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14 March 2025

19934-EBF-01-AA-R1

External Building Fabric Report

Project Number
19934

Issued For
POQ Architects

EXECUTIVE SUMMARY

This assessment has been undertaken so external building fabric elements can be specified in order to meet appropriate internal noise criteria at 9 Long Drive, Ruislip.

The assessment adheres to the Local Authority requirements, the principles provided by the *National Planning Policy Framework*: 2023 (NPPF) and internal noise criteria stated within BS 8233: 2014 *'Guidance on sound insulation and noise reduction for buildings'.*

The Institute of Acoustics' *Professional Guidance on Planning & Noise*: 2017 (ProPG) recommended approach for determining site risk due to environmental noise has also been adopted.

The site currently comprises an unused building. Proposals include the redevelopment of the building to comprise a three story residential unit and adjoining studio flat.

A noise survey has been undertaken as detailed in the report, in order to establish the prevailing environmental noise levels at the site.

A subsequent detailed analysis has been carried out of noise intrusion from the adjacent supermarket, nearby public house, adjacent trainline and surrounding road network through the external building fabric. Sound insulation performance specifications have been proposed for glazing and trickle ventilators.

The assessment has demonstrated that appropriate internal noise levels should be achievable with the installation of nominal glazing systems and typical trickle ventilators.

It is essential that certificated performances should be sought from the manufacturer(s) of the proposed glazing/cladding systems and trickle ventilators.

This report is designed to be suitable to discharge typical noise planning conditions, as per our original scope of work. The report should not be relied upon for further reasons, such as the detailed design of mitigation measures.

Clement Acoustics has used all reasonable skill and professional judgement when preparing this report. The report relies on the information as provided to us at the time of writing and the assumptions as made in our assessment. This report contains confidential information and should not be disclosed to third parties.

CONTENTS

LIST OF ATTACHMENTS

19934-SP1-2	Indicative Site Plans
19934-TH1 & TH2	Environmental Noise Time History
Appendix A	Glossary of Acoustic Terminology
Appendix B	ProPG Initial Site Risk Assessment Guidance

Issue	Date of Issue	Author	Reviewed	Authorised
R1	13/03/2025	**Jamie Newton** Senior Consultant BEng (Hons) MIOA	**Duncan Martin** Director BSc (Hons) MIOA	**John Smethurst** Director BSc (Hons) MIOA

Issue	Comment
R0	First Issue
R1	Revised glazing specification following clarification of use proposals by Client

1.0 INTRODUCTION

Clement Acoustics has been commissioned by POQ Architects to assess the suitability of the site at 9 Long Drive, Ruislip for residential development.

Proposals are to redevelop a currently unused building to comprise a three storey residential unit and adjoining residential studio as part of a Permitted Development Scheme.

This report presents the results of environmental noise surveys undertaken in order to measure prevailing background levels and details the proposed internal noise level criteria.

Full details of necessary mitigation measures in order to meet the proposed criteria are also provided.

2.0 SITE DESCRIPTION

The proposed development site is currently unused, with plans to comprise a three storey residential unit as part of a Permitted Development Scheme.

The site is in a predominantly commercial area facing on to Lond Drive, a street largely populated by residential flats, commercial retail units and restaurants. The site is bound by Long Drive to the north-west, a supermarket to the north-east and Long Drive Car Park to the south and west. South Ruislip Rail and Underground stations are located 50 m south of the site.

At the time of the survey, the background noise climate was dominated by road traffic noise from long Drive, with contribution from the adjacent carpark and nearby rail lines.

3.0 ARCHITECTURAL ASSUMPTIONS

3.1 Drawings

POQ Architects drawings 191/100 have been used in our assessment.

3.2 Room Volume and Window Dimensions

Based on the above drawings we have based our calculations on the following worst case living room and bedroom and window dimensions.

- Living Room
  - Room Volume: 105 m^3
  - Window Area: 5.4 m^2
- Bedroom
  - Room Volume: 53 m^3
  - Window Area: 3.2 m^2

3.3 Room Finishes

Our assessment assumes that bedrooms and living rooms will contain typical amounts of soft furnishings, including sofas, chairs, beds and curtains.

4.0 CRITERIA

4.1 General Permitted Development Order

It is understood that the development is part of a General Permitted Development Order (GDPO) and therefore local policies do not apply. The noise criteria for a permitted development scheme only takes into consideration noise from commercial premises.

In absence of specific requirements under the GDPO, guidance will be sought from other relevant documents such as BS 8233: 2014: '*Guidance on sound insulation and noise reduction for buildings*', and The World Health Organisation's (WHO) *'Guidelines for Community Noise'* 1999.

4.2 National Planning Policy Framework: 2023 (NPPF)

The NPPF, which was first published in 2012 with the latest revision in 2023, outlines the Government's environmental, economic and social policies for England. The NPPF aims to enable local authorities to produce their own distinctive local and neighbourhood plans, which should be applied in order to meet the needs and priorities of their communities.

Paragraph 185 of The *Ground Conditions and Pollution* section of the NPPF relates specifically to noise stating 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:*
>
> *a) 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;*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…'*

4.3 BS 8233: 2014 Internal Noise Criteria

BS 8233: 2014: '*Guidance on sound insulation and noise reduction for buildings*' describes recommended acceptable internal noise levels for residential spaces during daytime and night-time hours. These levels are shown in Table 4.1.

Activity	Location	Design Range $L_{eq,T}$	
		Daytime (07:00 - 23:00)	Night-time (23:00 – 07:00)
Resting	Living Room	35 dB(A)	-
Dining	Dining Room/Area	40 dB(A)	-
Sleeping	Bedroom	35 dB(A)	30 dB(A)

Table 4.1 BS 8233: 2014 recommended internal background noise levels

4.4 World Health Organisation Guidelines

The World Health Organisation (WHO) document on *'Guidelines for Community Noise'* 1999 states the internal noise level guidelines as summarised in Table 4.2.

Specific Environment	Critical Health Effects	$L_{eq,T}$	$L_{max,\ F}$
Dwelling, Indoors	Speech Intelligibility and moderate annoyance, daytime and evening	35 dB(A)	-
Inside Bedrooms	Sleep disturbance, night-time	30 dB(A)	45 dB(A)

Table 4.2 WHO Internal noise level guidelines

The document also states:

> *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dBA LAmax more than 10-15 times per night, (Vallet & Varnet 1991)."*

4.5 Proposed Noise Level Criteria

On the basis of Sections 4.1 to 4.4 above, Table 4.3 presents our proposed minimum design targets to be achieved in the worst affected dwellings.

Location	Period	Design Target	
		$L_{eq, T}$	$L_{max, F}$
Living Rooms	Daytime (07:00-23:00 hours)	35 dB(A)	-
Bedrooms	Night-time (23:00-07:00 hours)	30 dB(A)	45 dB(A)*

Table 4.3 Proposed noise level criteria

***Please note that this is not an absolute limit, however, $L_{max, F}$ 45 dB(A) should not be regularly exceeded.**

The external building fabric would need to be carefully designed to achieve these recommended internal levels.

4.6 Professional Guidance on Planning & Noise (ProPG)

The Institute of Acoustics' *Planning & Noise: Professional Practice Guidance on Planning and Noise: New Residential Development*: 2017 (the ProPG) provides a recommended approach for dealing with noise within the planning process, specifically in relation to new residential developments.

The ProPG follows 2-stage risk assessment approach. The two stages are as follows:

- Stage 1 - an initial assessment where external noise is rated against the risk of adverse effect; and
- Stage 2 – consideration of key elements to determine the suitability of the site for a residential dwelling.

The results of the initial Site noise risk assessment will determine the appropriate risk of developing the site and therefore how appropriate it is from a noise perspective.

Appendix B presents the Initial Site Risk assessment as presented in ProPG.

Stage 2 attempts to determine that good acoustic design principals have been incorporated into the design so that suitable internal noise levels can be achieved in habitable rooms and that suitable external noise levels can be achieved in outdoor amenity space.

4.7 Guidance on Ventilation

Guidance on ventilation and associated acoustic considerations is given in Acoustic Ventilation and Overheating – Residential Design Guide [AVO] issued jointly by the Association of Noise Consultants and the Institute of Acoustics.

In this guide, the need for ventilation (which falls under the requirements of Approved Document F [ADF]) are covered in three main requirements as follows:

- Whole Dwelling Ventilation
  - General ventilation – continuous ventilation of rooms or spaces at a relatively low rate
- Extract Ventilation
  - Removal of air from a space or spaces (typically stale air from bathrooms or kitchens) to outside
- Purge Ventilation
  - Manually controlled removal of air at a high rate to eliminate fumes and odours, e.g. during painting and decorating or from burnt food. May be provided by natural or mechanical means.

Four main template systems for providing each of the above ADF ventilation requirements are summarised in the AVO guide as shown in Table 4.4.

Ventilation System	Method of Whole Dwelling Ventilation	Method of Extract Ventilation	Method of Purge Ventilation
System 1 [Background ventilators and intermittent extract fans]	Background ventilators (trickle vents)	Intermittent extract fans	Typically provided by opening windows
System 2 [Passive Stack]	Background ventilators (trickle vents) & passive stack	Continuous via passive stack	Typically provided by opening windows
System 3 [Continuous Mechanical Extract (MEV)]	Continuous mechanical extract (low rate), trickle vents provide fresh air	Continuous mechanical extract (high rate), trickle vents provide fresh air	Typically provided by opening windows
System 4 [Continuously mechanical supply and extract with heat recovery (MVHR)]	Continuous mechanical supply and extract (low rate)	Continuous mechanical supply and extract (high rate)	Typically provided by opening windows

Table 4.4 Summary of template systems for ADF ventilation requirements

Where possible, natural forms of ventilation are typically preferred. However, in high noise areas, it may be necessary to recommend System 4, in order to minimise penetrations through the external building façade, which weaken the overall sound reduction performance.

Ventilation requirements will be assessed with consideration to the above systems.

5.0 ENVIRONMENTAL NOISE SURVEY

5.1 Unattended Noise Survey Procedure

Measurements were undertaken at two positions as shown on indicative site drawing 19934-SP1. The choice of these positions was based both on accessibility and on collecting representative noise data in relation to the proposed development.

The surroundings and position used for each monitoring location are described in Table 5.1.

Position No.	Description
1	The microphone was mounted on a tripod approximately 1.5 m above ground level, approximately 4 m north-west of the front façade of the building. *
2	The microphone was mounted on scaffolding at second floor level in the south-west corner of the building. The microphone was located > 3.5 m in front of any vertical reflective surface.*

Table 5.1 Description of unattended monitoring locations

Note [*]: The position was considered to be free-field according to guidance found in BS 8233: 2014, and a correction for reflections has therefore not been applied.

Continuous automated monitoring was undertaken for the duration of the survey between 11:00 on 7 March 2025 and 11:30 on 10 March 2025.

The measurement procedure generally complied with ISO 1996-2: 2017: '*Description, measurement and assessment of environmental noise'*.

5.2 Weather Conditions

At the time of set-up and collection of the monitoring equipment the weather conditions were dry with light winds. It is understood that the weather conditions during the unattended survey remained warm and dry with wind speeds below 5 m/s.

It is considered that the weather conditions did not significantly adversely affect the measurements and are therefore considered suitable for the measurement of environmental noise.

5.3 Equipment

The equipment calibration was verified, by means of a field verification check, before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 958 Class 1 Sound Level Meter
- 1 No. Svantek Type 957 Class 1 Sound Level Meter
- Rion Type NC-74 Class 1 Calibrator

6.0 RESULTS

6.1 Unattended Noise Survey Results

The $L_{Aeq:\,5min}$, $L_{Amax:\,5min}$, $L_{A10:\,5min}$ and $L_{A90:\,5min}$ acoustic parameters were measured at the location shown in site drawing 19934-SP1.

Measured noise levels are shown as a time history/histories in Attachments 19934-TH1 and 19934-TH2. A summary of the measured noise levels is presented in Table 6.1.

Position	Time Period	Average ambient noise level $L_{Aeq:\,T}$, dB	Maximum noise level $L_{AFmax:\,5min}$, dB
1	Daytime (07:00 - 23:00)	61	-
	Night-time (23:00 - 07:00)	57	74
2	Daytime (07:00 - 23:00)	62	-
	Night-time (23:00 - 07:00)	55	76

Table 6.1 Average ambient and maximum noise levels

The levels presented in Table 6.1 are as expected considering the sites proximity to commercial sites such as the adjacent car park and supermarket, as well as rail lines and Long Road. Outline mitigation measures are described in Section 8.0 of this report.

Maximum noise levels shown in Table 6.1 are deemed to be 'not regularly exceeded' as required for maximum internal noise level specification purposes.

7.0 PROPG INITIAL SITE RISK ASSESSMENT

The environmental noise survey has determined the onsite noise levels. Table 6.1 shows the calculated day and night-time noise levels to be used in the noise assessment.

With reference to the ProPG risk assessment guidance presented in Appendix B, Table 7.1 shows the identified risk level of this site.

Position	Period	Measured Noise Level	ProPG Noise Risk	ProPG Action Guideline
1	**Daytime** [07:00 - 23:00]	61 dB(A)	Low to Medium	See Note [1] and [2]
	Night-time [23:00 - 07:00]	57 dB(A)	Medium	See Note [2]
2	**Daytime** [07:00 - 23:00]	62 dB(A)	Low to Medium	See Note [1] and [2]
	Night-time [23:00 - 07:00]	55 dB(A)	Medium	See Note [2]

Table 7.1 ProPG initial site risk assessment

Note [1]: Low – 'At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an Acoustic Design Statement (ADS) which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.'

Note [2]: Medium – 'As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrates that a significant adverse noise impact will be avoided in the finished development.'

In consideration of the above, we would therefore recommend that assessing the site according to the guidance of British Standard 8233: 2014 will demonstrate that the impacts of noise can be suitably mitigated to avoid an adverse impact.

Provided adequate mitigation measures are put in place during the design and construction phase of the development, recommended internal noise levels can be achieved. Outline mitigation measures are described in Section 8.0 of this report.

8.0 EXTERNAL BUILDING FABRIC ASSESSMENT

8.1 External Building Fabric - Non Glazed Elements

It is currently assumed that the non-glazed external building fabric elements of the proposed development would be comprised of existing masonry. This would contribute towards a significant reduction of ambient noise levels in combination with a good quality window configuration, as shown in Section 8.2.

All non-glazed elements of the building facades should be designed to provide a sound reduction performance of at least the figures shown in Table 8.1 when tested in accordance with BS EN 10140-2: 2021.

Element	Octave band centre frequency SRI, dB					
	125	250	500	1k	2k	4k
Non glazed element SRI	41	43	48	50	55	55

Table 8.1 Minimum required sound reduction performance from non-glazed elements

8.2 External Building Fabric - Specification of Glazed Units

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed elements in order to achieve recommended internal noise levels shown in Table 4.3. This specification therefore presents the most robust assessment, for BS 8233: 2014 criteria for internal noise levels in habitable rooms at all affected facades.

The minimum sound reduction index (SRI) value required for all glazed elements to be installed is shown in Table 8.2. **The performance is specified for the whole window unit, including the frame and other design features.**

Type	Rooms	Minimum Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)						$R_w + C_{tr}$
		125	250	500	1k	2k	4k	
A	Bedrooms 1-3, Studio	28	23	32	38	42	44	31
B	All non-bedroom spaces	20	18	31	41	46	39	27

Table 8.2 Required glazing performance

Note 1 The $R_w + C_{tr}$ should be considered an indication of the overall performance of the glazing. The minimum performance values per octave bands must be achieved.

Where non-vision spandrel panels and external doors are proposed within habitable spaces, they should provide sound reduction performance at least equal to that required of the glazing in order to maintain the acoustic integrity of the external building fabric.

The attached site plan indicates 19934-SP2 indicates the location of the proposed glazing types.

It is essential that prospective glazing system suppliers can demonstrate compliance with the acoustic performance detailed in our specification rather than simply offering a generic glazing configuration. The complete glazing system should achieve the performance requirements stated in Table 8.2 when tested in accordance with BS EN 10140-2: 2021.

It is essential that the performance presented in Table 8.2 is met, However, the following typical configurations would be expected to meet the required levels of sound insulation.

- Type A: 4 mm Glass / 12 mm Air / 10 mm Glass
- Type B: 4 mm Glass / 20 mm Air / 4 mm Glass

Please note that the above guidance only considers acoustic performance. Other disciplines, which consider thermal, safety, durability etc. should be consulted to ensure suitability.

8.3 External Building Fabric - Specification of Trickle Ventilators

It is understood the proposal on this site is to use System 4 ventilation as summarised in Table 4.4.

In order to comply with Building Regulations (Part F), fresh air ventilation to habitable rooms is required via trickle ventilators.

The trickle ventilators should comply with the minimum octave band normalised weighted level differences stated in Table 8.3.

Type	Rooms	Minimum $D_{n,e}$ Values(dB) at Octave Band Centre Frequency (Hz)						$D_{n,ew}$[1]
		125	250	500	1k	2k	4k	
A	Bedrooms 1-3, Studio	31	31	31	37	28	31	32
B	All non-bedroom spaces	29	22	32	30	29	23	23

Table 8.3 Required ventilator performance

Note 1 The $D_{n,ew}$ should be considered an indication of the overall performance of the ventilator. The minimum performance values per octave bands must be achieved.

N.B. The stated performances should be achievable with standard units

It should be ensured that all mechanical extract ventilation is designed to not exceed the internal noise criteria stated in Table 4.3.

8.4 Flanking Transmission

It is understood that the external building fabric for this development does not include curtain walling or any other lightweight cladding. Therefore, a flanking performance specification should not be required.

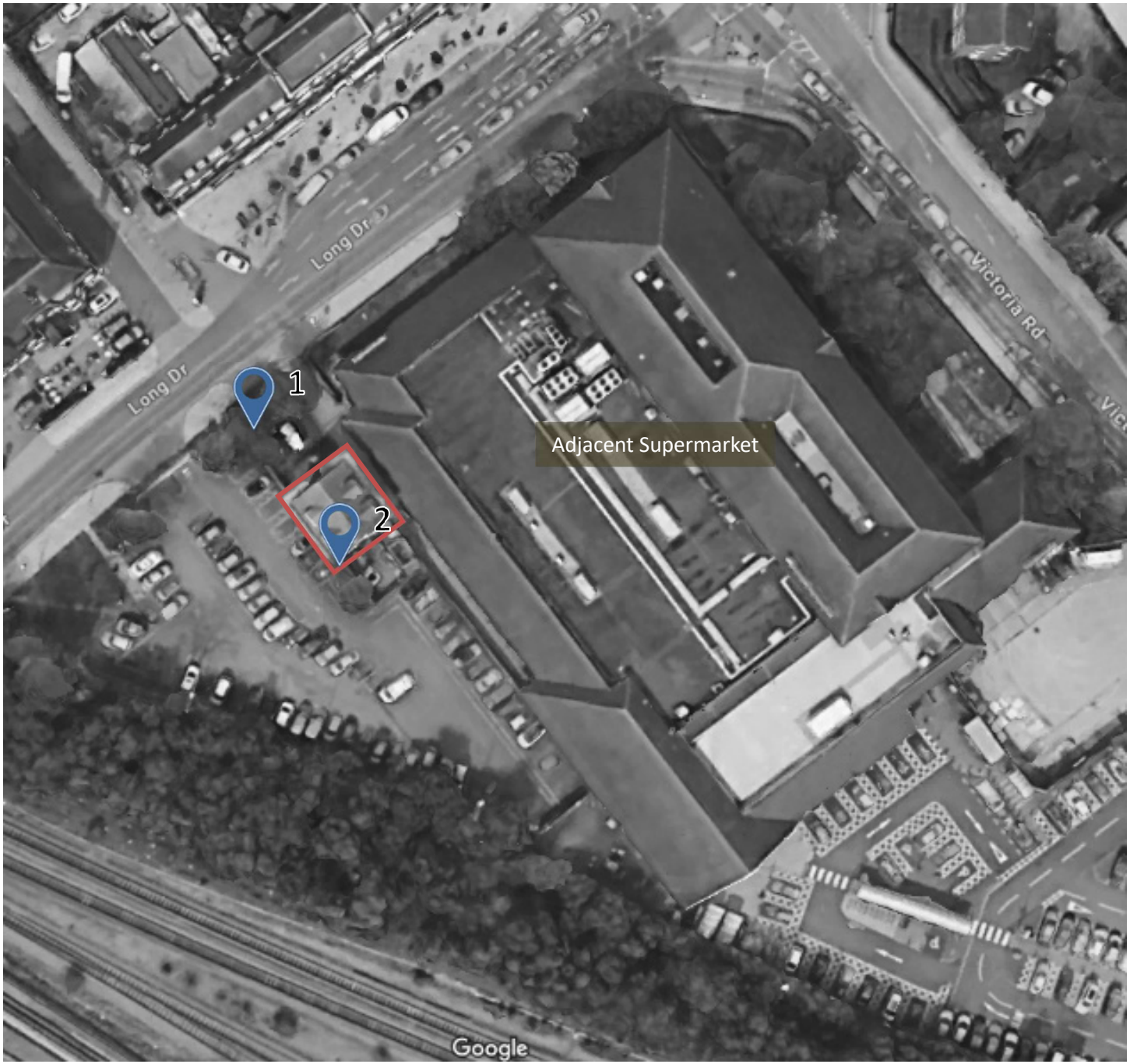
Junctions where party walls and floors interface with the external building fabric should however be carefully detailed. Suitable flexible cavity stops should be introduced into cavities at party floor/wall lines.

9.0 CONCLUSION

An environmental noise survey has been undertaken at 9 Long Drive, Ruislip in order to measure ambient noise levels in the area.

Measured noise levels have allowed an assessment of the level of exposure to noise of the proposed development site to be made.

Outline mitigation measures, including a glazing specification and the use of appropriate ventilation have been recommended and should be sufficient to achieve recommended internal noise levels for the proposed development according to BS 8233: 2014 and WHO.



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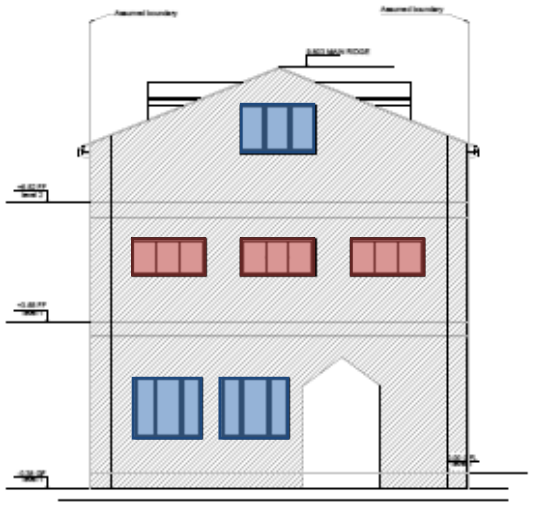
N

Not to scale

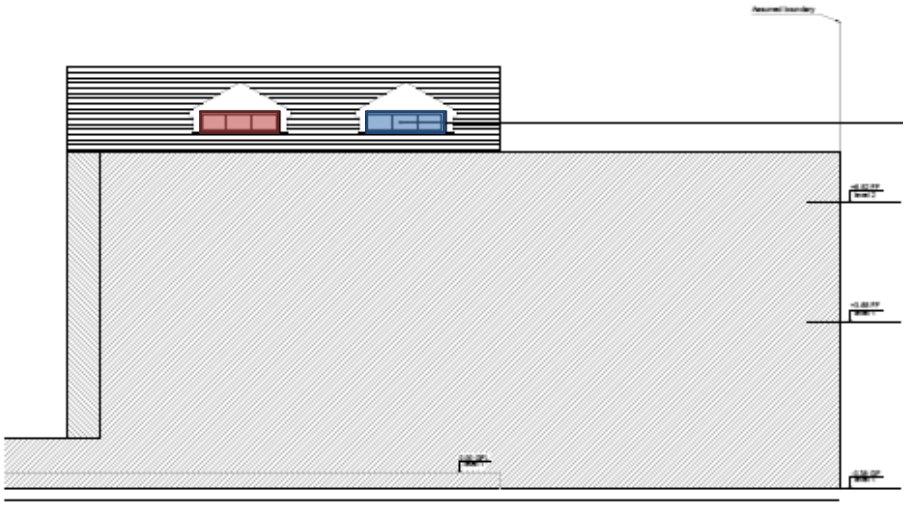
Description:
Indicative site plan showing noise monitoring position and nearest sensitive receiver

Date	14 March 2025
Reference	19934-SP1
Project Name	9 Long Drive, Ruislip
Image ©	Google Earth

Key:	
	Unattended Noise Survey Position
	Site Location



EXISTING/PROPOSED FRONT ELEVATION



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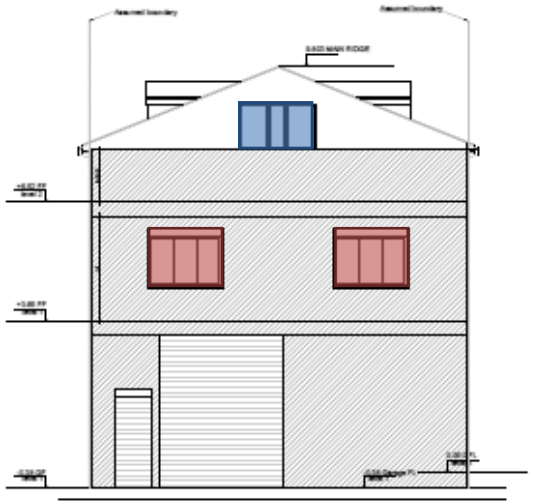
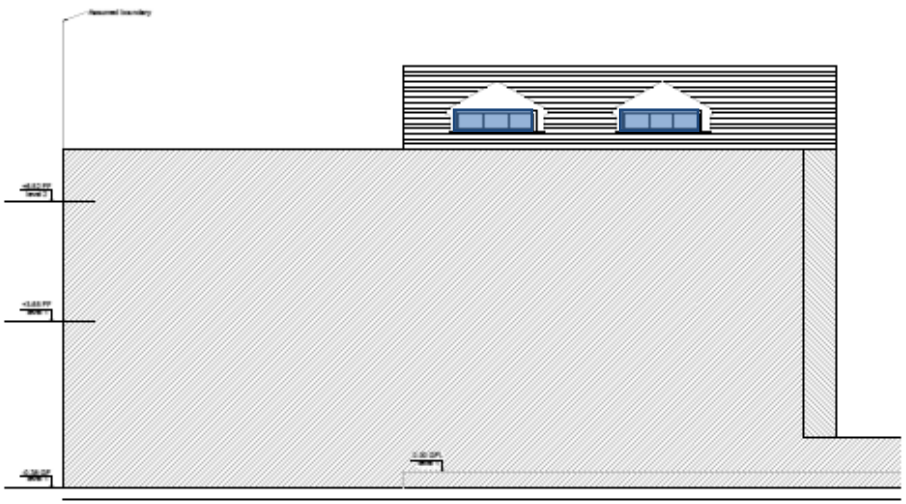


EXISTING/PROPOSED REAR ELEVATION



EXISTING/PROPOSED REAR ELEVATION

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N

Not to scale

Description:
Indicative site plan showing noise monitoring position and nearest sensitive receiver

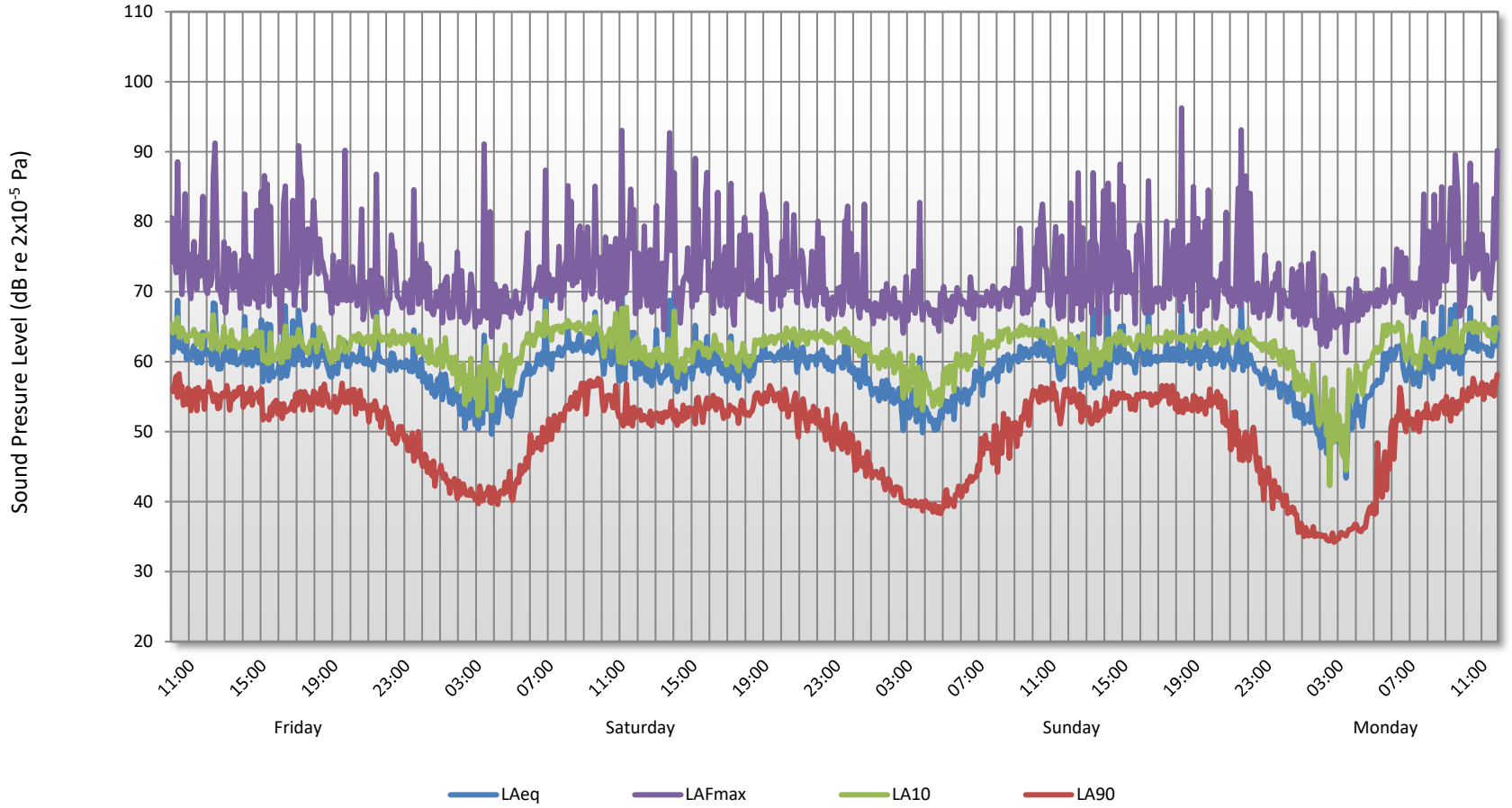
Date	14 March 2025
Reference	19934-SP2
Project Name	9 Long Drive, Ruislip
Image ©	POQ Architects

Key:	
	Glazing Type A (Bedrooms)
	Glazing Type B (Non-Bedrooms)

9 Long Drive, Ruislip

Position 1

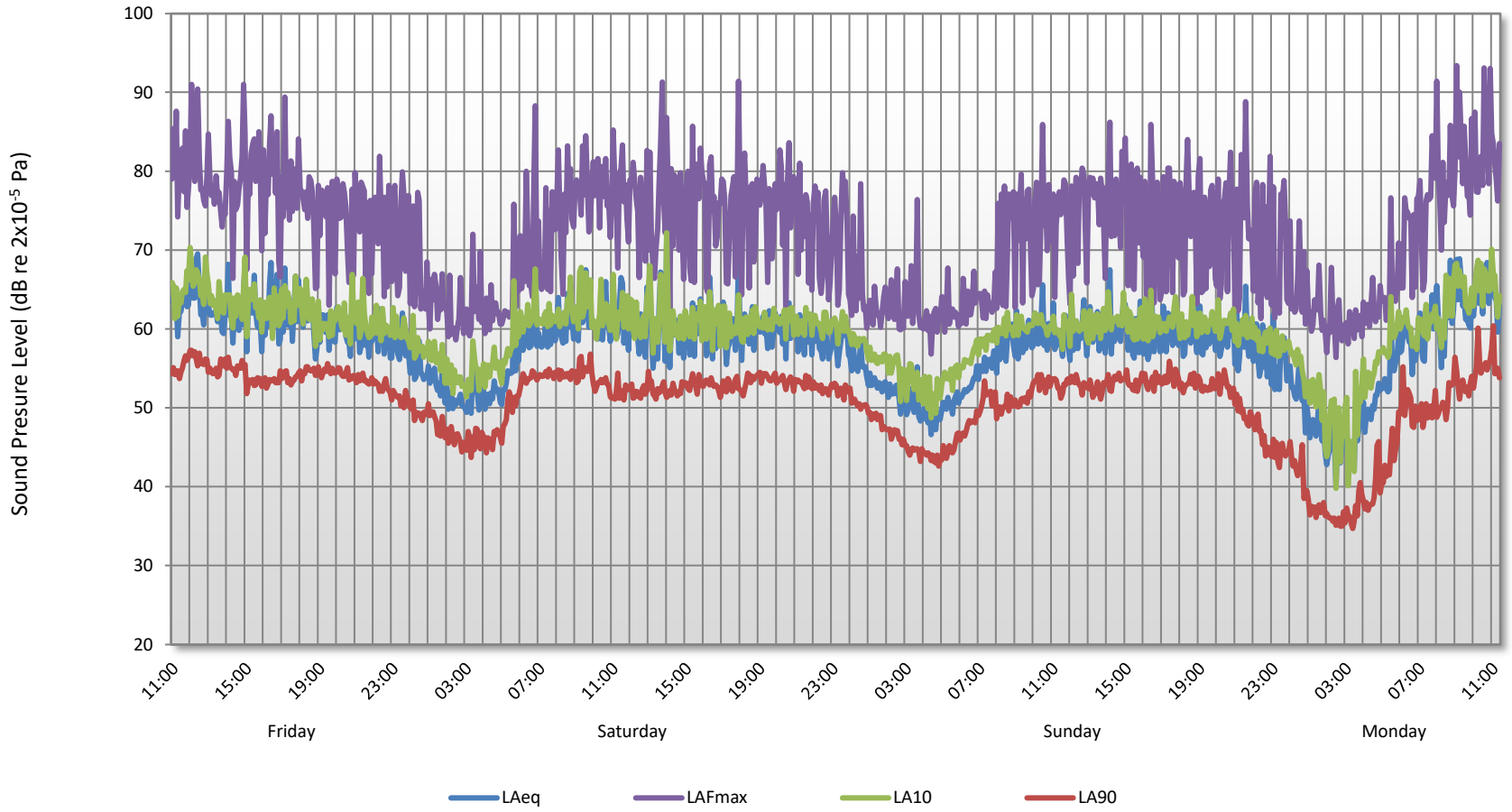
Environmental Noise Time History
07 March 2025 to 10 March 2025



9 Long Drive, Ruislip

Position 2

Environmental Noise Time History
07 March 2025 to 10 March 2025



19934-TH2

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and 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 not 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 not 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 10 such octave bands whose centre frequencies are defined in accordance with international standards.

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 one alone and 10 sources produce a 10 dB 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 3 dB for each doubling of distance.

APPENDIX A

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception 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 reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

APPENDIX B

ProPG Initial Site Risk Assessment Guidance

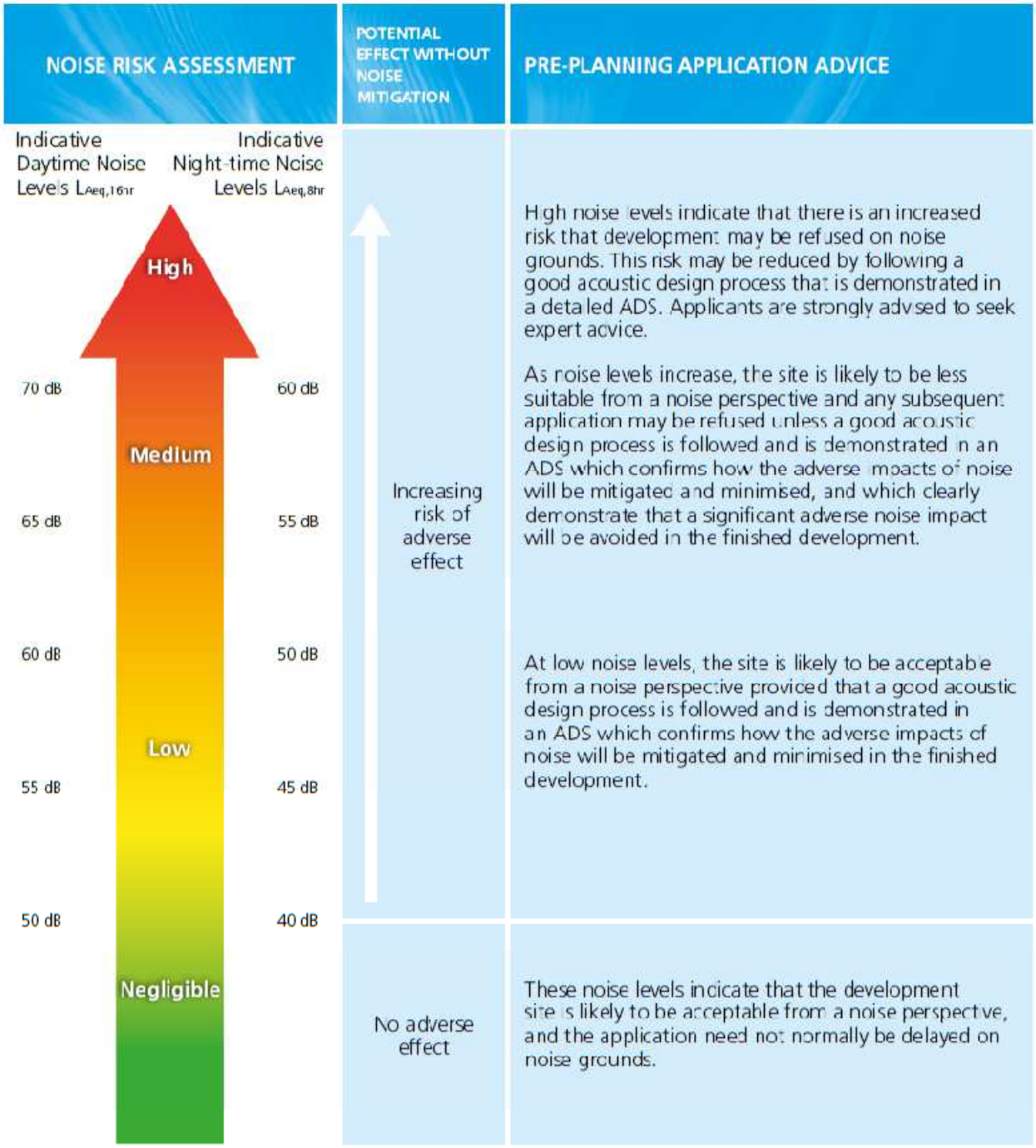


Figure 1. Stage 1– Initial Site Noise Risk Assessment

ProPG – Figure 1 – Initial Site Risk Assessment