveys were undertaken within the living room on the ground floor and the master bedroom on the 1st floor, which would be considered to be the worst affected spaces with regards to external noise ingress.

Both rooms were located on the front façade of the building, overlooking the dominant adjacent noise source of Old Hall Lane. The microphones were installed on tripods at >1.5m above the ground and >1.5m from any reflecting surface.

The Internal monitoring positions, as described above, are shown in Figures 2-3 below.

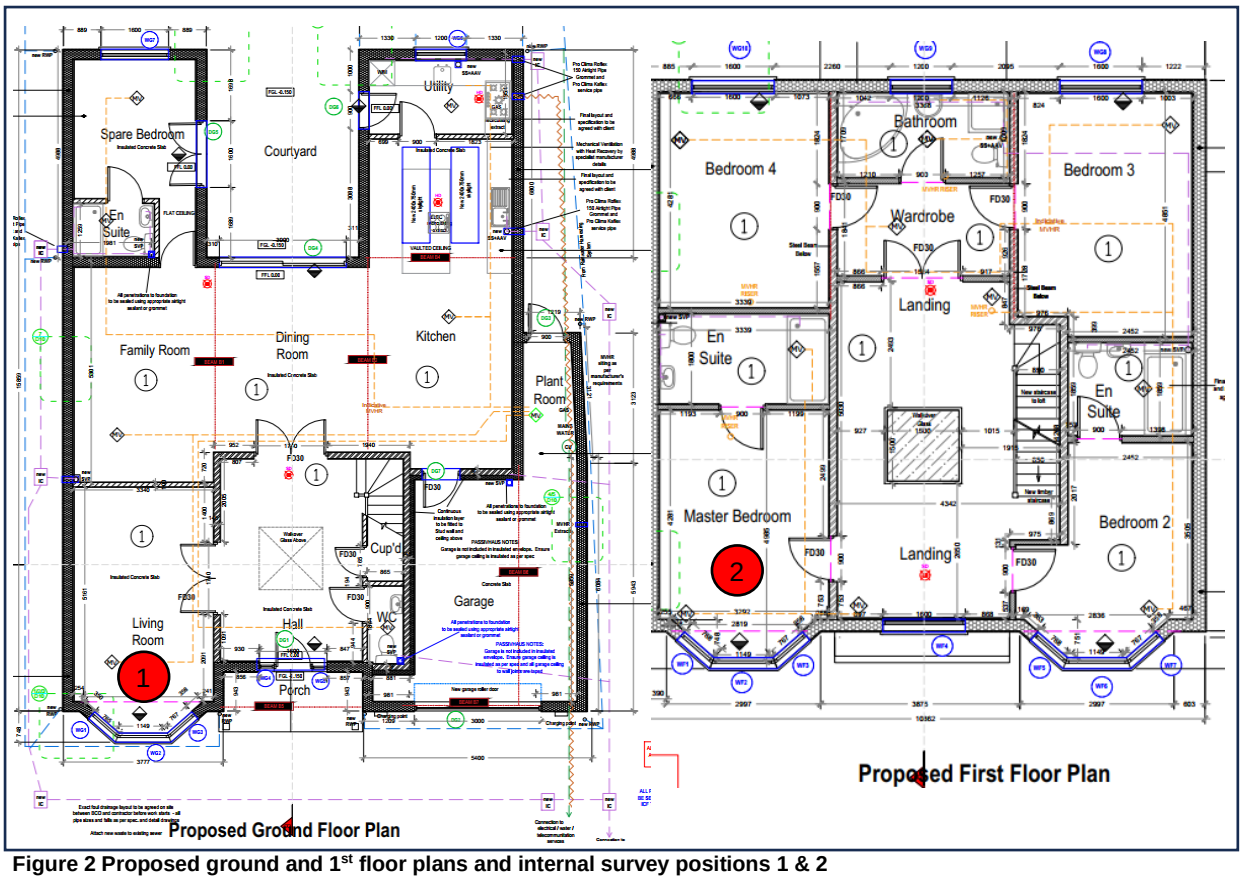


Figure 2 Proposed ground and 1st floor plans and internal survey positions 1 & 2

3.1.2 External Noise Surveys

An external noise survey was undertaken on site in order to determine noise levels within the external amenity area to the rear of the property.

Monitoring Position 3 was installed on the site scaffolding within the rear garden. Due to the proximity of the microphone to reflective surfaces, it was not possible to attain truly free-field measurements for the external monitors. As such, a 3dB correction has been made to the presented external noise levels to compensate for reflections. All time histories present the raw levels measured, as shown within Appendix B3.

Figure 4 External noise survey measurement (Survey position 3)

3.2 Measurement Equipment

The table below presents the equipment used for the baseline noise surveys. The equipment calibration was verified before and after use and no abnormalities were observed.

Equipment	Make and Model	Serial Number
Sound Level Meter	Svantek 977 Class 1 Sound Level Meter	81302
Microphone Capsule	ACO Pacific 7052E	74656
Microphone Preamplifier	Svantek SV 12L	110551
Sound Level Meter	Svantek 977C Class 1 Sound Level Meter	97547
Microphone Capsule	MTG MK 255	21272
Microphone Preamplifier	Svantek SV 12L	108454
Sound Level Meter	Svantek 958 Class 1 Sound Level Meter	97759
Microphone Capsule	PCB 377B02	359419
Microphone Preamplifier	PCB 378B02	179795
Sound Level Meter	NSRT MK4	ANB0hv2Y2V2XCpNQbyD5tD

Table 1 Noise survey equipment

3.3 Weather Conditions

Weather conditions during the automated monitoring were generally dry with light winds and therefore suitable for the measurement of environmental noise.

Data on temperature, wind speed and precipitation has been sourced from the closest weather station[1].

Analysis of the time history and measurement results showed that the levels of wind speed and precipitation have had no impact on the measured results.

A summary of the weather data is reported in Table 2.

Description	Installation Date 18/03/2025	Collection Date 19/03/2025
Average Wind Speed (m/s)	6	3
Average Temperature (°C)	10	10
Precipitation (mm)	0	0

Table 2 Weather conditions

3.4 Survey Results

3.4.1 Internal Noise Surveys

Time histories of the internal noise survey results are presented in Appendix B1 and B2 for Noise Measurement Position 1 and Noise Measurement Position 2 respectively. A summary of the measurement results is presented in the Table below:

Room	Period	Ambient Sound Level $L_{Aeq,\,T}$ (dB)	10th Highest Maximum Noise Level L_{AFmax} (dB)
Ground Floor, Living Room	Daytime 07:00-23:00	30	n/a
	Rush Hour Morning 07:00-10:00	31	n/a
	Rush Hour Afternoon 16:00-19:00	30	n/a
	Night-time 23:00-07:00	24	44
1st Floor, Master Bedroom	Daytime 07:00-23:00	31	n/a
	Rush Hour Morning 07:00-10:00	32	n/a
	Rush Hour Afternoon 16:00-19:00	31	n/a
	Night-time 23:00-07:00	24	44

Table 3 Measured internal noise levels

3.4.2 External Noise Surveys

Time histories of the external noise survey results are presented in Appendix B3. A summary of the measurement results is presented in the Table below:

[1] Weather Station: MANCHESTER, UK. ID: 03334099999, located 11 km from the site at Latitude 53.354, Longitude -2.275

Measurement Position	Period	Ambient Sound Level $L_{Aeq,\,T}$ (dB)	10th Highest Maximum Noise Level L_{AFmax} (dB)
3	Daytime 07:00-23:00	56	n/a
	Night-time 23:00-07:00	49	70
4	Daytime 07:00-23:00	43	n/a
	Night-time 23:00-07:00	41	68

Table 4 Measured internal noise levels

4 NOISE IMPACT ASSESSMENT

4.1 Internal Noise Surveys

Based on the results shown in Table 3 above, the performance of the installed external building fabric elements would demonstrate compliance with the internal noise level criteria, as stipulated within the planning condition, during daytime, rush hour and night-time hours.

The results also demonstrate compliance with the internal noise level criteria for individual noise events (L_{Amax}).

No further mitigation measures would therefore be required to protect the amenity of the proposed residential spaces.

4.2 Ventilation and Overheating

It is understood that the building will utilise mechanical/active means to control ventilation and overheating.

The client is proposing to install a Zehnder ComfoClime 36 unit, which will be installed within the garage and ducted throughout the property.

Although not yet installed, the system has been designed in order to provide full ventilation (in accordance with Approved Document F) and appropriate overheating control (in accordance with Approved Document O) whilst minimising the impact of building services noise.

Table 5 below presents the predicted building services noise within each living space within the property during active ventilation and thermal control, as provided by the M&E supplier Sips Eco Panels. Full details can be viewed within Appendix C.

Floor	Room	Predicted Building Services Noise dB(A)
Ground	Living Room	18
	Family Room	19
	Spare Bedroom	16
1st	Master Bedroom	16
	Bedroom 2	17
	Bedroom 3	17
	Bedroom 4	19
2nd	Office	15
	Prayer Room	16
	Bedroom 6	16
	Cinema Room	16

Table 5 Predicted building services noise in rooms during active ventilation and thermal control

Based on the results shown in Table 5 above, the performance of the proposed ventilation and overheating control system would demonstrate compliance with the internal noise level criteria, as stipulated within the planning condition.

4.3 Predicted Noise Levels Within Rooms due to External Noise Ingress and Ventilation/Overheating Control

Based on the results presented within Table 3 and 5 above, Tables 6 and 7 below present the predicted noise levels within each identified living space within the property, considering both the performance of the installed glazing system and the predicted building services noise within rooms during active ventilation and thermal control, during daytime and night-time respectively.

In this instance, the internal noise levels within each room, due to the performance of the installed glazing, in rooms where internal surveys were not undertaken, has been taken from the worst-case internal noise level measured during the survey for daytime and night-time hours.

Floor	Room	Ambient Internal Sound Level during Daytime $L_{Aeq,\,T}$ (dB)	Predicted Building Services Noise L_{Aeq} (dB)	Internal Noise Level Criteria L_{Aeq} (dB)	Predicted Noise Level Within Room L_{Aeq} (dB)
Ground	Living Room	30	18	35	30
	Family Room	31	19	35	31
	Spare Bedroom	31	16	35	31
1st	Master Bedroom	31	16	35	31
	Bedroom 2	31	17	35	31
	Bedroom 3	31	17	35	31
	Bedroom 4	31	19	35	31
2nd	Office	31	15	35	31
	Prayer Room	31	16	35	31
	Bedroom 6	31	16	35	31
	Cinema Room	31	16	35	31

Table 6 Predicted noise levels in rooms during daytime

Floor	Room	Ambient Internal Sound Level during Night-time $L_{Aeq,\,T}$ (dB)	Predicted Building Services Noise L_{Aeq} (dB)	Internal Noise Level Criteria L_{Aeq} (dB)	Predicted Noise Level Within Room L_{Aeq} (dB)
Ground	Spare Bedroom	24	16	30	25
1st	Master Bedroom	24	16	30	25
	Bedroom 2	24	17	30	25
	Bedroom 3	24	17	30	25
	Bedroom 4	24	19	30	25
2nd	Bedroom 6	24	16	30	25

Table 6 Predicted noise levels in rooms during night-time

Based on the results shown in Tables 6 and 7 the predicted noise level within each living space within the property, considering both the performance of the installed glazing system and the predicted building services noise within rooms during active ventilation and thermal control, would demonstrate compliance with the internal noise level criteria, as stipulated within the planning condition.

4.4 External Amenity Area Assessment

The noise levels within the amenity spaces, based on the environmental noise levels measured in the rear garden of the site, are presented in the table below.

External Amenity Space	Period	Measured Noise Level dB $L_{Aeq,T}$
Rear Garden	Daytime 07:00-23:00	43

Table 8 Expected noise levels in external amenity areas

As shown in the table above, noise levels within the proposed external amenity areas on site would demonstrate compliance with the planning condition.

5 CONCLUSION

An environmental noise survey has been undertaken at 161 Old Hall Lane, Manchester M14 6HJ in order to demonstrate compliance with the planning conditions.

The results of the internal noise survey have confirmed that internal noise levels would demonstrate full compliance with the internal noise level criteria, as stipulated within the planning condition, due to external noise ingress during daytime, rush hour and night-time hours.

Information provided by the M&E supplier has confirmed that internal noise levels would demonstrate full compliance with the internal noise level criteria, as stipulated within the planning condition, during active ventilation and thermal control.

The results of the external noise survey have confirmed that noise levels within the proposed external amenity areas on site would demonstrate compliance with the planning condition.

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

Decibel scale - dB

The decibel (dB) is a relative unit of measurement used in acoustics. The dB is a logarithmic ratio between a measured level and a reference level of 0 dB (i.e the threshold of human hearing). Simply put, the decibel compresses the wide range of sounds we hear into more manageable numbers.

Addition of noise from several sources

Sound produced by multiple sound sources are added logarithmically e.g. power ratio of 2 = 3dB, power ratio of 10 = 10dB. Therefore, two equally intense sound sources operating simultaneously produce a sound level which is 3dB higher than a single source e.g. 60dB + 60dB = 63dB.

Subjective impression of noise

Human response to sound is highly individualized and often based on psychological factors such as emotion and expectation. Sensitivity to sound typically depends on the loudness, pitch, duration of the occurrence, and time of occurrence (e.g. a sound source could cause annoyance during the night where it would not during the day). The following table is a guide to explain increases or decreases in sound levels for many scenarios.

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

'A' Weighted Frequency Filter - dB(A)

The human ear is not equally sensitive in all frequencies. The A-weighting filter was devised to take this into account when undertaking noise measurements and allows a sound level meter to replicate the human ears response to sound.

$L_{Aeq, T}$

Sound can fluctuate widely over a given period. L_{Aeq} is the A-weighted equivalent continuous sound level, with T denoting the time period over which the fluctuating sound levels were averaged e.g. $L_{Aeq,16h}$ is the equivalent continuous noise level over an 16 hour period.

L_{A90}

A-weighted sound level exceeded for 90% of the measurement period, calculated via statistical analysis. The L_{A90} descriptor is typically used to establish background sound levels for noise impact assessments

L_{A10}

A-weighted sound level exceeded for 10% of the measurement period, calculated via statistical analysis.

L_{AFmax}

A-weighted sound level maximum sound pressure level that has been measured over a given time period

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

Octave Bands

The audio or frequency spectrum of the human ear is in the range of 20Hz to 20 kHz. The spectrum tells how the energy of the sound signal is distributed in frequency. Octave bands divides the audio spectrum into 10 equal parts. The International Standards Organisation defines the centre frequency of these bands as 31.5Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1kHz, 2kHz, 4kHz, 8kHz and 16kHz.

Noise Rating (NR) Curves

A method of rating noise using a set of curves relating octave band sound pressure levels. Typically used for building services systems within offices

Airborne sound

Sound radiated from a source into the surrounding air e.g. musical instruments, tv/radio, machinery/equipment. Airborne sound insulation refers to the reduction or attenuation of airborne sound, usually via a solid partition between a source and receiver.

Impact sound

Sound resulting from the impact between colliding objects, e.g. footfall impact upon a floor. Impact sound insulation refers to the resistance of a floor to the transmission of impact sound, typically via the installation of a ‘resilient layer’

Flanking sound

The transmission of airborne sound between two adjacent rooms by paths other than via the separating partition between the rooms, e.g. the abutment point of a wall and floor.

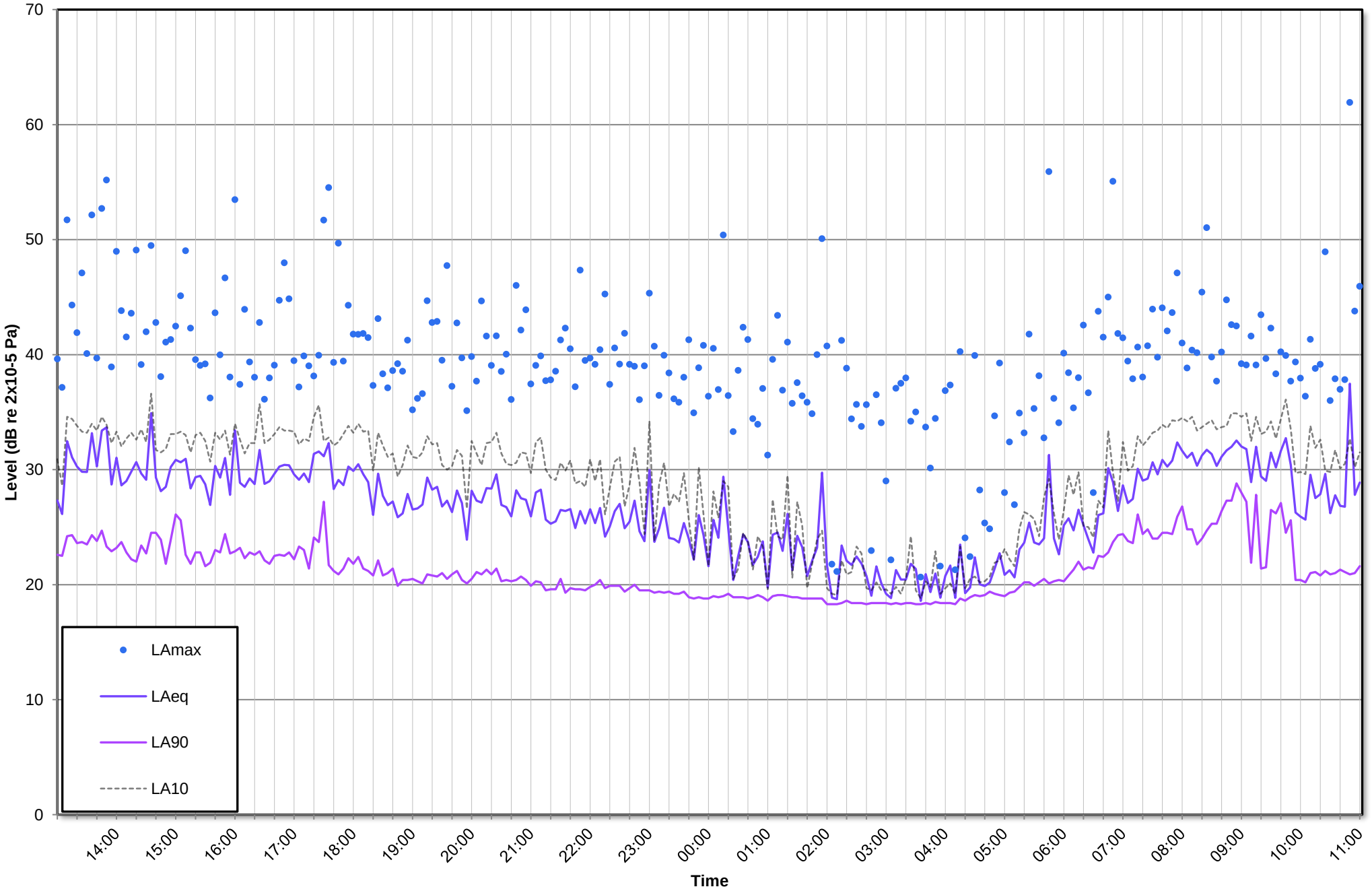
Structure-borne noise

Noise caused by the vibration of elements of a structure. This can result in reradiated noise, whereby the vibrating element transmits airborne sound into a space e.g. vibration caused by mechanical plant installed within a plant room which is not adequately isolated from the structure, or construction/demolition work in an adjacent building.

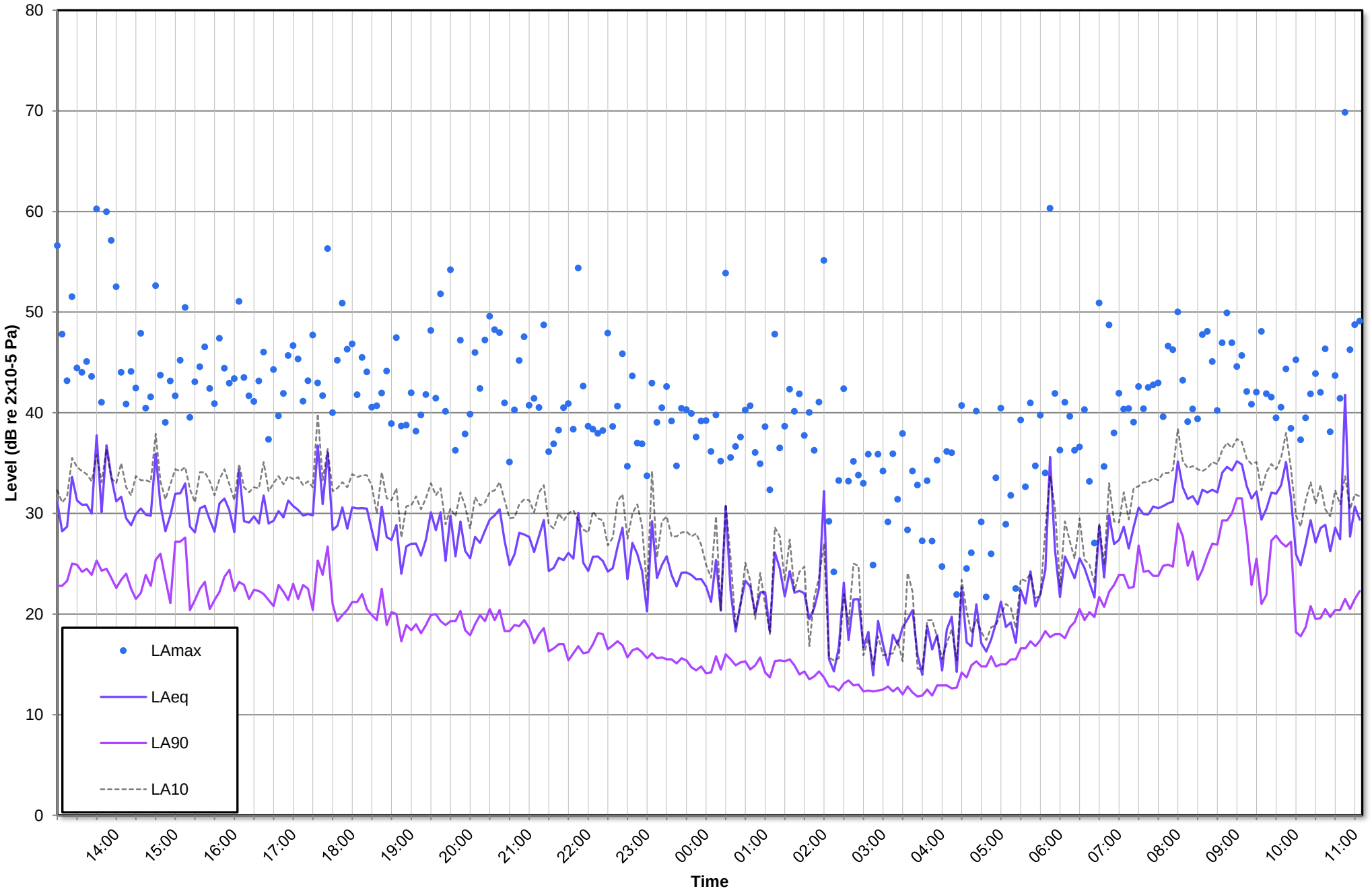
Reverberant sound

Sound in an enclosed space (usually a room), which results from repeated reflections at the boundaries. Reverberation time is the time taken for a steady sound level in an enclosed space to decay by 60dB, measured from the moment the sound source is switched off. A example of a typically reverberant space would be a classic church. Absorptive materials can be used to reduce reflections and reverberation times.

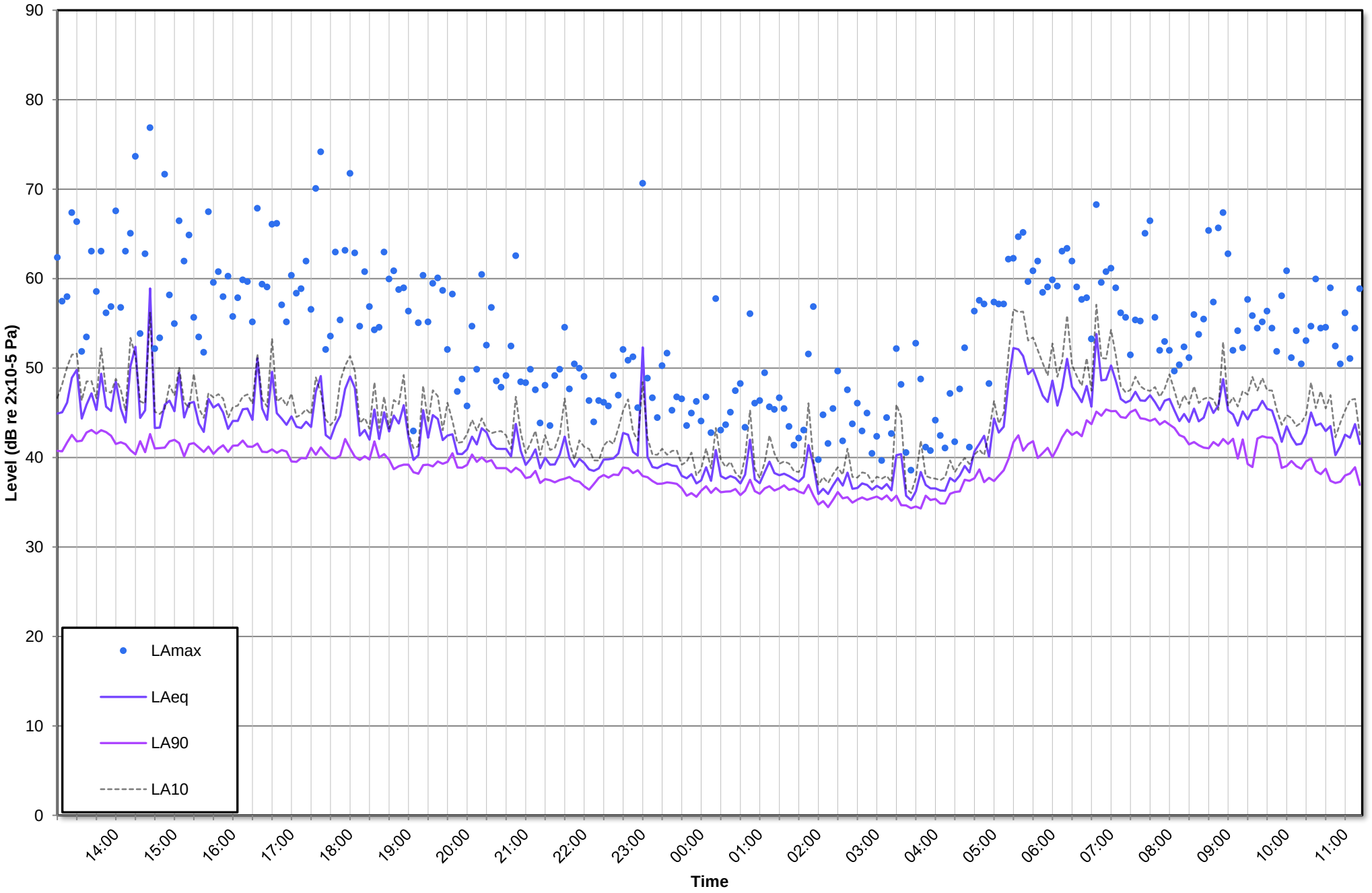
APPENDIX B1
22050.PNIA-RPT.01 - Ground Floor Living Room
12:00 on 18th March to 12:00 on 19th March 2025



APPENDIX B2
22050.PNIA-RPT.01 - 1st Floor Master Bedroom
12:00 on 18th March to 12:00 on 19th March 2025



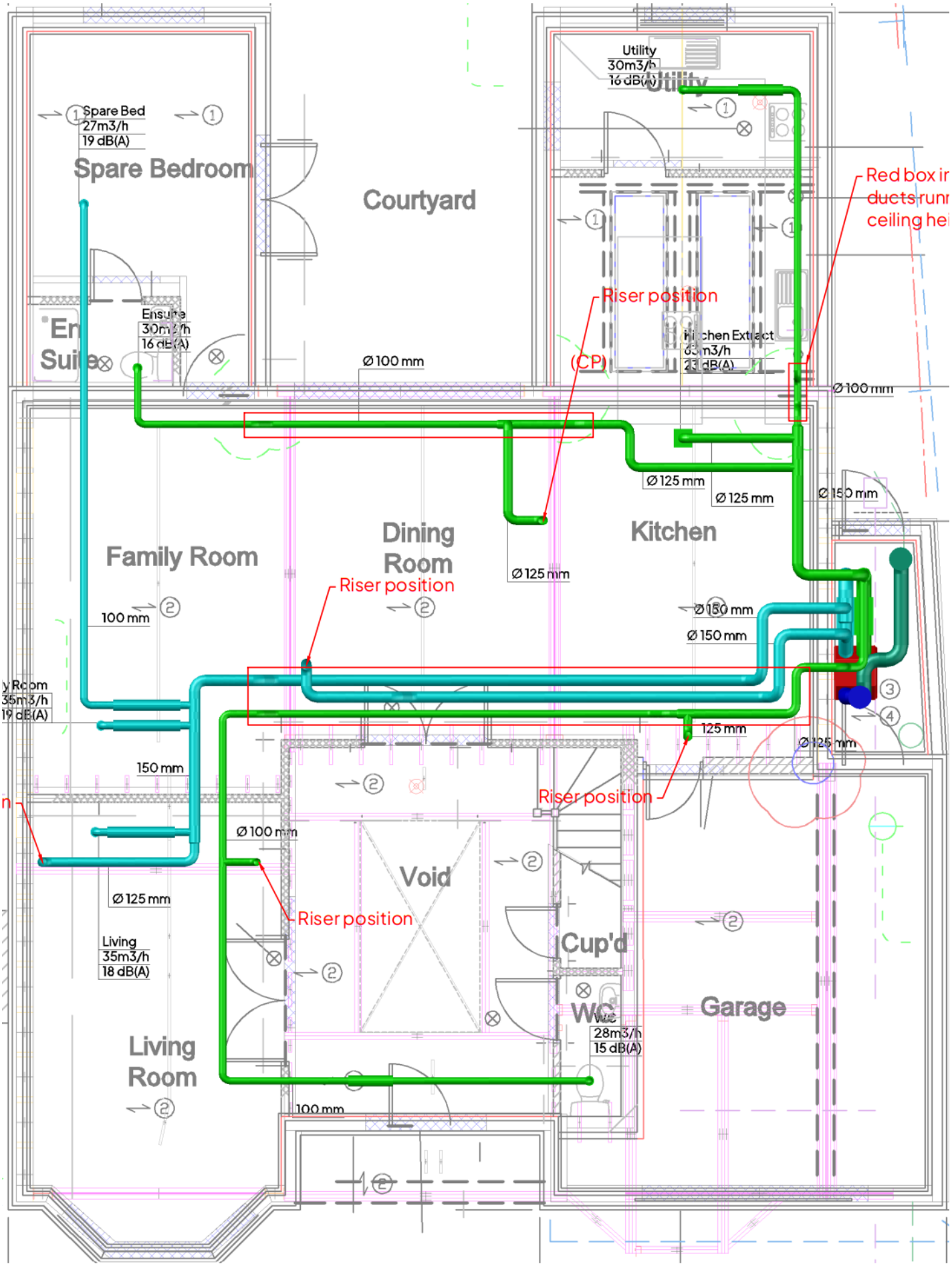
APPENDIX B3
22050.PNIA-RPT.01 - Rear Garden External
12:00 on 18th March to 12:00 on 19th March 2025



APPENDIX C

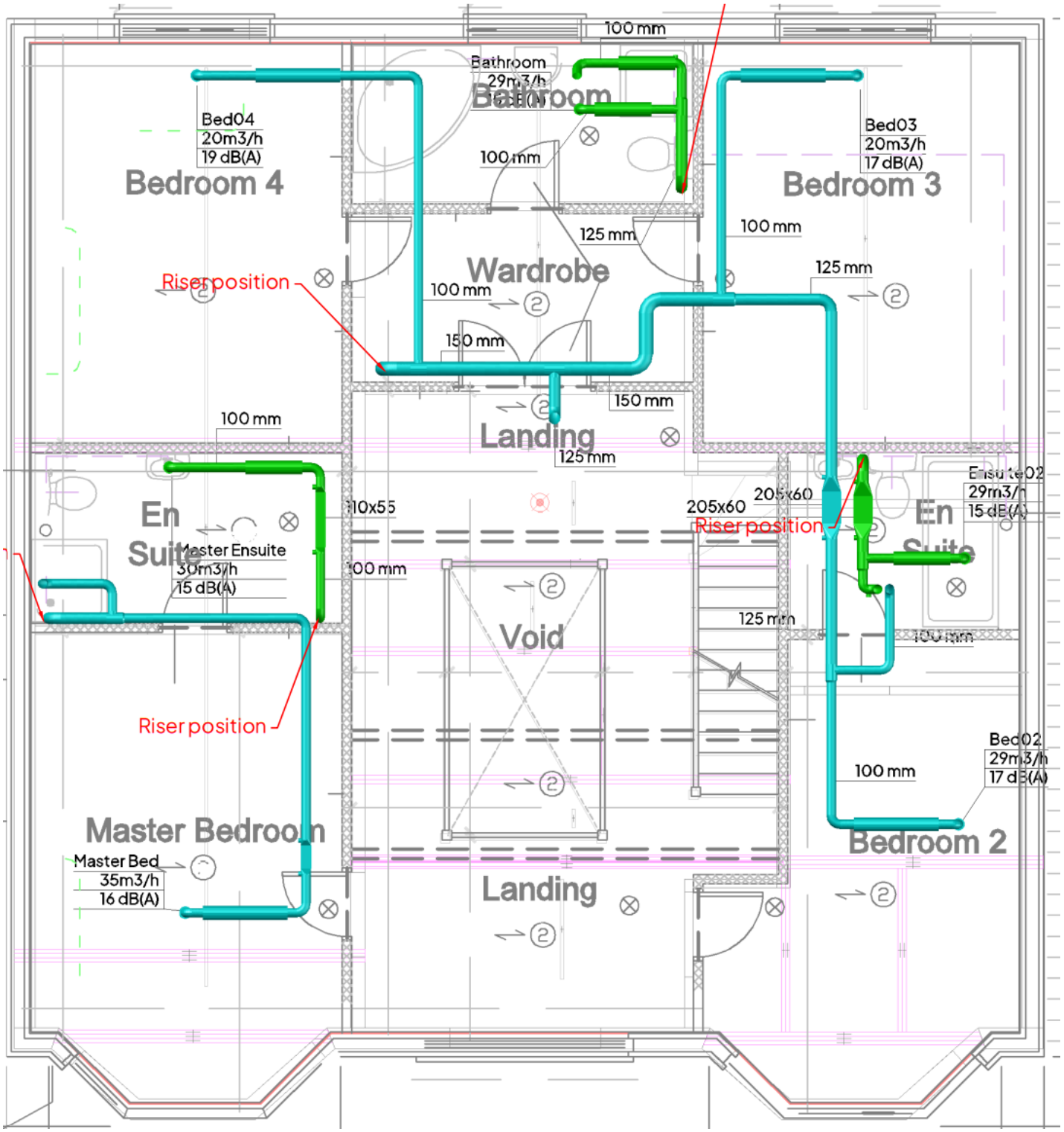
es acoustics

BUILDING SERVICES PLANS AND PREDICTED NOISE LEVELS



APPENDIX C

BUILDING SERVICES PLANS AND PREDICTED NOISE LEVELS



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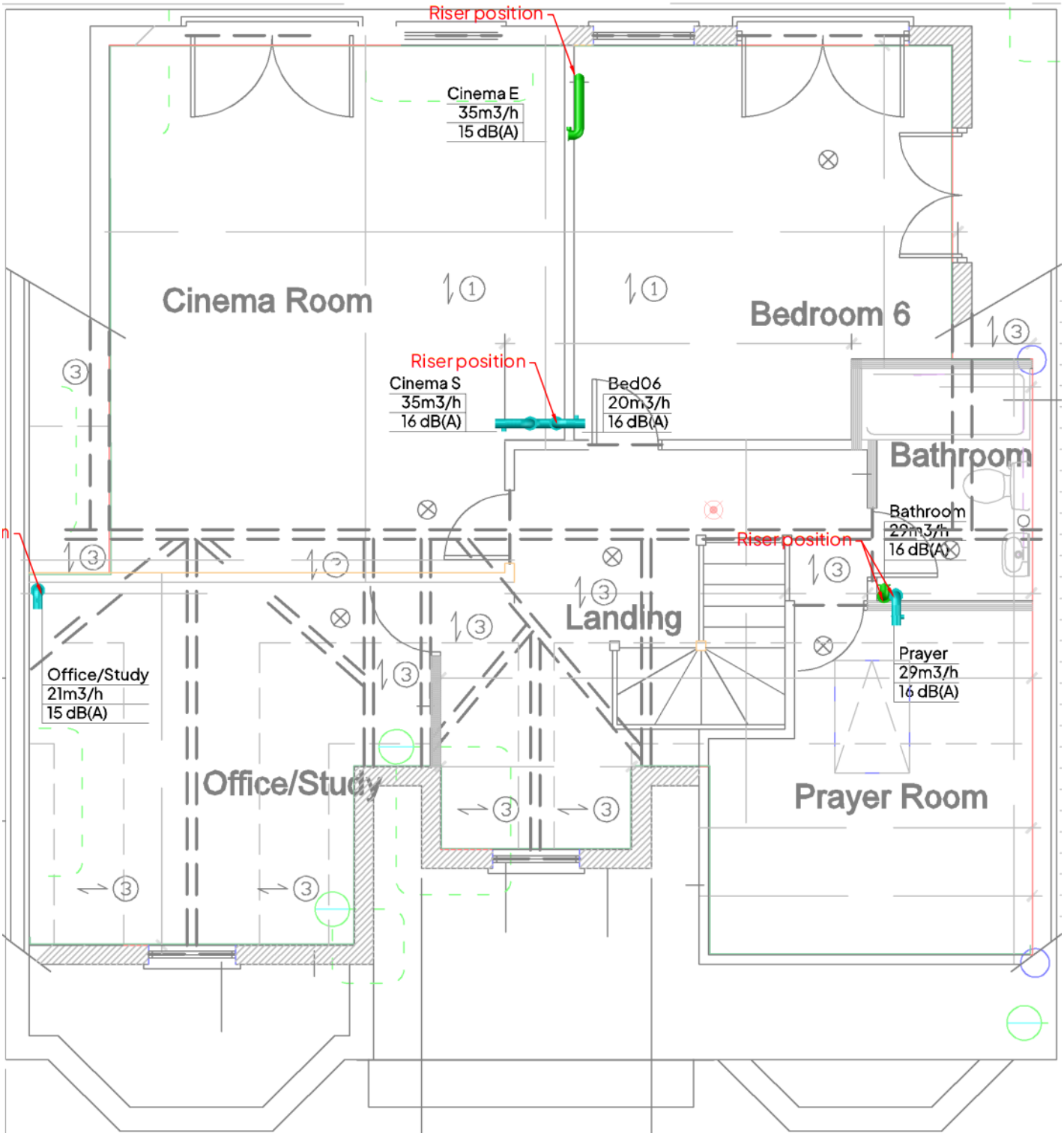
BUILDING SERVICES PLANS AND PREDICTED NOISE LEVELS