Noise Risk Assessment and Acoustic Design Statement – 75 Norcutt Road

Leek Real Estate (No. 1) Ltd

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Quality Management

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1 Introduction

1.1 The Acoustics Team of RPS Planning and Environment (RPS) has been appointed by Leek Real Estate (No. 1) Ltd to provide a noise assessment to accompany a planning application for the proposed redevelopment of 75 Norcutt Road, Twickenham. The development will consist of a five-storey block of residential flats with ancillary areas of landscaping, hardstanding and car parking. The site is located within the administrative area of the London Borough of Richmond upon Thames (LBRuT). The structure and content of this report is based upon the requirements of the Professional Practice Guidance on Planning and Noise (ProPG) [1] and provides the Acoustic Design Statement (ADS) for the site.

1.2 The assessment has been undertaken based upon appropriate information on the proposed development provided by the project team. RPS is a member of the Association of Noise Consultants (ANC), the representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. The assessment has been undertaken with integrity, objectivity and honesty in accordance with the Code of Conduct of the Institute of Acoustics (IOA) and ethically, professionally and lawfully in accordance with the Code of Ethics of the ANC.

1.3 The technical content of this assessment has been provided by RPS personnel, all of whom are corporate (MIOA) or non-corporate, associate members (AMIOA) of the IOA (the UK's professional body for those working in acoustics, noise and vibration). This report has been peer reviewed within the RPS team to ensure that it is technically robust and meets the requirements of our Quality Management System.

2 Assessment Methodology, Policy, Standards and Guidance

Basis of the Assessment

Noise

2.1 The assessment within this ADS has been carried out on the basis of the guidance in the ProPG. A Stage 1 risk assessment has been carried out based upon a baseline sound level survey. The risk assessment has been used to determine the level of detail required for the subsequent Stage 2 assessment, which has been carried out in accordance with the guidance.

2.2 In accordance with Stage 2: Element 4 of the ProPG, the development has been designed to comply with relevant national guidance in the Noise Policy Statement for England (NPSE) [2], National Planning Policy Framework (NPPF) [3], Planning Practice Guidance on Noise (PPG-N) [4]. The noise policy within the London Plan [5], local noise planning policy in the London Borough of Richmond Upon Thames Local Plan [6] as well as the Supplementary Planning Document (SPD) for development control for noise generating and noise sensitive development [7] have also been used to inform the acoustic design. Further policy details are provided in Appendix A.

Vibration

2.3 It is understood that the railway line adjacent to the proposed development is for electric commuter trains. Based on previous substantial experience on similar sites with similar proximity to the railway line, the effects of vibration are likely to be negligible. Furthermore, a previous vibration study was carried out for a planning application at the same site, of which subsequently found that vibration effects from trains passed were negligible (ref: 17/1033/FUL). In addition to this, there are a series of residential dwellings which are positioned at similar distances from the railway line in the immediate vicinity of the proposed development. Therefore, vibration has been scoped out of the assessment.

National Planning Policy

2.4 Appendix A provides a complete summary of the relevant guidance contained within national planning policy in the NPSE, the NPPF and the PPG-N. These documents do not contain guidance in terms of numerical noise levels. Guidance is provided descriptively, which may be transposed to numerical noise levels for site-specific situations, using the methods contained within BSs. However, there is no specific guidance on this; the research that Defra promoted has apparently been inconclusive and is likely to vary by source.

2.5 Relevant experience and professional judgment are fundamental to all stages of the assessment that leads to the determination of the significance of a noise effect.

2.6 The PPG-N states that there are many factors which should be considered when determining if a noise is of concern; one factor is the number of noise events and the frequency and pattern of occurrence of the noise.

2.7 The PPG-N provides further information on the adverse effects of noise and how it can be mitigated. For noise sensitive development, mitigation measures can include: avoiding noisy locations; designing the development to reduce the impact of noise from the local environment; including noise barriers; and optimising the sound insulation provided by the building envelope including through noise insulation.

Regional and Local Planning Policy

2.8 Descriptions of the relevant local planning policies are provided in Appendix A. The relevant documents are:

- The London Plan 2016;
- The London Borough of Richmond Upon Thames Local Plan 2018; and
- Supplementary Planning Document (SPD) for development control for noise generating and noise sensitive development 2018.

Supplementary Planning Document

2.9 The SPD has been produced by the London Borough of Richmond Upon Thames in order to address the noise issues affecting the Borough and assist in providing a consistent approach to development where noise is an issue.

2.10 The SPD supplements the Borough's Local Plan by providing interpretation of national planning and noise policy in a local context along with advice on the technical requirements that the Borough regards as relevant to meeting those requirements.

2.11 The SPD acknowledges the ProPG document as having informed the content of the SPD, as a number of the SPD and ProPG working groups had common members and the drafting periods of the documents overlapped. The SPD states that it is broader in scope and contains guidance specifically adapted to the needs and aspirations of the borough.

2.12 A description of the objectives, policies and technical requirements unique to the SPD that are applicable to the proposed development have been described in Appendix A.

ProPG Planning and Noise – New Residential Development

2.13 This ProPG provides practitioners with guidance on a recommended approach to the management of noise within the planning system in England for new residential development. The guidance has been produced by the Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health and is expected to be widely adopted by planning authorities as best practice when considering noise affecting new residential development. The scope of this ProPG is restricted to the consideration of new residential development that will be exposed predominantly to airborne noise from transport sources, though it is considered appropriate to incorporate other sources of noise where they are present but not dominant.

Overview

2.14 This ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging. The two sequential stages of the overall approach are:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements.

2.15 The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are listed below, with further details in the following sections:

- 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”.

2.16 The approach is underpinned by the preparation and delivery of an “Acoustic Design Statement” (ADS). An ADS for a site assessed as high risk should be more detailed than for a site assessed as low risk. An ADS should not be necessary for a site assessed as negligible risk.

Stage 1 Risk Assessment

2.17 Table 2.1 summarises the Stage 1 Initial Site Noise Risk Assessment that is provided in Figure 1 of ProPG, which is based on indicative noise levels derived from current guidance and experience. The indicative noise levels are intended to provide a sense of the noise challenge at a potential residential development site and should be interpreted flexibly having regard to the locality, the project and the wider context. In the final column, the initial noise risk assessment is

aligned with pre-planning application guidance that highlights the increasing importance of good acoustic design as the noise risk increases.

Table 2.1 - ProPG External Noise Level Guidelines

Noise Risk Assessment	Potential Effect Without Noise Mitigation	Pre-planning Application Advice
Indicative Daytime Noise Levels $L_{Aeq,16hr}$ / *Indicative Night-time Noise Levels* $L_{Aeq,8hr}$ **High** 70 dB / 60 dB	**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.
Medium 65 dB / 55 dB		
60 dB / 50 dB	**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.

Notes:

a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.

b. 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".

c. $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.

d. 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.

Stage 2 Element 1 - Good Acoustic Design Process

2.18 ProPG states that planning applications for new residential development should include evidence that the following have been properly considered:

- Check 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.
- Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc.
- Assess the viability of alternative solutions.
- Assess external amenity area noise.

Stage 2 Element 2 – Internal Noise Level Guidelines

2.19 The internal noise level guidelines provided under Element 2 above in Figure 2 of ProPG are provided in Table 2.2 below. These are based upon the guidance in BS 8233:2014: 'Guidance on sound insulation and noise reduction for buildings' [8].

Table 2.2 - ProPG Internal Noise Level Guidelines

Activity	Location	07:00 – 23:00 hrs	23:00 – 07:00 hrs
Resting	Living room	35 dB $L_{Aeq,16r}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16r}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16r}$	30 dB $L_{Aeq,16r}$ 45 dB $L_{Amax,F}$ (Note 4)

Accompanying Note 4, 5, 6 & 7 from Figure 2 of ProPG states the following:

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. 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 (see Appendix A).*

NOTE 5 *Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.*

NOTE 7 *Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (see Section 3.D).*

2.20 Paragraphs 2.34 to 2.36 of ProPG contain guidance regarding the use of open windows in relation to ventilation and overheating:

"Where the LPA accepts that there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide "whole dwelling ventilation" in accordance with Building Regulations Approved Document F [9] (e.g. trickle ventilators) in the open position (see Supplementary Document 2). Furthermore, in this scenario the internal L_{Aeq} target noise levels should not generally be exceeded.

It should also be noted that the internal noise level guidelines are generally not applicable under "purge ventilation" conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).

In addition to providing purge ventilation, open windows can also be used to mitigate overheating. Therefore, should the LPA accept a scheme is to be assessed with windows closed, but this scheme is reliant on open windows to mitigate overheating, it is also necessary to consider the potential noise impact during the overheating condition. In this case a more detailed assessment of the potential impact on occupants should be provided in the ADS. It should be noted that overheating issues will vary across the country and any specific design solutions will need to be developed alongside advice from energy consultants."

2.21 Paragraph 2.38 of ProPG states the following with respect to mechanical service plant:

"Where mechanical services are used as part of the ventilation or thermal comfort strategy for the scheme, the impact of noise generated by these systems on occupants should also be assessed."

Stage 2 Element 3 – External Amenity Area Noise Assessment

2.22 ProPG refers to the design ranges in BS 8233:2014 with respect to the assessment of external amenity, as well as guidance in the PPG-N. Based on these two documents the following guidance is provided with respect to the assessment of noise in external amenity areas:

3(i) *"If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended".*

3(ii) *"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 LAeq,16hr."*

3(iii) *"These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces."*

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 minutes walking distance)."*

Stage 2 Element 4 – Other Relevant Issues

2.23 ProPG states that the following other relevant issues, should be considered, where appropriate

- 4(i) compliance with relevant national and local policy
- 4(ii) magnitude and extent of compliance with ProPG
- 4(iii) likely occupants of the development
- 4(iv) acoustic design v unintended adverse consequences
- 4(v) acoustic design v wider planning

Planning Recommendations

2.24 Having followed this approach to its end, it is envisaged that noise practitioners will then have a choice of one of four possible recommendations to present to the decision maker. In simple terms the choice of recommendations are as follows:

- grant without conditions;
- grant with conditions;
- "avoid" significant adverse effects (corresponding to SOAEL within national planning policy); or
- "prevent" unacceptable adverse effects (corresponding to the UAEL within national planning policy).

2.25 Full details of where/when the above recommendation apply are provided in Section 3 of ProPG.

Consultation

2.26 Contact was attempted to be made with the environmental health department at LBRuT by both email and phone. However, no comment was received with regard to our proposed survey and assessment methodology. Therefore, it has been assumed the proposed methodologies are in accordance with policy and guidance. A copy of the consultation correspondence is provided in Appendix D.

3 Baseline Characterisation and Stage 1 Risk Assessment

Site Description

3.1 The proposed development site is located in a cul-de-sac at the northern end of Norcutt Road. The London over ground railway line between Twickenham and Whitton stations runs along the northern boundary of the site; Twickenham Grid Substation at the northern end of the adjacent Warwick Road runs along the eastern boundary of the site; a large non-operational commercial/industrial building runs along the western boundary of the site; and, a three-storey residential block runs along the southern boundary of the site.

3.2 During the sound surveys, it was observed that the sound environment of the proposed development site was not influenced by any large industrial sources. The commercial/industrial building on the western boundary of the site was non-operational and thus no noise was observed. The Twickenham Grid Substation was not audible within the proposed development site boundary. However, it is worth noting that the “hum” of the power transformer was just audible further south outside of the site boundary, adjacent to the existing residential development.

Establishing Baseline Conditions

3.3 Baseline surveys were carried out to determine the existing levels of sound affecting the proposed development area. Two partially attended baseline sound surveys were deployed on site and ran from 12:15 hours on Tuesday 21st May 2019 until 12:00 hours on Tuesday 28th May 2018. In addition to the long-term surveys, supplementary attended short-term surveys were carried out across the site. A plan showing the locations of the measurement positions and the site boundary is provided in Figure 3.1. The survey locations were chosen based on the locations that were likely to provide the most representative measurement data of the dominant sound sources affecting the site.

3.4 The first partially attended survey (LT1) was located on the northern boundary of the site adjacent to the railway line, approximately 5 m from the façade of the existing commercial building and approximately 5 m from the edge of the railway line.

3.5 The second partially attended survey (LT2) was located in the south eastern corner of the site approximately 3.5 m from the façade of the existing commercial building, approximately 3.5 m from the façade of the existing residential block, and approximately 5 m from the façade of the large commercial/industrial building.

3.6 The sound environment at both survey locations was mainly distant road traffic noise (A316 to the north, and Heath Road to the south, as well as the surrounding network of smaller roads). Air traffic noise, and railway noise from passing commuter trains on the adjacent railway line were also dominating the noise environment. Other sound sources observed were residents talking in their external amenity areas from nearby residential dwellings; distant shouts from a football/rugby team playing; distant light construction noise; distant brass band playing; flora movement due to a light breeze; and, occasional road traffic movements on Norcutt Road.

3.7 Both partially attended surveys were positioned at a height of 1.5 m above ground level. Both partially attended surveys were located at least 3.5 m from the nearest reflecting surface, therefore the measurements made at the two locations are considered free-field.

3.8 All sound measurements were made using 'Class 1' Rion NL-52 sound level meters (SLMs) in accordance with BS 7445-2:1991 [10]. All SLMs were calibrated before and after use with a Rion NC-74 calibrator with no significant drift occurring. Data were logged of the broadband A-weighted sound pressure level in 100 ms samples with the required periods extracted in post-processing.

3.9 Meteorological conditions were monitored by a meteorological station set up in conjunction with the sound survey at LT2. Measured wind speeds were low throughout the survey period ranging between 0 and 5 m/s for the entire period. The wind was predominately in a north westerly direction. There were no periods of rainfall for the duration of the survey. Therefore, no sound data have been excluded from the analysis.

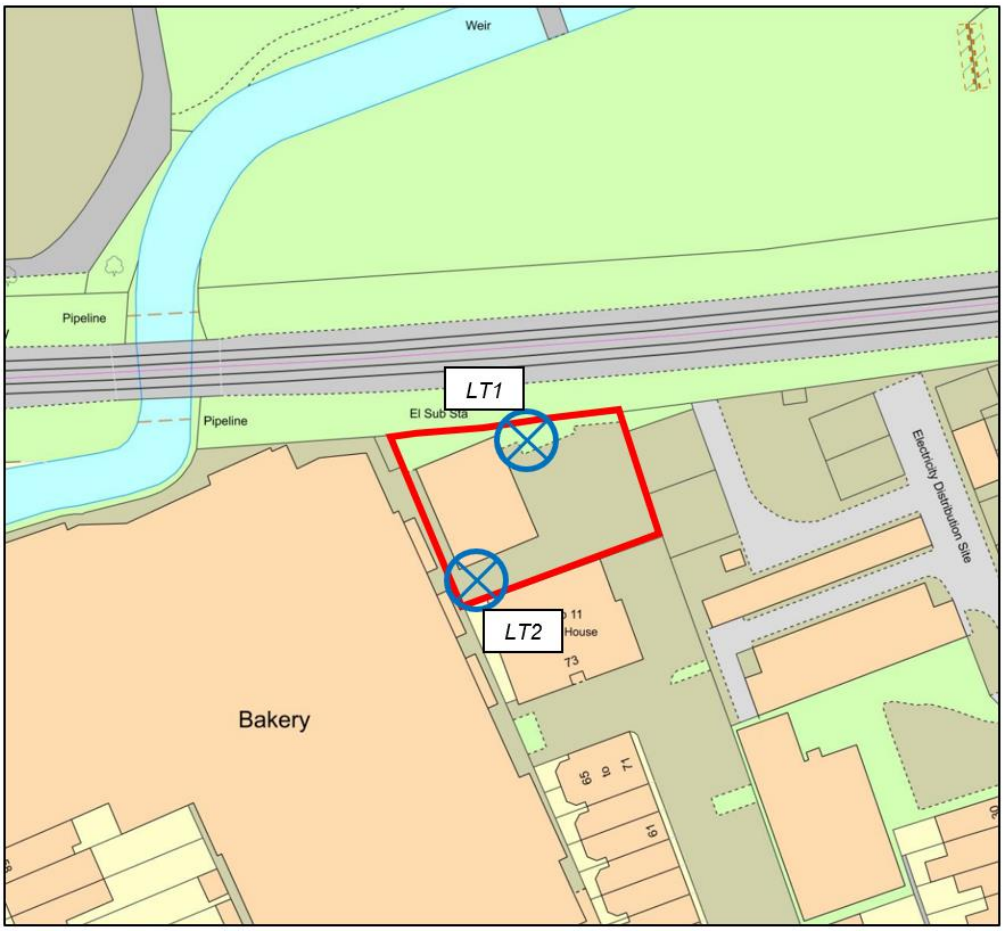

Figure 3.1: Partially attended survey locations, site boundary and existing disused office building.

3.10 A summary of the measured data is provided in Table 3.1 below. Due to the development site being relatively small, the two survey locations are considered representative of the spatial variation in sound levels across the site, and are therefore considered representative of the sound levels at the associated facades of the proposed building, as identified in Table 3.1 below. Further details of the baseline sound level surveys are provided in Appendix B.

Table 3.1 - Representative Baseline Sound Level Data used in the Assessment

Location	Daytime (07:00 - 23:00 hrs)		Night-time (23:00 - 07:00 hrs)		Range of dB $L_{AFmax,15min}$
	dB, $L_{Aeq,16hr}$	dB, $L_{A90,16hr}$	dB, $L_{Aeq,16hr}$	dB, $L_{A90,16hr}$	
LT1 (Northern, Eastern and Western facades of the proposed development)	60	42	56	37	38 - 92
LT2 (Southern façade of the proposed building)	52	44	49	38	38 - 85

Future Baseline

3.11 Based on current information, it is not anticipated that there will be a significant increase in future baseline noise levels at the proposed development. Due to the relative size of the proposed development, the additional road traffic created will be negligible and therefore is unlikely to cause a rise in sound levels.

Risk Assessment

3.12 As shown in Table 3.1, with reference to Table 2.1, ProPG External Noise Level Guidelines, as provided in Section 2 of this report, the site falls into the medium risk category, as night-time noise levels exceed 55 dB $L_{Aeq,8hr}$ at LT1.

3.13 Furthermore, Note D of Table 2.1 of ProPG specifies that, to be regarded as negligible risk, there should be no more than 10 noise events at night (23:00 to 07:00 hrs) with $L_{Amax,F}$ levels greater than 60 dB. Night-time data from LT1 and LT2 were post-processed into 5-minute periods for each night-time period and used as a basis to determine the number of noise events. This analysis indicated that there is an average of 39 events at LT1 that exceeded 60 dB $L_{Amax,F}$ per night, and an average of 4 events at LT2 that exceeded 60 dB $L_{Amax,F}$ per night. This provides another indication that the risk is medium with respect to location LT1.

3.14 Note E of Figure 2 in the SPD specifies that a site should be regarded as high risk if the $L_{Amax,F}$ exceeds, or is likely to exceed 80 dB more than 20 times a night. The analysis indicates that there is an average of 7 events at LT1 that exceeded 80 dB $L_{Amax,F}$ a night, and no events at LT2 that exceeded 80 dB $L_{Amax,F}$ a night. Therefore, the risk is not considered high and stays at medium risk.

3.15 With reference to paragraph G.1 of BS 8233:2014, an estimate of the internal sound levels within typical dwellings may be determined on the basis of the sound reduction provided by the windows. Research contained within Report NANR 116 [11] finds that a window partially open to provide background ventilation provides approximately 15 dB $D_{A,road}$ of attenuation to road traffic noise.

3.16 On this basis, and with reference to the design targets contained within the ProPG that are reproduced in Table 2.2 of this report, satisfactory internal acoustic environments are likely to be achievable where the external environmental sound level is no greater than 50 dB $L_{Aeq,16h}$ and 45 dB $L_{Aeq,8h}$ during the daytime and night-time periods, respectively. Therefore, acoustic mitigation will be necessary in order to satisfy the internal noise level requirements for the development and, as such, a Stage 2 assessment is required.

4 Acoustic Design Statement - Stage 2

Acoustic Design Process

4.1 With reference to paragraph 2.15, if a Stage 2 assessment is required, the ProPG states that planning applications for new residential development should include evidence that the following have been properly considered:

1. check the feasibility of relocating, or reducing noise levels from relevant sources;
2. consider options for planning the site or building layout;
3. consider the orientation of proposed building(s);
4. select construction types and methods for meeting building performance requirements;
5. examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc;
6. assess the viability of alternative solutions; and
7. assess external amenity area noise.

4.2 The above points are considered in the following sections below.

Mitigating Existing Noise Levels and Design Considerations (items 1, 2 and 3 above)

4.3 As the main noise sources across the site are road traffic, air traffic and rail noise, it would not be possible to reduce noise levels at source.

4.4 By increasing the distance between a noise source and a noise sensitive receptor (NSR), the noise level experienced at the NSR decreases. Due to significant spatial constraints, and the relative size of the proposed development site, an alternative orientation of the current proposed layout would have a negligible net effect in mitigating noise levels from the main noise sources.

4.5 In order to mitigate noise levels from the dominant sources through internal building layout, sensitive rooms would need to be located away from external facades directly subject to significant noise sources. This is unlikely to be possible due to lighting, amenity and space constraints within the building, and as such, the majority of rooms will have to be located adjacent to an external façade. Furthermore, due to the relative size of the site, and the number of facades with direct line of site to most specifically the railway line, it is unlikely that there will be scope to provide sufficient mitigation through internal building layout design.

Internal Noise Levels (Item 4 above)

Building Performance Requirements and Construction Types/Methods

4.6 With reference to Table 2.2 the guidance in BS 8233:2014 proposes that the external building fabric for residential dwellings be designed such that a minimum steady-state internal daytime noise level of 35 dB $L_{Aeq,16hr}$ and a night-time level of 30 dB $L_{Aeq,8hr}$ can be achieved within habitable rooms.

4.7 Accompanying note 4 of Figure 2 in ProPG explains that:

"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."

4.8 It is considered that suitable glazing and ventilation attenuation can be provided to habitable rooms, such that internal average noise levels would be within acceptable limits, as per BS 8233:2014.

4.9 The façade specification requirements are driven by the night-time $L_{Amax,F}$ events. This is due to a higher level of façade attenuation being required in order to control the baseline $L_{Amax,F}$ events to meet the maximum of 10 exceedances of 45 dB $L_{Amax,F}$ inside the proposed sensitive rooms, than the level of façade attenuation required to control the baseline ambient sound levels.

4.10 The specific acoustic performance requirements of the glazing and ventilation system are dependent on the exact layout of the buildings, room sizes, wall and roof designs etc. The assessment has been based on assumptions of the likely room type specifications in conjunction with initial drawings. The assessment of internal noise levels has therefore been undertaken with reference to a number of façade treatments which may be specified to achieve the required level of façade attenuation. The total façade sound attenuations of various façade configurations have been calculated and the results provided in Table 4.1 below. Full calculation sheets are presented in Appendix C.

Table 4.1 - Calculated Façade Reduction Required with various Façade Elements

Level of Mitigation Required	External Wall	Window	Ventilation	Total Façade Sound Attenuation
	$R_w + C_{tr}$ (dB)	$R_w + C_{tr}$ (dB)	$D_{n,ew}$ (dB)	$D_{2m,n}$ (dB)
Openable Windows	-	-	-	**15**[2]
Enhanced	47 [1]	32 [3]	35 [5]	**31**
Enhanced +	47 [1]	40 [4]	44 [6]	**38**

Notes:

[1] Standard wall construction (based on BS 8233:2014)

[2] Attenuation provided by a partially open window (based on Defra report NANR116)

[3] Standard thermal double-glazed window unit (based on BS EN 12758:2011 [12])

[4] High specification thermal double-glazed window unit (based on manufacturer's data)

[5] Acoustic trickle vents (based on manufacturer's data)

[6] High performance acoustic trickle vents, or acoustic mechanical ventilation system (based on manufacturers data)

Calculations have been carried out following the guidance contained within BS 8233:2014 and BS EN 12354-3:2000 [13] and are based on the worst-case receiver room.

4.11 Within the vast majority of traditionally built facades (which include masonry external walls and slate, tile or timber roofs), the weakest elements of the external elevation are the glazing and ventilation systems. Normally, the specification of these elements will be the primary factor in determining the internal ambient noise levels within habitable rooms due to noise ingress from outside.

4.12 It is typical that trickle ventilators are located either in window heads or 'through-wall' and that these are designed to provide the minimum background ventilation rates under Building Regulations Part F [14]. It is therefore critical that the internal ambient noise level targets are met with such ventilators in their fully-open position.

4.13 Based on the noise impact across the site, it is suggested that, to achieve acceptable internal noise environments, windows to habitable rooms will be required to be closed on facades exposed to the highest sound levels presented in conjunction with varying high specification acoustic trickle vents. Figure 1 at the end of the report illustrates where any façade treatment will be necessary, as outlined in Table 4.1. It should be noted that the internal noise level guidelines are generally not applicable when windows or other natural ventilators are open solely to provide 'purge'

ventilation, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).

4.14 For the enhanced mitigation, an external wall construction providing a sound insulation performance of 47 dB $R_w + C_{tr}$ and a standard thermal double glazed window unit providing a sound insulation performance of 32 dB $R_w + C_{tr}$, with windows closed. Ventilation can either be provided by fitting acoustic trickle vents in the window frames or through the wall type passive acoustic vents that achieve at least 35 dB $D_{n,e,w}$, as indicated in Table 4.1.

4.15 For the enhanced+ mitigation, an external wall construction providing a sound insulation performance of 47 dB $R_w + C_{tr}$ and a standard thermal double glazed window unit providing a sound insulation performance of 40 dB $R_w + C_{tr}$, with windows closed. Ventilation can either be provided by high specification acoustic trickle vents in the window frames, through the wall type passive acoustic vents, or a mechanically ventilated solution that achieve at least 44 dB $D_{n,e,w}$, as indicated in Table 4.1.

4.16 Non-habitable rooms (i.e. kitchens, bathrooms and hallways/stairs/landings) typically do not require any facade treatments. However, the building design includes open plan living, in which case, these rooms should be treated as habitable and façade treatment will be required. It is assumed that windows to all dwellings will be provided with standard thermal double glazing as a minimum in any case.

4.17 The glazing and ventilation systems used in the assessment are provided as examples only. Any glazing and ventilation systems which equal or better the performance of the example systems used will be appropriate for use in the final design.

4.18 For those dwellings which include balconies, the actual noise levels at the balcony facades is likely to be lower than those monitored on site due to the screening that the balconies will provide. On this basis, the assessment of noise levels inside dwellings with balconies is considered to be robust and worst case.

4.19 Accompanying note 4 of Figure 2 in the ProPG explains that:

"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 practical 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.

In such a case it is recommended that a more detailed assessment should be undertaken using available dose-response relationships appropriate for the types of noise sources being considered, in line with the WHO Night Noise Guidelines publication and any other relevant research."

4.20 With the proposed façade mitigation outlined in Table 4.1, the analysis of the internal L_{Amax} levels indicates that there will be an average of seven events per night at the worst affected facades that will result in an internal noise level of greater than 45 dB $L_{Amax,F}$, with windows closed and trickle vents open, providing background ventilation. This is acceptable in accordance with the guidance within the ProPG and the SPD.

Effects of Noise Control, Noise from Mechanical Services and Ventilation and Overheating Strategy (Item 5 above)

4.21 A number of proposed methods of noise control have been considered. They involve the provision of passive acoustic trickle ventilation of varying performance and/or a mechanically ventilated solution, such that background ventilation can be provided without the need for opening windows in order to meet the internal ambient noise level criteria.

4.22 Nevertheless, windows should be provided that can be opened at residents' discretion for purge ventilation. However, as mentioned above, purge ventilation should only happen occasionally (e.g. to remove odour from painting and decorating or from burnt food – the definition for purge ventilation is provided in the Building Regulations Part F). Paragraph 2.35 of the ProPG states that during periods of purge ventilation, the internal ambient noise level criteria are generally not applicable.

4.23 Therefore in summary, all windows on all facades must be closed at all times, except for the southern façade during the day, in order to meet the internal ambient noise level criteria. However, the design should incorporate openable windows on all facades so residents can open the windows at their discretion for purge ventilation (e.g. to remove odour from painting and decorating or from burnt food), where during periods of purge ventilation the internal ambient noise level criteria are generally not applicable.

4.24 Please note that air quality considerations may also influence the ventilation specification.

4.25 The ProPG states that the impact of noise generated from mechanical services as part of the scheme should be assessed. Plant areas have not been proposed in this stage of the design. If plant areas are incorporated into the design, it is advised that this aspect is fully assessed at detailed design stage of the scheme, of which would likely be subject to a planning condition. Noise generated by mechanical services in habitable rooms should be within the internal noise level guidelines outlined in Table 2.2.

External Noise Levels in Amenity Areas (Item 7 above)

4.26 With reference to paragraph 2.22, the ProPG refers to the design ranges in BS 8233:2014 with respect to the assessment of external amenity; this is reflected in the SPD. The ProPG also refers to guidance in the PPG-N. Based on these three documents, the following guidance is provided with respect to the assessment of noise in external amenity areas:

3(ii) "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 $L_{Aeq,16hr}$."

4.27 The average daytime noise levels measured at LT1 were 60 dB $L_{Aeq,16hr}$. This is 5 dB above the upper guideline level. The average daytime noise levels measured at LT2 were 52 dB $L_{Aeq,16hr}$. This is 3 dB below the lower guideline level.

4.28 The ProPG, BS 8233:2014, the NPPF, NPSE, PPG-N and the SPD all indicate that a balanced approach should be taken when determining the acceptability of external amenity noise levels in excess of the upper guideline level of 55 dB $L_{Aeq,16hr}$. With reference to paragraph 2.22, the ProPG gives further guidance on the context of the development in relation to external noise levels in amenity areas:

3(iii) "These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces."

4.29 BS 8233:2014 also gives the following guidance in the second paragraph of section 7.7.3.2:

"…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."

4.30 In addition, with reference to paragraph 2.22, the ProPG gives guidance on how to offset any excessive noise levels through access to *"…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 minutes walking distance)."*

4.31 The above is also reflected in section 5.3 of the SPD:

"The acoustic environment of external amenity areas shall always be assessed, and noise levels should ideally not be above the range 50 to 55 dB $L_{Aeq,16hr}$. It may be necessary to carefully locate and design amenity areas and/or to provide acoustic screening in order to meet this goal.

…

…the availability of reasonable access to an outdoor recreational area away from but close to the development site, that meets the above target external levels will be taken into account in deciding whether the scheme is acceptable in noise terms. Soundscape management techniques, including psychological masking, may also help to provide a suitable outdoor acoustic environment in otherwise noisy locations. It is accepted that, in some circumstances it may be appropriate to vary, or not apply, these goals in order to meet wider planning objectives."

4.32 Based on the above guidance, the location context and constraints of the proposed development, and the proximity to public amenity spaces including Twickenham Green (approximately 350 m to the south) and Craneford Way Playing Fields (approximately 200 m to the north), the proposed external amenity/balcony areas can be considered acceptable. In addition, any proposed external amenity areas located to the front of the proposed development to the south will likely benefit from additional screening effects from the building, therefore reducing ambient noise levels within these areas.

Compliance with ProPG, National, Regional and Local Policy

4.33 Mitigation has been specified to ensure that internal sound levels will meet the guideline values contained within the ProPG.

4.34 With respect to the London Plan, the London Borough of Richmond Upon Thames Local Plan and the SPD, on the basis of the above, the pertinent criteria and guidance have been satisfied.

4.35 Levels in external amenity areas are likely to exceed the ProPG and SPD guidance levels. Despite this, it is considered that due to the context of the site and the proximity to green areas, the predicted noise levels in the external amenity areas of a number of dwellings across the proposed building are considered acceptable under the above guidance.

4.36 On the basis of the above, appropriate mitigation has been provided to reduce the levels of noise for occupiers. Although noise levels within the site may be above the LOAEL, they would not exceed the SOAEL. The site therefore the proposed development would be designed such that it complies with national policy with respect to noise and there are no reasons, with regards to noise, why planning permission should not be granted for the proposed development.

5 Summary and Conclusions

5.1 The Acoustics Team of RPS Planning and Environment (RPS) has been appointed by Leek Real Estate (No. 1) Ltd to provide a noise assessment to accompany a planning application for the proposed redevelopment of 75 Norcutt Road, Twickenham. The site is located within the administrative area of the London Borough of Richmond upon Thames (LBRuT).

5.2 Baseline sound levels were determined from two partially attended long term surveys. The main sound sources affecting the site were distant road traffic noise (A316 to the north, and Heath Road to the south, as well as the surrounding network of smaller roads), air traffic noise and railway noise from passing commuter trains on the adjacent railway line.

5.3 With respect to the ProPG and the SPD, the proposed development site is considered medium risk. Through the appropriate design outlined in this report, the proposed development would be subject to satisfactory internal and external acoustic environments with respect to the ProPG, British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' and the SPD.

5.4 Based on the above, the proposed development accords with national (Noise Policy Statement for England, National Planning Policy Framework, Planning Practice Guidance on Noise), regional (The London Plan) and local planning policy. Therefore, there are no reasons, with regards to noise, why planning permission should not be granted for the proposed development at 75 Norcutt Road, Twickenham.

Figures

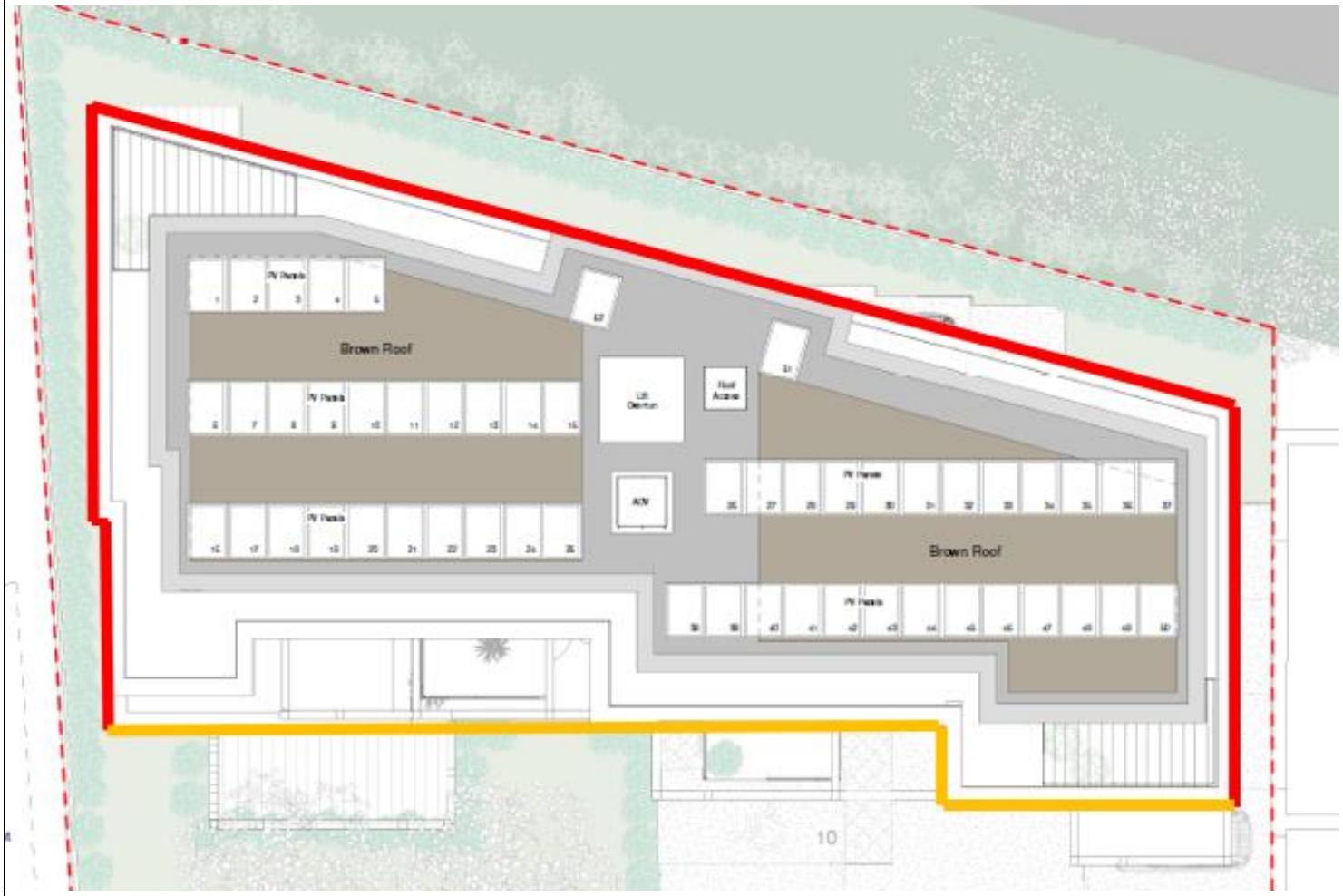

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Figure 1: Façade Sound Reduction Requirements

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Appendices

Appendix A - National, Regional and Local Planning Policy Summary

National Planning Policy Framework

A.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. The emphasis of the Framework is to allow development to proceed where it can be demonstrated to be sustainable. In relation to noise, Paragraph 180 of the Framework states:

'Planning policies and decisions should 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 the development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'

A.2 The point 'a)' refers to 'significant adverse impacts' which relates to the 'significant observed adverse effect level' (SOAEL) in the Noise Policy Statement for England (NPSE), though the term 'effect' is used instead of the term 'impact' although these have been deemed to be interchangeable in this context. Therefore, given the comments above on the NPSE with regard to assessment methods and criteria, the current content of the NPPF does not require any change in previously adopted approaches.

Noise Policy Statement for England

A.3 The NPSE, published in March 2010 by Defra, aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.

A.4 Paragraph 1.6 of the NPSE sets out the long-term vision and aims of Government noise policy:

"Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

"Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life."

A.5 The aims require that all reasonable steps should be taken to avoid, mitigate and minimise adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development, which include social, economic, environmental and health considerations.

A.6 With regard to the terms 'significant adverse' and 'adverse' included in the 'Noise Policy Aims', these are explained further in the 'Explanatory Note' as relating to established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation which 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 human health and quality of life due to noise.

LOAEL – Lowest Observed Adverse Effect Level

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

A.7 Defra has then extended these concepts for the purpose of the NPSE to introduce the concept of:

'SOAEL – Significant Observed Adverse Effect Level

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

A.8 The accompanying explanation states:

'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. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available'.

Planning Practice Guidance - Noise (PPGN)

A.9 The Government has published Planning Practice Guidance on a range of subjects including noise. The guidance forms part of the NPPF and provides advice on how to deliver its policies. The PPGN reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards (BSs) and contains examples of acoustic environments commensurate with various effect levels. Paragraph 006 of the PPGN explains that:

'The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.'

A.10 According to the PPGN, factors that can influence whether noise could be of concern include:

- the source and absolute level of the noise together with the time of day it occurs;
- for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content and the general character of the noise;
- the local topology and topography along with the existing and, where appropriate, the planned character of the area.

- where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time;
- in cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur;
- where relevant, Noise Action Plans, and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations;
- the effect of noise on wildlife;
- if external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces; and
- the potential effect of a new residential development being located close to an existing business that gives rise to noise should be carefully considered. This is because existing sound levels from the business even if intermittent (for example, a live music venue) may be regarded as unacceptable by the new residents and subject to enforcement action. To help avoid such instances, appropriate mitigation should be considered, including optimising the sound insulation provided by the new development's building envelope. In the case of an established business or community facility, the ('agent of change') policy set out in paragraph 182 of the NPPF should be followed.

A.11 The PPGN provides a relationship between various perceptions of noise, effect level and required action in accordance with the NPPF. This is reproduced in Table 1, below.

Table A.1 – Noise Exposure Hierarchy Based on the Likely Average Response

Perception	Increasing Effect Level	Action
Not noticeable	No Observed Effect	No specific measures required
Noticeable and not intrusive	No Observed Adverse Effect	No specific measures required

	LOAEL	
Noticeable and intrusive	Observed Adverse Effect	Mitigate and reduce to a minimum
	SOAEL	
Noticeable and disruptive	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Unacceptable Adverse Effect	Prevent

A.12 The PPGN describes sound that is not noticeable to be at levels below the NOEL. It describes exposures that are noticeable but not to the extent there is a perceived change in quality of life as below the LOAEL and need no mitigation. With reference to the definition of noise in the NPSE, such immissions are 'sound' and not 'noise'. On this basis, the audibility of sound from a development is not, in itself, a criterion to judge noise effects that is commensurate with national planning policy.

A.13 The PPGN suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPGN is having to turn up the volume on the television; needing to speak more loudly to be heard; where there is no alternative ventilation, closing windows for some of the time because of the noise; or, a potential for some reported sleep disturbance. In line with the NPPF and NPSE, the PPGN states that consideration needs to be given to mitigating and minimising effects above the LOAEL but taking account of the economic and social benefits being derived from the activity causing the noise.

A.14 The PPGN suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL provided in the PPGN are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present; and/or there is a potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. In line with the NPPF and NPSE, the PPGN states that effects above the SOAEL should be avoided and that whilst the economic and social benefits being derived from the activity causing the noise must be taken into account, such exposures are undesirable.

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

A.15 BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' [xv] provides guideline values for internal ambient noise levels in spaces when they are unoccupied. A summary

of the levels recommended in paragraph 7.7.1 of subclause 7.7 and Table 4 of BS 8233:2014 for rooms used for resting, dining and sleeping is provided in Table A.1 below. The guideline values in Table A.1 are annual average values and do not have to be achieved in all circumstances.

A.16 The guidance in paragraph 7.7.1 of Section 7.7 of BS 8233:2014 applies to external noise as it affects the internal acoustic environment from sources without a specific character. The paragraph states, including the accompanying note:

"… Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. …"

"NOTE 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."

Table A.2 – BS 8233:2014 Indoor Ambient Noise Levels for Dwellings

Activity	Location	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 $L_{Aeq,8h}$

A.17 Note 7 of the following text states the following:

"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 5 dB and reasonable internal conditions still achieved."

A.18 In relation to external noise levels, the second paragraph of 7.7.3.2 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."

The London Plan

A.19 The spatial development strategy for London was adopted in 2011, and since had a number of consolidations. The document contains a number of policies that are pertinent to noise:

"POLICY 5.3 SUSTAINABLE DESIGN AND CONSTRUCTION

…

D minimising pollution (including noise, air and urban runoff)

…

POLICY 7.15 REDUCING AND MANAGING NOISE, IMPROVING AND ENHANCING THE ACOUSTIC ENVIRONMENT AND PROMOTING APPROPRIATE SOUNDSCAPES

Strategic

A The transport, spatial and design policies of this plan will be implemented in order to reduce and manage noise to improve health and quality of life and support the objectives of the Mayor's Ambient Noise Strategy.

Planning Decisions

B Development proposals should seek to manage noise by:

a) avoiding significant adverse noise impacts on health and quality of life as a result of new development;

b) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development or adding unduly to the costs and administrative burdens on existing businesses;

c) improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity);

d) separating new noise sensitive development from major noise sources (such as road, rail, air transport and some types of industrial development) through the use of distance, screening or internal layout – in preference to sole reliance on sound insulation;

e) where it is not possible to achieve separation of noise sensitive development and noise sources, without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through the application of good acoustic design principles;

f) having particular regard to the impact of aviation noise on noise sensitive development;

g) promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.

…"

The London Borough of Richmond Upon Thames Local Plan

A.20 The London Borough of Richmond Upon Thames Local Plan, as adopted by the Council on the 3rd July 2018 contains several policy elements and strategic objectives that are pertinent to noise with regard to the proposed development. These have been summarised as follows:

- **Strategic Objectives and Sustainability:** Section 2.3 *Strategic Objectives* and Section 3.0 *Spatial Strategy* provide comment as follows:

  "Reduce or mitigate environmental impacts and pollution levels (such as air, noise, light, odour, fumes, water and soil) and encourage improvements in air quality particularly along major roads and areas that already exceed acceptable air quality standards.

  …

  The Spatial Strategy seeks to ensure that local environmental impacts of all development proposals do not lead to detrimental impacts on the health, safety and the amenity of existing and new users or occupiers of development or the surrounding area. Consideration will therefore be given to a range of potential impacts, including, but not limited to, air pollution, noise and vibration, light pollution, odours and fumes and land contamination…"

- **Amenity & Living Conditions:** Policy LP8 states that all development will be required to protect the amenity and living conditions for occupants of new, existing, adjoining and neighbouring properties. The elements of the policy pertinent to noise are as follows:

"…

2. ensure balconies do not raise unacceptable overlooking or noise or disturbance to nearby occupiers; height, massing or siting, including through creating a sense of enclosure;

…"

- **Local Environmental Impacts:** The noise and vibration section of Policy LP10 states the following:

  "…

  Noise and Vibration

  The Council encourages good acoustic design to ensure occupiers of new and existing noise sensitive buildings are protected. The following will be required, where necessary:

  1. *a noise assessment of any new plant and equipment and its impact upon both receptors and the general background noise levels;*
  2. *mitigation measures where noise needs to be controlled and managed;*
  3. *time limits and restrictions for activities where noise cannot be sufficiently mitigated;*
  4. *promotion of good acoustic design and use of new technologies; and*
  5. *measures to protect the occupiers of new developments from existing sources.*

  …

  4.10.2 In addition, where there are already significant adverse effects on the environment, amendity or living conditions due to pollution, sensitive uses should ideally be steered away from those areas. However, given the limited availability of land for development in this borough, this will not always be possible. Therefore, new developments, including changes of use, should mitigate and reduce any adverse impacts resulting from air and light pollution, noise vibration and dust to acceptable levels.

  …"

Supplementary Planning Document – Development Control for Noise Generating and Noise Generating Noise Sensitive Development

A.21 As discussed in paragraph 2.8 – 2.11, the SPD has been produced by the London Borough of Richmond Upon Thames in order to address the noise issues affecting the Borough and assist in providing a consistent approach to development where noise is an issue.

A.22 The SPD supplements the Borough's Local Plan by providing interpretation of national planning and noise policy in a local context along with advice on the technical requirements that the Borough regards as relevant to meeting those requirements.

A.23 The SPD acknowledges the ProPG document as having informed the content of the SPD, as a number of the SPD and ProPG working groups had common members and the drafting periods of the documents overlapped. The SPD states that it is broader in scope and contains guidance specifically adapted to the needs and aspirations of the borough.

A.24 There are a number of policies and technical requirements unique to the SPD that are applicable to the proposed development. These have been summarised as follows:

Principles and Requirements (Section 3.1):

- encourage good acoustic design;
- improve living and working conditions where the acoustic environment already has a significant adverse effect on people's quality of life;
- improve and enhance the acoustic environment and promote soundscapes that are appropriate for the local context including the promotion of a vibrant acoustic environment where this is appropriate and the protection of relative tranquillity and quietness where such features are valued;
- mitigate and reduce to a minimum the adverse effects of noise within the context of the sustainable development;
- avoid significant adverse effects of noise on people living and working in the Borough within the context of sustainable development; and
- prevent development which is unacceptable in terms of noise.

Brownfield Development (Section 3.4):

Policies to encourage the use of brownfield land in order to minimise pressure on open space may well challenge a desire to separate conflicting land uses. Policies to increase housing supply may mean that some of the noisier locations in the Borough will have to be considered for future development. Where such circumstances arise and where a site is deemed suitable within the wider context of sustainable development, then any potential adverse effects should be controlled and mitigated through the application of good acoustic design principles.

General Approach to Noise Sensitive Development (NSD) (Section 3.5):

There will be a general presumption against new noise sensitive development that is likely to experience significant adverse effects from noise unless it can be demonstrated that the economic and/or social and/or environmental benefits associated with the proposed development outweigh the adverse effects.

$L_{Amax,F}$ Events (Section 5.1, Figure 2, Note 'e'): With reference to both the ProPG and Figure 2 in the SPD:

"…

e. A site should be regarded as high risk if the $L_{Amax,F}$ exceeds, or is likely to exceed 80 dB more than 20 times a night.

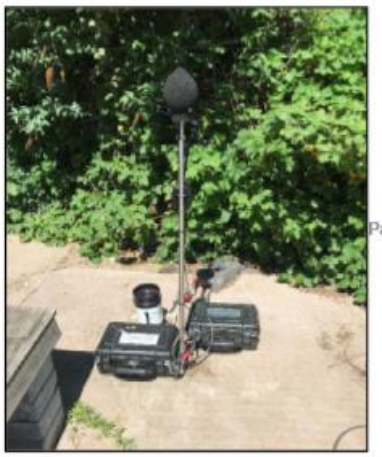
…"

Appendix B - Baseline Survey Record Sheets

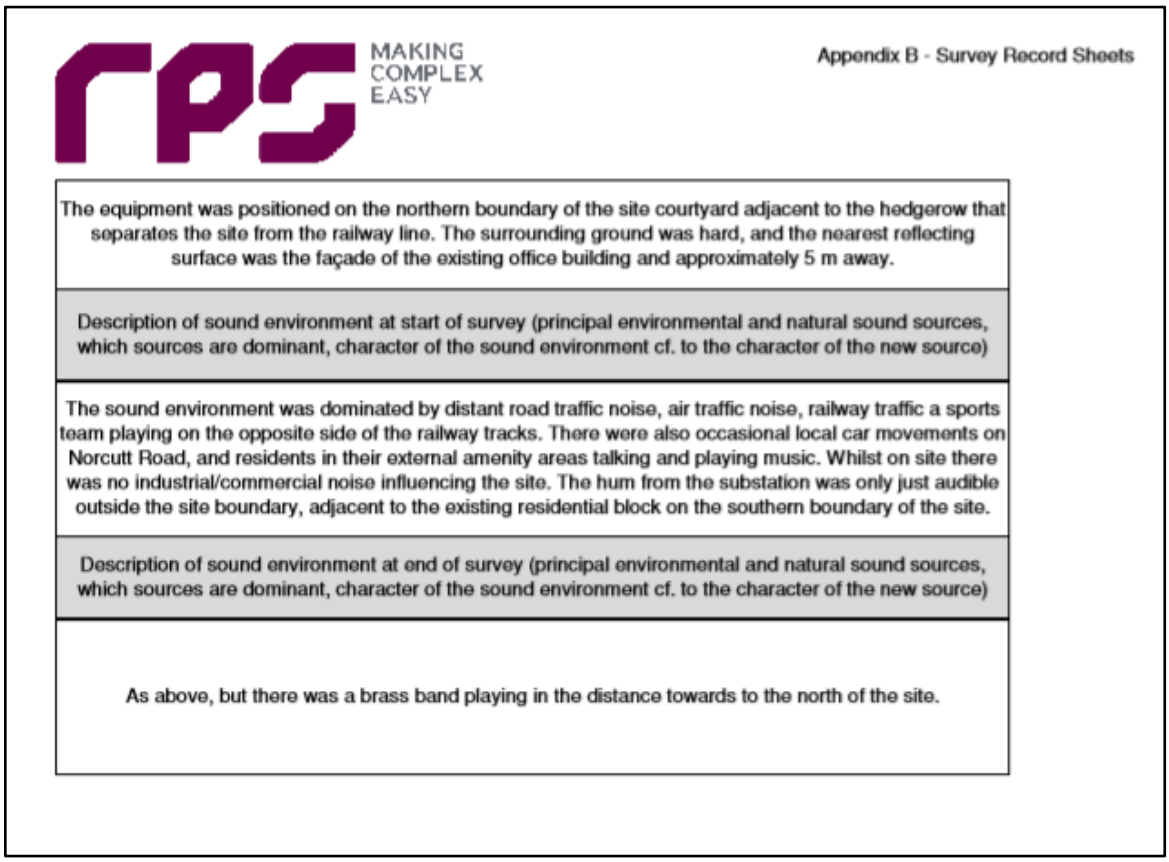
Sound Level Survey Record

Location			LT1 - Northern Boundary				
Purpose of Monitoring			Baseline				
Relevant Guidance / Standard			BS 7445-1:2003 / BS 7445-2:1991 / BS 4142:2014				
Sound Measurement System							
RPS ID	Manufacturer / Model		Serial	Last Lab	Filename	Memory Card	
126	Rion NL-52		164423	01/04/2019	Auto_0001	-	
Microphone Height	Measurement Interval	Dynamic Range	Time Weighting	Frequency Weighting	Façade / Freefield	Photo?	
1.5 m	100 ms	28 - 135	F	A	Freefield	✓	
			START		**END**		
Personnel			JW		JW		
Date / time			21/05/2019 11:45		28/05/2019 12:00		
Calibrator	RPS ID		15		33		
	Manufacturer / Model		RION NC-74		RION NC-74		
	Serial Number		110090		34472822		
	Date last verification		21/11/2018		21/11/2018		
	Reference level		94		94		
	Meter reading		94		93.9		
	Wind speed (m/s) & dir'n Av.		0 - 1	N/A	2 - 3	NW	
	Cloud cover (100%= 8 oktas)		1		7		
	Temperature (degrees Celsius)		22		18		
	Likely temp. inversion / Precipitation / Fog / Wet ground / Frozen ground / Snow cover? (tick boxes)		TI: - P: - F: - W: - Fr: - Sn: -		TI: - P: - F: - W: - Fr: - Sn: -		
	Subjective description / additional		Warm, dry and sunny		Warm, breezy, overcast.		

Photographs of Measurement Location



Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))



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Appendix B - Survey Record Sheets

The equipment was positioned on the northern boundary of the site courtyard adjacent to the hedgerow that separates the site from the railway line. The surrounding ground was hard, and the nearest reflecting surface was the façade of the existing office building and approximately 5 m away.
Description of sound environment at start of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
The sound environment was dominated by distant road traffic noise, air traffic noise, railway traffic a sports team playing on the opposite side of the railway tracks. There were also occasional local car movements on Norcutt Road, and residents in their external amenity areas talking and playing music. Whilst on site there was no industrial/commercial noise influencing the site. The hum from the substation was only just audible outside the site boundary, adjacent to the existing residential block on the southern boundary of the site.
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
As above, but there was a brass band playing in the distance towards to the north of the site.

Appendix B - Survey Record Sheets

Sound Level Survey Record

Location			LT2 - Western Boundary			
Purpose of Monitoring			Baseline			
Relevant Guidance / Standard			BS 7445-1:2003 / BS 7445-2:1991 / BS 4142:2014			
Sound Measurement System						
RPS ID	Manufacturer / Model		Serial	Last Lab	Filename	Memory Card
24	RION NL-31		352030	20/11/2017	Auto_0001	-
Microphone Height	Measurement Interval	Dynamic Range	Time Weighting	Frequency Weighting	Façade / Freefield	Photo?
1.5 m	100 ms	28 - 135	F	A	Freefield	✓

		START	END
Personnel		JW	JW
Date / time		21/05/2019 11:55	28/05/2019 12:00
Calibrator	RPS ID	15	33
	Manufacturer / Model	RION NC-74	RION NC-74
	Serial Number	110090	34472822
	Date last verification	21/11/2018	21/11/2018
	Reference level	94	94
	Meter reading	94	94.1
	Wind speed (m/s) & dir'n Av.	0 - 1 N/A	2 - 3 NW
	Cloud cover (100%= 8 oktas)	1	7
	Temperature (degrees Celsius)	22	18
	Likely temp. inversion / Precipitation / Fog / Wet ground / Frozen ground / Snow cover? (tick boxes)	TI P F W Fr Sn - - - - - -	TI P F W Fr Sn - - - - - -
	Subjective description / additional	Warm, dry and sunny	Warm, breezy, overcast.

Photographs of Measurement Location

Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))

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Appendix B - Survey Record Sheets

The equipment was positioned on the eastern boundary of the site courtyard amongst some overgrown foliage adjacent to the large industrial/commercial building. The surrounding ground was hard, and the nearest reflecting surface was the façade of the existing office building and approximately 3.5 m away.
Description of sound environment at start of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
The sound environment was dominated by distant road traffic noise, air traffic noise, railway traffic and residents in their external amenity areas of the adjacent residential block. There were also occasional local car movements on Norcutt Road. Whilst on site there was no industrial/commercial noise influencing the site. The hum from the substation was only just audible outside the site boundary, adjacent to the existing residential block on the southern boundary of the site.
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)
As above, but there was a brass band playing in the distance towards to the north of the site.

Appendix C - Noise Break-in Calculation Sheet

Calculation of Composite Whole Façade Reduction

Calculations are undertaken in accordance with the guidance provided in BS EN 12354 Part 3.[1]

Project Number:	JAE11048
Project Name:	75 Norcutt Road
Date:	31-05-19

External Sound Pressure Level	Worst Case N Façade	Worst Case E Façade	Worst Case W Façade	Worst Case S Façade
External representative night-time sound pressure level $L_{Aeq,8h}$ (dB)	80	80	80	70

Receiving Room and Façade Properties

Receiving Room Volume (m^3)	35	35	30	22
Floor Area (m^2)	14.6	14.6	12.5	9.2
Total Façade Area (m^2)	11	11	8	7
Reference Reverberation Time (s)	0.5	0.5	0.5	0.5
Reference Equivalent Sound Absorption Area A_0 (m^2)	10	10	10	10
Window Sound Reduction Index (SRI) $R_w + C_{tr}$ (dB)	39	39	39	30
Window Area (m^2)	5	5	3	5
Wall SRI $R_w + C_{tr}$ (dB)	47	47	47	47
Wall Area (m^2)	10.0	6.0	5.0	2.0
Vent SRI $D_{n,e,w} + C_{tr}$ (dB)	42	42	42	39
Number of vent units	4	4	4	4
Total Vent SRI $D_{n,e,situ}$ (dB)	36	36	36	33
Vent Equivalent Open Area (m^2)	0.009	0.009	0.009	0.010
Calculated Composite (Whole Façade) Weighted SRI R'_w (dB)	35	35	34	28
Average sound pressure level in receiving room, normalised to 10 m^2 absorption $L_{2,n}$ (dBA)	45	45	45	42
Subsequent Compositite Façade Spec	Enhanced +	Enhanced +	Enhanced +	Enhanced

1. British Standards Institution. British Standard EN 12354-3:2000 'Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: airborne sound insulation against outdoor sound'.

Appendix D - Consultation Correspondence

From: Josh Wilson
Sent: 20 May 2019 17:32
To: community.safety@richmond.gov.uk
Subject: FAO: EHO Noise - Assessment Methodology for Planning Application, 75 Norcutt Road, Twickenham TW2 6SR

Dear Sir or Madam,

I called your planning support department earlier and was passed this email address.

I am an Acoustic Consultant working on a proposed residential redevelopment of a site at 75 Norcutt Road, Twickenham TW2 6SR. Our client has commissioned us to carry out a baseline sound level survey and noise assessment in order to advise on the residential feasibility with regard to noise. The proposed site comprises a 4-5 storey block of residential flats with ancillary areas of landscaping, hardstanding and car parking.

I would be grateful if you could review our survey and assessment proposals below and comment on their suitability.

Baseline Sound Level Survey

Figure 1 below shows the approximate site boundary in red. The site is located adjacent to the over ground railway line between Whitton and Twickenham to the north, a commercial/industrial building to the west, a substation to the east and residential dwellings to the south. The figure indicates the proposed partially attended survey locations (LT1 & LT2).

Further supplementary short term sound measurements will be made to identify any industrial sources influencing the sound environment of the site.

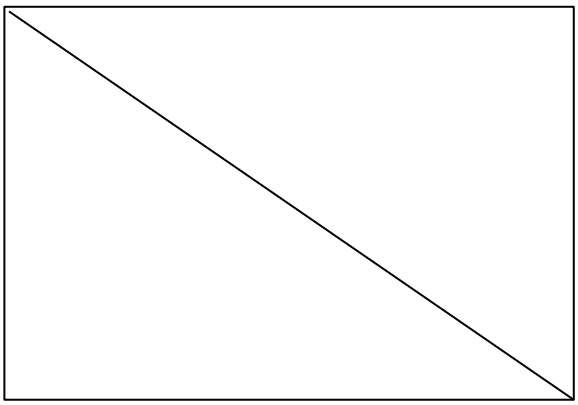

Figure 1: Proposed Site Plan & Survey Locations

Assessment

The residential feasibility assessment, with reference to the ProPG assessment methodology, will use the following levels from BS 8233:2014 for the internal and external noise level criteria:

- Internal noise level of 35 dB $L_{Aeq,16h}$ during the daytime (BS 8233:2014 table 4),
- Internal noise level of 30 dB $L_{Aeq,8h}$ during the night-time (BS 8233:2014 table 4),

- External noise level of 55 dB $L_{Aeq,16h}$ during the daytime (BS 8233:2014 paragraph 7.7.3.2);

We will consider all appropriate guidance in the Planning Practice Guidance for Noise document and any pertinent local policies. We will assess any potential impacts on the residential dwellings due to existing industrial and commercial sound in accordance with BS 4142:2014.

We have scoped out a vibration survey and assessment as a previous vibration study was carried out for a planning application at the same site, of which subsequently found that vibration effects from trains passing were negligible (ref: 17/1033/FUL). Furthermore, there are a series of residential dwellings which are positioned at similar distances from the railway line in the immediate vicinity of the proposed development. Therefore vibration has been scoped out of our assessment.

Please let me know if you have any queries.

Best regards,

Josh

Josh Wilson
Consultant - Acoustics
RPS | Consulting UK & Ireland
6-7 Lovers Walk
Brighton, East Sussex BN1 6AH, United Kingdom
rpsgroup.com

References

1 Association of Noise Consultants. Institute of Acoustics. Chartered Institute of Environmental Health. ProPG: Planning and Noise. Professional Practice Guidance on Planning and Noise. New Residential Development. 2017.

2 Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. Defra. 2010.

3 Department for Communities and Local Government. National Planning Policy Framework: HMSO. March 2012.

4 Department for Communities and Local Government. National Planning Practice Guidance.

5 The London Plan. The Spatial Development Strategy For London Consolidated With Alterations Since 2011. 2016.

6 The London Borough of Richmond Upon Thames Local Plan. July 2018.

7 The London Borough of Richmond Upon Thames Supplementary Planning Document. Development Control for Noise Generating and Noise Sensitive Development. 2018.

8 British Standards Institution. British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings.

9 The Building Regulations 2010. Approved Document F: Ventilation. Office of the Deputy Prime Minster. 2010.

10 British Standards Institution. British Standard 7445-2:1991 Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use. 1991.

11 Defra Report NANR116. Open/Closed Window Research – Sound Insulation through Ventilated Domestic open Windows. The Building Performance Centre, School of the Built Environment, Napier University. 2007.

12 British Standards Institution. BS EN 12578:2011 ‘Glass in building – Glazing and airborne sound insulation – Product descriptions and determination of properties’. 2011.

13 British Standards Institution. British Standard BS EN 12354-3:2000 ‘Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound’ July 2000.

14 The Building Regulations 2010. Approved Document F: Ventilation. Office of the Deputy Prime Minister. 2010.

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