



Boorley Green, Southampton

Noise Impact Assessment

On behalf of **McCarthy & Stone (Developments) Ltd.**

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1 Introduction

1.1 Background

- 1.1.1 Stantec UK Limited (Stantec) has been commissioned by McCarthy & Stone Retirement Developments Limited to undertake a noise impact assessment to support the planning and design of a proposed residential development site which comprises 52no. retirement living apartments and 2no. 3 bedroom open market houses at Boorley Green, Southampton (Winchester Road, Boorley Green, SO32 2DH).
- 1.1.2 An environmental sound survey has been undertaken by Stantec, to establish the existing environmental sound levels associated with transportation sources incident on the proposed development.
- 1.1.3 The results of the environmental sound survey have been used to establish façade incident sound levels for the proposed development which form the basis of our assessment of the acoustic requirements of the building façade.
- 1.1.4 This report presents the relevant results of the environmental sound surveys, details of our assessment and proposed acoustic specifications for windows, ventilators, external walls and roofs of the buildings.
- 1.1.5 An explanation of the acoustic terminology used in this report is included in **Appendix A**.

1.2 Scope of Report

The scope of this report is:

- Establish, by means of a detailed 24-hour daytime and night-time environmental sound survey, the existing environmental sound levels at selected street level positions.
 - Propose appropriate internal ambient noise level design criteria with respect to external noise ingress for habitable spaces based on the requirements of the Local Planning Authority and applicable guidance.
 - Undertake a detailed assessment of the likely airborne noise ingress into habitable spaces and determine the required acoustic performance of the windows, ventilators, external walls and roofs of the building façade in order to achieve the proposed criteria with windows closed.
 - Undertake an outline assessment of the likely airborne noise ingress to bedrooms at night, to determine the likelihood of compliance with the noise requirements of Approved Document O and establish where the internal sound criteria could potentially be achieved with open windows.
- 1.2.1 Advice and recommendations within this report will need to be integrated, coordinated and ratified with the design by the principal designer and design team to ensure that all other design interfaces, buildability, workmanship and other requirements are considered. Any sketches or drawings provided illustrate acoustic principles only.

1.3 Site Description and Location

- 1.3.1 The proposed development site is located at Boorley Green, approximately 8.5 km east of Southampton and falls within the jurisdiction of Eastleigh Borough Council.
- 1.3.2 The site consists of a field used for agricultural storage. The site is bound by a footpath and residential dwellings to the north, west, and south and Winchester Road (B3354) to the east. Macdonald Botley Park Hotel & Spa (Hotel) is approximately 70 m from the eastern site boundary.

1.3.3 The location of the proposed site is detailed in **Figure 1.1**.

Figure 1.1: Site Location Plan



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2 Policy, Standards, Guidance and Criteria

2.1 Local Policy

Eastleigh Borough Local Plan (2016-2036), Adopted April 2022

- 2.1.1 The Adopted Local Plan states the following which relates to noise and the proposed development. The site is on land that is allocated under Policy BO4 – Land north of Myrtle Cottage, Winchester Road:

“Planning permission will be granted provided that the detailed proposals comply with the development plan, and comply with an approved masterplan for the whole site which addresses the following specific requirements:

- *i. ensuring an acceptable noise environment for new homes through appropriate siting of development and the provision of suitable noise mitigation measures...*”

- 2.1.2 Policy DM8, Pollution of the Adopted Local Plan states the following, relating to noise:

“1 – Development will not be permitted if it is likely to cause loss of amenity or impact on public health or other unacceptable environmental impacts through... noise or vibration”.

- 2.1.3 Section 5.49 of the Adopted Local Plan states the following regarding noise:

“The Council supports the approach of the Noise Policy Statement for England in relation to the effective control of noise within the context of sustainable development”.

For proposed noise sensitive development, existing and potential change of noise levels should be considered. Significant adverse noise impacts to residential amenities should be avoided. Proposals should, *“ensure that they mitigate and minimise adverse noise impacts and, where possible, contribute to the improvement of health and quality of life”.*

The noise assessment is expected to *“identify all significant sources of noise; assess the likely short and long term impacts of noise generated or exposure to noise; and propose noise protection measures”.*

“Wherever possible, developments should use site and building layout and design to manage levels of noise on development sites acceptable internal noise levels cannot be met with open windows, alternative ventilation will be required. Where the development site is affected by air pollution in addition to noise, early consideration of the location of air ventilation inlets is recommended”.

The Policy also states that BS 8233:2014 should be used to, *“assess the acceptability of development proposals affected by steady external noise sources.”*

- 2.1.4 Policy DM14, Parking states:

“4 - Proposals to provide new car parks... will be permitted if...

- *d. the design, layout, planting and landscaping and lighting provision addresses ..., noise...”*

Pre-Application Advice

**Eastleigh Borough Council – Senior Pollution Control Officer – Neil Scott –
Detailed comments Wednesday 17 April 2024**

- 2.1.5 Environmental Health has advised that:

- Good acoustic design principles should be followed and included in development proposals to avoid significant noise impacts and minimise and manage and adverse impacts. Good acoustic design principles should consider the following:
 - Set-back distance from Winchester Road and potential for low barrier and surface treatment to reduce the need of noise insulation / mitigation to meet internal ambient noise levels.
 - Internal layout options should minimise number of noise sensitive rooms facing Winchester Road.
- A noise impact assessment should consider the following:
 - Existing and future road traffic noise from Winchester Road
 - Potential entertainment noise impact from Macdonald Botley Park Hotel & Spa
 - Potential noise impact from proposed centralised heating and cooling systems on nearby noise sensitive development.

2.1.6 Environmental Health has advised the following with regard to ventilation and overheating:

- For ventilation:
 - MVHR for facades overlooking Winchester Road is supported.
 - Plenum windows should be considered.
 - Potential noise screening from proposed balconies should be considered.
- For overheating:
 - If open windows are not a suitable means to mitigate overheating whilst preventing substantial noise ingress, alternative methods to mitigate overheating should be considered alongside MVHR.

2.2 National Policy

The National Planning Policy Framework (NPPF)

2.2.1 The revised National Planning Policy Framework (NPPF) was published in December 2023. In respect of noise, paragraph 180 states that in relation to conserving and enhancing the natural environment:

“Planning policies and decisions should 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 ... noise pollution...”

2.2.2 In relation to ground conditions and pollution, paragraph 191 states that:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

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 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...”

- 2.2.3 The NPPF indicates that the Noise Policy Statement for England (NPSE) should be used to define the “*significant adverse impacts*”.

Planning Practice Guidance

- 2.2.4 The Planning Practice Guide (PPG) was launched in 2014 (with the latest update being in 2019) and provides additional guidance and interpretation to the Government’s strategic policies outlined within the NPPF in a regularly updated, web-based resource.
- 2.2.5 The PPG provides guidance on the effects of noise exposure, relating these to people's perception of noise, and linking them to the no observed effect level (NOEL) and, as exposure increases, the lowest observed adverse effect level (LOAEL) and significant observed adverse effect level (SOAEL).
- 2.2.6 As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.
- 2.2.7 Exposure to noise above the LOAEL is described in PPG (Paragraph: 005 Reference ID: 30-005-20190722) as:

“...noise starts to cause small changes in behaviour and/or attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).”

- 2.2.8 Exposure to noise above SOAEL is described as:

“...noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.”

Noise Policy Statement for England

- 2.2.9 The Noise Policy Statement for England (NPSE) was published in March 2010 and clarifies the underlying principles and aims of existing policy documents that relate to noise. It also sets out the long-term vision of Government noise policy which is: “*to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development*”.
- 2.2.10 The NPSE states that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and its effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.
- 2.2.11 Paragraphs 2.20 and 2.21 define ‘significant adverse’ and ‘adverse’ impacts as applied to noise as follows:

“There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.”

- 2.2.12 It is necessary to define the LOAEL and SOAEL for the potential source of noise to relate the potential impact to the aims and requirements of the NPSE.

2.3 Standards

British Standard 8233: 2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

- 2.3.1 BS 8233:2014 in relation to this development, sets out guideline values in habitable rooms, such as living rooms and bedrooms which should not be exceeded.
- 2.3.2 The guideline values relate to steady external noise without a specific character, previously termed 'anonymous noise'. According to the standard, noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate. Examples of noise with a character may include tonal/intermittent plant noise emissions, music playback, and workshop noise. Examples of external steady noise sources may include environmental noise sources such as busy road traffic.

2.3.3 The guideline internal ambient noise levels for dwellings are presented in **Table 2.1**.

Table 2.1: BS 8233 Guideline Internal Ambient Noise Levels for Dwellings

Activity	Location	Internal Ambient Noise Level	
		07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$
*Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,f}$, depending on the character and number of events per night. Sporadic noise events could require separate values.			
Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative source of ventilation that does not compromise the façade insulation or the resulting noise levels.			
Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved.			
*A selection of the available notes			

2.3.4 The standard also provides advice in relation to sound levels for external noise. It states that:

“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 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. 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 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

British Standard 4142:2014 + A1 2019 'Methods for Rating and Assessing Industrial and Commercial Sound'

- 2.3.5 British Standard 4142:2014 + A1 2019 "*Methods for rating and assessing industrial and commercial sound*" (BS 4142) describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in the standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.
- 2.3.6 The standard is used to determine the rating levels for sources of sound of an industrial and/or commercial nature and the ambient, background and residual sound levels at outdoor locations. These levels could be used for the purposes of investigating complaints; assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and assessing sound at proposed new dwellings or premises used for residential purposes. However, the determination of noise amounting to a nuisance is beyond the scope of the standard.
- 2.3.7 The standard should not be used to assess sound from the passage of vehicles on public roads and railway systems; recreational activities; people among other sources; and other sources falling within the scopes of other standards or guidance. The standard cannot be applied to the derivation of indoor sound levels arising from sound levels outside, or the assessment of indoor sound levels.
- 2.3.8 The procedure contained in BS 4142 assesses the significance of sound which depends upon the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs/will occur.
- 2.3.9 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level and considering the following:
- Typically, the greater this difference, the greater the magnitude of the impact;
 - A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context; and
 - A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- 2.3.10 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.
- 2.3.11 Where the initial estimate of the impact needs to be modified due to the context, the following factors should be considered:
- The absolute level of sound, as BS 4142 notes that the magnitude of the overall impact might be greater where the residual sound level is high than for an acoustic environment where the residual sound level is low;
 - The character and level of the residual sound compared to the character and level of the specific sound;
 - The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions such as:
 - Façade insulation treatment;
 - Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and

- Acoustic screening.

2.4 Guidance

Professional Practice Guidance on Planning and Noise, 2017

- 2.4.1 The Professional Practice Guidance on Planning and Noise (ProPG) was jointly published in 2017 by the Institute of Acoustics, the Chartered Institute of Environmental Health and the Association of Noise Consultants and provides guidance on a recommended approach to the management of noise within the planning system in England.
- 2.4.2 The scope of ProPG is limited to new residential development that will be predominantly exposed to airborne noise from transport sources.
- 2.4.3 The guidance is mostly focused on new flats and houses, although there is some relevant content in regard to other types of residential units, such as care homes and residential institutions.
- 2.4.4 Noise sources other than airborne transport (i.e., industrial, commercial, entertainment, etc.) and ground-borne noise and vibration fall outside of the scope of ProPG.
- 2.4.5 ProPG details a two-stage approach to the consideration of noise issues including:
 - Stage 1 – an initial noise risk assessment of the proposed development site.
 - Stage 2 – a systematic consideration of four key elements.
- 2.4.6 **Table 2.2** is a reproduction of Figure 1 within ProPG which summarises the noise risk categories for Stage 1 of the assessment process.

Table 2.2: Stage 1 ProPG Risk Categories

Noise Risk Assessment	Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
Indicative Daytime Noise Levels L_{Aeq,16hr} Indicative Night-time Noise Levels L_{Aeq,8hr} 70 dB 65 dB 60 dB 55 dB 50 dB 60 dB 55 dB 50 dB 45 dB 40 dB High Medium Low Negligible	↑ Increasing risk of adverse effect	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. Applicants are strongly advised to seek expert advice. 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 demonstrate that a significant adverse noise impact will be avoided in the finished development. 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 ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

Figure Notes:

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is “not dominant” .
- L_{Aeq,16hr} is for daytime 0700 - 2300, L_{Aeq,8hr} is for night-time 2300 - 0700.
- An indication that there may be more than 10 noise events at night (2300 - 0700) with L_{Amax,F} > 60 dB means the site should not be regarded as negligible risk.

2.4.7 Stage 2 comprises four key elements which are undertaken in parallel:

- Element 1 – demonstrating a ‘Good Acoustic Design Process’;
- Element 2 – observing internal ‘Noise Level Guidelines’;
- Element 3 – undertaking an ‘External Amenity Area Noise Assessment’; and
- Element 4 – consideration of ‘Other Relevant Issues’.

2.4.8 Following a good acoustic design process involves considering acoustics at an early stage in the design process; avoid ‘unreasonable’ acoustic conditions and prevent ‘unacceptable’ acoustic conditions; and achieve an integrated, optimum solution without overdesign.

2.4.9 Demonstration of good acoustic design should include:

- Checking the feasibility of relocating or reducing noise levels from relevant sources.
- Consider options for planning the site or building layout.
- Consider the orientation of proposed building(s).
- Select construction types and methods for meeting building performance requirements.
- Consider the effects of noise control measures on ventilation, fire regulation, health and safety, CDM, etc.
- Assess the viability of alternative solutions.
- Assess external amenity areas noise.

2.4.10 With respect to internal noise levels, ProPG recommends that noise levels set out in BS 8233 are used for residential development. However, an additional criterion is proposed by ProPG for night-time L_{Amax} levels as follows:

“[...] In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax, F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.”

2.4.11 With respect to external noise levels, ProPG again makes reference to the guideline levels detailed in BS8233 stating that:

“The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq, 16hr}$.”

2.4.12 The final element indicates that the assessment should consider ‘Other Relevant Issues’ which may include:

- Compliance with relevant national and local policy.
- Magnitude and extent of compliance with ProPG.
- Likely occupants of the development.

- Acoustic design verses unintended adverse consequences.
- Acoustic design verses wider planning objectives.

Draft Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O

2.4.13 ADO was released in December 2021 and updated in June 2022.

2.4.14 Approved Document O of the Building Regulations 2010 does not form a planning requirement unless conditioned by the Local Authority.

2.4.15 Approved Document O gives guidance on how to comply with Part O of the Building Regulations and applies to residential buildings (excluding hotels) only.

2.4.16 Requirement O1(1) states that:

“Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel (“residences”) to –

(a) Limit unwanted solar gains in summer;

(b) Provide an adequate means to remove heat from the indoor environment.”

2.4.17 Requirement O1(2) states that:

“In meeting the obligations in paragraph (1) –

(a) Account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and

(b) Mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.”

2.4.18 Compliance with Requirement O1(1) can be demonstrated by using the ‘simplified method’ or by ‘dynamic thermal modelling’, as described in Approved Document O.

2.4.19 In relation to noise, Paragraphs 3.2 and 3.3 of Approved Document O state:

3.2 In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

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

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

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

3.4 Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants’ Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use.

2.4.20 ADO also identifies the relative risk of overheating for a site, in terms of either ‘high’ or ‘moderate’ risk locations across the country. The proposed development site is categorised as being in a ‘moderate’ risk location.

Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O

- 2.4.21 In response to the release of Approved Document O, the Institute of Acoustics and the Association of Noise Consultants developed a document that seeks to standardise the acoustic design approach to address the requirements of Approved Document O.
- 2.4.22 It establishes that the 'simplified method' cannot be used to demonstrate compliance (with open windows) where external noise levels exceed the thresholds outlined in **Table 2.3** at night. The external noise threshold assumes a 9 dB loss through a façade with an open window, and assume a reverberation time within bedrooms of 0.5 s.

Table 2.3: External Noise Thresholds for Moderate Overheating Risk Locations

Parameter	External Noise Threshold (dB)
$L_{Aeq,8hr}$, averaged over 8 hours (between 11pm and 7am)	49
L_{AFmax} , more than 10 times a night (between 11pm and 7am)	64

- 2.4.23 Where noise levels exceed these thresholds, ADO states that dynamic thermal modelling should be used. If dynamic thermal modelling is used, it is possible to calculate the window open area required, which can be compared with the maximum open area required to comply with the internal noise requirements. The maximum open area required to comply with the internal noise requirements can be calculated based on detailed layout and elevation drawings.
- 2.4.24 Limiting solar gains around the development may reduce the required window open area and may allow external noise levels to be higher than those indicated in **Table 2.3**, while still complying with the internal noise criteria.
- 2.4.25 For facades which are anticipated to experience external noise levels in excess of the thresholds, a further assessment can be undertaken to determine the maximum openable window area possible whilst still meeting internal noise levels shown in **Table 2.4**.

Table 2.4: Internal Noise Level Criteria for partially open windows

Period	Internal Noise Threshold (dB)
Night-time	40 dB $L_{Aeq,8hours}$
	55 dB L_{AFMax}

- 2.4.26 Where it is not permissible to open windows to mitigate overheating, guidance is provided to assess other ventilation strategies, including attenuated ventilation or mechanical ventilation.
- 2.4.27 The criteria outlined within this technical note relate to ADO. The noise criteria within ADO only apply to bedrooms at night. Other guidance (which does not form a requirement under the Building Regulations) on internal noise levels is available for habitable areas during daytime hours within the Acoustics, Ventilation and Overheating Guide (AVO). Review of internal noise levels during other periods of the day, in other spaces, is outside the scope of this technical note.

Guidelines for Environmental Noise Impact Assessment

- 2.4.28 The IEMA Guidelines for Environmental Noise Impact Assessment 2014 detail an assessment process applicable to a wide range of potential environmental noise sources where a specific assessment method either does not exist or is not considered to be appropriate.
- 2.4.29 The guidelines suggest that by defining the sensitivity of receptors, the change in noise environment as a result of the source under consideration, and considering the type of noise, an assessment of the potential noise impact can be undertaken.

- 2.4.30 Receptors are those aspects of the environment sensitive to changes in baseline conditions. The sensitivity of a particular receptor depends upon the extent to which it is susceptible to such changes. Residential receptors are typically considered to have a high sensitivity.
- 2.4.31 Based on the IEMA guidelines, **Table 2.5** details the relative change in sound level and the corresponding magnitude of change at a typical receptor of high sensitivity (e.g. a residential receptor).

Table 2.5: Magnitude of Change and Description of Effect at a Receptor with High Sensitivity

Relative Change in Sound Level	Magnitude of Change	Description of Effect
Greater than 10 dB change	Large	Noticeable and Very Disruptive Very Substantial Impact
5 to 9.9 dB change	Medium	Noticeable and Disruptive Substantial Impact
3 to 4.9 dB change	Small	Noticeable and Intrusive Moderate Impact
2.9 dB or less change	Negligible	Noticeable and Not Intrusive

2.5 Criteria

Proposed Internal Ambient Noise Levels & External Amenity Noise Level Criteria

- 2.5.1 With reference to the requirements of the Local Authority and applicable guidance documents. **Table 2.6** details the proposed assessment criteria. The proposed criteria are not statutory unless conditioned by the Local Authority and for the purposes of this assessment are considered to represent the LOAEL.

Table 2.6: Internal and External Sound Level Assessment Criteria

Location	Assessment Period	Internal Ambient Noise Level	External Amenity Area Noise Level
Living Rooms / Dining Rooms	Daytime 07:00 – 23:00 hours	35 dB LAeq,16hours	50 dB LAeq,16h - desirable 55 dB LAeq,16h – upper limit
Bedrooms	Night-time 07:00 – 23:00 hours	30 dB LAeq,8hours 45 dB LAmax,F*	-

*Not to be normally exceeded more than 10 times per night-

Plant Noise Emission Limits

- 2.5.2 **Table 2.7** details the proposed plant noise emission limits, based on the difference between the rating level of proposed plant and the existing measured background sound levels, when determined at the nearest noise sensitive receptors (as an incident sound level) and in accordance with BS 4142:2014+A1:2019. For the purposes of this assessment the following criteria represent the LOAEL.

Table 2.7: Proposed Plant Noise Emission Limits

Location	Difference Between Rating Level (LA _{r,Tr}) and Background Sound Level (LA _{90,T}), dB
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At nearest dwelling	≤0
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Approved Document O – Overheating

2.5.3 The following criteria is enforced by Building Control.

2.5.4 **Table 2.8** details the external noise level thresholds at which the 'simplified method' cannot be used to demonstrate compliance with ADO, and that if exceeded dynamic thermal modelling should be used.

Table 2.8: External noise level thresholds where 'simplified method' can be used to demonstrate ADO compliance

Parameter	External Noise Threshold (dB)
L _{Aeq,8hr} , averaged over 8 hours (between 11pm and 7am)	49
L _{AFmax} , more than 10 times a night (between 11pm and 7am)	64

2.5.5 For facades which are anticipated to experience external noise levels in excess of the thresholds in **Table 2.8**, internal noise level criteria for partially open windows are shown in **Table 2.9**.

Table 2.9: Internal Noise Level Criteria for partially open windows

Period	Internal Noise Threshold (dB)
Night-time	40 dB L _{Aeq,8hours}
	55 dB L _{AFMax}

Change in Sound Levels due to Road Traffic

2.5.6 **Table 2.10** details criteria used to assess the effect of a relative change in sound level across the proposed development site due to a change in road traffic flows on the surrounding road network. For the purposes of this assessment, a small magnitude of change (i.e. 3 dB) represents the LOAEL.

Table 2.10: Magnitude of Change and Description of Effect at a Receptor with High Sensitivity

Relative Change in Sound Level	Magnitude of Change	Description of Effect
Greater than 10 dB change	Large	Noticeable and Very Disruptive Very Substantial Impact
5 to 9.9 dB change	Medium	Noticeable and Disruptive Substantial Impact
3 to 4.9 dB change	Small	Noticeable and Intrusive Moderate Impact
2.9 dB or less change	Negligible	Noticeable and Not Intrusive

3 Environmental Sound Survey

3.1 Procedure

- 3.1.1 An attended environmental sound survey was undertaken between approximately 11:50 hours on Thursday 20 June 2024 and approximately 12:10 hours on Friday 21 June 2024 to determine the existing sound climate at locations considered representative of sound levels incident on the future development.
- 3.1.2 Measurements were made over 2-minute intervals of the L_{Aeq} , L_{A90} and L_{AFMax} sound levels and over 15-minute intervals for the L_{A90} sound levels.
- 3.1.3 The sound level meters were located on a tripod. The microphones were fitted with the manufacturer's windshield.
- 3.1.4 The instrumentation used in the survey (including calibration information) is listed in **Appendix B**.
- 3.1.5 Field calibrations were performed before and after the measurements with no significant fluctuations recorded (< 0.5 dB). Calibration certificates are available upon request.

3.2 Measurement Locations

- 3.2.1 Sound measurements were undertaken at two positions at the site, considered representative of the site. The measurement positions are detailed in **Figure 3.1** and described in **Table 3.1**.

Figure 3.1: Environmental Sound Measurement Locations



Contains information from: Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Maxar, Microsoft. Stantec UK - Acoustics Team
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Table 3.1: Description of Measurement Locations

Position	Description
MP1	The microphone was located in a free-field position near the eastern boundary of the proposed development, approximately 13 m from Winchester Road. The microphone was positioned approximately 1.5m above ground level
MP2	The microphone was located in a free-field position near the eastern boundary of the proposed development, approximately 68 m from Winchester Road. The microphone was positioned approximately 1.5m above ground level.

3.3 Meteorological Conditions

- 3.3.1 Based on observations and on-site measurements, the meteorological conditions during the survey are detailed in **Table 3.2**. Weather data is presented in **Table C.3** in **Appendix C**.

Table 3.2: Meteorological Conditions

Description	11:50 Thursday 20 June 2024 to 12:10 Friday 21 June 2024
Temperature (°C)	11 - 21
Precipitation (mm)	0
Cloud Cover (%)	30
Wind Speed (m/s)	< 0.5
Wind Direction	WSW

- 3.3.2 These conditions are therefore considered suitable for obtaining representative sound level measurements.

3.4 Assumptions/Limitations

- 3.4.1 At the start of the environmental sound survey, occasional light construction noise associated with small scale renovation works on adjacent premises to the north and west of the proposed development was audible. The following periods of time are omitted from the survey results and assessment:
- 14:34 to 14:52 Thursday 20 June
 - 15:36 to 16:04 Thursday 20 June
- 3.4.2 This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

4 Environmental Sound Survey Results

- 4.1.1 The results of the survey from Thursday 20 June to Friday 21 June are presented in the time history graphs in **Appendix D**.
- 4.1.2 A summary of the survey results is provided in **Table 4.1**.

Table 4.1: Summary of Measured Environmental Sound Survey Results

Location	Period, T	Measured Sound Level (dB)		
		$L_{Aeq,T}$	Typical* L_{AFMax}	Typical** $L_{A90,T}$
MP1	Daytime (07:00 – 23:00 hours) – Includes Prom Event	56	-	42
	Daytime (07:00 – 21:00 hours) – Excludes Prom Event	56	-	44
	Daytime (20:00 – 21:00) – no prom	53	-	42
	Daytime (21:00 – 22:00) – with prom	53	-	42
	Daytime (21:00 – 22:45 hours) – Prom Event	53	-	42
	Night-time (23:00 – 07:00 hours)	48	67	30
MP2	Daytime (07:00 – 23:00 hours)	49	-	42
	Night-time (23:00 – 07:00 hours)	44	65	30
* Based on the 10th highest measured L_{AFmax} level.				
** Calculated based on the statistical distribution of background sound levels during the measurement period in general accordance with guidance in BS 4142:2014+A1:2019				

5 Suitability of Site for Residential Development

5.1 Environmental Sound Climate

- 5.1.1 An analysis of measured environmental sound levels has determined that during the daytime and night-time the environmental sound environment across the site is dominated by sound from road traffic movements on the surrounding road network, namely Winchester Road.
- 5.1.2 A school prom event was noted to occur at the Hotel, between approximately 21:00 and 22:45 hours on Thursday 20 June. Analysis of audio recorded at MP1 during the prom event was used to determine that noise from vehicular movements on Winchester Road dominated the noise climate with the prom event being just audible at the measurement position.

5.2 Hotel Event Noise

- 5.2.1 Events take place in Function Building located to the west of the Hotel building (**Figure 5.1**).
- 5.2.2 Liaison with the Site Manager on Thursday 27 June 2024 indicates that:
- Windows are closed during events to reduce sound egress.
 - Proms are usually louder than weddings.
 - Proms end by approximately 23:00.
 - Weddings end by approximately 00:00.
- 5.2.3 Environmental sound measurements at MP1 during a prom event have been assumed to be representative of incident sound levels from event noise from a prom or wedding during the daytime or night-time at the eastern façade of the proposed development.

Figure 5.1: Hotel Event Noise Locations



Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Maxar, Microsoft. Contains public sector information licensed under the Open Government Licence v3.0

5.3 Acoustic Model

- 5.3.1 The 3D acoustic model has been informed by the illustrative masterplan and has been verified using the results of the environmental sound survey. The model includes noise contributions from existing sources, comprising vehicle movements on the surrounding road network, namely Winchester Road.

5.4 Assessment Calculations

- 5.4.1 Calculations of noise ingress have been undertaken using both modelled sound levels of road traffic noise and measured environmental sound levels during a period of event noise from the hotel. Appropriate façade specifications have been provided to ensure suitable internal noise levels are achieved in both scenarios.

5.5 Good Acoustic Design

- 5.5.1 Illustrated masterplan drawings provided by HGP Architects in April 2024 exhibit the following good acoustic design features:
- Main façade is set back approximately 21 m from Winchester Road.
 - Most bedrooms recede into the façade overlooking Winchester Road.
 - An enclosed courtyard area.

5.6 External Noise Break-in Assessment (Windows Closed)

Overview

- 5.6.1 Analysis of the proposed external building fabric has been undertaken to determine the required acoustic performance of glazing and ventilation elements to achieve the criteria detailed in **Table 2.4** with windows closed. Compliance with the acoustic performance specification detailed herein is expected to result in compliance with the proposed acoustic criteria.
- 5.6.2 The assessment is based on the following incident sound levels derived from the results of the environmental sound survey and calculated façade incident sound levels.

Ventilation

- 5.6.3 The requirements for building ventilation in new dwellings are detailed in Approved Document F (ADF) and include provision for 'whole dwelling ventilation', 'extract ventilation' and 'purge ventilation', as described below.

Whole Dwelling Ventilation

- 5.6.4 Nominally continuous ventilation of rooms or spaces at a relatively low rate to provide fresh air to the building and dilute, disperse and remove water vapour and pollutants not removed by extract ventilation.

Extract Ventilation

- 5.6.5 The extraction of air where water vapour or pollutants are likely to be released (e.g. bathrooms and kitchens). Fans may be either intermittent or continuous operation.

Purge Ventilation

- 5.6.6 Manually controlled ventilation at a relatively high rate to remove pollutants and/or water vapour (e.g. fumes from painting). Purge ventilation is typically provided by means of openable windows. Due to the temporary nature of purge ventilation, significant noise impacts are not normally expected.

Types of Ventilation System

- 5.6.7 ADF provides three 'template' systems which comply with the ventilation requirements, formed of whole dwelling ventilation and extract ventilation, and can be adopted to demonstrate compliance. These are:
- Natural ventilation (applicable to less airtight dwellings) - incorporating background ventilators and intermittent extract fans
 - Continuous mechanical extract ventilation - incorporating background ventilators and continuous extract fans
 - Mechanical ventilation with heat recovery (MVHR) - incorporating continuous ventilation fans
- 5.6.8 Each system has different noise implications, however in the context of this assessment external noise ingress via the ventilation system is the primary consideration. Generally, for natural ventilation and continuous mechanical extract ventilation, this is via the ventilators and for MVHR this is via the inlet and exhaust grilles within the dwelling associated with the MVHR system.

Selected Ventilation System

- 5.6.9 It is understood that ventilation to dwellings is to be provided by MVHR units located within each dwelling.
- 5.6.10 MVHR has much greater resistance to external noise ingress than trickle ventilators and in the context of this site noise ingress via the MVHR system is not considered to be significant.

Calculation Parameters

- 5.6.11 The external building fabric analysis has assumed the following:

Room Absorption

- 5.6.12 It has been assumed the bedrooms and living rooms to be acoustically 'soft' with carpets, curtains and other soft furnishings. For the purposes of our analyses, we have assumed the average equivalent absorption coefficients detailed in **Table 5.1**.

Table 5.1: Average Equivalent Acoustic Absorption Coefficients

Room	Average Equivalent Acoustic Absorption Coefficient ($\bar{\alpha}$) at Octave-band Centre Frequency (Hz)				
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz
Bedrooms / Living Rooms	0.18	0.25	0.27	0.31	0.32

Proposed External Building Fabric

- 5.6.13 The assessment has been based on a typical brick/block cavity wall external wall build-up. Please note that assessment of internal sound transfer falls outside the scope of this report and should be assessed in detail by the relevant specialists. **Table 5.2** details typical sound reduction indices associated with the assumed external building fabric construction, providing an indicative overall performance of 52 dB R_w .

Table 5.2: Assumed External Wall Sound Reduction Performance

Construction	Sound Reduction Index (R) at Octave-band Centre Frequency (Hz)				
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz
External Wall	41	45	45	54	58

- 5.6.14 Our calculations have been based on building and window dimensions obtained from drawings produced by HGP Architects in April 2024.

Glazing and Ventilation Acoustic Specification and Guidance on Construction

- 5.6.15 A single glazing specification and glazing zone has been determined throughout the development.
- 5.6.16 The glazing performance specification applies to the glazing package as a whole inclusive of glazing, louvres, spandrel panels, framing, opening lights, doors, seal etc. The performance of the glazing system will depend on many factors such as the glazing configuration, size of windows panels, quality of framing, quality of sealing etc.
- 5.6.17 The proposed windows should be tested in accordance with BS EN ISO 10140-2:2021 and the quoted minimum sound reduction specifications should be met by the system as a whole, including frames etc. as appropriate, and not just the glass.

- 5.6.18 For guidance purposes we would suggest that a construction based around the following configuration is likely to prove commensurate with achieving the sound insulation performance specification detailed within **Appendix E**.

Table 5.3: Glazing and Trickle Ventilator Guidance Constructions

Area	Glazing Type	Ventilation Type	Guidance Glazing and Ventilator Construction
Living Spaces	G1	MVHR	Conventional double glazing comprising 4 mm glass / 16 mm cavity / 6 mm glass. With MVHR ventilation system.
Bedrooms			

- 5.6.19 The guidance construction above is provided for costing purposes only. Selected glazing and ventilation systems should be capable of meeting the performance specifications shown in **Appendix E**, with laboratory test certificates being made available in support of the quoted performance. Glazing proposals which simply reflect the guidance constructions indicated in this report will not, in isolation, be sufficient evidence that a glazing configuration will meet the performance specification.
- 5.6.20 The acoustic specifications will need to be integrated, coordinated and ratified with the design by the principal designer and design team to ensure that all other design interfaces, buildability, workmanship and other requirements are considered.
- 5.6.21 It should be noted that the acoustic specifications are intended to demonstrate the ability of the scheme to comply with planning requirements and are not intended to be used as detailed acoustic design specifications. All acoustic specifications should be reviewed and confirmed during the detailed design stage.
- 5.6.22 Based on the results of the external building fabric assessment, the internal ambient sound levels are likely to meet the proposed criteria during daytime and night-time periods.

5.7 External Noise Break-in Assessment (Windows Open)

Overview

- 5.7.1 Analysis of external sound levels around the development has been undertaken to determine the likelihood of compliance with the noise requirements outlined within Approved Document O Overheating. The purpose of this section of the report is not demonstrate compliance with the requirements, but to determine the likelihood of compliance.

Assessment

- 5.7.2 **Figure F.1**, in **Appendix F** presents the results of the acoustic model, where red coloured facades are modelled as having external noise levels above the thresholds stated in **Table 2.8** and do not comply with the Simplified Method in ADO. These facades require further analysis through dynamic thermal modelling.
- 5.7.3 Exceedances of the criteria are in most cases between 1-4 dB. In these cases we have determined the maximum open areas for the windows whilst still meeting the ADO acoustic criteria.
- 5.7.4 Façades coloured in blue are modelled as having external noise levels below the thresholds in **Table 2.8** and comply with the Simplified Method in ADO. Openable windows on these facades are likely to be suitable as a means of controlling overheating and complying with the internal noise requirements. It should be noted that the use of open windows would be subject to other (i.e. non-noise related) requirements of Approved Document O also being met.

Facades Requiring Dynamic Thermal Modelling

- 5.7.5 For facades coloured in red, subject to the results of dynamic thermal modelling, it is unlikely that fully openable windows can be utilised as a means to both control overheating and achieve the internal noise level criteria. Therefore, the ventilation strategy may need to consider the use of partially openable windows, an attenuated ventilation path or mechanical means by which to remove excess heat. These could include:
- An open window area of less than that assumed within the simplified method of ADO (see **Table 5.4**). Unless it is possible to substantially reduce the required open area, this is unlikely to affect the outcome of the acoustic assessment.
 - An attenuated ventilation path, e.g. acoustically rated louvre or plenum which provides sufficient airflow.
 - A mechanical system which either increases airflow and/or provides additional cooling.
- 5.7.6 The alternative ventilation strategy would be subject to detailed design development and the suitable specification of acoustic attenuation. These should be reviewed by a suitably qualified acoustic consultant to determine whether the measures are suitable for achieving the internal noise related requirements of ADO.

Assessment of Mitigating Overheating Using Open Windows

- 5.7.7 For facades which are anticipated to experience external noise levels in excess of the thresholds, a further assessment has been undertaken to determine the maximum openable window area possible whilst still meeting an internal noise level of 40 dB $L_{Aeq,8hours}$ and 55 dB L_{AFMax} during the night-time period.
- 5.7.8 Calculations have been undertaken at 4 dwellings chosen to represent a range of incident façade levels that exceed the threshold. Dwellings that have been selected for calculation are indicated with a yellow dot in **Figure E.1**. It should be noted that this approach should be confirmed as acceptable by the Building Control officer. The results of the calculations are outlined in **Table 5.4** below.

Table 5.4: Results of Maximum Openable Window Area Calculations

Dwelling / House Type / Room	Window Area (m ²)	Calculated Maximum Openable Window Area (m ²)*	Resultant Internal Noise Level ($L_{Aeq, 8hours}$)
RL103, F0-13, F1-33, bed	1.1	0.1	40
RL 201, F0-14, F1-34, bed1	2.0	0.1	40
RL 201, F0-14, F1-34, bed2	2.0	0.1	40
RL201R, F1-31, bed1	2.0	0.1	40
RL201R, F1-31, bed2	2.0	0.1	40
RL21R FD, F2-48, bed	1.4	0.1	40

- 5.7.9 The dynamic thermal model should be checked to determine if these maximum openable window areas will result in compliance with the overheating requirements.

Mechanical Ventilation and Cooling Noise Guidance

- 5.7.10 The requirements of Approved Document O do not apply to noise generated by mechanical ventilation or cooling systems. However, noise levels within bedrooms at night should be 30 (± 5) dB L_{Aeq}^1 . Further:

“Higher noise levels, e.g. by up to 10 dBA may be appropriate in some operating scenarios, where rapid changes to the cooling or ventilation rates quickly improve the thermal comfort of the occupant. Equally, lower noise levels may be appropriate for some types of residential development. When considering variations to the proposed desirable levels, the classification system from ISO/TS 19488 [Ref. 19] may be used as a guide.”¹

- 5.7.11 If these systems are utilised, noise generated by the systems should be reviewed by a suitably qualified acoustic consultant to determine whether the measures are likely to achieve suitable internal noise levels.
- 5.7.12 A detailed assessment of external noise intrusion during the overheating condition should be undertaken when the relevant design aspects are available for assessment.

5.8 External Amenity Areas

- 5.8.1 An assessment has been undertaken, based on measured sound levels across the proposed development site, to determine whether sound levels in external amenity areas are likely to achieve the criteria detailed in **Table 2.6**.
- 5.8.2 Based on the proposed development plans, the development is to feature private external amenity areas in the form of balconies and a communal courtyard area within the vicinity of the site.
- 5.8.3 **Figure G.1** in **Appendix G**, used to inform the assessment of sound levels in external amenity areas, shows the calculated sound levels across the proposed development site during the daytime. The results of the assessment indicate that:

- Sound levels on proposed balconies on facades up to approximately 21 m from Winchester Road are likely to be up to approximately 58 dB $L_{Aeq,16hours}$.
- Sound levels on the proposed balconies on other facades are likely to be up to 55 dB $L_{Aeq,16hours}$. BS 8233:2014 advises the following in relation to sound levels in external amenity areas:

“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 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. 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

¹ Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O July 2022 v1.0. (Based on the Acoustics, Ventilation and Overheating (AVO) Guidance).

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 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."

- Sound levels in the communal outdoor area and external amenity areas of the open market properties are likely to be significantly below criteria.
- 5.8.4 Based on the results of the assessment, sound levels on balconies up to approximately 21 m from to Winchester Road are likely to exceed the criteria. However, the following factors and mitigation measures should be taken into consideration:
- BS8233:2014 states that *"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."*
 - External noise levels in these areas are considered to be a compromise between the convenience of living at the proposed development and the proximity of the site to the strategic transport network.
 - Future residents will have access to a communal outdoor area, where sound levels are likely to be below significantly below the relevant criteria.
- 5.8.5 Sound levels in other external amenity areas at the site are likely to achieve the criteria. Therefore, sound levels in external amenity areas at the site are considered to be suitable.

5.9 Change in Road Traffic Flows

- 5.9.1 IEMA guidelines state that the relative change in sound level of more than 2.9 dB would be required to cause a small magnitude of change and noticeable and intrusive moderate impact.
- 5.9.2 A relative change of more than 2.9 dB would approximately require a doubling of road traffic flows on the surrounding road network, in particular on Winchester Road. This is considered to be unlikely with any changes in traffic flows likely to be significantly less than this. Therefore, the magnitude of change due to a change in road traffic flows on Winchester Road is likely to be negligible, notable and not intrusive and unlikely to have a significant impact on the proposed development.

5.10 Plant Noise Emission Limits

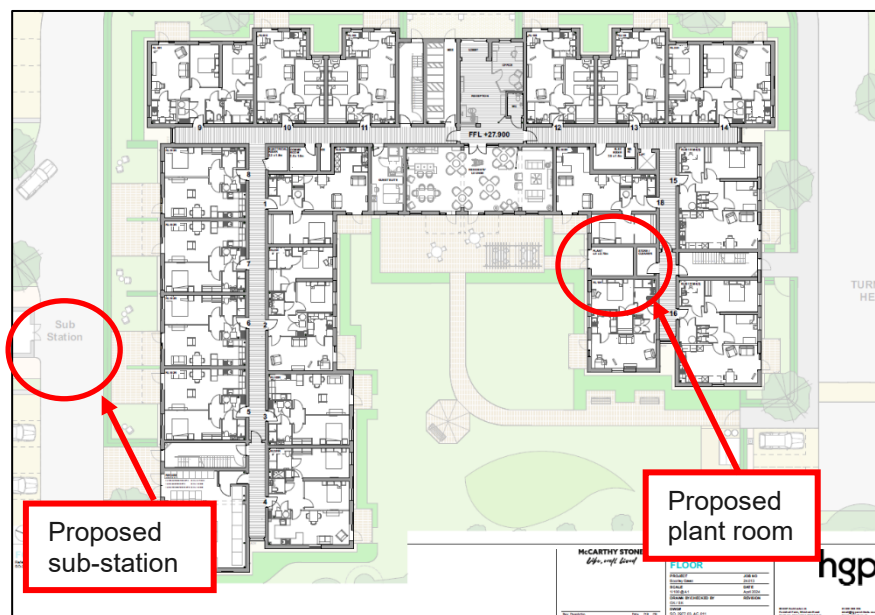
Local Authority Requirements

- 5.10.1 The Pollution Control Officer at Eastleigh Borough Council requests that the impact of noise from the proposed building services plant on existing and proposed noise sensitive receptors is considered.

Context

- 5.10.2 **Figure 5.1** shows a plant room on the ground floor of the proposed development and a proposed sub-station. Plant details are yet to be finalised and it is not possible to undertake a detailed assessment at this stage.

Figure 5.1: Proposed Site Plan and plant room and substation areas



Source: Contains information from: Drawing SO_2977_03_AC_011

Proposed Plant Noise Emission Limits

- 5.10.3 Based on the results of the environmental sound surveys and criteria stated in **Table 2.7**, the plant noise emission limits are proposed in **Table 5.5**. The proposed plant noise emission limits should be achieved at 1 m from the nearest noise sensitive residential receptor windows. Compliance with the limits is unlikely to result in a significant noise impact at both proposed and existing noise sensitive receptors.

Table 5.5: Proposed Plant Noise Emission Limits

Receptor	Receptor Type	Time Period	Proposed Plant Noise Emission Limit ($L_{A,T,r}$ dB)
Proposed Development	Residential	Daytime (07:00 – 23:00 hours)	42
		Night-time (23:00 – 07:00 hours)	30

Mitigation Measures

- 5.10.4 Further mitigation measures for the proposed plant room and substation would be determined at the detailed design stage, when information pertaining to the sound level and character of sound from proposed plant is available to assess potential plant noise impact using guidance from BS 4142:2014.
- 5.10.5 The proposed plant room is likely to be ventilated by a louvred grille, which can be acoustically attenuated if needed.
- 5.10.6 The proposed substation is likely to be installed within an enclosure and is unlikely to generate substantial noise.

5.11 Uncertainty

- 5.11.1 There is uncertainty inherent in each aspect of the assessment, including:
- Known tolerances of measurement equipment.

- The survey period is only representative of a short-term sample of typical prevailing noise conditions, which could vary daily, weekly or annual basis and due to the weather.
- The calculation of sound propagation.
- The façade sound insulation performance, including the acoustic performance of open windows and other elements.

5.11.2 Estimates of accuracy between measured and calculated sound levels for this assessment are between ± 3 dB.

5.12 Summary

5.12.1 A noise impact assessment has been undertaken to ascertain the suitability of the Site for residential use with respect to the prevailing environmental sound climate. The assessment has indicated that the Site is suitable for residential use subject to the development following a good acoustic design process during the detailed design stage.

5.12.2 The noise impact assessment demonstrates that:

- Internal ambient sound levels during the daytime and night-time are likely to be below the proposed criteria, indicating noise associated with the nearby road network and Hotel is likely to be below the LOAEL.
- Ambient sound levels in private external amenity areas approximately 21 m from Winchester Road are slightly above criteria and therefore slightly above the LOAEL. However, future residents will have access to a communal outdoor area where sound levels are below criteria. This demonstrates that noise levels in external amenity areas have been mitigated and reduced to a minimum when considering the wider, non-acoustic constraints of the development.
- Plant noise emission limits have been proposed according to guidance in BS 4142:2014 and compliance is likely to result in potential impact of sound levels from proposed building services plant falling below the LOAEL at proposed and existing noise sensitive receptors. Further mitigation measures for the proposed plant room and substation would be determined at the detailed design stage.
- Overheating thresholds for the majority of the site are likely to be below the relevant criteria. For dwellings where overheating thresholds are exceeded, the maximum window open areas have been calculated. The dynamic thermal model should be checked to determine if these maximum openable window areas will result in compliance with the overheating requirements.
- The change in sound levels due to road traffic is likely to be negligible and the magnitude of change is below the LOAEL.

6 Conclusions

- 6.1.1 Stantec has been commissioned by McCarthy & Stone Retirement Developments Limited to undertake a noise impact assessment to support the planning and design of a proposed retirement development site at Boorley Green, Southampton (Winchester Road, Boorley Green, SO32 2DH).
- 6.1.2 An environmental sound survey has been undertaken by Stantec, to establish the existing environmental sound levels associated with transportation sources incident on the proposed development.
- 6.1.3 The results of the environmental sound survey and an acoustic model have been used to establish façade incident noise levels for the proposed development which form the basis of our assessment of the acoustic requirements of the building façade.
- 6.1.4 Assessment criteria have been proposed based on the requirements of the Local Authority and applicable guidance documents.
- 6.1.5 Analysis of the proposed external building fabric has been undertaken in order to determine the acoustic performance of the glazed and ventilation elements. Compliance with the acoustic performance specification detailed herein is expected to result in compliance with the proposed acoustic criteria, and therefore internal ambient sound levels are below the LOAEL.
- 6.1.6 The acoustic specifications will need to be integrated, coordinated and ratified with the design by the principal designer and design team to ensure that all other design interfaces, buildability, workmanship and other requirements are considered.
- 6.1.7 An outline assessment of the likelihood of compliance with the requirements of Approved Document O has been undertaken. The results of the assessment indicate that for facades approximately 21 m from Winchester Road (coloured red in **Figure F.1** in **Appendix F**), subject to the results of dynamic thermal modelling, it is unlikely that fully openable windows can be utilised as a means to both control overheating and achieve the internal noise level criteria. Therefore, the ventilation strategy may need to consider the use of partially openable windows, an attenuated ventilation path or mechanical means by which to remove excess heat. These could include:
- An open window area of less than that assumed within the simplified method of ADO; or
 - An attenuated ventilation path; or
 - A mechanical system which either increases airflow and/or provides cooling.
- 6.1.8 The alternative ventilation strategy would be subject to detailed design development and the suitable specification of acoustic attenuation. These should be reviewed by a suitably qualified acoustic consultant to determine whether the measures are suitable for achieving the internal noise related requirements of ADO and will be subject to approval by building control.
- 6.1.9 Openable windows are likely to be a suitable method of controlling overheating in rooms with windows on facades coloured blue on **Figure F.1** in **Appendix F**.
- 6.1.10 Assessment of sound levels in external amenity areas has determined that sound levels at balconies up to 21 m from Winchester Road slightly exceed criteria. However future residents will have access to a communal outdoor area where sound levels are below criteria. Balconies more than 21 m from Winchester Road likely to be below criteria. Therefore, sound levels in the majority of private external amenity areas are below the LOAEL.
- 6.1.11 The magnitude of change in road traffic flows on Winchester Road is unlikely to double, therefore a change in sound levels across the proposed development site due to a change in road traffic flows is likely to be negligible, notable and not intrusive and below the LOAEL.
- 6.1.12 Plant noise emission limits have been defined for the development based on the results of the environmental sound survey. Compliance with these limits is likely to result in sound levels from proposed building services plant falling below the LOAEL at proposed and existing noise

sensitive receptors. Further mitigation measures for the proposed plant room and substation would be determined at the detailed design stage.

- 6.1.13 It should be noted that the acoustic specifications are to demonstrate the ability of the scheme to comply with planning requirements and are not intended to be used as detailed acoustic design specifications. All acoustic specifications should be reviewed and confirmed during the detailed design stage.

Appendix A Acoustic Terminology

Parameter	Description
Ambient Sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Comprises of the residual sound and the specific sound when present.
Ambient Sound Level ($L_a = L_{Aeq,T}$)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
A-Weighted Decibel (dBA)	A decibel level that has been corrected for the A-Weighting curve.
A-Weighting	Octave band and 1/3 octave band filters that correlate to the response of the human hearing system to sound pressure levels at different frequencies.
Background Sound	The level of sound measured in the absence of extraneous noise sources.
Background Sound Level ($L_{A90,T}$)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using a fast time-weighting and quoted to the nearest whole number of decibels.
Decibel (dB)	A logarithmic unit used to describe the ratio between the measured level and a reference level of 0 dB. The ratio can be sound pressure, intensity or power. The reference value for sound pressure is 20 μ Pa and for sound power is 1 pW.
Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$)	Value of the time-averaged A-weighted sound pressure level, in decibels (dB), of a continuous steady sound for the duration of the specified time interval, T.
Façade Level	The sound pressure level at a distance of 1 metre from the façade
Fast Time Weighted	The speed at which the instrument responds to changes in amplitude of the measured signal. The response time of a fast time-weighted instrument is 0.125 seconds.
Free-Field Level	The sound pressure level measured away from any reflective surfaces.
Frequency (f)	The number of cycles of pressure fluctuations within a given period of time. Measured in Hertz.
Hertz (Hz)	The unit of frequency or pitch of a sound. One hertz is equal to one cycle per second.
$L_{10,T}$	The noise level exceeded for 10 % for a given time interval, T. Generally used to describe traffic noise.
L_{Amax}	The maximum A-weighted level measured during a given time period.
Octave Band	Band of frequencies where the upper limit of the band is twice the frequency of the lower limit. E.g., the 1000 Hz band contains noise energy at all frequencies from 707 to 1414 Hz.

Percentile Level ($L_{AN,T}$)	The A-Weighted Sound Pressure Level which is exceeded for N% of the specified time interval. E.g., the LA90,1 hour is the A-weighted sound level exceeded for 90% of 1 hour/
Sound Pressure	The difference between the pressure caused by a sound wave and the ambient pressure of the medium the sound wave is passing through. Measured in Pascals.
Sound Pressure Level (L_p)	The logarithm of the ratio of a given sound pressure (p) to the reference sound pressure (p0). The reference value for sound pressure is 20 µPa. Defined as: $L_p = 20 \log \left(\frac{p}{p_0} \right)$

Appendix B Instrumentation

B.1.1 The instrumentation used in the survey is listed in **Table B.1**.

Table B.1: Instrumentation

Description	Manufacturer	Type	Serial Number	Laboratory Calibration Date
Sound Level Meter	RION	NL-52	542903	12/01/2023
½" Pre-polarised microphone		UC-59	06480	12/01/2023
Pre-amplifier		NH-25	42931	12/01/2023
Sound Level Meter	RION	NL-52	1010734	19/06/2023
½" Pre-polarised microphone		UC-59	23232	19/06/2023
Pre-amplifier		NH-25	11381	19/06/2023
Sound Calibrator	Brüel & Kjær	4231	2619374	14/11/2023

Appendix C Weather Data

Table C.1: Weather Data from Lynxclose Weather Station.

Source: <https://www.metoffice.gov.uk/observations/details/20240716uukskr1deye69kyhcbn55zehko>

Report Date / Time	Air Temperature (°C)	Rainfall (mm)	Wind Direction	Wind speed (m/s)
20/06/2024 11:52	21.3	0	WSW	0.9
20/06/2024 11:57	21.5	0	NNW	0.6
20/06/2024 12:03	21.5	0	S	0.6
20/06/2024 12:09	21.9	0	WSW	1.0
20/06/2024 12:14	21.8	0	NW	1.1
20/06/2024 12:19	21.7	0	SSE	0.6
20/06/2024 12:25	21.9	0	W	0.8
20/06/2024 12:30	21.9	0	ESE	1.6
20/06/2024 12:35	21.5	0	W	0.1
20/06/2024 12:41	21.6	0	WNW	1.5
20/06/2024 12:46	21.7	0	E	0.8
20/06/2024 12:51	21.8	0	E	0.8
20/06/2024 12:57	21.8	0	WSW	0.1
20/06/2024 13:02	22	0	ENE	0.5
20/06/2024 13:07	21.8	0	SSE	0.7
20/06/2024 13:13	21.4	0	SW	0.6
20/06/2024 13:18	21.7	0	WNW	0.8
20/06/2024 13:23	21.2	0	W	0.6
20/06/2024 13:29	22.1	0	E	1.0
20/06/2024 13:34	22.5	0	SW	0.9
20/06/2024 13:39	22.5	0	ESE	0.7
20/06/2024 13:45	22.4	0	ESE	0.4
20/06/2024 13:50	22.5	0	SE	1.7
20/06/2024 13:55	22.3	0	S	0.5
20/06/2024 14:01	23.5	0	WNW	0.1
20/06/2024 14:06	23.3	0	SSW	0.4
20/06/2024 14:11	23.6	0	W	0.4
20/06/2024 14:17	23	0	SSW	0.5
20/06/2024 14:22	22.9	0	SW	0.3
20/06/2024 14:27	24.7	0	W	0.8
20/06/2024 14:33	23.8	0	WNW	1.0
20/06/2024 14:38	23.6	0	WSW	0.1
20/06/2024 14:43	23.4	0	W	0.2
20/06/2024 14:49	23.5	0	WSW	0.4
20/06/2024 14:54	23.2	0	W	0.1
20/06/2024 14:59	23.8	0	W	0.1
20/06/2024 15:05	23.4	0	W	0.4

20/06/2024 15:10	23.5	0	E	0.6
20/06/2024 15:15	24.1	0	WSW	0.4
20/06/2024 15:21	23.5	0	WSW	0.0
20/06/2024 15:26	24	0	S	0.3
20/06/2024 15:31	24	0	SW	0.1
20/06/2024 15:37	24.7	0	W	0.5
20/06/2024 15:42	24.3	0	SSE	0.4
20/06/2024 15:47	24.3	0	SSW	0.2
20/06/2024 15:53	24.7	0	W	0.0
20/06/2024 15:58	25.5	0	W	0.4
20/06/2024 16:03	24.3	0	WSW	0.4
20/06/2024 16:09	25.3	0	WSW	0.0
20/06/2024 16:14	26.1	0	WSW	0.2
20/06/2024 16:19	26.7	0	WSW	0.0
20/06/2024 16:25	26.6	0	W	0.4
20/06/2024 16:30	26.9	0	WSW	0.1
20/06/2024 16:35	26.8	0	SW	0.3
20/06/2024 16:41	26	0	W	0.1
20/06/2024 16:46	26.6	0	W	0.0
20/06/2024 16:51	25.9	0	SW	0.3
20/06/2024 16:57	25.6	0	WSW	0.6
20/06/2024 17:02	24.9	0	WNW	0.5
20/06/2024 17:07	24.8	0	WSW	0.4
20/06/2024 17:13	25.3	0	ESE	0.8
20/06/2024 17:18	24.1	0	W	0.6
20/06/2024 17:23	24.3	0	SSW	0.0
20/06/2024 17:29	24.2	0	WSW	0.0
20/06/2024 17:34	24.1	0	WSW	0.0
20/06/2024 17:39	24.9	0	WSW	0.3
20/06/2024 17:45	24.2	0	SW	0.6
20/06/2024 17:50	23.9	0	SW	0.3
20/06/2024 17:55	24.2	0	W	0.5
20/06/2024 18:01	24.2	0	W	0.0
20/06/2024 18:06	24.1	0	SE	0.1
20/06/2024 18:11	24.1	0	SW	0.2
20/06/2024 18:17	24	0	WSW	0.0
20/06/2024 18:22	24.4	0	S	0.7
20/06/2024 18:27	23.5	0	WSW	0.0
20/06/2024 18:33	24.2	0	W	0.2
20/06/2024 18:38	23.3	0	W	0.4
20/06/2024 18:43	22.9	0	W	0.0
20/06/2024 18:49	23.1	0	WNW	0.2
20/06/2024 18:54	22.9	0	W	0.3
20/06/2024 18:59	22.4	0	WSW	0.0
20/06/2024 19:05	22	0	WSW	0.0

20/06/2024 19:10	21.7	0	WSW	0.0
20/06/2024 19:15	21.3	0	WSW	0.0
20/06/2024 19:21	20.8	0	WSW	0.3
20/06/2024 19:26	20.5	0	WSW	0.0
20/06/2024 19:31	20.3	0	WSW	0.0
20/06/2024 19:37	20.2	0	WSW	0.0
20/06/2024 19:42	20	0	WSW	0.0
20/06/2024 19:47	19.8	0	WSW	0.0
20/06/2024 19:53	19.7	0	WSW	0.0
20/06/2024 19:58	19.4	0	WSW	0.0
20/06/2024 20:03	19.2	0	WSW	0.0
20/06/2024 20:09	19	0	W	0.0
20/06/2024 20:14	18.9	0	WSW	0.0
20/06/2024 20:19	18.8	0	W	0.0
20/06/2024 20:25	18.6	0	WSW	0.0
20/06/2024 20:30	18.4	0	WSW	0.0
20/06/2024 20:35	18.2	0	WSW	0.0
20/06/2024 20:41	18.1	0	WSW	0.0
20/06/2024 20:46	18	0	WSW	0.0
20/06/2024 20:51	17.8	0	WSW	0.0
20/06/2024 20:57	17.7	0	WSW	0.0
20/06/2024 21:02	17.5	0	WSW	0.0
20/06/2024 21:07	17.4	0	WSW	0.0
20/06/2024 21:13	17.3	0	WSW	0.0
20/06/2024 21:18	17.2	0	WSW	0.0
20/06/2024 21:23	17.1	0	WSW	0.0
20/06/2024 21:29	17	0	WSW	0.0
20/06/2024 21:34	16.7	0	W	0.0
20/06/2024 21:39	16.5	0	WSW	0.0
20/06/2024 21:45	16.6	0	WSW	0.0
20/06/2024 21:50	16.4	0	WSW	0.0
20/06/2024 21:55	16.1	0	W	0.0
20/06/2024 22:01	15.9	0	W	0.0
20/06/2024 22:06	15.8	0	W	0.0
20/06/2024 22:11	15.7	0	WSW	0.0
20/06/2024 22:17	15.5	0	WSW	0.0
20/06/2024 22:22	15.3	0	WSW	0.0
20/06/2024 22:27	15.1	0	WSW	0.0
20/06/2024 22:33	15	0	W	0.0
20/06/2024 22:38	14.9	0	WSW	0.0
20/06/2024 22:43	14.6	0	WSW	0.0
20/06/2024 22:49	14.5	0	WSW	0.0
20/06/2024 22:54	14.4	0	WSW	0.0
20/06/2024 22:59	14.5	0	WSW	0.0
20/06/2024 23:05	14.3	0	WSW	0.0

20/06/2024 23:10	14.4	0	WSW	0.0
20/06/2024 23:15	14.3	0	W	0.0
20/06/2024 23:21	14.2	0	W	0.0
20/06/2024 23:26	13.9	0	WSW	0.0
20/06/2024 23:31	13.7	0	WSW	0.0
20/06/2024 23:36	13.4	0	WSW	0.0
20/06/2024 23:42	13.4	0	W	0.0
20/06/2024 23:47	13.2	0	W	0.0
20/06/2024 23:52	13.2	0	W	0.0
20/06/2024 23:58	13.2	0	WSW	0.0
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21/06/2024 00:08	13.1	0	WSW	0.0
21/06/2024 00:14	13.1	0	WSW	0.0
21/06/2024 00:19	13	0	WSW	0.0
21/06/2024 00:24	13	0	WSW	0.0
21/06/2024 00:30	13.3	0	WSW	0.0
21/06/2024 00:35	13.3	0	WSW	0.0
21/06/2024 00:40	13.5	0	WSW	0.0
21/06/2024 00:46	13.5	0	WSW	0.0
21/06/2024 00:51	13.2	0	WSW	0.0
21/06/2024 00:56	13	0	WSW	0.0
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21/06/2024 01:07	12.5	0	WSW	0.0
21/06/2024 01:12	12.4	0	WSW	0.0
21/06/2024 01:18	12	0	WSW	0.0
21/06/2024 01:23	11.8	0	WSW	0.0
21/06/2024 01:28	11.7	0	WSW	0.0
21/06/2024 01:34	11.6	0	WSW	0.0
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21/06/2024 01:44	11.3	0	WSW	0.0
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21/06/2024 01:55	11.6	0	WSW	0.0
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21/06/2024 02:11	10.7	0	WSW	0.0
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21/06/2024 02:22	10.5	0	WSW	0.0
21/06/2024 02:27	10.8	0	WSW	0.0
21/06/2024 02:33	10.9	0	WSW	0.0
21/06/2024 02:38	10.6	0	WSW	0.0
21/06/2024 02:43	10.4	0	WSW	0.0
21/06/2024 02:49	10.4	0	WSW	0.0
21/06/2024 02:54	10.3	0	WSW	0.0
21/06/2024 02:59	10.3	0	WSW	0.0
21/06/2024 03:05	10.2	0	WSW	0.0

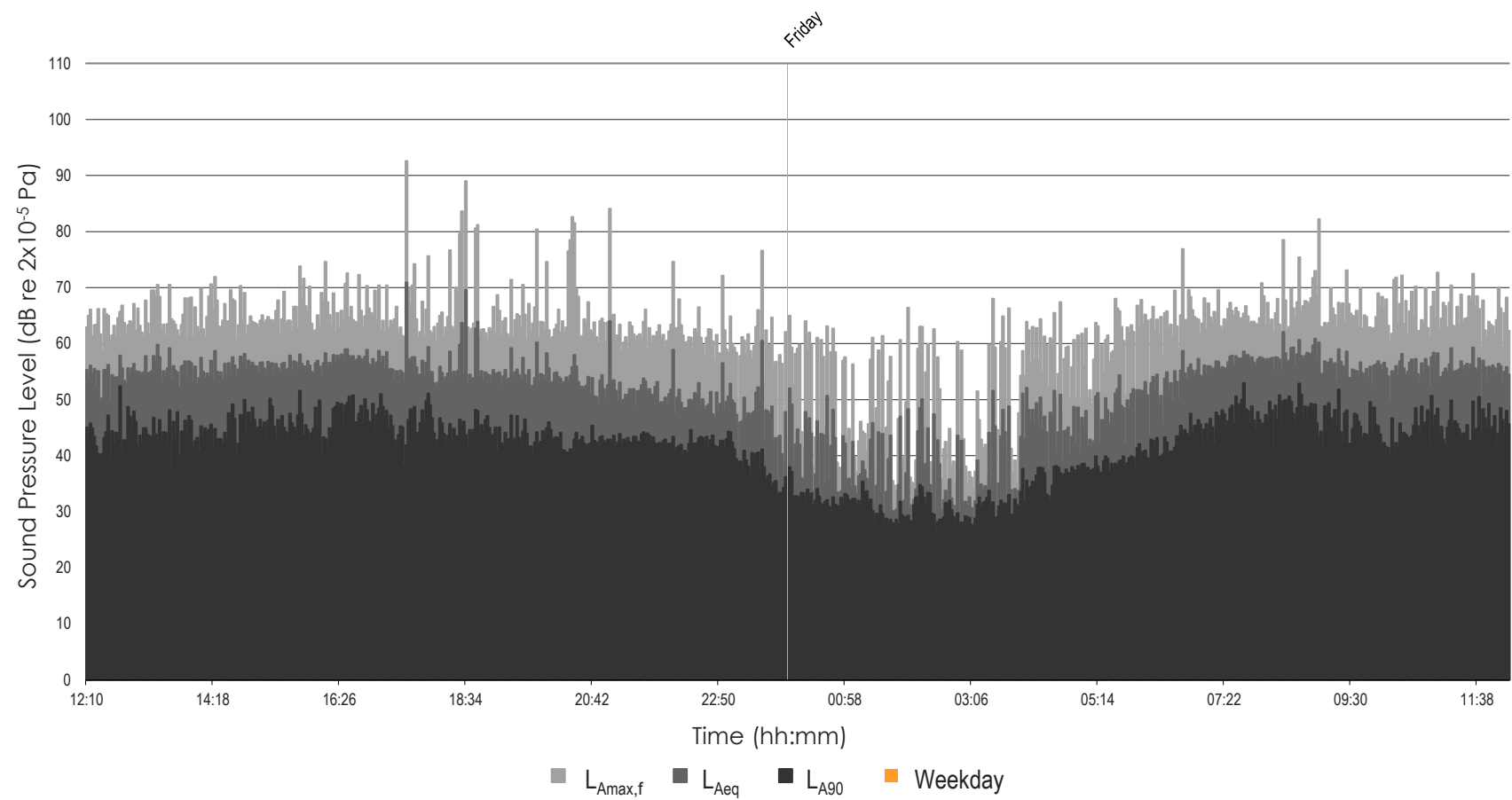
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21/06/2024 03:21	10.2	0	WSW	0.0
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21/06/2024 03:47	9.5	0	WSW	0.0
21/06/2024 03:53	9.5	0	WSW	0.0
21/06/2024 03:58	9.4	0	WSW	0.0
21/06/2024 04:03	9.5	0	WSW	0.0
21/06/2024 04:09	9.4	0	WSW	0.0
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21/06/2024 04:19	9.2	0	W	0.0
21/06/2024 04:24	9.3	0	WSW	0.0
21/06/2024 04:30	9.4	0	WSW	0.0
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21/06/2024 05:12	9.2	0	WSW	0.0
21/06/2024 05:18	9	0	WSW	0.0
21/06/2024 05:23	8.9	0	WSW	0.0
21/06/2024 05:28	8.8	0	WSW	0.0
21/06/2024 05:34	8.8	0	WSW	0.0
21/06/2024 05:39	8.8	0	WSW	0.0
21/06/2024 05:44	8.9	0	WSW	0.0
21/06/2024 05:50	9	0	WSW	0.0
21/06/2024 05:55	9	0	WSW	0.0
21/06/2024 06:00	9.3	0	WSW	0.0
21/06/2024 06:06	10	0	WSW	0.0
21/06/2024 06:11	11	0	WSW	0.0
21/06/2024 06:16	11.8	0	WSW	0.0
21/06/2024 06:22	12.2	0	WSW	0.0
21/06/2024 06:27	12.5	0	WSW	0.0
21/06/2024 06:32	13	0	WSW	0.0
21/06/2024 06:38	13.3	0	WSW	0.0
21/06/2024 06:43	13.8	0	WSW	0.0
21/06/2024 06:48	14.5	0	WSW	0.0
21/06/2024 06:54	14.4	0	W	0.0
21/06/2024 06:59	15.1	0	WSW	0.0
21/06/2024 07:04	15.9	0	WSW	0.0

21/06/2024 07:10	16.5	0	WNW	0.0
21/06/2024 07:15	16.9	0	WSW	0.0
21/06/2024 07:20	16.4	0	WSW	0.0
21/06/2024 07:26	17	0	WSW	0.0
21/06/2024 07:31	17.2	0	W	0.0
21/06/2024 07:36	17.4	0	W	0.0
21/06/2024 07:42	18.3	0	WSW	0.0
21/06/2024 07:47	18.3	0	SW	0.1
21/06/2024 07:52	18.8	0	W	0.0
21/06/2024 07:58	18.1	0	WSW	0.0
21/06/2024 08:03	18.9	0	SSW	0.1
21/06/2024 08:08	19.2	0	WSW	0.1
21/06/2024 08:14	19.2	0	W	0.1
21/06/2024 08:19	19.9	0	W	0.0
21/06/2024 08:24	20.2	0	WSW	0.0
21/06/2024 08:30	19.1	0	SW	0.1
21/06/2024 08:35	19.3	0	WSW	0.0
21/06/2024 08:40	20	0	WSW	0.0
21/06/2024 08:46	20.6	0	WSW	0.0
21/06/2024 08:51	20.1	0	WSW	0.0
21/06/2024 08:56	19.9	0	WSW	0.0
21/06/2024 09:02	20	0	SSW	0.4
21/06/2024 09:07	20.5	0	WSW	0.2
21/06/2024 09:12	21.3	0	WSW	0.1
21/06/2024 09:18	20.8	0	WSW	0.0
21/06/2024 09:23	21.5	0	WNW	0.1
21/06/2024 09:28	21.4	0	SW	0.2
21/06/2024 09:34	21.8	0	SSW	0.7
21/06/2024 09:39	21.3	0	WSW	0.0
21/06/2024 09:44	21.1	0	WSW	0.1
21/06/2024 09:50	21.3	0	SSW	0.3
21/06/2024 09:55	21.7	0	W	0.0
21/06/2024 10:00	21.6	0	WSW	0.0
21/06/2024 10:06	22.2	0	WSW	0.0
21/06/2024 10:11	22.2	0	WNW	0.0
21/06/2024 10:16	22.5	0	SSW	0.6
21/06/2024 10:22	21.9	0	SSE	1.1
21/06/2024 10:27	21.7	0	WSW	0.0
21/06/2024 10:32	21.9	0	SSW	0.6
21/06/2024 10:38	21.6	0	SW	0.1
21/06/2024 10:43	21.2	0	WSW	0.0
21/06/2024 10:48	21.8	0	WSW	0.5
21/06/2024 10:54	21.9	0	WSW	0.0
21/06/2024 10:59	22.4	0	SSE	0.5
21/06/2024 11:04	22.5	0	W	0.0

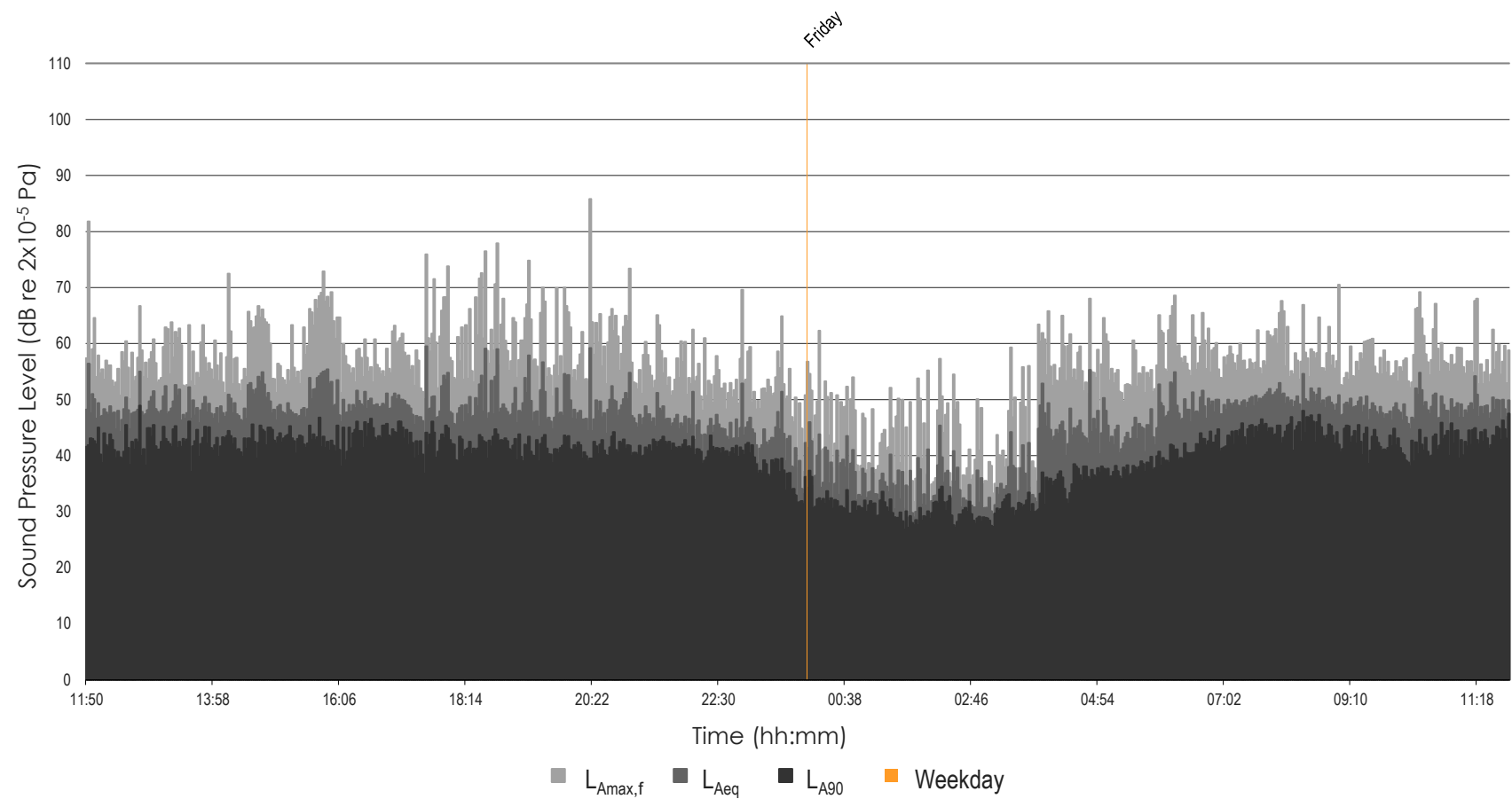
21/06/2024 11:10	22.5	0	W	0.4
21/06/2024 11:15	21.9	0	W	0.2
21/06/2024 11:20	23.1	0	ESE	0.5
21/06/2024 11:26	23.2	0	W	0.4
21/06/2024 11:31	23.1	0	W	0.4
21/06/2024 11:36	23.3	0	WNW	0.1
21/06/2024 11:42	24.2	0	WSW	0.3
21/06/2024 11:47	23.4	0	WSW	0.8
21/06/2024 11:52	23.6	0	WSW	0.7
21/06/2024 11:58	23.5	0	SW	0.1
21/06/2024 12:03	22.7	0	WSW	0.4
21/06/2024 12:08	22.4	0	WSW	0.0

Appendix D Time-history Graphs

Boorley Green, Southampton
 L_{Aeq} , $L_{Amax,f}$ and L_{A90} Time History
MP1 - Thursday 20 June to Friday 21 June 2024



Boorley Green, Southampton
 L_{Aeq} , $L_{Amax,f}$ and L_{A90} Time History
MP2 - Thursday 20 June to Friday 21 June 2024



Appendix E External Building Fabric Acoustic Performance Specification

- E.1.1 The project criteria are expressed in terms of an overall A-weighted dB sound level. Alternative frequency specific performance levels may therefore be acceptable subject to confirmation from Stantec.
- E.1.2 Fully detailed test reports from independent acoustic test authorities shall be supplied. All test reports shall be in English or, a full English translation.
- E.1.3 Test data should include the 1/3 octave band results from 100 Hz to 3150 Hz inclusive, together with the corresponding octave band results from 125 Hz to 4000 Hz inclusive.
- E.1.4 As a result of wind or other atmospheric effects, external building elements should not give rise to noise e.g. via rattling, creaking or whistling.

E.2 Glazing Sound Insulation Performance

- E.2.1 The complete glazing system (including frames, joints, seals, spandrel panels and opening lights and trickle vents (as appropriate)) shall achieve the following minimum sound reduction indices when tested in accordance with BS EN ISO 10140-2:2021.

Glazing Type	Minimum Sound Reduction Index (R) value (dB) at Octave Band Frequency (Hz)					R _w *
	125	250	500	1k	2k	
G1	20	20	27	30	30	29

*The overall R_w figure is provided for guidance purposes only. The octave-band specification should be referred to check compliance with the requirements.

Appendix F Overheating Assessment (Simplified Method) Results

Figure F.1: Facades and Overheating Thresholds (next page)



This figure has been prepared by Stantec UK Limited ('Stantec') on behalf of its client to whom this figure is addressed ('Client') in connection with the project described and takes into account the Client's particular instructions and requirements. This figure was prepared in accordance with the professional services appointment under which Stantec was appointed by its Client. This figure is not intended for and should not be relied on by any third party (i.e. parties other than the Client). Stantec accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this figure.

Key

Building

Assessed Plots

Night-time Typical Maximum Sound Level
L_{Amax,f} dB

Moderate Risk Area External Noise Criteria:

≤ 64 Internal noise criteria could be achieved with open windows

64 < Internal noise criteria unlikely to be achieved with open windows

Figure F.1:
Predicted facade locations with incident noise levels above overheating thresholds

Client: McCarthy & Stone (Developments) Ltd.
Project: Boorley Green, Southampton
Project Number: 332611606
Project Engineer: JM
Calculation at above ground
Created: 10/07/2024
Processed with SoundPLAN 9.0
Update 10/04/2024

Figure not to scale. Do not scale.

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Appendix G External Amenity Areas

Figure G.1: Sound levels in external amenity areas (next page)



This figure has been prepared by Stantec UK Limited ('Stantec') on behalf of its client to whom this figure is addressed ('Client') in connection with the project described and takes into account the Client's particular instructions and requirements. This figure was prepared in accordance with the professional services appointment under which Stantec was appointed by its Client. This figure is not intended for and should not be relied on by any third party (i.e. parties other than the Client). Stantec accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this figure.

Sound Level
L_{Aeq,16hr} dB

<=	35
35 <	<= 40
40 <	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	<= 80
80 <	

Key

Red Line Boundary

Building

Figure G.1:
Sound Levels in External Amenity Areas

Client: McCarthy & Stone (Developments) Ltd.
Project: Boorley Green, Southampton
Project Number: 332611606
Project Engineer: JM
Calculation at 1.5 m above ground
Created: 10/07/2024
Processed with SoundPLAN 9.0
Update 10/04/2024



Figure not to scale. Do not scale.

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