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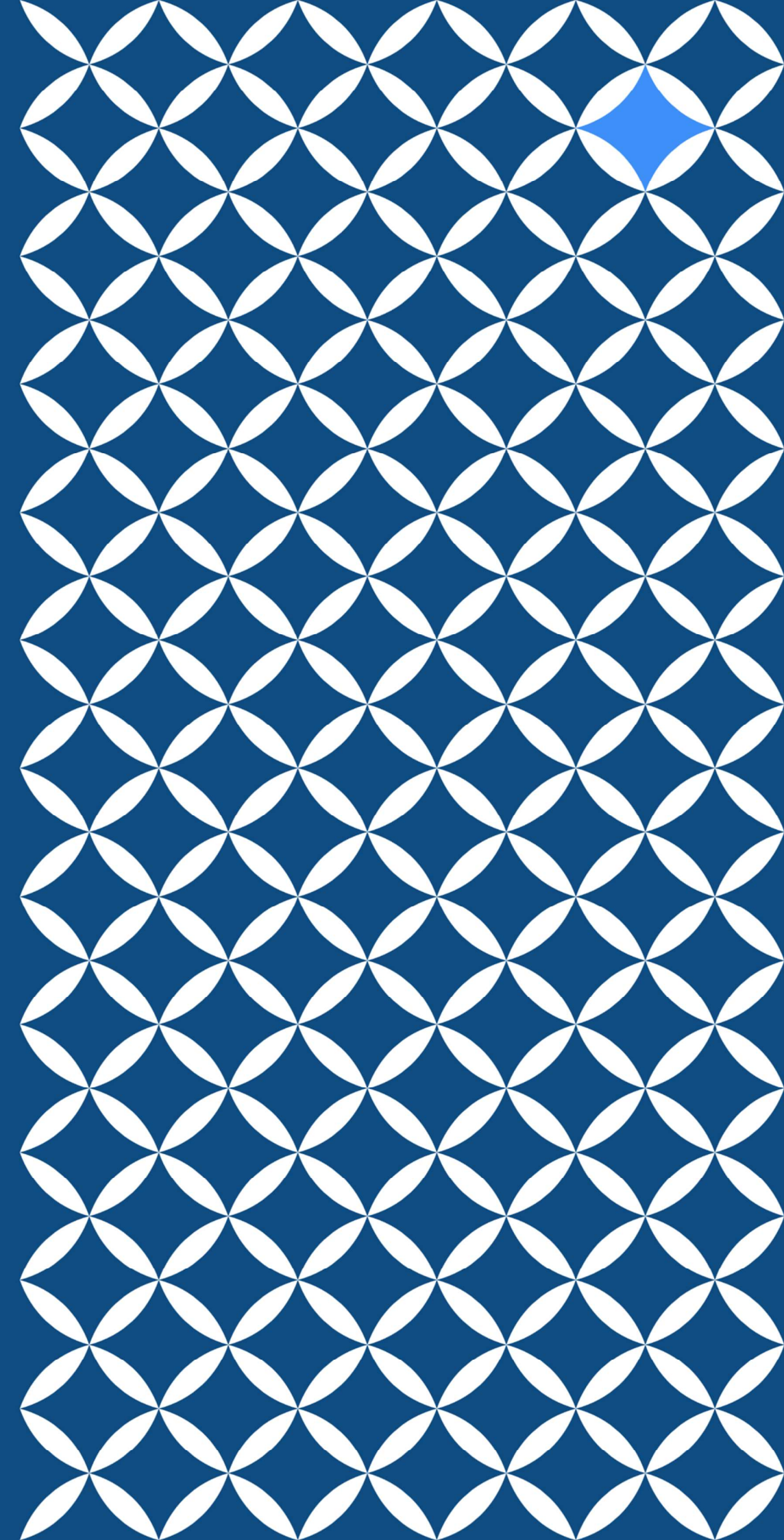
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Lord Street, Manchester

Environmental and Intrusive Noise Assessment

P2599-SOL-REP-04 P02

21 January 2026





PROJECT	Lord Street, Manchester Environmental and Intrusive Noise Assessment
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DOCUMENT REFERENCE	P2599-SOL-REP-04 P02
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DATE	21 / 01 / 2026

Revision	Date	Description
P01	03/11/2025	First issue
P02	21/01/2026	Updated to reflect latest GA plans

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Name of Organisation	Sol Acoustics Limited
Company Registration Number	4218702

Summary

Sol Acoustics Limited have been commissioned by Linear Design and Construct to undertake a baseline noise survey and acoustic design assessment of the proposed residential development at the corner of Lord Street and Cheetham Hill Road in Manchester.

The development proposals comprise a single 23 storey tower block to provide 251 new residential units with residential amenity and associated ancillary spaces at ground and 15th floor.

The purpose of this acoustic report is to assess the suitability of the development site as based on the pre-existing environmental noise climate on-site as measured by Sol during July 2025, together with outputs from the Sol 3D noise model, the guidance presented in *‘Professional Planning Guidance: Planning and Noise’*, BS 8233: 2014 *‘Guidance on sound insulation and noise reduction for buildings’*, and Manchester City Council’s *‘Planning and Noise Technical Guidance’*.

In order to predict the likely resultant environmental noise levels at the development site, a 3D computer-based environmental noise model was created using proprietary DataKustik “CadnaA” Noise Mapping software. The outputs obtained from this 3D noise model have been used to inform this environmental and intrusive noise assessment.

This report demonstrates that the proposed residential development site can be categorised as **“high risk”** as defined by *‘Professional Planning Guidance: Planning and Noise’ (“ProPG”)*. The development is likely to be acceptable from a noise perspective assuming a good acoustic design process is demonstrated to mitigate any potential impacts of environmental noise, as outlined in this report.

Appropriate indoor ambient noise levels can be achieved within internal residential habitable rooms across the residential development with an MVHR Approved Document F background ventilation strategy and acoustic glazing strategy as outlined in the report.

Acoustic guidance is also presented concerning the noise constraints regarding mitigating residential summertime overheating using a natural ventilation strategy in accordance with the assessment framework provided in *‘Acoustics, Ventilation and Overheating, Residential Design Guide 2020’* and the requirements of Building Regulations *‘Approved Document O’*.

It is considered that for specific façade areas, the use of “partially open” or “fully open windows” to mitigate overheating may results in a significant adverse noise impact to a number of low-level residential units during the daytime and/or result in an exceedance of Building Regulations Approved Document O Section 3 intrusive noise requirements within bedrooms during night-time periods.

Therefore, a suitable overheating mitigation strategy must be developed with the window opening restrictions as outlined within this report, which must be reviewed and approved by Sol. (Others must check other non-acoustics aspects, such as Architectural and aesthetic considerations, SAP/overheating strategies, and suchlike).

Predictions show that environmental noise levels within the proposed external amenity at ground floor will likely exceed desired noise level targets, however the noise levels in the proposed external amenity at the 15th floor roof are predicted to comply. Given the access to the communal external amenity space at the 15th floor roof level and nearby open park space within the vicinity of the site, it is considered that the predicted noise levels in external amenity areas are in line with standard guidance.

Appropriate daytime and nighttime environmental noise limits for operational noise egress and M&E plant (and associated louvres, cowls etc.) have also been set herein, all as based on the results obtained from the environmental noise survey undertaken, and as discussed within this report.



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1 Introduction

1.1 Scope

- 1.1.1 Sol Acoustics Limited have been commissioned by Linear Design and Construct to undertake a baseline noise survey and acoustic design assessment of the proposed residential development at the corner of Lord Street and Cheetham Hill Road in Manchester.
- 1.1.2 The development proposals comprise a single 23No. storey tower block to provide 251No. residential units with residential amenity and associated ancillary spaces at ground and 15th floor.
- 1.1.3 The purpose of this report is as follows:
- 1.1.4 To assess the proposed residential scheme in accordance with *'ProPG: Planning & Noise 2017'*, Manchester City Council's *'Planning and Noise Technical Guidance'*.
- 1.1.5 To outline acoustic performance specifications for the building envelopes based on the pre-existing environmental noise climate on-site and appropriate internal ambient noise levels stated within the relevant design guidance.
- 1.1.6 To identify the key noise constraints concerning the impact of mitigating residential summertime overheating using a natural ventilation strategy in accordance with the assessment framework provided in *'Acoustics, Ventilation and Overheating, Residential Design Guide 2020'* and *'Approved Document O'*.
- 1.1.7 To specify appropriate daytime and night-time environmental noise limits for amenity noise breakout and M&E plant based on the results obtained from the environmental survey undertaken at site.
- 1.1.8 This report has been produced by suitably qualified and competent professionals with relevant experience as detailed in Table 1:

Name	Position	Qualifications	Membership of professional bodies	Experience
Joe Sinker	Executive Consultant	MSc(Research) Acoustics and Audio Engineering, BSc(Hons) Audio Technology	Member of the Institute of Acoustics, Association of Noise Consultants registered pre-completion tester	10 years relevant acoustic consultancy experience.
Thomas Leach	Associate Director	MSc Sound & Vibration Studies. BSc(Hons) Sound Technology	Member of the Institute of Acoustics, Association of Noise Consultants registered pre-completion tester	14 years relevant acoustic consultancy experience including the assessment and design of high-rise and mixed-use residential developments such as the proposed scheme.

Table 1: Competency and experience

1.2 Location & Description of Development

Description of the Existing Site

- 1.2.1 The proposed development site is located at the corner of Lord Street and Cheetham Hill Road in Manchester city centre. The site has been vacant since the demolition of the previous row of single storey commercial premises at the west of the site in 2019.
- 1.2.2 The site is bounded by Lord Street, Cheetham Hill Road, and Fernie Street to the north, west, and east respectively. To the south the site borders a petrol station. The surrounding buildings comprise a mixture of residential, offices, shops, a church, and a petrol station.
- 1.2.3 Cheetham Hill Road is a busy two-lane road and bus route. Lord Street is a moderately busy minor road linking Cheetham Hill Road and Red Bank. Fernie Street provides vehicle access to the existing residential and commercial premises at Jefferson Place, Hallmark Tower, and the Radisson Hotel, with no vehicle through route.
- 1.2.4 A local bus route with associated bus stops is located along Cheetham Hill Road.
- 1.2.5 The level of the site varies significantly with the lowest point in the southeast corner approximately 5 metres below the western site boundary and approximately 2 metres below the northeast corner of the site.

Development Proposal

- 1.2.6 The development proposals comprise a single 23 storey tower with 15th floor roof terrace to the south and east, ground and 15th floor residential amenity space, and basement with ancillary plant, cycle store, and refuse store facilities.
- 1.2.7 Figure 1 below shows the proposed site plan and site outline boundary for the development.

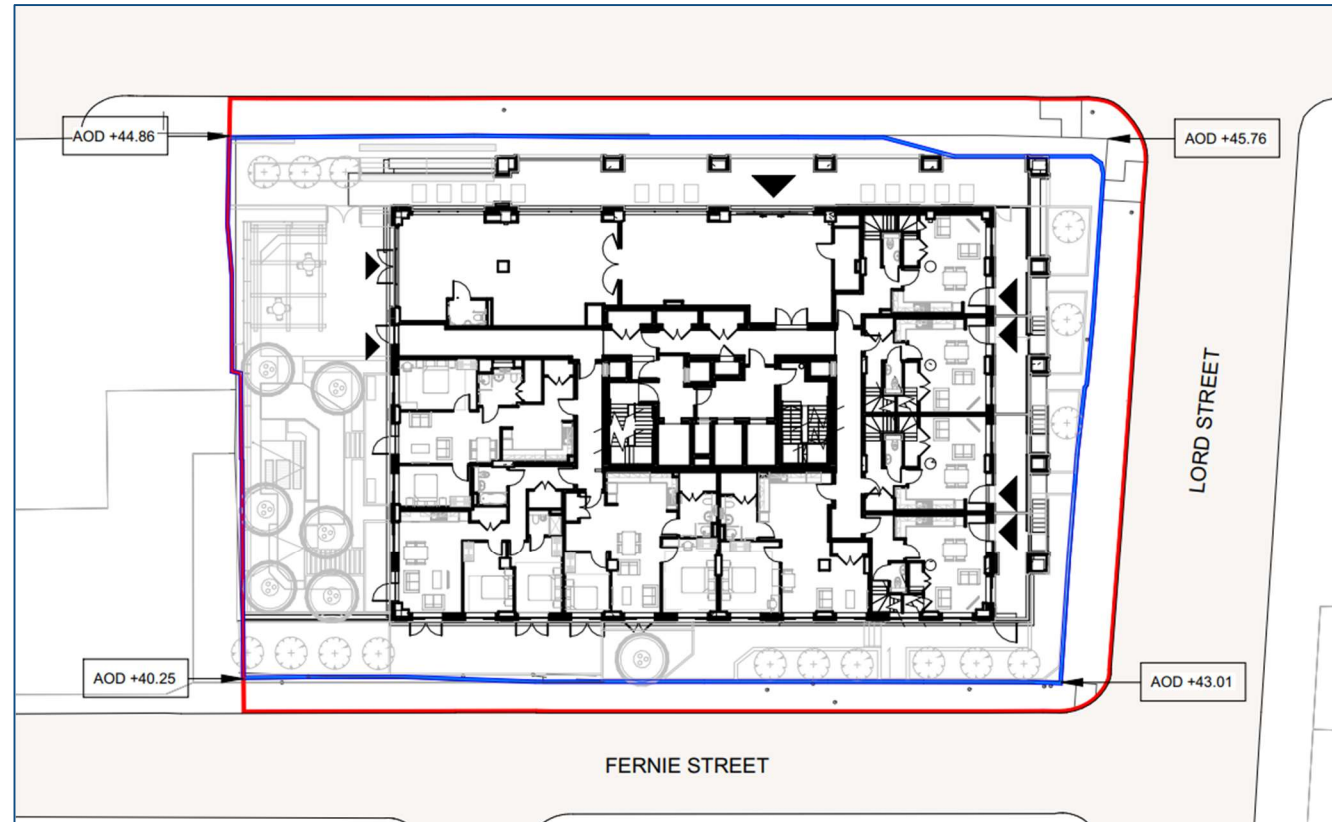


Figure 1: Proposed site plan (c/o AEW)

2 Baseline Environmental Noise Survey

2.1 Noise Survey Details

- 2.1.1 An environmental survey was conducted by Sol between Wednesday 23rd July 2025 and Tuesday 29th July 2025. The survey was undertaken in line with the requirements of BS 7445 'Description and measurement of environmental noise' Parts 1-3.
- 2.1.2 The survey consisted of two long-term unattended measurement positions as described in Table 2 below and shown in Figure 2.

Measurement position	Description
Measurement position 1 ("MP1")	Mast-mounted microphone positioned c.2.5m above local ground level. The location was representative of "free field" conditions. It was positioned along the western site boundary to the south of the site with direct line of sight to Cheetham Hill Road.
Measurement position 2 ("MP2")	Mast-mounted microphone positioned c.2.5m above local ground level. The location was representative of "free field" conditions. It was positioned on the eastern site boundary to the north of the site with direct line of sight to both Lord Street and Fernie Street.

Table 2: Summary of measurement positions

- 2.1.3 MP1 and MP2 were secure unattended measurement positions intended to quantify the pre-existing baseline noise levels at the proposed site.
- 2.1.4 Type 1 Precision Grade sound measuring instrumentation was exclusively used and microphone windshields were fitted at all times. Full details of all the instrumentation used and corresponding traceable calibration records are retained on file by Sol and is available for inspection if required.
- 2.1.5 Weather conditions were monitored throughout the survey at MP2. The prevailing weather conditions were generally suitable for the purposes of environmental noise measurements throughout the majority of the noise survey. However, as illustrated on the Time History Graphs in Appendix B, there were periods of wind speeds greater than 5ms⁻¹. Data affected by the adverse weather has been omitted from the noise assessment.
- 2.1.6 Notwithstanding the weather conditions, the microphone systems were entirely weatherproofed and fitted with all-weather environmental windshields, each with a bird spike.



Figure 2: Satellite image showing the existing site and noise survey measurement location (Google Earth 2025)

2.2 Noise Survey Results Summary

2.2.1 Table 3 provides a basic summary of the A-weighted broadband environmental noise levels measured during the survey at MP1 and MP2.

Measurement Location	Typical Measured Noise Level (dB, $L_{Aeq,T}$, 10 th Highest L_{Amax} , and Range L_{A90})				
	Daytime		Nighttime		
	$L_{Aeq, 16hr}$	$L_{A90, 15min}$	$L_{Aeq, 8hr}$	$L_{A90, 15min}$	$L_{Amax, 15min}$
MP1	64 – 65	46 – 59	61 – 63	36 – 58	80
MP2	56 – 57	41 – 55	51 – 55	34 – 52	73

Table 3: Summary of typical measured noise levels

2.2.2 Appendix B provides further information and a full summary of the measurement data.

2.2.3 Table 4 summarises the corresponding unweighted, time-averaged ($L_{Aeq,T}$) daytime and night-time period ambient noise levels used for the assessment, in linear (unweighted) octave band frequency terms as based on the representative survey data.

Measurement Location	Measurement Period	A-weighted Broadband noise level (dB $L_{Aeq,T}$)	Unweighted sound pressure level (dB, $L_{eq,T}$) at Octave band centre Frequency (Hz)							
			63	125	250	500	1k	2k	4k	8k
MP1	Daytime	65	68	63	60	59	60	60	52	45
	Night-time	63	65	60	60	58	58	57	53	45
MP2	Daytime	57	64	59	56	55	52	48	43	37
	Night-time	55	61	57	57	51	50	45	40	32

Table 4: Summary of unweighted sound pressure levels at octave band centre frequency

2.2.4 From the statistical analysis it is considered that the representative Background Sound Level measured at MP1 was 55dB $L_{A90, 15min}$ during the daytime and 39dB $L_{A90, 15min}$ during the night-time. For MP2, the Background Sound Level was 49dB $L_{A90, 15min}$ during the daytime and 38dB $L_{A90, 15min}$ during the night-time. Histogram plots showing the distribution of measured background noise levels at each measurement position are included in Appendix B.

2.2.5 Through detailed review of the measured noise levels and audio recordings taken at MP1 a period of activity associated with the adjacent petrol station has been identified between approximately 09:40 and 10:25 on the morning of Tuesday 29 July, that has been attributed to a fuel tanker delivery. During this approximately 45-minute period ambient noise levels at MP1 increased to approximately 68dB L_{Aeq} .

2.2.6 It is understood that these short-term events occur infrequently and are unlikely to occur more than once a week. Therefore, given their infrequency, and the long-standing of both the petrol station and adjacent residential premises to the south and east at a similar distance to the proposed building, this period of activity has been included within the analysis of the measured noise levels used to undertake the noise break-in assessments herein but has not been assessed in isolation.

2.3 Predicted Development Environmental Noise Levels

2.3.1 In order to predict the likely resultant environmental noise levels across the future façades of the proposed development, a 3D computer based environmental noise model has been created using the proprietary DataKustik “CadnaA” Noise Mapping software. The following assumptions have been made in the generation of the noise model:

- ◆ The noise model was set up to apply the noise prediction methodology set out in ISO 9613-2: ‘Acoustics – Attenuation of Sound propagation outdoors – Part 2: General Method of Calculation’
- ◆ The existing land topography of the site and surrounding areas have been taken into consideration in the assessment. Third party topographical information has been obtained from open-source data as available from DEFRA.
- ◆ The model was set to include up to second order reflected noise from solid structures.
- ◆ Ground absorption was set to G=0 (hard ground).
- ◆ Acoustic screening and reflections afforded by nearby buildings and solid structures.

2.3.2 Based upon the above and the measured environmental noise levels the daytime and night-time free field noise levels have been predicted across the development.

2.3.3 A 3-dimensional example of the noise map is shown in Figure 3, further noise maps are shown in Appendix B.

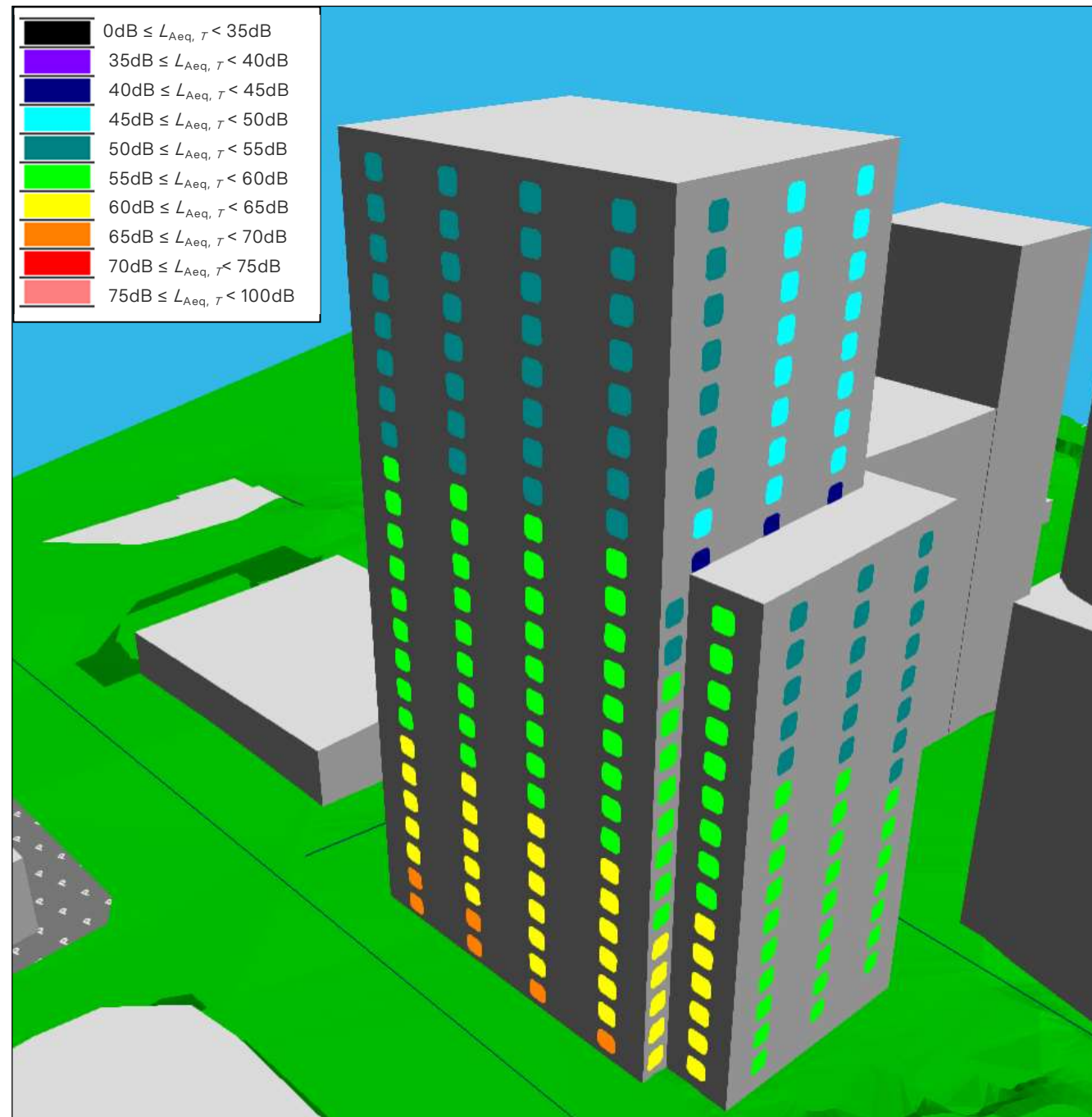


Figure 3: CadnaA 3D noise map

3 Legislation, Planning Policy, and Guidance

3.1 Overview

3.1.1 The following national, regional, and local planning policy and guidance is of relevance to the assessment in relation to the noise:

- ◆ National Planning Policy Framework, 2024
- ◆ Noise Policy Statement for England, 2010
- ◆ Planning Practice Guidance on Noise, 2019

3.2 National Planning Policy Framework

3.2.1 The updated "National Planning Policy Framework" (NPPF) sets out the Government's requirements for the planning system. Key to this assessment are paragraphs 187, 198 and 200 of NPPF.

3.2.2 Paragraph 187 requires the planning system to:

- '... contribute to and enhance the natural and local environment by*
- e) 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'*

3.2.3 With regard to noise, Paragraph 198 of NPPF states that:

- '... Planning policies and decisions should aim to...*
- 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; and*
- 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.'*

3.2.4 Importantly, paragraph 200 states:

- '... Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'*

3.3 Noise Policy Statement for England

- 3.3.1 The planning objectives of the NPPF are linked and reflect the policies and objectives set out in the Noise Policy Statement for England ("NPSE"). The NPSE introduces the key phrases "Significant Observed Adverse Effect Level" ("SOAEL"), "Lowest Observed Adverse Effect Level" ("LOAEL"), and "No Observed Adverse Effect Level" ("NOAEL").
- 3.3.2 The NPSE however does not provide any quantitative thresholds for each identified level of "adverse effect" and notes that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations.
- 3.3.3 Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is for a project to identify relevant SOAELs taking account of the different sources of exposure and different receptors.
- 3.3.4 Where the noise level from the Proposed Development is between LOAEL and SOAEL, the NPSE states:
'... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.'
- 3.3.5 Other factors, such as the number of dwellings affected and the magnitude of noise change, can result in impacts between LOAEL and SOAEL being reported as likely adverse effects.

3.4 Planning Practice Guidance – Noise

- 3.4.1 Planning Practice Guidance (PPG) provides details on the relevance of noise to the planning process following the introduction of the NPPF and NPSE. This guidance states that the following should be taken into consideration by local authorities:
'whether or not a significant adverse effect is occurring or likely to occur; whether or not an adverse effect is occurring or likely to occur; and whether or not a good standard of amenity can be achieved.'
- 3.4.2 In line with NPSE, this includes identifying where noise exposure is above or below the significant observed adverse effect level and the lowest observed adverse effect level for a given situation during the operation of the proposed development.
- 3.4.3 Further guidance on each of the various observed effect levels set out in the NPSE is provided in the noise exposure hierarchy table, reproduced below. It should be noted that no specific target noise levels are defined, instead, subjective descriptions of noise are provided. It is stated that there is no simple relationship between noise levels and the impact on those affected and this depends on various factors.

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not present	No effect	No observed effect	No specific measures required
No Observed Adverse Effect Level (NOAEL)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Table 5: Reproduced NPSE Noise exposure hierarchy table

3.5 Local Planning Policy

3.5.1 Manchester City Council’s *‘Planning and Noise Technical Guidance’* document published in October 2022 provides guidance on the assessment of noise and vibration impacts associated with various type of development within Manchester.

3.5.2 With regards to residential developments it states:

“...The Council have adopted the following noise limits for residential properties:

- *Bedrooms (night time – 23:00 – 07:00) 30dB L_{Aeq} (individual noise events should not normally exceed 45dB $L_{Amax,f}$ by more than 10 times)*
- *Living Rooms (daytime – 07:00 – 23:00) 35dB L_{Aeq}*
- *Gardens and terraces (daytime) 55dB L_{Aeq} ...”*

3.5.3 With regards to noise from fixed building services plant it states:

“...The development should be designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location...”

3.5.4 Furthermore, with regards to overheating in residential developments it states:

“...It is recommended that either where a condition has been imposed to control internal noise levels for residential development or where overheating may be an issue, the guidance provided in the AVO Guide is followed...”

4 ProPG: Planning and Noise (Residential Development)

4.1 Introduction

4.2 Professional Planning Guidance: Planning and Noise (“ProPG”) provides a risk-based assessment framework to assist with delivering high-quality sustainable development by promoting good health and wellbeing by the effective management of noise through good acoustic design.

4.3 ProPG provides a 2-stage systematic approach as follows:

- ◆ Stage 1 – An initial noise risk assessment of the proposed development
- ◆ Stage 2 – Systematic consideration of four key elements:
 - ◇ Good acoustic design process
 - ◇ Internal noise levels
 - ◇ External amenity noise levels
 - ◇ Consideration of other relevant issues

4.2 Stage 1 Assessment

4.2.1 The Stage 1 assessment provides an early indication if noise levels across a proposed development site are likely to provide greater acoustic challenges based on a sliding scale of Risk of Adverse Effect, as shown in Figure 4, in accordance with the National Planning Policy Framework and the Noise Policy Statement for England.

4.2.2 Based on the as measured environmental noise levels and the calculated daytime and night-time noise levels across the façades of the proposed development, the worst-case affected façades of the development are designated as **“medium risk”** during the daytime and **“high risk”** during the night-time as indicated in the figure below.

4.2.3 Therefore, for a “high-risk” site, the Pre-planning application advice states the following:

‘...High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS...’

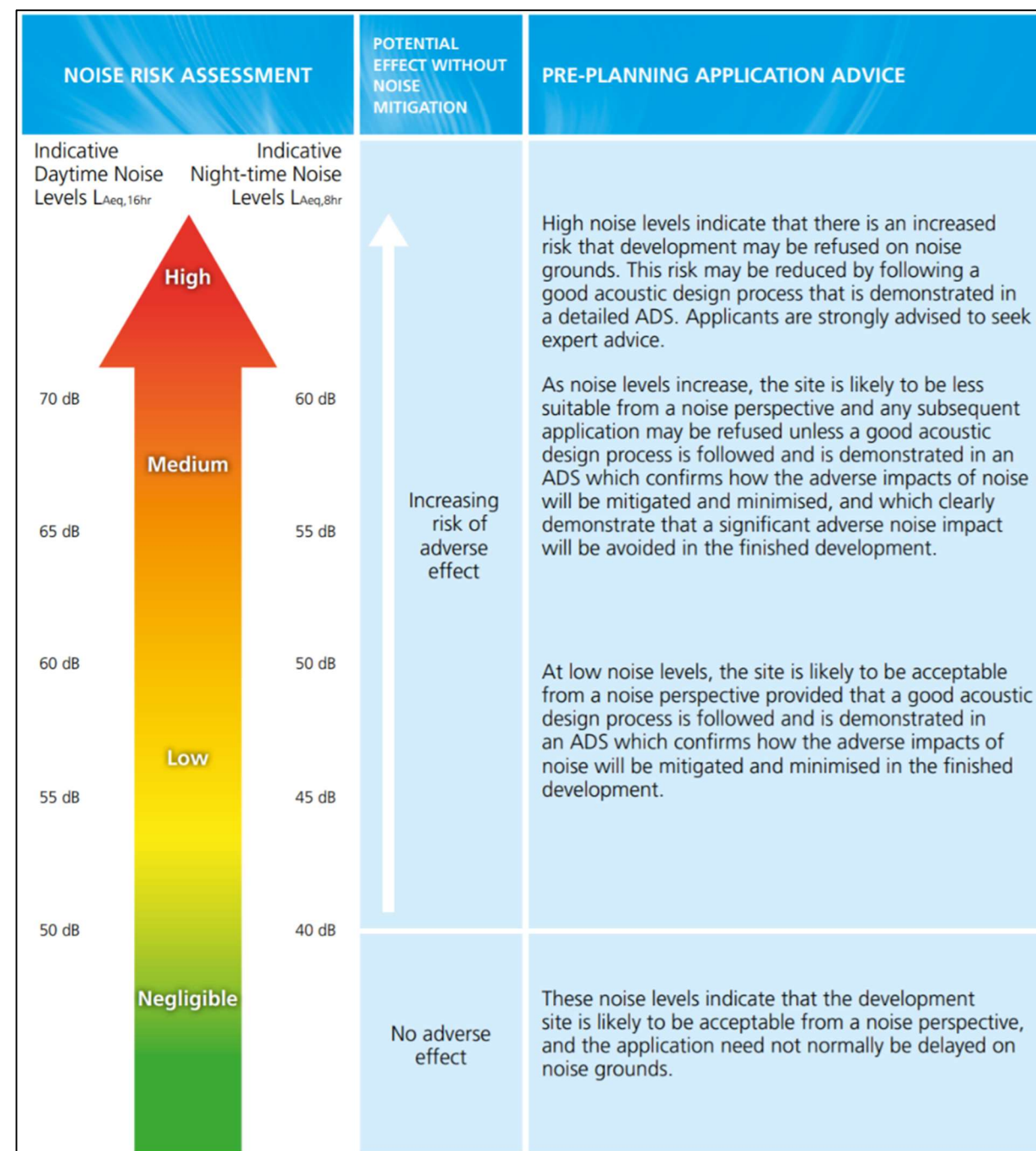


Figure 4: ProPG Stage 1 Assessment

4.3 Stage 2 Assessment

Element 1 – Good Acoustic Design Process

- 4.3.1 A good acoustic design process is an implicit part of achieving good design as required by Government and Local Planning Policies. Good acoustic design should avoid “unacceptable” acoustic conditions.
- 4.3.2 Evidence that good acoustic design principles have been followed are presented in the following sections of this report.

Element 2 – Internal Noise Level Guidelines

- 4.3.3 BS 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’ provides appropriate criteria for acceptable levels of noise ingress within dwellings.
- 4.3.4 In particular, Section 7.2.2 of the Standard, entitled ‘internal ambient noise levels in dwellings’ states that ‘In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 4 [of BS 8233]’ as duplicated in the Table 6 below.

BS 8233:2014 – Indoor ambient noise levels for dwellings			
Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35dB $L_{Aeq, 16hr}$	
Dining	Dining room / area	40dB $L_{Aeq, 16hr}$	
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq, 16hr}$	30dB $L_{Aeq, 8hr}$

Table 6: Internal ambient noise level requirements as per BS 8233:2014

- 4.3.5 Note 7 of BS 8233 states that ‘...Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed up to 5dB and reasonable internal conditions still achieved.’
- 4.3.6 No specific performance recommendation is given within BS 8233:2014 regarding maximum (L_{Amax}) intrusive noise levels within bedrooms. ProPG expands on the guidance presented in BS 8233:2014. Section 2.31 states that ‘...In noise sensitive rooms at night (e.g. bedrooms) individual noise events (from all sources) should not normally exceed 45dB $L_{Amax, F}$ more than 10 times a night as this represents a threshold below which the effects of individual noise events on sleep can be regarded as negligible.’

Element 3 – External Amenity Noise Levels

4.3.7 Regarding outdoor amenity spaces, BS 8233:2014 states the following (emphases added):

... For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$...

*... However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, **development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.***

*Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks etc. **In these locations, specification of noise limits is not necessarily appropriate.***

Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.'

4.3.8 Further guidance provided in ProPG states that:

'... 3(iv) Whether or not external amenity spaces are an intrinsic part of the overall design, consideration of the need to provide access to a quiet or relatively quiet external amenity space forms part of a good acoustic design process.

3(v) Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:

a relatively quiet facade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or

a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or

a relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or

a relatively quiet, protected, publicly accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.'

4.3.9 Therefore, it is further considered that any potential adverse impact to residential small balconies will be suitably mitigated by access to nearby external amenity areas.

4.3.10 In summary therefore, the “upper guideline” noise level for external amenity spaces, as recommended by BS 8233 is 55dB $L_{Aeq, 16 \text{ hour}}$, albeit it is duly recognised that this may be exceeded for urban developments and should ultimately not prohibit development if exceeded in other external amenity areas.

4.3.11 Any adverse impact in outdoor amenity areas facing transport noise sources can be further mitigated by providing access to other relatively quiet residential facades and additional amenity areas.

Element 4 – Other Relevant Issues

4.3.12 It is pertinent that the **overheating mitigation strategy** for the development is developed with consideration of the environmental noise impact from an early stage of the design development. The relevant statutory requirements and current design guidance is introduced below.

Approved Document O

4.3.13 The development is required to comply with the mandatory requirements of 'Approved Document O – Overheating 2021' ("ADO").

4.3.14 Section 3 of ADO requires that the overheating mitigation strategy is useable and thus if the overheating strategy is to rely on open windows, suitable noise conditions within bedrooms at night should be achieved under such conditions to sure the “reasonable enjoyment” of the residence as reproduced below:

'...the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits:

a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)

b. 55dB LAF_{max} , more than 10 times a night (between 11pm and 7am).'

AVO Assessment Framework

4.3.15 The 'Acoustics, Ventilation and Overheating Guide' ("AVO Guide") published by the Association of Noise Consultants in 2020 provides a recommended framework for the early design stage assessment of new residential development that takes due regard of the interdependence of provisions for acoustics, ventilation, and overheating.

4.3.16 Typically, new residential developments in urban environments require closed windows for reasonable internal noise conditions in accordance with BS 8233:2014. Until recently, this has often been assessed separately from the overheating strategy, which may require windows open for reasonable thermal conditions. This can result in residential accommodation in which the occupants may choose either acoustic comfort or indoor air quality and thermal comfort but not achieve both simultaneously.

4.3.17 The AVO Guide provides a two-stage assessment, as shown in Figure 5 to highlight at the planning stage residential facades which may result in adverse or significant adverse noise impact when using an open window ventilation strategy, and to help the design team identify suitable overheating mitigation strategies.

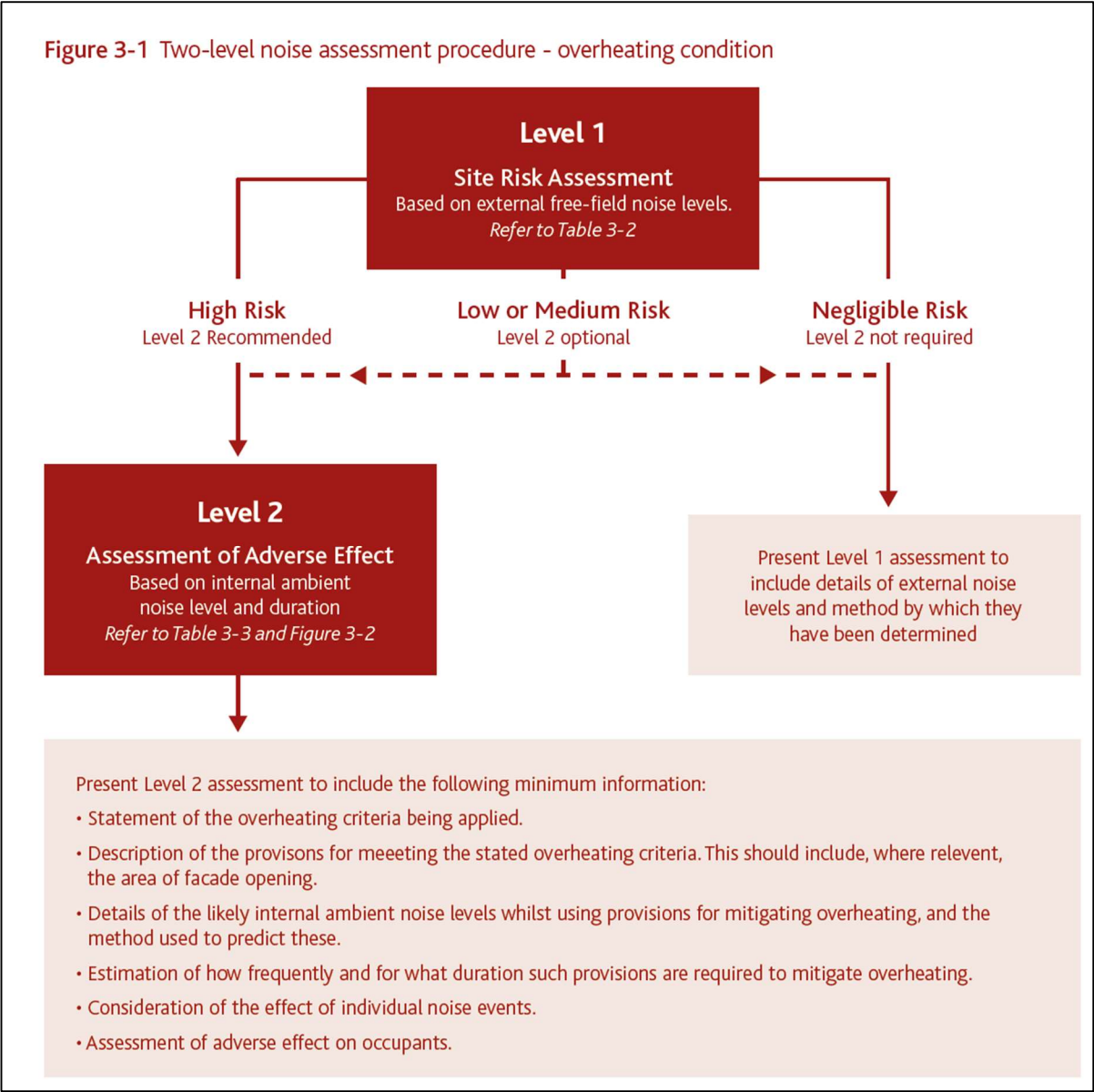


Figure 5: AVO Guide two stage assessment frameworks

5 Building Façade Specification

5.1 Assessment

- 5.1.1 By taking account of the levels of ambient and maximum noise levels as measured and predicted at the site façade locations, the proposed areas of façade elements and their intended constructions (i.e. glazing and walls), as well as the likely acoustic characteristics of the noise sensitive receiving space (i.e. living rooms, bedrooms), the required sound reduction performance specifications of glazing has been determined through acoustic calculations.
- 5.1.2 For the acoustic impact assessment presented herein, the following documents and GA drawings were used, along with site layouts as provided by AEW to Sol:
- ◆ NO1LOR-AEW-XX-00-DR-A-0102-P03-Proposed Site Plan
 - ◆ NO1LOR-AEW-XX-B1-DR-A-21050-P02-Proposed GA Plan - Basement Plan
 - ◆ NO1LOR-AEW-XX-00-DR-A-21000-P02-Proposed GA Plan - Ground
 - ◆ NO1LOR-AEW-XX-01-DR-A-21001-P02-Proposed GA Plan - First
 - ◆ NO1LOR-AEW-XX-02-DR-A-21002-P03-Proposed GA Plan - Second (to Fourteenth)
 - ◆ NO1LOR-AEW-XX-15-DR-A-21015-P01-Proposed GA Plan - Fifteenth
 - ◆ NO1LOR-AEW-XX-16-DR-A-21016-P02-Proposed GA Plan - Sixteenth (to Twenty Second)
 - ◆ NO1LOR-AEW-XX-23-DR-A-21023-P01-Proposed GA Plan - Twenty Third

5.2 Background Ventilation Strategy

Part F Background Ventilation

- 5.2.1 It is understood that background ventilation will be provided to dwellings via. MVHR units and therefore there will be no requirement for passive openings in the façade (e.g. trickle ventilators) for background ventilation purposes.
- 5.2.2 It is understood that purge ventilation will be provided by openable panels forming part of the window system.

5.3 Residential Building Envelope

External Wall

- 5.3.1 Table 7 provides the recommended minimum acoustic performance requirements for the external building envelope, in terms of sound reduction indices:

Wall Construction	Weighted Sound Reduction Index dB $R_w + C_{tr}$
External Wall	45

Table 7: Minimum building fabric acoustic airborne sound insulation performance requirement

- 5.3.2 The exact construction of the external walls is yet to be determined however it is considered likely that a brick slip system on insulated SFS with internal plasterboard linings will be used. Such a system is likely to be suitable to achieve compliance with the above specification subject to review and detailing.

Glazing

- 5.3.3
- By taking account of the levels of ambient and maximum noise levels as measured and predicted at the site façade locations, the proposed areas of façade elements and their intended constructions (i.e. glazing and walls), as well as the likely acoustic characteristics of the noise sensitive receiving space (i.e. living rooms, bedrooms), the required sound reduction performance specifications of glazing has been determined through acoustic calculations.
- 5.3.4
- Approximate window areas and room dimensions have been based upon the GA plans provided by AEW as listed in Paragraph 5.1.2 above.
- 5.3.5
- These acoustic specifications are preliminary and shall be updated and refined as the design develops during RIBA Stage 3.
- 5.3.6
- Glazing specifications are therefore provided to demonstrate site suitability only and final specifications must be reviewed during the detailed design stage.

Acoustic Specification for Glazing to Habitable Rooms

- 5.3.7
- Table 8 below provides the minimum acoustic performance requirements for the glazing (and any glazed doors) for residential dwellings forming part of the development that are needed to meet the requirements for suitable internal ambient noise levels. The extent of the façade zones is illustrated in Figures 6 to 12.

Façade Zone	Room Type	Glazing type example	Weighted sound reduction index dB ($R'_w + C_{tr}$)
A	Bedrooms	8 PLANILUX / 20 / 66.2 STADIP SILENCE	38
	Living Rooms	4 PLANILUX / 10 / 10 PLANILUX	30
B	Bedrooms	4 PLANILUX / 16 / 8 PLANILUX	32
	Living Rooms	4 PLANILUX / 12 / 4 PLANILUX	26
C	Bedrooms	4 PLANILUX / 10 / 10 PLANILUX	30
	Living Rooms	4 PLANILUX / 12 / 4 PLANILUX	26

Table 8: Recommended minimum glazing system acoustic specification

- 5.3.8
- Example glazing configurations are provided for guidance only.
- 5.3.9
- All glazing and glazed doors, inclusive of framing systems, seals, and hardware must achieve the minimum acoustic performance specifications as indicated.
- 5.3.10
- Please note that the performance values in Table 8 are given in terms of the on-site performance requirement ($R'_w + C_{tr}$). For large format windows and glazed doors a suitable correction term (i.e. further safety tolerance) of typically up to +2dB may need to be applied to the tabulated values (i.e. more onerous requirement) in accordance with the guidance in BS EN 14351:2006+A2:2016.

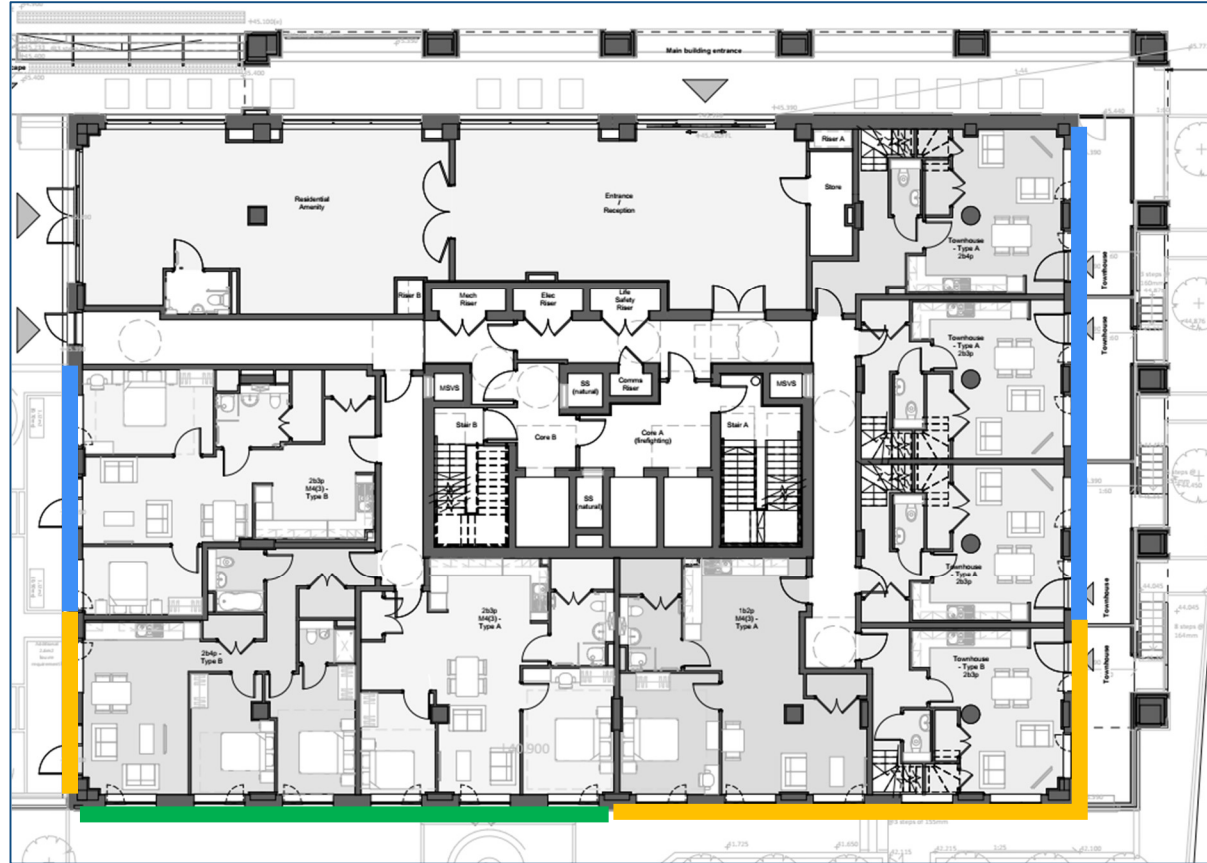


Figure 6: Façade zones - Ground Floor

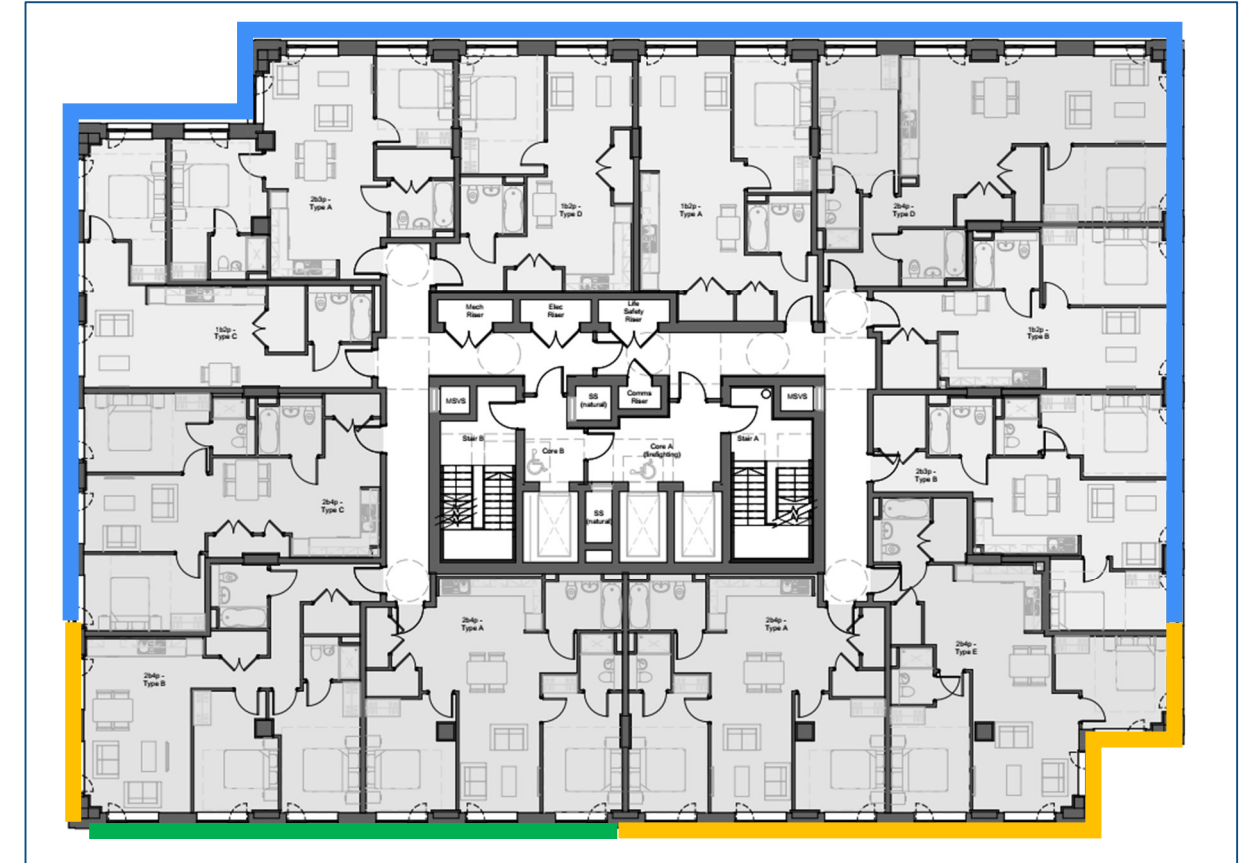


Figure 8 - Façade zones - 2nd to 11th floor

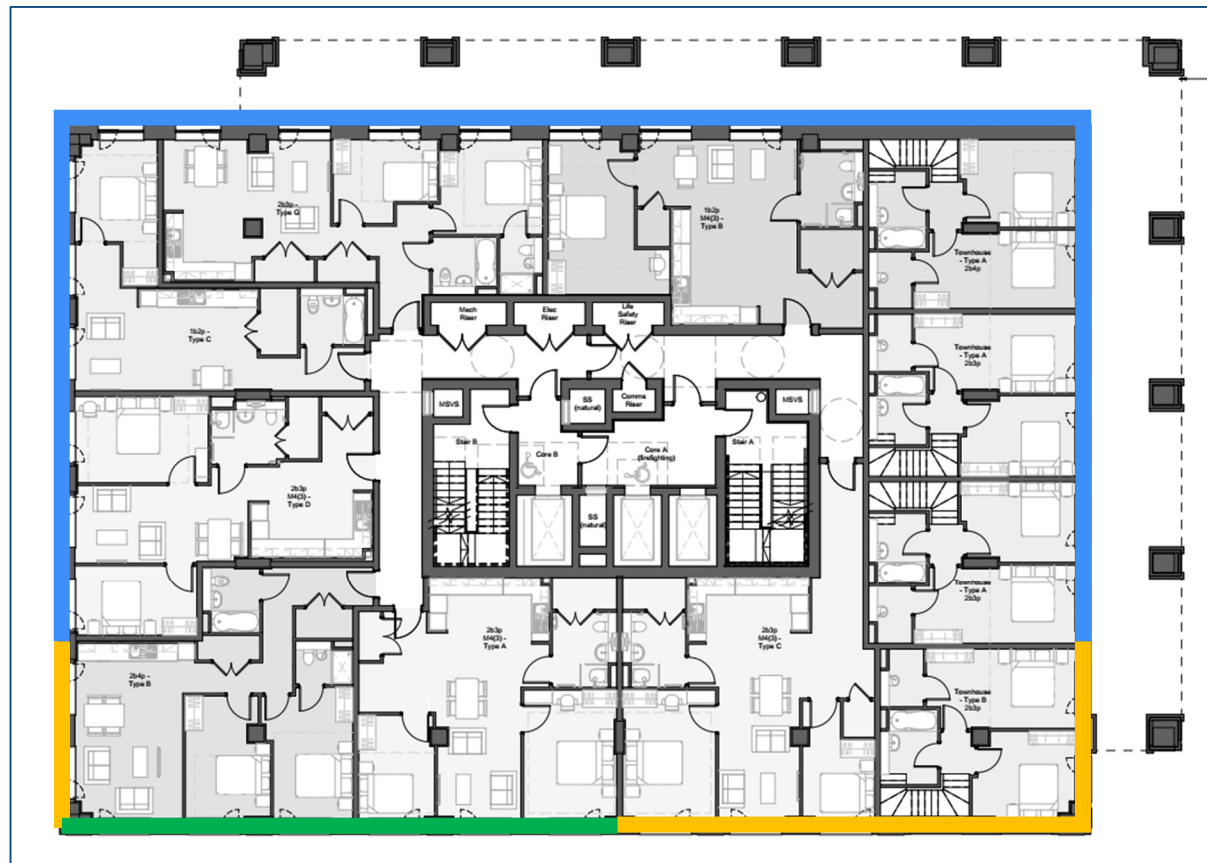


Figure 7: Façade zones - First Floor

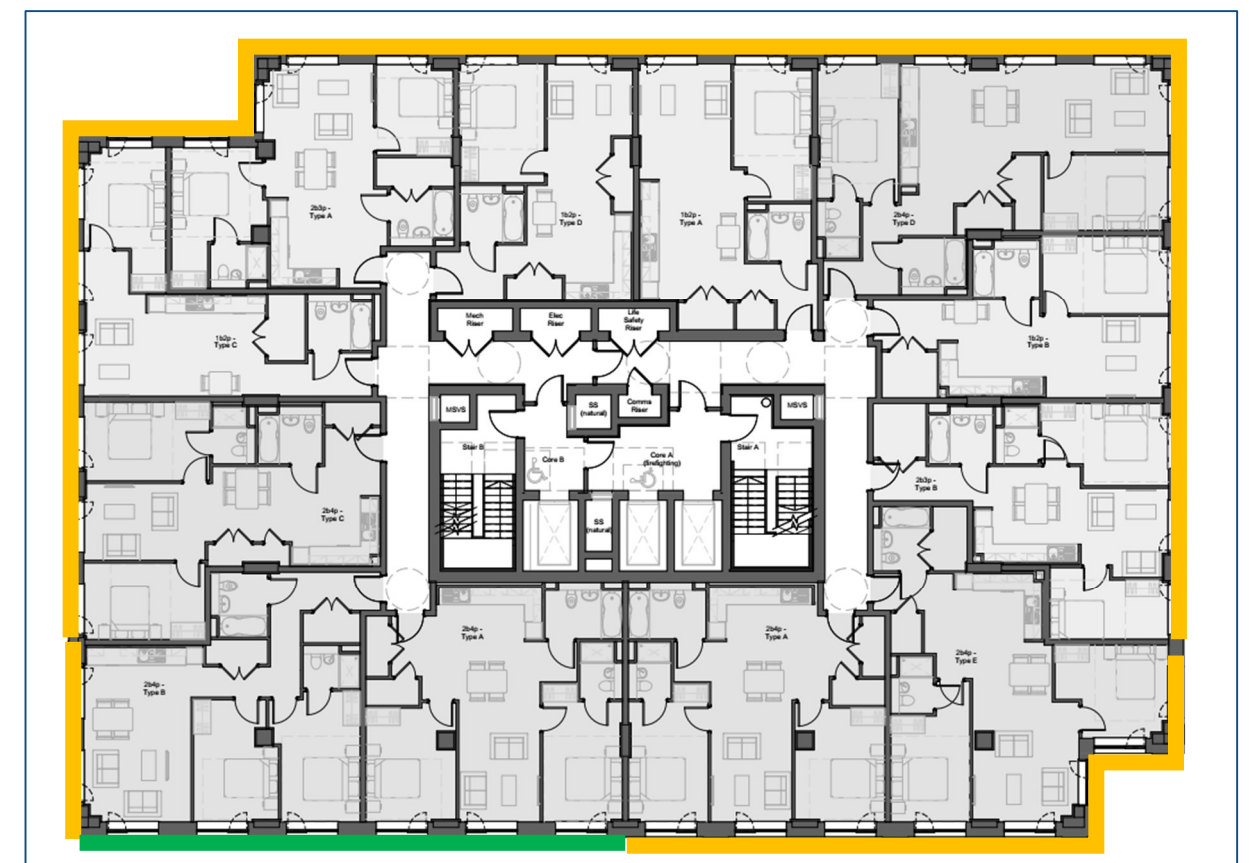


Figure 9 - Façade zones - 12nd to 14th floor

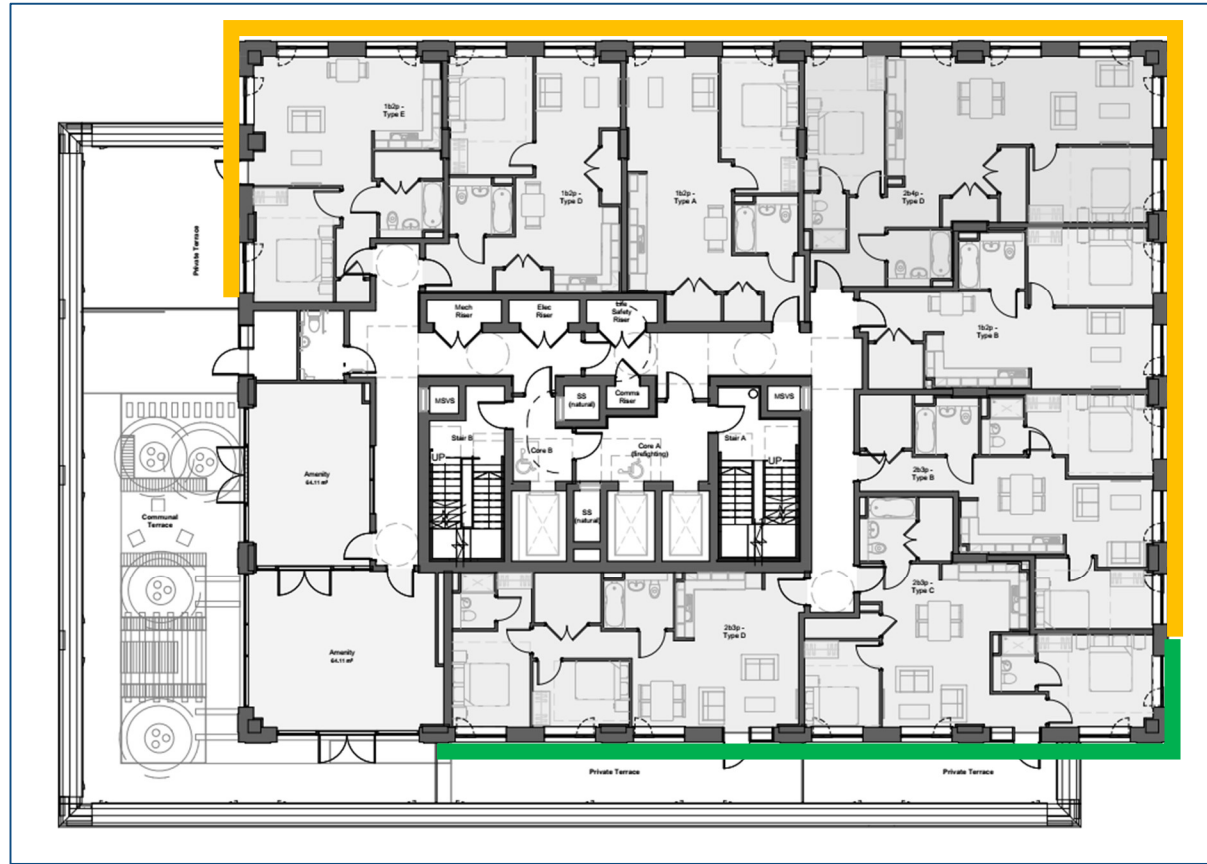


Figure 10: Façade zones – 15th floor

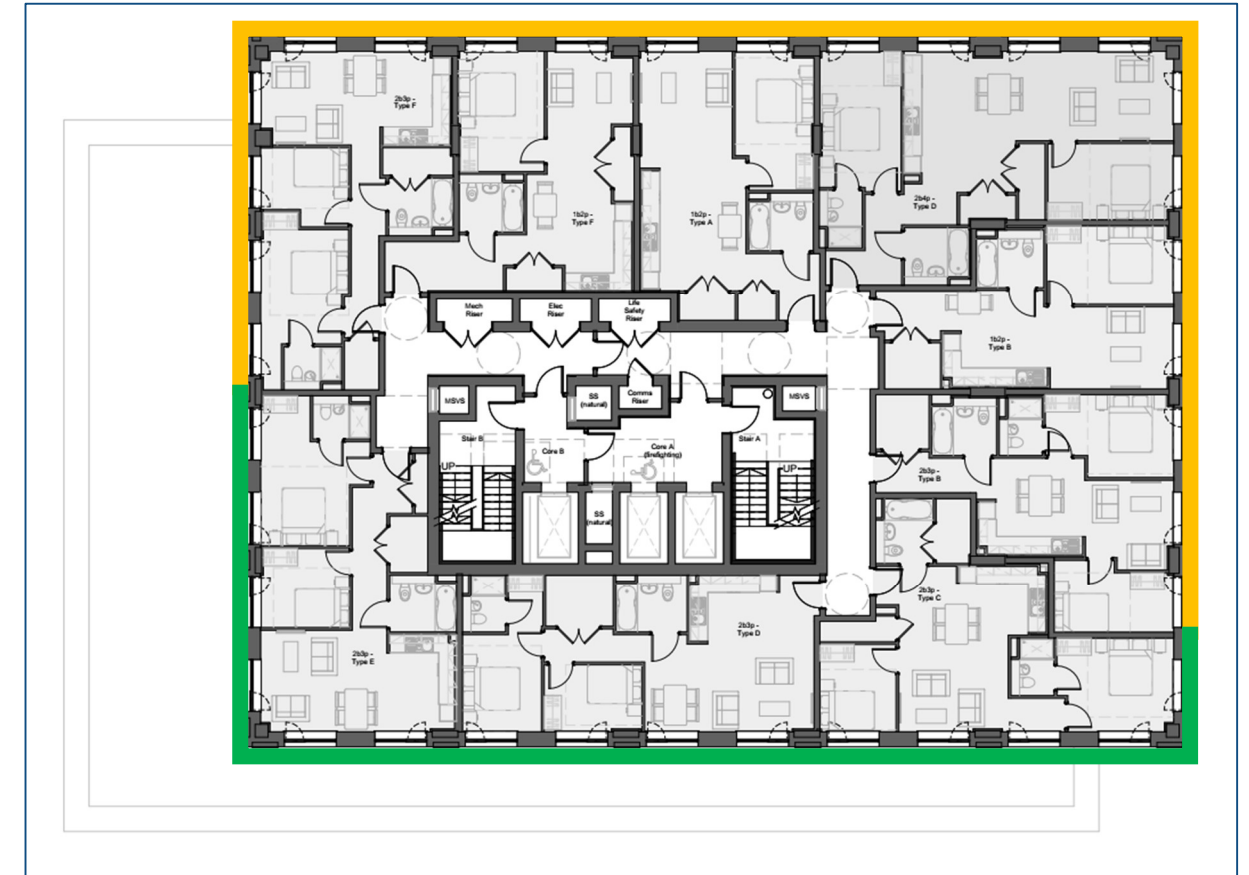


Figure 11: Façade zones – 16th - 22nd Floor

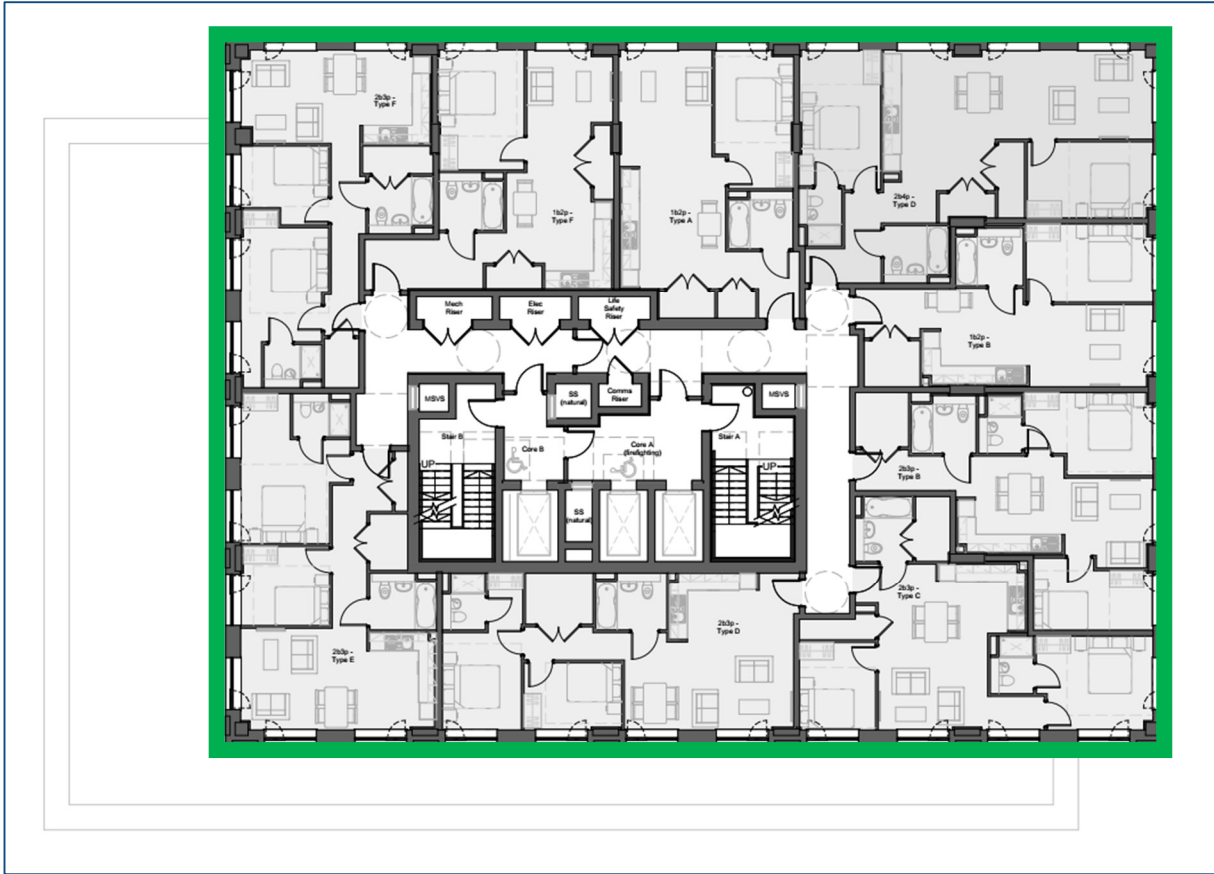


Figure 12: Façade zones – 23rd floor

Glazing Configurations and Specification Compliance

- 5.3.11 In all cases, example glazing configurations are provided for guidance only.
- 5.3.12 All glazing, including any glazed doors, inclusive of framing systems, seals, and hardware must achieve the minimum acoustic performance specifications as indicated.
- 5.3.13 The sound reduction performance must be confirmed and corroborated by independent acoustic laboratory test data in accordance with BS EN ISO 10140-2:2010 of identical constructions (i.e. including window frames) which must be submitted to Sol for approval.

6 External Amenity Areas Noise Level Assessment

6.1 External Amenity Areas

- 6.2 It is understood that the proposed development will provide private and communal external amenity areas for residents in the form of ground and 15th floor terraces.
- 6.1.1 Based upon the results of the environmental noise survey and the 3D noise model of the site, it is predicted that the target level of 55dB $L_{Aeq,16hr}$ will likely be exceeded in the ground floor terraces but should not be exceeded in the 15th floor roof terraces.
- 6.1.2 However, ProPG states that where despite following a good acoustic design, adverse noise impacts remain on any private external amenity space (i.e. garden or balcony), the impact may be partially offset if residents are provided through the design of the development or the planning process, with access to:
 - "a relatively quiet, protected, publicly accessible, external amenity space (e.g. a public park or local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations."*
- 6.1.3 Therefore, given the proposed access to the communal terrace at 15th floor level and area of open park spaces with an approximate 10-minute walking distance (Angel Meadow Park) it is deemed that, from an environmental noise perspective, residents will have access to suitable external amenity space and no further environmental noise mitigation is deemed to be required.

7 Acoustics, Ventilation, and Overheating

7.1 AVO Guide Level 1 Site Risk Assessment

7.1.1 Based on the environmental noise survey results, the noise level from transportation noise sources at the most exposed residential façades of the development is predicted to be c.65dB $L_{Aeq,16h}$ during daytime periods, and c.62dB $L_{Aeq,8h}$ during night-time periods.

7.1.2 In line with the AVO Level 1 Site Risk Assessment framework, as shown in the figure below, the worst-case façades fall into the "high risk" category during the nighttime and therefore a more detailed Level 2 assessment is recommended.

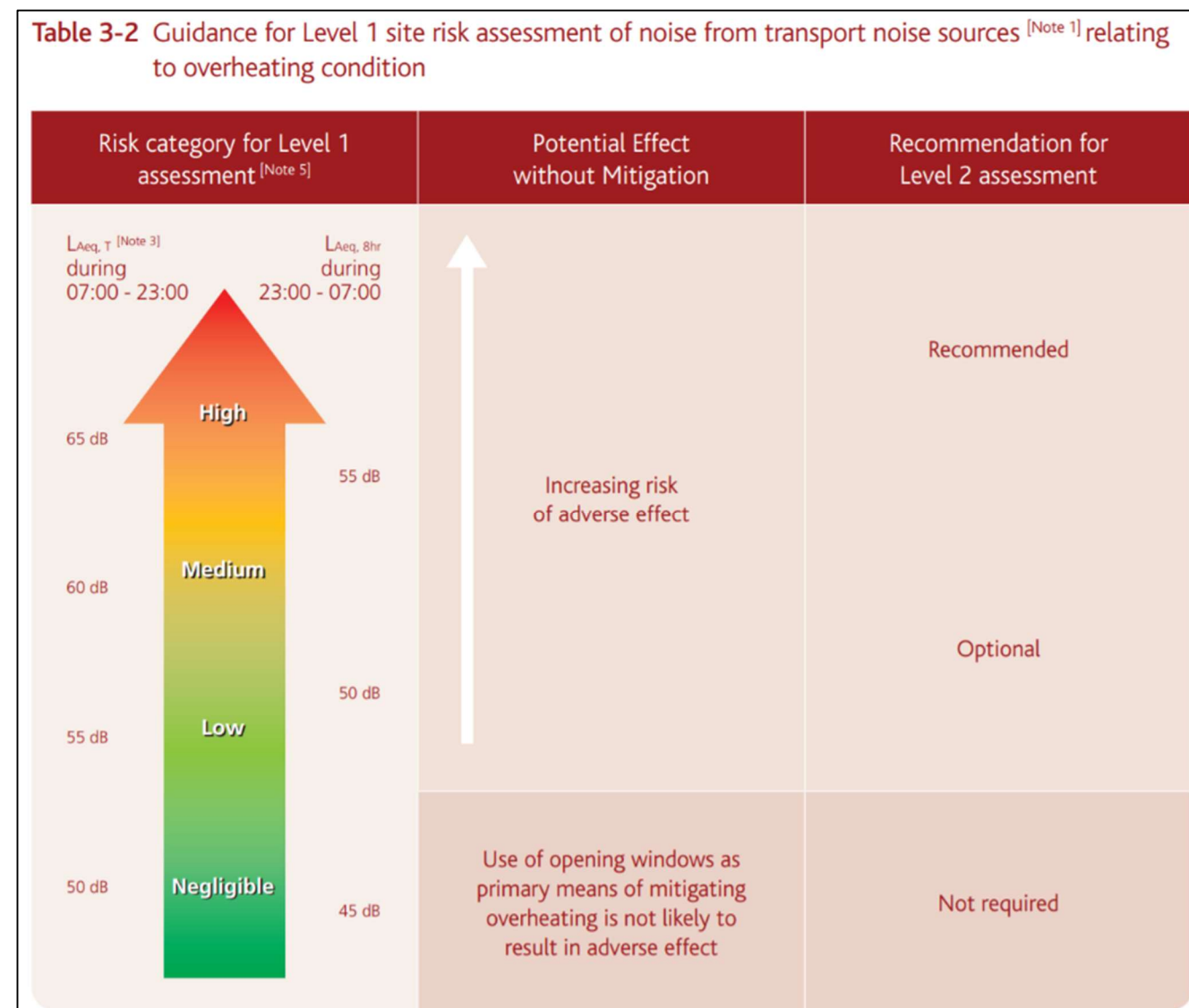


Figure 13: AVO Guide Level 1 Site Risk transportation noise levels thresholds

7.2 AVO Guide Level 2 Site Risk Assessment

7.2.1 The Level 2 Assessment provides a detailed assessment of the likely adverse effects of occupants relating to the magnitude of indoor ambient noise levels. Table 3-3 of the AVO Guide, as shown in the figure below, provides a table of typical outcomes for occupants with regards to changes in noise level.

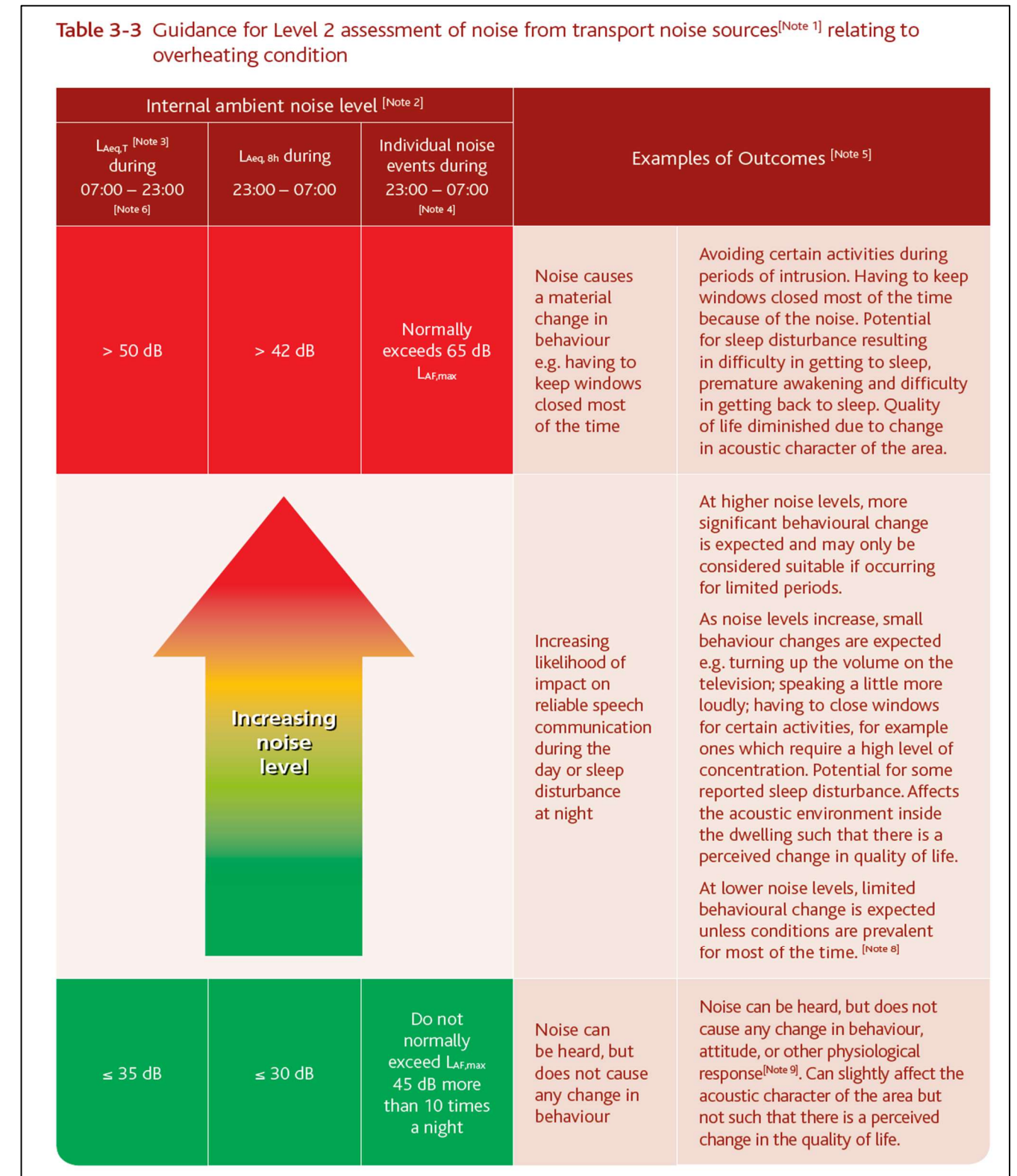


Figure 14: AVO Guide IANL assessment of effect from transportation noise sources

Planning Practice Guidance on Noise

- 7.2.2 Planning Practice Guidance on Noise ("PPGN") provides a summary of the noise exposure hierarchy, and links the significance of effect based on the likely average response to noise levels to the Noise Policy Statement for England, 2010 defined categories for Observed Adverse Effect Levels:
- ◆ No Observed Effect Level ("NOEL") which is the level below which no effect can be detected.
 - ◆ Lowest Observed Adverse Effect Level ("LOAEL") which is the level above which adverse effects on health and quality of life can be detected.
 - ◆ Significant Observed Adverse Effect Level ("SOAEL") which is the level above which significant adverse effects on health and quality of life occur.
- 7.2.3 Table 9 provides the significance of effect based on the internal ambient noise level presented in the AVO Level 2 Assessment Guide.

Indoor Ambient Noise Levels			Significance of Effect
Daytime $L_{Aeq, 16hr}$	Night-time $L_{Aeq, 8hr}$	Individual night-time noise events $L_{AF, max}$	
> 50dB	> 42dB	Normally exceeds 65dB $L_{AF, max}$	SOAEL
Between 36dB and 50dB	Between 31dB and 42dB	Normally in between 45dB and 65dB $L_{AF, max}$	LOAEL
≤35dB	≤30dB	Do not normally exceed 45dB more than 10 times a night	NOEL

Table 9: Internal ambient noise level significance of effect

Residential Daytime Acoustic Criteria Summary

- 7.2.4 Based upon the Approved Document O requirements and the AVO Guide Level 2 assessment guidance, the noise criteria listed in Table 10 have been adopted as the basis of the acoustic assessment.
- 7.2.5 The daytime criteria have been selected to prevent SOAEL in line with Planning Policy Guidance. The night-time criteria are based on the statutory acoustic requirements of Approved Document O.

Noise source	Location	07:00 to 23:00 hrs	23:00 to 07:00 hrs
Transportation noise sources	Living rooms (internal)	50dB $L_{Aeq, 16hr}$	-
All environmental noise sources	Bedrooms (internal)	50dB $L_{Aeq, 16hr}$	40dB $L_{Aeq, 8hr}$ 55dB L_{AmaxF*}

*Not normally greater than 10 exceedances per night-time period.

Table 10: Summary of nosie criteria for overheating mitigation conditions

AVO Daytime Noise Assessment

- 7.2.6 An assessment has been undertaken based on the predicted façade noise levels and the corresponding predicted daytime internal ambient noise levels, as based on an open window providing a minimum of 13dB attenuation, based on an open window transfer function of 2% floor area, as per the AVO guide.
- 7.2.7 The façade areas highlighted in **Green** on Figure 15 below indicate façade areas where an open window which provides a minimum of 13dB external-to-internal sound reduction will be below the threshold of SOAEL during the daytime period.
- 7.2.8 The façade areas highlighted in **Red** on Figure 15 below indicate façade areas where an open window which provides a minimum of 13dB external-to-internal sound reduction will be exceed the threshold of SOAEL if open for greater than 12.5 hours during the daytime period.

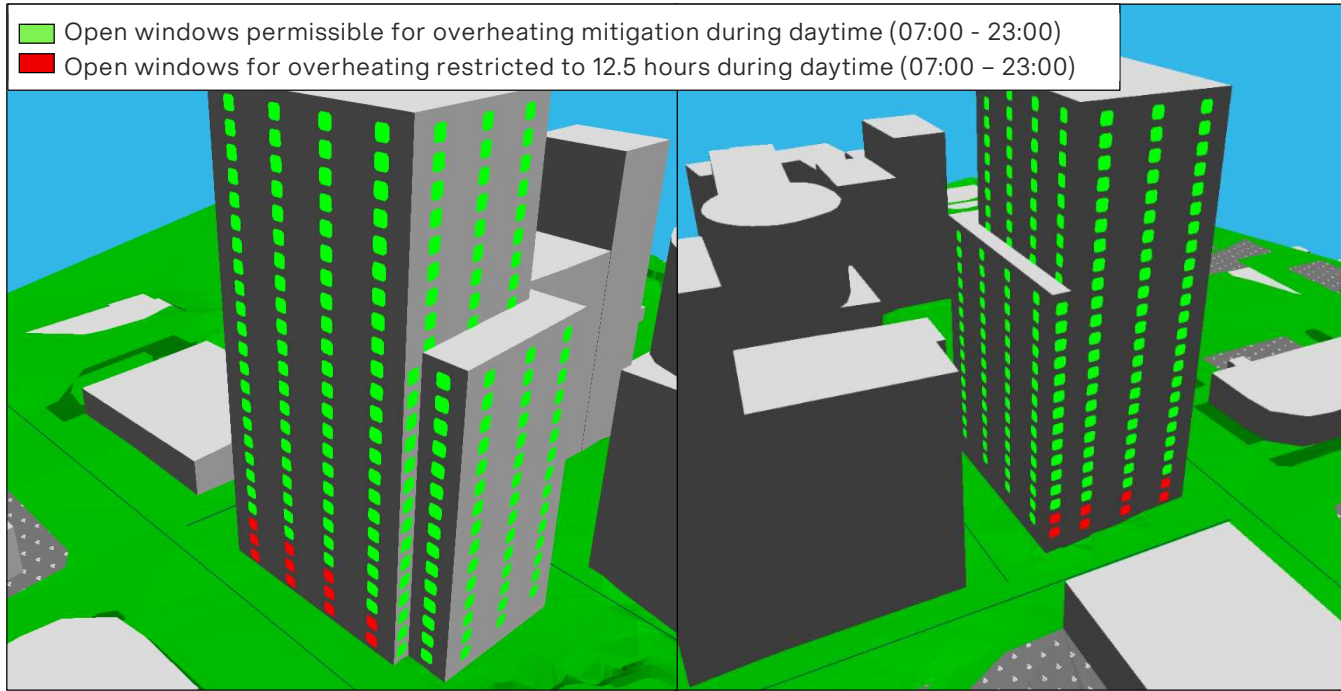


Figure 15: Daytime AVO Assessment

ADO Night-Time Noise Assessment

- 7.2.9 The proposed development will be required to comply the overheating assessment requirements of the Building Regulations Approved Document O.
- 7.2.10 An assessment has been undertaken based on the predicted façade noise levels; the proposed opening purge panel dimensions provided by the architect (A_{casement}), and the corresponding predicted night-time internal noise levels.
- 7.2.11 The external-to-internal sound reduction for an opening purge panel has been calculated based on the proposed purge panel type and the following opening angles (a) and equivalent open areas (A_{aperture}) to inform the strategy noise constraints plan:

Window opening angle (a)	Predicted open window attenuation
10 degrees	10dB
20 degrees	8dB
30 degrees	7dB
40 degrees	6dB
50 degrees	6dB
60-90 degrees	6dB

Table 11: Predicted open window attenuation at various opening angles

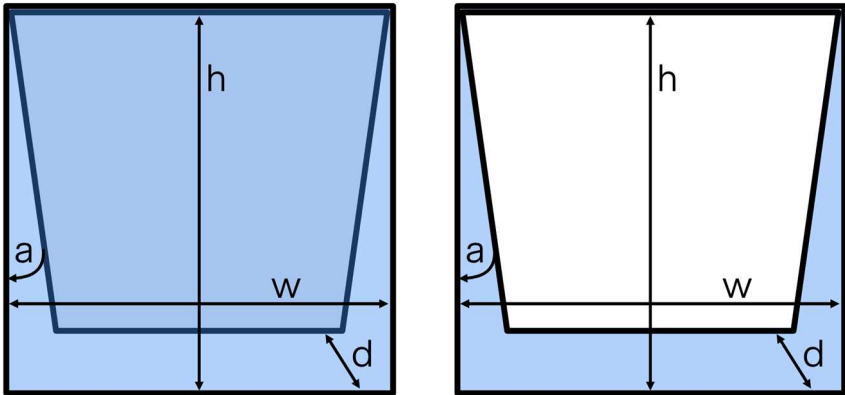


Figure 16: Illustrative example of A_{casement} (left) and A_{aperture} (right)

- 7.2.12 Figure 17 presents the limitations on a passive overheating mitigation strategy to avoid exceedances of the ADO Section 3 noise criteria when open windows are relied upon to control overheating for bedrooms during night-time hours (23:00 to 07:00 hours). These restrictions are required for compliance with the statutory Approved Document O Building Regulations requirements.

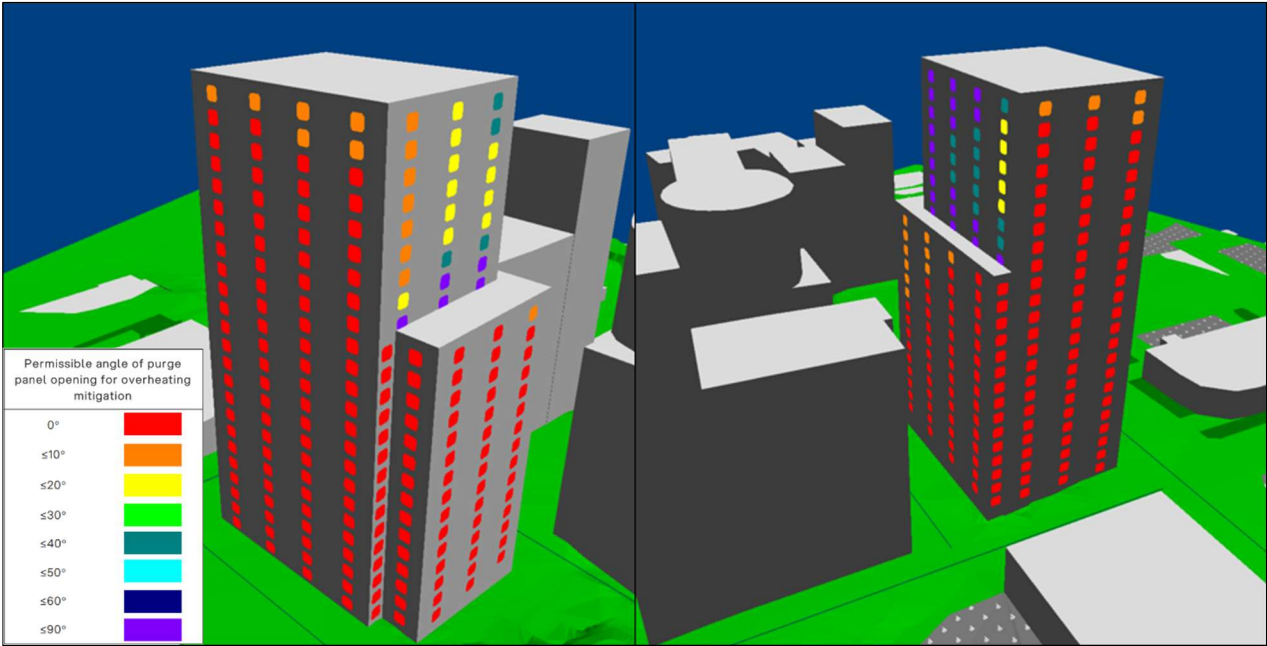


Figure 17: Night-time ADO Assessment

Results

- 7.2.13 Based on the results of the above AVO daytime assessment in Figure 15, all levels above 3rd floor level can rely on open windows as a means of passive overheating mitigation during the daytime (07:00 – 23:00), whereas levels from ground up to 3rd floor level must restrict reliance on open windows as a means of passive overheating mitigation to 12.5 hours during the daytime (07:00 – 23:00).
- 7.2.14 Results of the night-time assessment in Figure 17 show that predicted internal noise levels are predicted to exceed the ADO noise criteria across the majority of the development but some reliance on open windows at limited angles of opening is permissible at upper floors.
- 7.2.15 Where open windows are not permissible as a means of passive overheating mitigation alternative mitigation measures, such as mechanical ventilation, must be used to comply with the overheating mitigation criteria.
- 7.2.16 Final details of the proposed overheating strategy developed by others, including details of assumed window openings, must be submitted to Sol Acoustics for review and approval. (Others must check all other non-acoustic aspects, such as Architectural and aesthetic considerations, SAP and suchlike)
- 7.2.17 Note - in accordance with the good acoustic design principles of ProPG it is still recommended that openable windows are provided for user-controlled comfort and purge ventilation in all cases.
- 7.2.18 Note - Mechanical ventilation methods, e.g. running MVHR units at enhanced duties or with peak lopping capability, should be reviewed by Sol Acoustics as early as possible in the design development to confirm suitability.

8 M&E Plant Noise Levels

8.1 BS 4142:2014+A1:2019

- 8.1.1 BS 4142:2014+A1:2019: *‘Method for rating and assessing industrial and commercial sound’* ("BS 4142") is intended to be used to assess noise of a commercial nature such as that arising from commercial premises.
- 8.1.2 The procedure contained in BS 4142 for assessing environmental noise impact is to compare the measured or predicted noise level from the source in question, the "Specific Sound Level" immediately outside the noise sensitive premises, with the corresponding representative "Background Sound Level". Where the noise contains attention attracting characteristics such as tonal, impulsive and/or intermittent elements, it may be appropriate to apply a correction to the Specific Sound Level to obtain the "Rating Level".
- 8.1.3 BS 4142 states that the significance of sound arising from an industrial and/or commercial nature depends upon both the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, and also the context in which the sound occurs:
- Typically, the greater this difference, the greater the magnitude of the impact.
 - A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- 8.1.4 The lower the Rating Level is relative to the measured Background Sound Level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the Rating Level does not exceed the Background Sound Level, this is an indication of the specific sound source having a low impact, depending on the context.
- 8.1.5 For the daytime, the assessment is carried out over a one-hour period, and over a 15-minute period at night. The daytime and night-time periods are defined as occurring between 07:00 hours to 23:00 hours, and 23:00 hours to 07:00 hours, respectively.

8.2 Environmental Plant Noise Limits

- 8.2.1 In line with Manchester City Council’s guidance it will be necessary to limit the total, aggregate environmental noise from all M&E plant, when operating simultaneously, to an ambient noise level (in $L_{Aeq,T}$ terms) equating to 5dB below the typical, pre-existing daytime or night-time background noise level at any residential property façade, in L_{A90} terms, in accordance with BS 4142: 2014.
- 8.2.2 Therefore, based on the results of the environmental noise study undertaken in July 2025, it is recommended that the total, aggregate environmental noise from all M&E plant at a distance of 1 metre externally from any residential window façade must be controlled to not exceed the rating noise levels ($L_{Ar, Tr}$) presented in Table 12.

Zone	Maximum Permissible Rating Level Limit 1m from nearest residential façade dB $L_{Aeq,T}$	
	Daytime (07:00 – 23:00 hrs)	Nighttime (23:00 – 07:00 hrs)
All	44	33

Table 12: Maximum permissible Rating Level Limit for M&E plant noise

- 8.2.3 The values in the table above were derived from the histogram plot which can be found in Appendix B. Statistical analysis of the data was undertaken to determine a representative background noise level at the site.
- 8.2.4 It must also be noted that the M&E plant noise limits identified above are applicable to all plant serving all areas of the development, when operating simultaneously. The allowable individual noise contribution from all plant items and atmospheric terminations such as louvres and cowls must be determined based on these overall noise limits - and consequently will be lower.

9 Amenity Space Noise Breakout

- 9.1.1 In line with Manchester City Council’s guidance it will be necessary to control noise breakout from residential amenity spaces to an ambient noise level (in $L_{Aeq,T}$ terms) equating to 5dB below the typical, pre-existing daytime or night-time background noise level at any residential property façade, in L_{A90} terms, in accordance with BS 4142: 2014.
- 9.1.2 Therefore, based on the results of the environmental noise study undertaken in July 2025, it is recommended that operational noise breakout from amenity spaces at a distance of 1 metre externally from any residential window façade must be controlled to not exceed the rating noise levels ($L_{Ar, Tr}$) presented in Table 13.

Zone	Maximum Permissible Rating Level Limit 1m from nearest residential façade dB $L_{Aeq,T}$	
	Daytime (07:00 – 23:00 hrs)	Nighttime (23:00 – 07:00 hrs)
All	44	33

Table 13: Maximum permissible Rating Level Limit for amenity noise breakout

- 9.1.3 The values in the table above were derived from the histogram plot which can be found in Appendix B. Statistical analysis of the data was undertaken to determine a representative background noise level at the site.

10 Conclusion

- 10.1 Sol Acoustics Limited have been commissioned by Linear Design and Construct to undertake a baseline noise survey and Stage 2 concept acoustic design assessment of the proposed residential development at the corner of Lord Street and Cheetham Hill Road in Manchester.
- 10.2 The development proposals comprise a single 19 storey tower block to provide 217 new residential units with ground floor residential amenity and associated ancillary space.
- 10.3 The suitability of the development site has been assessed based on the pre-existing environmental noise climate on-site as measured by Sol during July 2025, together with reference to the guidance presented in '*Professional Planning Guidance: Planning and Noise*', BS 8233: 2014 '*Guidance on sound insulation and noise reduction for buildings*', and Manchester City Council's '*Planning and Noise Technical Guidance*'.
- 10.4 Initial acoustic guidance has been presented concerning the outline noise constraints regarding mitigating residential summertime overheating using a natural ventilation strategy in accordance with the assessment framework provided in 'Acoustics, Ventilation and Overheating, Residential Design Guide 2020' and the requirements of Building Regulations 'Approved Document O'.
- 10.5 Noise levels at the site are such that the use of open windows to mitigate overheating will be constrained during the night-time, however the extent of these constraints will need to be developed during early RIBA Stage 3 in coordination with the architectural design and TM59 assessment by others.
- 10.6 It has been demonstrated that the proposed residential development site can be categorised as **"high risk"** as defined by '*Professional Planning Guidance: Planning and Noise*' ("*ProPG*"). The development is likely to be acceptable from a noise perspective assuming a good acoustic design process is demonstrated to mitigate any potential impacts of environmental noise, as outlined in this report.
- 10.7 Appropriate indoor ambient noise levels can be achieved within internal residential habitable rooms across the residential development with an MVHR Approved Document F background ventilation strategy and acoustic glazing strategy as outlined in the report.
- 10.8 Predictions show that environmental noise levels within the proposed external amenity at ground floor will likely exceed desired noise level target, however the noise levels in the proposed external amenity at the 17th floor roof are predicted to be below the desired noise level target. Given the access to the communal external amenity space at the 17th floor roof level and nearby open park space within the vicinity of the site, it is considered that the predicted noise levels in external amenity areas are in line with standard guidance.
- 10.9 The relevant requirements of the Building Regulations Part E have been identified and outline commentary on strategies for compliance has been provided.
- 10.10 Appropriate daytime and nighttime environmental noise limits for M&E plant (and associated louvres, cowls etc.) have also been set herein, all as based on the results obtained from the environmental noise survey undertaken.

APPENDIX A

Glossary of Acoustic Terms

Term	Abbreviation	Description
Decibel	dB	A scale for comparing the ratios of two quantities, including sound pressure and sound power.
A-weighting	dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the change in sensitivity of the human ear at varying frequencies.
Sound Pressure Level	L_{pA}	A measure of the sound pressure at a particular location. Typically expressed in dB(A) referenced to 2×10^{-5} Pascals.
Equivalent Continuous Sound Level	$L_{Aeq,T}$	The steady level of sound over a prescribed period of time which would contain the same total sound energy as the actual fluctuating noise under consideration in the same period of time.
Statistical Sound Levels	L_{A10} and L_{A90}	The level of noise exceeded for a percentage of the time period being sampled, namely 10% or 90% respectively.
Background Sound Level	$L_{A90,T}$	The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of the time period being sampled.
Maximum Sound Level	L_{Amax}	The maximum sound or noise level determined with instrumentation set to either a fast time weighting, L_{AFmax} or a slow time weighting, L_{ASmax} as occurring during the time period being sampled.
Sound Power Level	L_{WA}	A measure of the total sound energy radiated from a source. Like sound pressure levels, this is also expressed in dB(A) terms, but it is referenced to 1×10^{-12} W.
Broadband		Sound sampled over a wide range of frequencies.
Narrow band		Sound sampled over a specific, restricted frequency range. Used to ascertain the amplitude and significant of individual, audible tones, and to assist in identifying particular sources of noise within a complex, multi-source soundscape environment.
Ambient Sound	$L_{eq,T}$	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, both near and far.
Specific Sound Level	$L_{eq,T}$	The Equivalent Continuous A-Weighted Sound Level at an assessment position produced by a specific sound over a given reference time interval, T .
Rating Level	$L_{Ar,Tt}$	The Specific Sound Level plus any adjustment for the acoustic characteristic features of the noise (e.g. intermittency, tones etc.).
Residual Noise	$L_{Aeq,T}$	The ambient sound remaining at given position in a given situation, when the specific sound source is suppressed to such an extent that it no longer contributes to the ambient sound.
Sound Reduction Index	SRI	The reduction in sound energy when transmitted through a panel or similar planar element, typically used in relation to single octave or one-third octave frequency band values.
Weighted Sound Reduction Index	R_w	The Sound Reduction Index expressed as a single figure, as expressed against a reference curve.
Dynamic Insertion Loss	DIL	Reduction in acoustic energy resulting from the insertion of a noise control element (e.g. an attenuator, acoustic enclosure etc.).
Free Field		Noise measuring location that is free from the presence of sound reflecting objects (except the ground), usually taken to mean being at least 3.5 metres distance from reflective surface(s) or greater.

APPENDIX B

Noise Survey Details and Summary Results

LOCATION

Lord Street, Manchester

DATES AND TIMES

14:00 hours on Wednesday 23rd July 2025 to 13:00 hours on Tuesday 29th July 2025.

WEATHER CONDITIONS

Weather conditions were understood to be generally dry however there were periods where wind speed exceeded 5ms⁻¹. Such periods have been excluded from further assessment.

PERSONNEL

Joe Sinker MIOA – Sol Acoustics Ltd

INSTRUMENTATION

01dB Cube Sound Level Meter (serial no. 11348)

01dB Pre22 Microphone Preamplifier (serial no. 1805362)

Gras 40CD Microphone Capsule (serial no. 260642)

01dB Cube Sound Level Meter (serial no. 14452)

01dB Pre22 Microphone Preamplifier (serial no. 2343088)

Gras 40CD Microphone Capsule (serial no. 470955)

01dB CAL21 Sound Calibrator (serial no. 34675320)

METHODOLOGY

Before and after the measurements the noise monitoring equipment was calibrated to an accuracy of ±0.4dB using the 01dB CAL21 Sound Calibrator. The calibrator produces a sound pressure level of 94 dB re 2x10⁻⁵ Pa @ 1kHz.

MEASUREMENT RESULTS

Graph B1 and Graph B2 summarises the broadband A-weighted results obtained during the survey

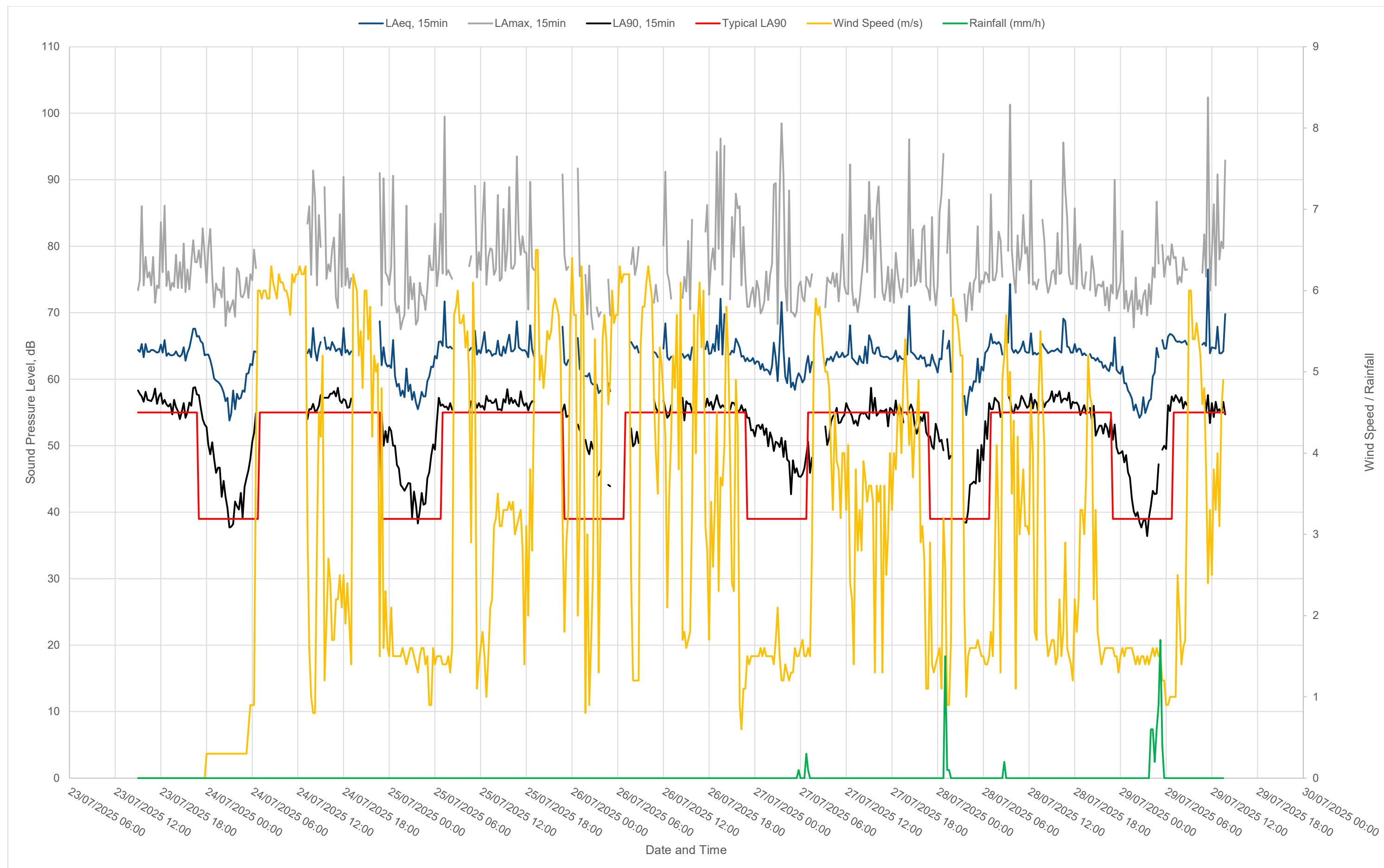


Figure B1: Graph showing measured environmental noise levels at Measurement Position MP1

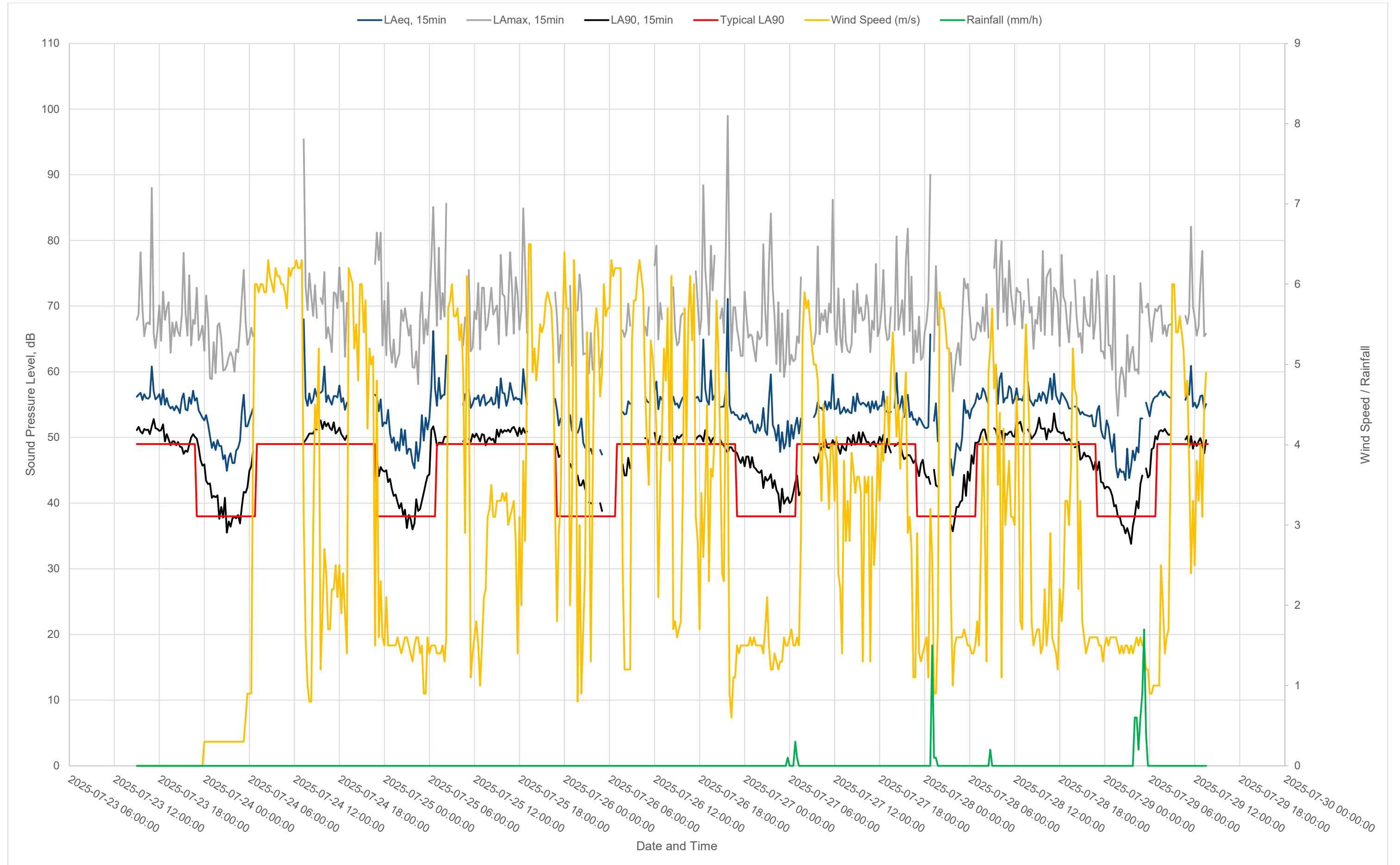


Figure B2: Graph showing measured environmental noise levels at Measurement Position MP2

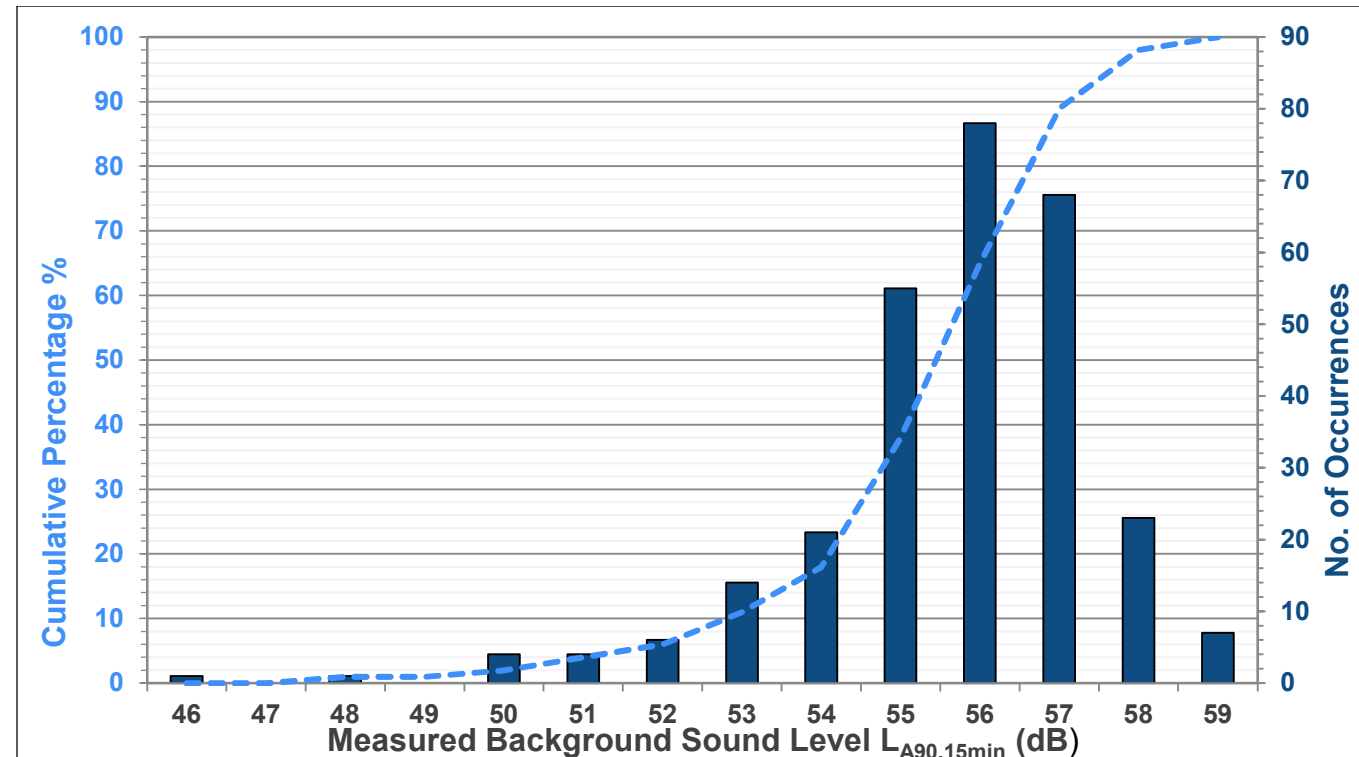


Figure B.3: Histogram of daytime background noise levels at MP1

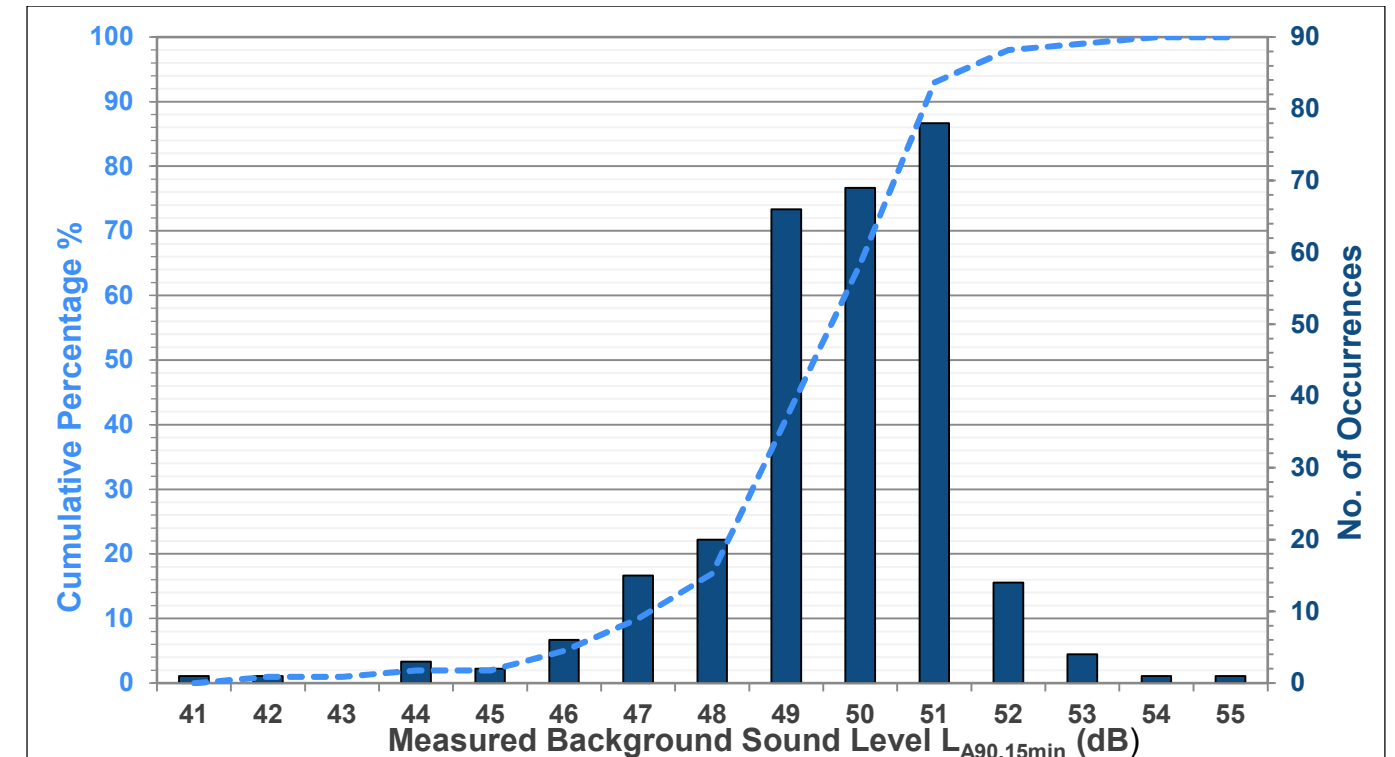


Figure B.5: Histogram of daytime background noise levels at MP2

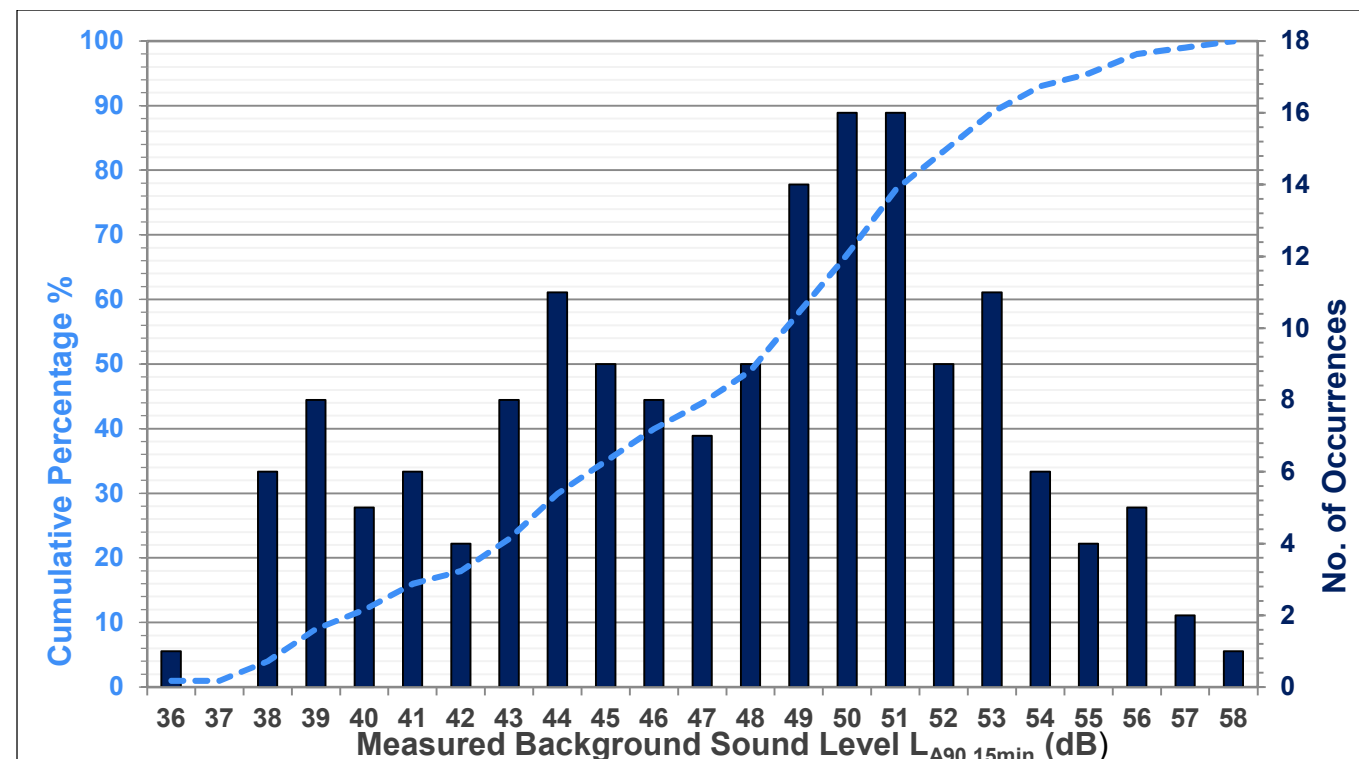


Figure B.4: Histogram of night-time background noise levels at MP1

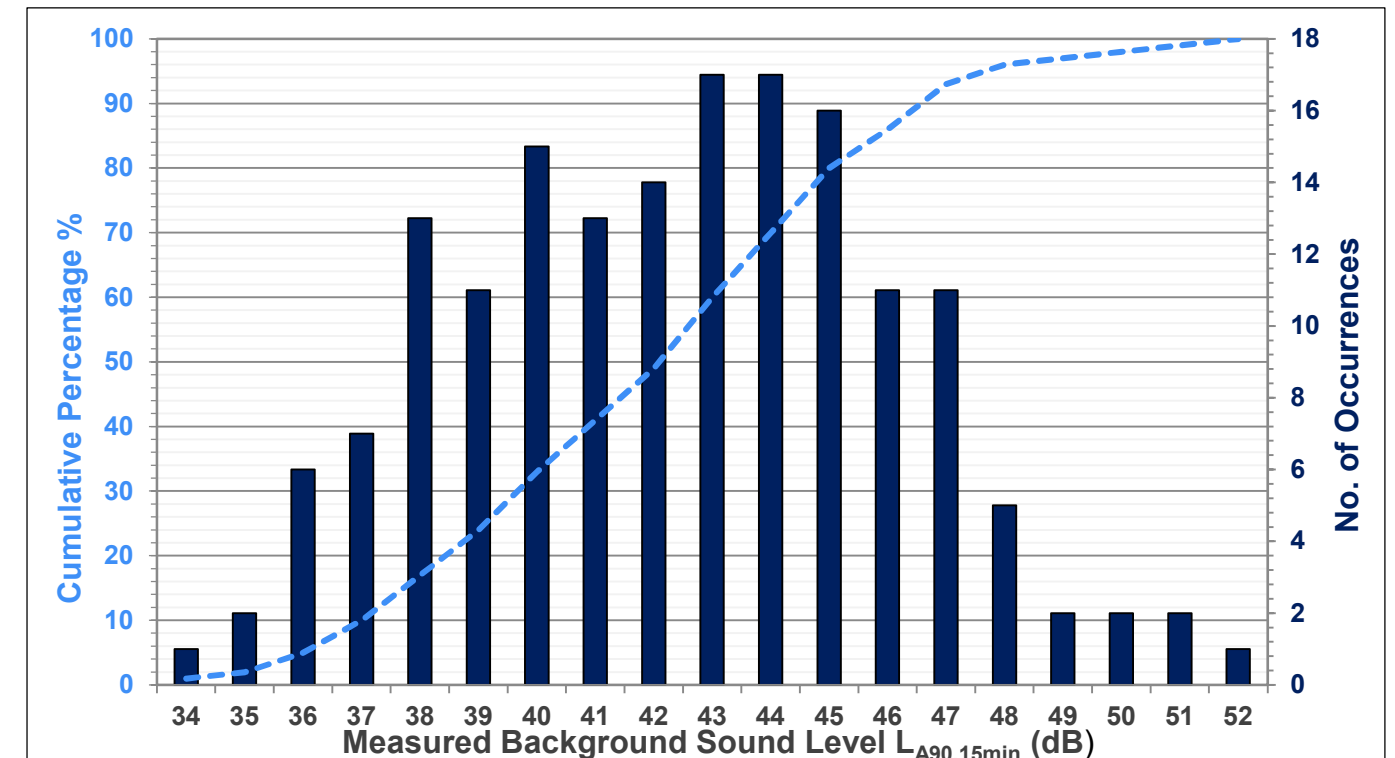


Figure B.6: Histogram of night-time background noise levels at MP2

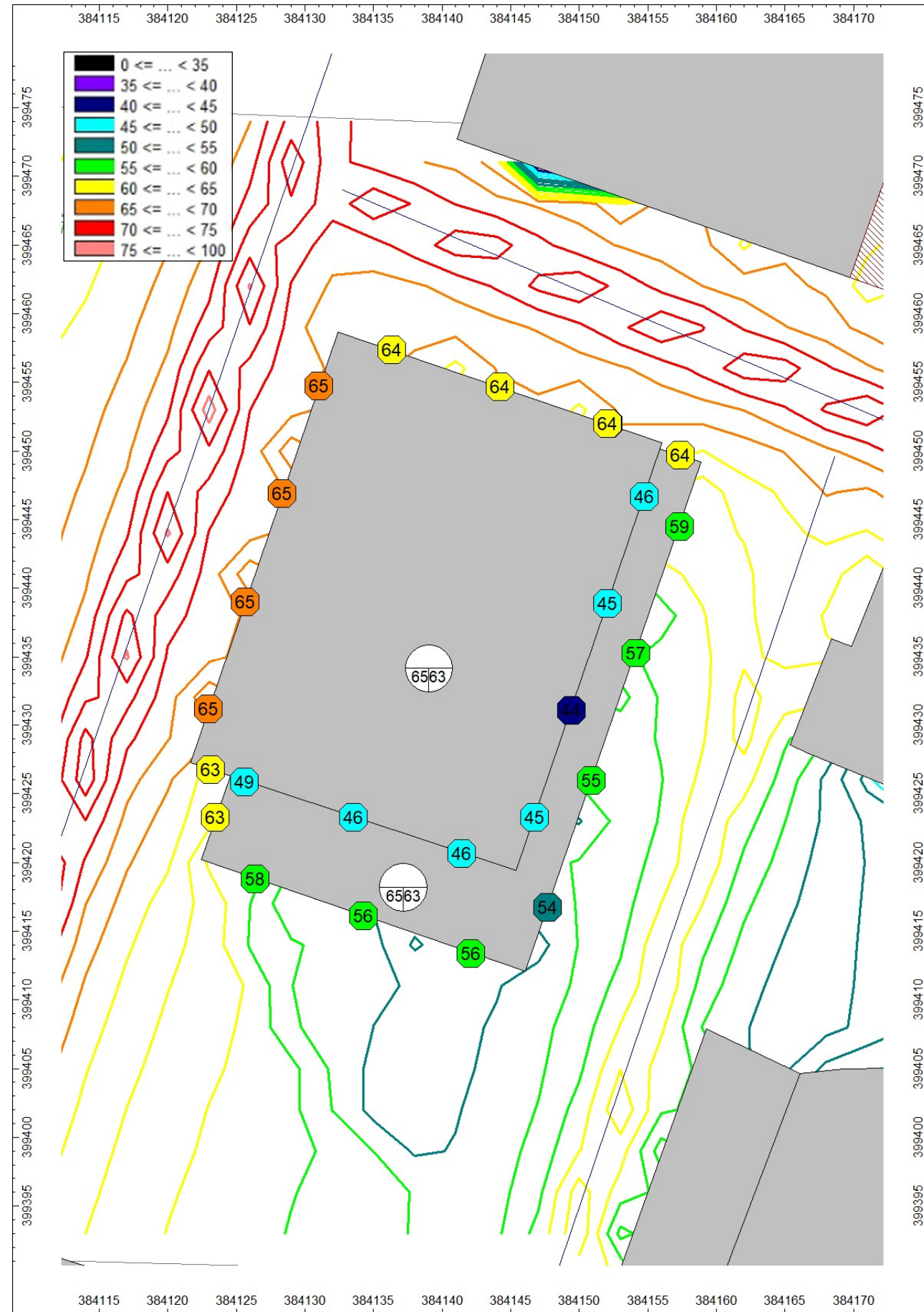


Figure B7: CadnaA 3D daytime $L_{Aeq,16hr}$ noise map

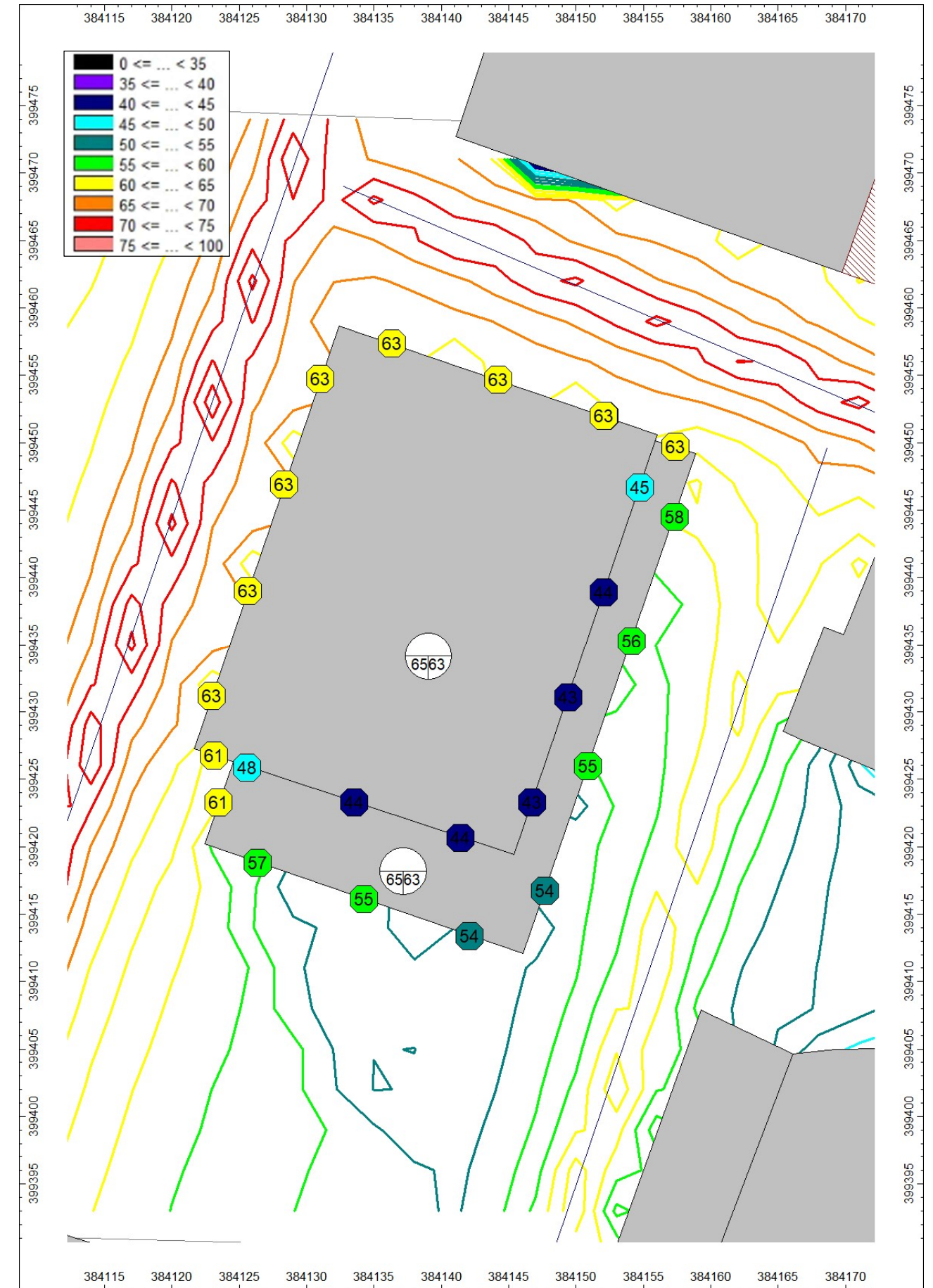


Figure B8: CadnaA 3D night-time $L_{Aeq,8hr}$ noise map