
Noise Assessment for a Proposed Mixed Use Development at New Henry Street, Bristol

For Dominus Bristol Limited

Report Quality Management			
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1 Introduction

- 1.1 The Savills Acoustics Team has been appointed by Dominus Bristol Limited to undertake a noise assessment to be submitted as part of the planning application for a proposed mixed use development called New Henry Street, located at Kingsland Road, Bristol. The site lies within the administrative area of the Bristol City Council (BCC).
- 1.2 The site is currently occupied by an industrial warehousing area (Calor Centre (depot) and scrap metal yard). The scheme regenerates the 0.75 ha plot by providing 705 student accommodation units, alongside commercial units, community space and a courtyard garden.
- 1.3 The site is bounded by Alfred Street to the north, which is comprised of industrial/commercial units. Further industrial/commercial units are present to the east and west, with Kingsland Road and existing residential dwellings to the south.
- 1.4 An existing nightclub (Dare To Club), is located approximately 10 meters from the boundary of the site to the east on the other side of Alfred Street. Due to night-time events held at this venue (from 22:00 to 05:00 hours), this noise source has been considered in conjunction with other sources affecting the site.
- 1.5 An existing site plan and surrounding area is shown in Figure 1.1 below.

Figure 1.1 Existing Site Plan



1.6 The proposed ground floor plan is shown in Figure 1.2.

Figure 1.2 Proposed Ground Floor Plan



- 1.7 In order to quantify and characterise the baseline acoustic environment at the site, a noise survey has been undertaken; this is detailed in Section 3 of this report.
- 1.8 The assessment has been undertaken based upon information on the proposed development provided by the project team.
- 1.9 The Savills Acoustics Team is a member of the Association of Noise Consultants (ANC), the representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. This assessment has been completed 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.
- 1.10 The technical content of this assessment has been provided by Savills personnel, all of whom are Members (MIOA) or Fellows (FIOA), both corporate grades, of the IOA, the UK's professional body for those working in acoustics, noise and vibration. The assessment has been undertaken with integrity, objectivity and honesty in accordance with the Code of Conduct of the IOA.
- 1.11 This report and assessment has been peer reviewed within the Savills team to ensure that it is technically robust and meets the requirements of our Integrated Management System.

2 Policy, Guidance and Standards

- 2.1 This assessment has been undertaken to establish if the proposed development would be compliant with relevant national and local planning policy and guidance.

National Planning Policy

- 2.2 A summary of relevant National Planning Policy and Guidance, pertinent to this assessment, is provided below.

Noise Policy Statement for England

- 2.3 The Noise Policy Statement for England (NPSE) [1] sets out the long term overarching vision of Government noise policy, which is to promote good health and a good quality of life through the management of noise within the context of Government policy on sustainable development.
- 2.4 The NPSE describes a 'Noise Policy Vision' and three 'Noise Policy Aims' and states that these visions and aims provide:

“the necessary clarity and direction to enable decisions to be made regarding what is an acceptable noise burden to place on society.”

- 2.5 The 'Noise Policy Vision' is supported by the following aims:

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

- 2.6 The aims of the policy differentiate between noise impacts on health and noise impacts on quality of life. The aims also differentiate between 'significant adverse impacts' and 'adverse impacts'. The explanatory note to the NPSE clarifies that a significant adverse impact is deemed to have occurred if the 'Significant Observed Adverse Effect Level' (SOAEL) is exceeded. An adverse effect, on the other hand, lies between the 'Lowest Observed Adverse Effect Level' (LOAEL) and the SOAEL.

National Planning Policy Framework

- 2.7 The National Planning Policy Framework (NPPF) [2] sets out the Government's planning policies for England and how these are expected to be applied. In relation to noise, Paragraph 185 of the NPPF 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.”*

Planning Practice Guidance - Noise

- 2.8 Planning Practice Guidance on Noise (PPG-N) [3] provides guidance to local planning authorities to ensure effective implementation of the planning policy set out in the NPPF.
- 2.9 The PPG-N reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards.
- 2.10 The PPG-N provides a relationship between various perceptions of noise, effect level and required action in accordance with the NPPF. This is reproduced in Table 2.1 below.
- 2.11 In line with the NPPF and NPSE, the PPG-N 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.
- 2.12 In line with the NPPF and NPSE, the PPG-N 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.

Table 2.1 Noise Exposure Hierarchy based on the Likely Average Response

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Local Planning Policy

Bristol City Council

2.13 The Bristol Development Framework Core Strategy [4] Policy BCS23 sets out the requirement for new designs and developments to avoid impacting the local area through the generation of pollution, including noise and vibration.

2.14 Policy BCS23 is provided below for reference:

'Policy BCS23

Development should be sited and designed in a way as to avoid adversely impacting upon:

- *Environmental amenity or biodiversity of the surrounding area by reason of fumes, dust, noise, vibration, smell, light or other forms of air, land, water pollution, or creating exposure to contaminated land.*

- *The quality of underground or surface water bodies.*

In locating and designing development, account should also be taken of:

- *The impact of existing sources of noise or other pollution on the new development...*

2.15 In addition to the above, the BCC 'Development Management Conditions & Reasons and Advices' document [5] states for the following design criteria regarding noise:

"1007 Sound insulation/acoustic reports

The recommended design criteria for dwellings are as follows:

Daytime (07.00 - 23.00) 35 dB LAeq 16 hours in all rooms & 50 dB in outdoor living areas.

Night-time (23.00 - 07.00) 30 dB LAeq 8 hours & L_{max} less than 45 dB in bedrooms.

Where residential properties are likely to be affected by amplified music from neighbouring pubs or clubs, the recommended design criteria is as follows:

Noise Rating Curve NR20 at all times in any habitable rooms".

Planning Guidance

ProPG: Professional Practise Guidance on Planning and Noise

- 2.16 The ProPG [6] document provides practitioners with guidance on a recommended approach to the management of noise within the planning system in England for new residential development.
- 2.17 The guidance was produced by the ANC, IOA and Chartered Institute of Environmental Health (CIEH) and published in 2017. It is now an established document, with the guidance widely accepted as 'best practice' when considering and assessing noise affecting new residential development.
- 2.18 The ProPG document suggests a two stage methodology for the acoustic assessment of a proposed residential development.
- 2.19 Stage 1 involves an "Initial Site Risk Assessment", to identify the likely risk of adverse effects from noise. Figure 1 of the ProPG (provided below as Table 2.2) summarises the 'Stage 1 Initial Site Noise Risk Assessment' criteria. It should be noted that where industrial or commercial noise is present, but not dominant, its contribution may be included in the noise level used to establish the degree of risk.

Table 2.2 ProPG Stage 1 Initial Site Noise Risk Assessment

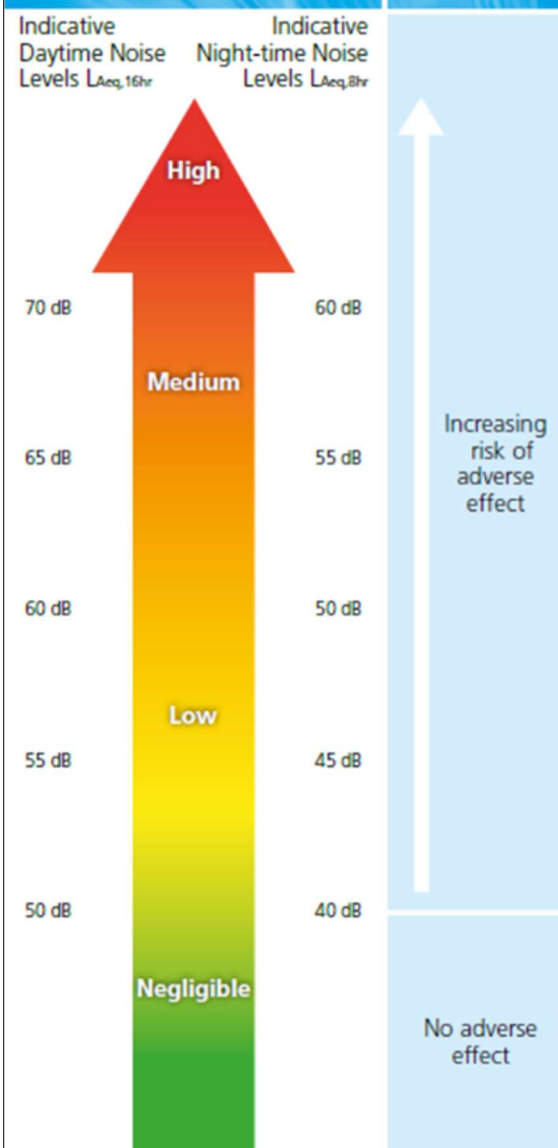
NOISE RISK ASSESSMENT		POTENTIAL EFFECT WITHOUT NOISE MITIGATION	PRE-PLANNING APPLICATION ADVICE
Indicative Daytime Noise Levels $L_{Aeq,16hr}$	Indicative Night-time Noise Levels $L_{Aeq,8hr}$		
			
70 dB	60 dB	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk 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.
65 dB	55 dB		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.
60 dB	50 dB		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.
55 dB	45 dB		
50 dB	40 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.

Figure 1 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.

British Standards

British Standard 8233

2.20 BS 8233:2014 ‘Sound Insulation and Noise Reduction for Buildings’ [7] (BS 8233) offers the following design guidance for indoor ambient noise levels within dwellings:

Table 2.3 BS 8233 Indoor Ambient Noise Level Design Guidance

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}

2.21 A note accompanying the above table states:

“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.”

2.22 Despite identifying that maximum values ‘may’ be set, guidance values for differing types of noise/frequency of events are not currently given.

2.23 A further note to the above table indicates that, where “development is considered necessary or desirable”, the above guideline values can be relaxed by 5 dB and “reasonable” internal conditions still be achieved.

British Standard 4142

2.24 BS 4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ (BS 4142) [8] primarily provides a numerical method by which to determine the significance of sound of a commercial and/or industrial nature, i.e. the ‘specific sound’, at residential dwelling ‘noise sensitive receptor’ (NSR) locations.

2.25 The specific sound level may then be corrected for the character of the sound, if appropriate, and is then termed the ‘Rating Level’.

2.26 The commentary to paragraph 9.2 of BS 4142 suggests the following subjective methods for the determination of the rating penalty for tonal, impulsive and/or intermittent specific sounds:

“Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a rating penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. ... If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

- 2.27 The Rating Level is then compared to the background sound level, which should be representative of the period being assessed.
- 2.28 An initial estimate of the impact of the specific sound is obtained by subtracting the representative background sound level from the Rating Level.
- 2.29 Typically, the greater this difference, the greater is 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.
 - A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- 2.30 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.
- 2.31 Whilst there is a relationship between the significance of impacts determined by the method contained within BS 4142 and the significance of effects described in the PPGN, there is not a direct link. It is not appropriate to ascribe numerical rating / background level differences to LOAEL and SOAEL because this fails to consider the context of the sound, which is a key requirement of the Standard.

- 2.32 The significance of the effect of the noise in question (i.e. whether above or below the SOAEL and LOAEL) should be determined on the basis of the significance of the initial estimate of impact from the BS 4142 assessment with reference to the examples of outcomes described within the PPGN and after having considered the context of the sound at the receptor/s affected.

Approved Document O: Overheating

- 2.33 Approved Document O: Overheating (ADO) [9], was published in December 2021, taking effect on 15 June 2022.
- 2.34 ADO required that reasonable provision must be made for residential dwellings to “limit unwanted solar gains on summer” and to “provide an adequate means to remove heat from the indoor environment”.
- 2.35 With regard to the second point, ADO provides a ‘simplified method’ for demonstrating compliance requiring a minimum ventilation ‘free area’.
- 2.36 With reference to paragraph 4.1.7 of the ANC published ‘Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O’ [10]:

“...the resulting outside-to-inside level difference for window openings necessary to satisfy the simplified method of AD-O are expected to be approximately 4 dB for ‘high’ risk locations and 9 dB for ‘medium’ risk locations.”

- 2.37 Furthermore ADO states that:

“..the simplified method cannot be met. For example, if external noise is an issue, it is unlikely that windows would be opened by an occupant...”

and:

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).

- 2.38 On the basis of the above, compliance with ADO for medium risk locations (such as this), using the simplified method (open windows), can be achieved where external night-time ambient and maximum levels do not exceed either 49 dB $L_{Aeq,T}$ or 64 dB L_{AFmax} , i.e. 9 dB above the ADO external levels.

3 Baseline Noise Survey

Survey Methodology

- 3.1 In order to establish baseline acoustic conditions at the site, three unattended long term sound level surveys (LT1, LT2, and LT3) were deployed on Friday 24th February and collected on Wednesday 1st February 2023. In addition, attended short-term observations were made between 00:00 and 01:00 hours on Saturday 25th February when the nightclub was operating.
- 3.2 LT1 was deployed behind the perimeter fence on the west side of Alfred Street, opposite the nightclub but with the microphone positioned clear of the fence. LT2 was installed on the southern corner of site on the Calor Centre's fencing, on the corner of Sussex Street and Kingsland Road. LT3 was deployed on the north end of Alfred Street on a perimeter fence to the left of the entrance to the Scrap Metal yard.
- 3.3 A survey location plan is included as Figure 1 at the end of this report.
- 3.4 The microphones were mounted at least 1.5 m above ground level in a free-field position (at least 3.5 m from any reflecting surface, excluding the ground).
- 3.5 At the time of deployment and collection of the surveys, the following noise sources were noted as affecting the acoustic environment: road traffic movements on Kingsland Road and some activity within the units where LT1 was deployed (e.g. light hammering and van movements), trains on the railway to the south and scrap metal activity on the Bristol Scrap Metal site.
- 3.6 It should be noted that, whilst the commercial activity within the units close to LT1 and at the scrap metal yard were present, these will no longer be present if the proposed development gains consent and proceeds. Noise from other commercial land uses in the area was not as being discernible.
- 3.7 A 1-hour attended survey was also conducted on Alfred Street opposite the nightclub on Saturday 25th of February 2023, between 00:00 to 01:00 hours. This was in order to observe the noise and character associated with the operation of the nightclub during a night-time event.
- 3.8 During the attended survey, the following noise sources were noted as affecting the acoustic environment: patrons in the outside area of the night-club (chatter and conversation noise), low-frequency noise from music within the nightclub, taxis arriving every approximately 5 to 10 minutes with people entering the nightclub, and security guards talking/conversations in the doorway of the nightclub.
- 3.9 Sound level measurements for LT1 were made using a Rion NL-52 Class 1 Sound Level Meter with the Enhanced Long Term Noise Monitoring Kit and was set to measure the A-weighted broadband and unweighted one-third-octave band sound pressure levels.

- 3.10 Sound level measurements for LT2 and LT3 were made using 'Class 1' Convergence NSRT_mk3' sound level meters (SLM) in accordance with BS 7445-2:1991 'Description and measurement of environmental noise Part 2: Guide to the acquisition of data pertinent to land use' [11].
- 3.11 These two SLMs was set up to log the A-weighted broadband sound pressure level (SPL) in 125 ms periods. Raw data were post processed into 15- and 5-minute periods.
- 3.12 The SLMs were all field calibrated before and after the survey. No significant drift in calibration was observed, i.e. more than 0.5 dB. All SLMs are within 2 years of laboratory calibration.
- 3.13 Meteorological conditions during the survey period were dry (apart from one short period of rainfall) and with light winds, below 5 m/s, from various directions¹.
- 3.14 Given the length of the survey period (6-days) and variety of weather conditions throughout the survey, the measurement data are considered to provide a robust representation of noise levels characterising the site.

Measurement Results

- 3.15 Tables 3.1 to 3.3 below provide a summary of the baseline ambient sound levels measured over the 6-day survey period, at locations Lt1 to LT3 respectively, with Table 3.4 providing an overall summary. Ambient levels presented are the logarithmic average of each period, background levels are the arithmetic average.
- 3.16 It should be noted that the final L_{AFmax} value not exceeded more than 10 times, is calculated based on the 5-min interval data and includes all five night-time periods of the survey.
- 3.17 The below values represent the total noise levels measured at the site including contributions from road and rail traffic and existing industrial uses etc.
- 3.18 A graphical presentation of the survey results is provided as Figure 2 at the end of this report.
- 3.19 Table 3.5 below provides the highest 15-minute unweighted one-third-octave band sound pressure levels that were recorded at the LT1 survey location during hours when the nightclub was in operation, namely Friday and Saturday night between 23:00 and 05:00 hours.
- 3.20** The levels that are presented are the highest that were logged in each band during the nightclub hours, as such these represent the highest level that would be expected to occur.

¹ <https://www.wunderground.com/dashboard/pws/IBRIST258>

Table 3.1 LT1 Survey Results

Date	Daytime (07:00 to 23:00 hours)			Night-time (23:00 to 07:00 hours)		
	L _{Aeq,16h} (dB)	L _{AFmax} (dB)	L _{A90} (dB)	L _{Aeq,8h} (dB)	L _{A90} (dB)	L _{AFmax} not exceeded more than 10 times (dB)
24/02/2023	57	98	46	58	51	-
25/02/2023	60	100	47	57	49	-
26/02/2023	58	105	45	48	42	-
27/02/2023	62	101	48	48	40	-
28/02/2023	59	99	48	48	40	-
01/03/2023	61	95	49	-	-	-
Average	60	105	47	48¹	40	71

Notes:
1.Excludes Friday and Saturday night data, average with these two nights 54 dB L_{Aeq,8h}.

Table 3.2 LT2 Survey Results

Date	Daytime (07:00 to 23:00 hours)			Night-time (23:00 to 07:00 hours)		
	L _{Aeq,16h} (dB)	L _{AFmax} (dB)	L _{A90} (dB)	L _{Aeq,8h} (dB)	L _{A90} (dB)	L _{AFmax} not exceeded more than 10 times (dB)
24/02/2023	67	100	52	60	46	-
25/02/2023	65	97	51	62	47	-
26/02/2023	63	97	49	60	44	-
27/02/2023	67	98	53	59	43	-
28/02/2023	67	98	54	60	43	-
01/03/2023	67	98	55	-	-	-
Average	66	100	52	60	44	81

Table 3.3 LT3 Survey Results

Date	Daytime (07:00 to 23:00 hours)			Night-time (23:00 to 07:00 hours)		
	L _{Aeq,16h} (dB)	L _{AFmax} (dB)	L _{A90} (dB)	L _{Aeq,8h} (dB)	L _{A90} (dB)	L _{AFmax} not exceeded more than 10 times (dB)
24/02/2023	59	94	50	52	48	-
25/02/2023	59	96	52	51	48	-
26/02/2023	58	92	49	57	45	-
27/02/2023	63	101	53	53	44	-
28/02/2023	63	96	54	49	43	-
01/03/2023	64	98	53	-	-	-
Average	62	101	52	53	46	61²



Table 3.4 Summary Results

Survey	Daytime (07:00 to 23:00 hours)			Night-time (23:00 to 07:00 hours)		
	L _{Aeq,16h} (dB)	L _{AFmax} (dB)	L _{A90} (dB)	L _{Aeq,8h} (dB)	L _{A90} (dB)	L _{AFmax} not exceeded more than 10 times (dB)
LT1	60	105	47	48	40	71
LT2	66	100	52	60	44	81
LT3	62	101	52	54	46	61

Table 3.5 LT1 Night Club Highest 1/3 Octave Levels L_{eq,15min}

31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1,000	1,250	1,600	2,000	2,500
80	73	77	77	75	78	66	61	58	57	55	53	54	54	53	49	48	47	45	45

Notes:
 Combined sound pressure level in 63 Hz octave band (i.e. 50 + 63 + 80 Hz), 81 dB L_{eq,15min}.

4 Calculations and Modelling

- 4.1 In order to calculate sound levels at and across the proposed development associated with operation of the nightclub and road traffic movements on Kingsland Road, a 3D sound model has been built using SoundPLAN 8.2 modelling software.
- 4.2 The model predicts sound levels under light down-wind conditions based on hemispherical sound propagation with corrections for atmospheric absorption, ground effects, screening and directivity based on the procedure detailed in ISO 9613-2:1996 'Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation' [12].

Modelled Noise Sources

- 4.3 The model has been constructed based upon publicly available topographical data which was noted to accord with subjective observations of local topography carried out whilst on site during the survey periods.
- 4.4 Kingsland Road has been input as a line source at 0.5 m Above Ground Level (AGL). The source has been assigned a sound power level such that modelled levels match the surveyed levels at LT2, as detailed in Table 3.1.
- 4.5 The nightclub has been included in the model as two source types, an outdoor area source, representing the area in which patrons congregated outside the nightclub and the nightclub building itself, as an 'industrial building'.
- 4.6 The two nightclub sources have been assigned sound power levels and one-third-octave-spectral data, such that the modelled one-third-octave levels at the LT1 survey location correlate with those measured, as summarised in Table 3.5.
- 4.7 The following generic assumptions have been incorporated into the noise model:
- the topography of the site and the surrounding area has been obtained from publicly surveyed topographical data and Ordnance Survey (OS) 'Terrain 50' open data;
 - the effect of screening from solid structures (buildings) has been incorporated into the modelling process by importing OS Open Data 'Settlement Area' shape file data into the model; and
 - the ground type in the model has been set to hard for the Site, G=0.

Model Results

- 4.8 Figure 4.1 below provides a graphical summary of low frequency noise levels (63 Hz) associated with operation of the nightclub.
- 4.9 Tables 4.3 and 4.4 provide daytime and night-time specific sound levels from the nearby roads.

Figure 4.1 Predicted Specific Sound Levels from the Nightclub (63Hz)

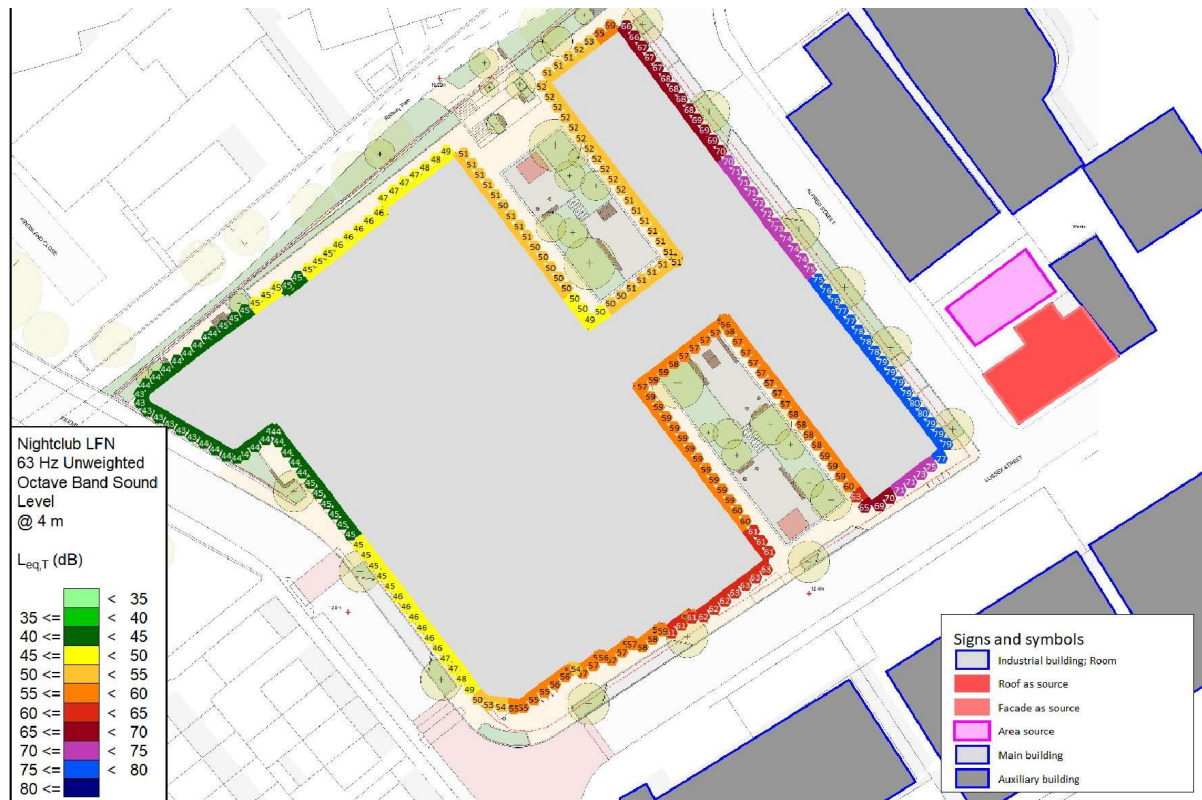
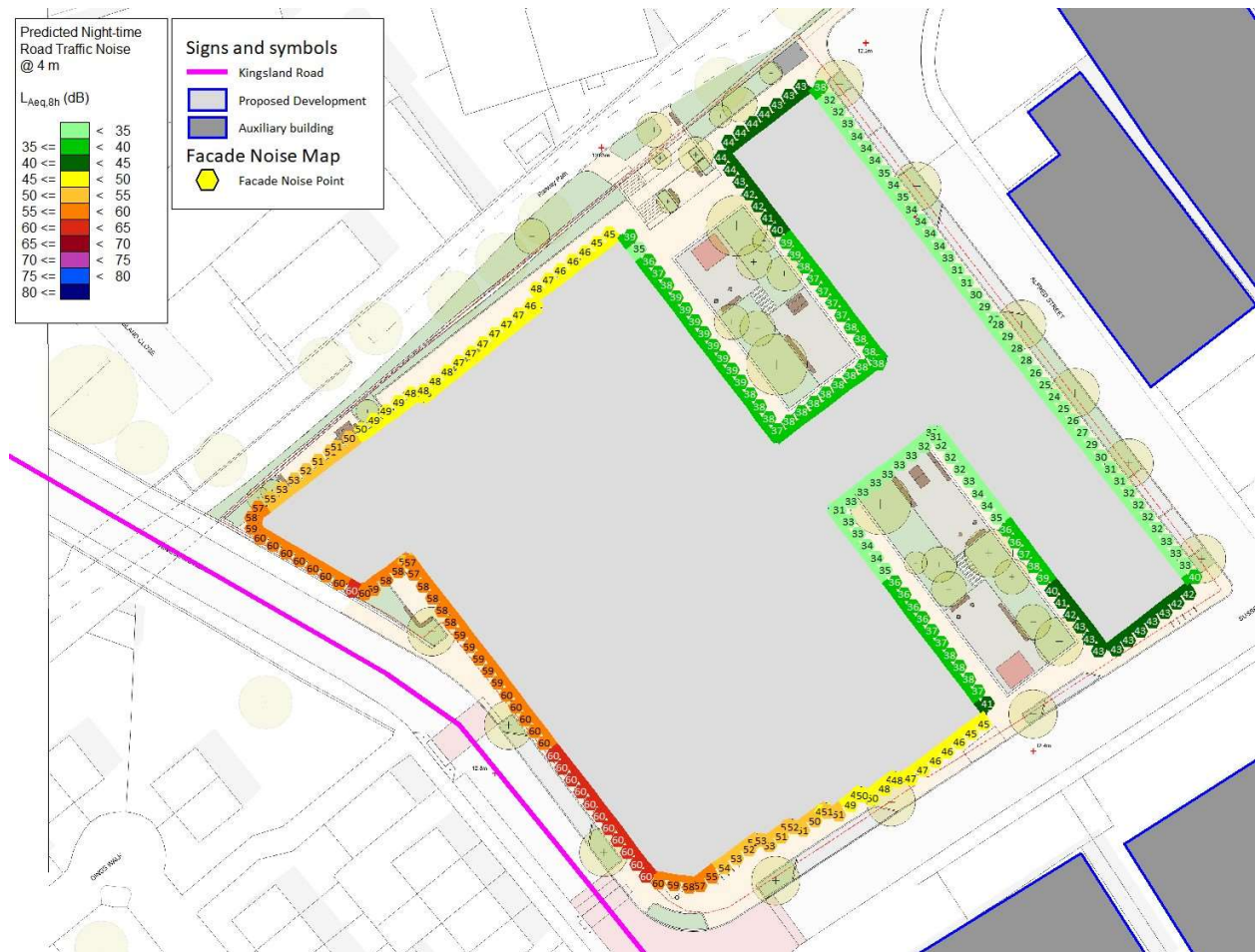


Figure 4.2 Daytime Road Traffic Noise Levels



Figure 4.3 Night-time Road Traffic Noise Levels



5 Stage 1: ProPG Noise Risk Assessment

5.1 An initial noise risk assessment of the site has been undertaken in accordance with ProPG guidance for the residential aspects of the development. For presentation purposes, the site has been classified into four “noise risk” bands – “Negligible”, “Low”, “Medium” and “High” – in line with the following boundaries.

Table 5.1 ProPG Risk Assessment Boundaries

Time Period	Negligible (dB)	Low (dB)	Medium (dB)	High (dB)
Daytime	≤50	51-62	63-68	>69
Night-time	<40	40-54	55-59	60<

5.2 With reference to Table 3.1 above, daytime and night-time sound levels at the site have been measured as 66 dB $L_{Aeq,16h}$ during daytime and 60 dB $L_{Aeq,8h}$ during night-time; therefore, the site falls into the ‘medium’ to ‘medium/high’ risk categories.

5.3 A summary of the above information is included in Table 3.2 below.

Table 5.2 ProPG Risk Assessment Stage 1

ProPG Stage 1	Daytime (dB $L_{Aeq,16h}$)	Night-time (dB $L_{Aeq,8h}$)
Measured Noise Level	66	60
ProPG Noise Risk Level	Medium	Medium/High
Potential Effect Without Mitigation	Risk of Adverse Effect	Risk of Adverse Effect

5.4 For “low” risk sites, ProPG states:

“At low noise levels, the site is likely to be acceptable from a noise perspective 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.”

5.5 For “medium” risk sites, ProPG states:

“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.”

5.6 For “high” risk sites, ProPG states:

“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.”

- 5.7 It should be noted that commercial/industrial noise was not observed to be dominant, rather vehicle movements on Kingsland Road. This does not take into account noise associated with the operation of the nightclub, as this will be assessed separately.
- 5.8 On the basis of the above, in accordance with the ProPG, the contribution from any industrial/commercial noise affecting baseline noise levels can be included in the noise level used to establish the degree of risk.
- 5.9 It is, however, important to stress that ProPG guidance is not intended to provide “absolute” boundaries of noise impact. The guidance is intended to be applied flexibly and is a concept supported by governmental Planning Practice Guidance, e.g. Paragraph: 015 Reference ID: 30-015-20190722 cautions that *“Care should be taken, however, to avoid these [noise standards] being implemented as fixed thresholds as specific circumstances may justify some variation being allowed”*. Paragraph 007 Reference ID: 30-007-20190722 states *“These values [including ProPG guidance] are not to be regarded as fixed thresholds and as outcomes that have to be achieved in every circumstance”*. Notwithstanding this, the use of semantic boundaries is considered to provide a useful means of providing an initial, broad visual characterisation of the noise risk at the site.
- 5.10 Based on the results of the initial site risk assessment, it can be concluded that, subject to the implementation of appropriate mitigation, the site is suitable for residential development.

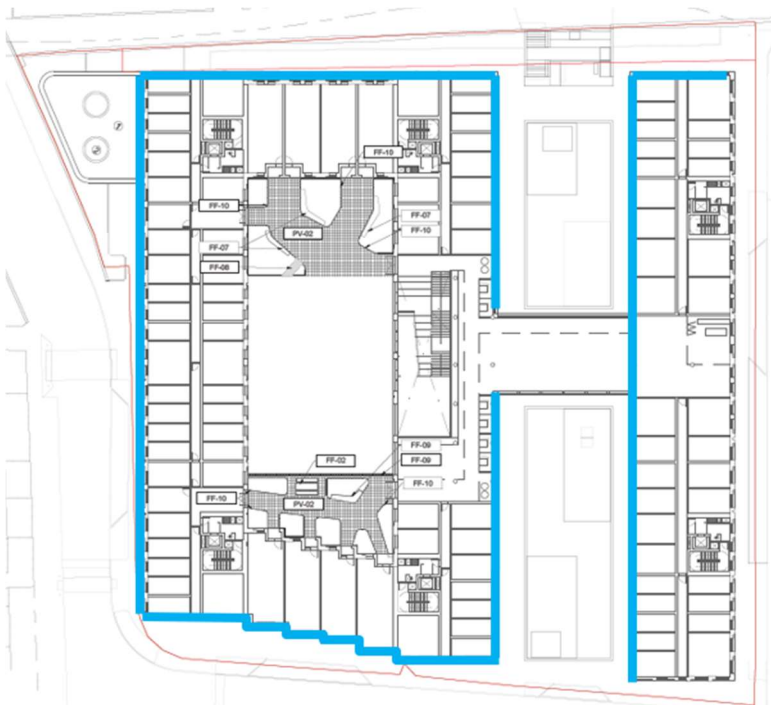
6 Internal and External Noise Assessment (Stage 2)

Internal Noise Assessment

General Noise

- 6.1 With reference to Table 2.3, BS 8233 offers design guidance for indoor ambient noise levels. These guideline levels are intended to provide future occupants of developments a comfortable acoustic environment.
- 6.2 The noise survey relating to the general environmental noise (excluding the nightclub), indicates that general environmental noise levels at the site are relatively acceptable with appropriately specified mitigation.
- 6.3 Provided facades of the proposed development are designed to provide an outside to inside sound reduction of at least 36 dBA, then appropriate internal sound levels will be achieved.
- 6.4 The above specification is suitable for all facades marked in blue in Figure 5.1 below.

Figure 6.1 Standard Glazing Areas



- 6.5 For example, this could be met with enhanced glazing and high performance through-frame acoustic wall/window vents, to meet the Building Regulations 2010 Approved Document F requirement (ADF), both of which are readily available and typically used in such developments.
- 6.6 Table 6.1 below shows the minimum dB reduction needed for the blue facades of the proposed development to comply with BS 8233/ProPG noise level guidelines.

Table 6.1 BS 8233 Insulation Assessment

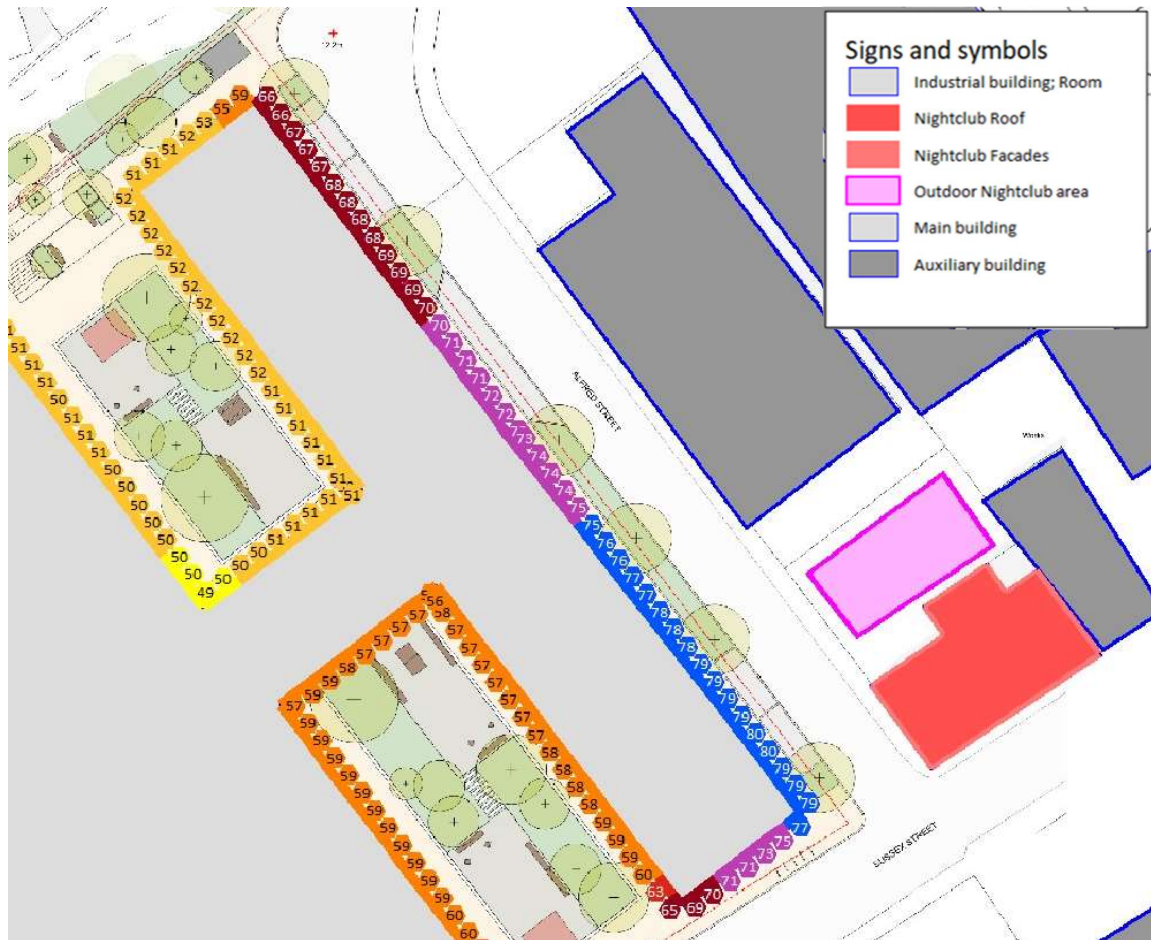
Period	Measured Level (dB)	BS 8233 Internal Guideline Level (dB)	Minimum Insulation Required (dB)
Daytime (L _{Aeq,16h})	66	35	31
Night-time (L _{Aeq,8h})	60	30	30
Night-time (L _{AFmax})	81	45	36

- 6.7 It should be noted that noise impacts can also be minimised through ‘good acoustic design’, by developing the internal arrangement of dwellings to locate, where possible, non-habitable rooms on the ‘noisier’ side of the building and habitable rooms on any screened (quieter) facades.
- 6.8 This approach should also help maximise the potential for habitable rooms to be able to rely on natural ventilation.

Nightclub Noise

- 6.9 Whilst standard enhanced glazing will be sufficient to mitigate general environmental noise in the area, facades closer to the south-eastern edge of the development will require a higher level of mitigation. This is due to their proximity to the nightclub and associated low frequency noise during operation.
- 6.10 During the survey, it was noted that the club utilises an outdoor car park space. The amplified music noise from this area, as well as the noise leakage from inside the venue, results in high levels of low frequency noise that would affect south-eastern facades of the proposed development.
- 6.11 Figure 6.2 below shows the noise levels on the facades closest to the nightclub at 63 Hz.

Figure 6.2 63 Hz Modelling Results



6.12 As shown in Figure 6.2 above, the highest noise level was 80 dB at 63 Hz on the closest facades to the nightclub. These high levels of low frequency noise will require appropriate and well-designed mitigation measures to provide acceptable internal levels inside the proposed dwellings.

6.13 The below BCC guidance has been used when determining the acceptable levels of internal low frequency noise:

“Where residential properties are likely to be affected by amplified music from neighbouring pubs or clubs, the recommended design criteria is as follows. Noise Rating Curve NR20 at all times in any habitable room”

6.14 As stated above, rating curve level NR20 is considered by BCC to be an acceptable internal level for the control of amplified music from neighbouring pubs or clubs.

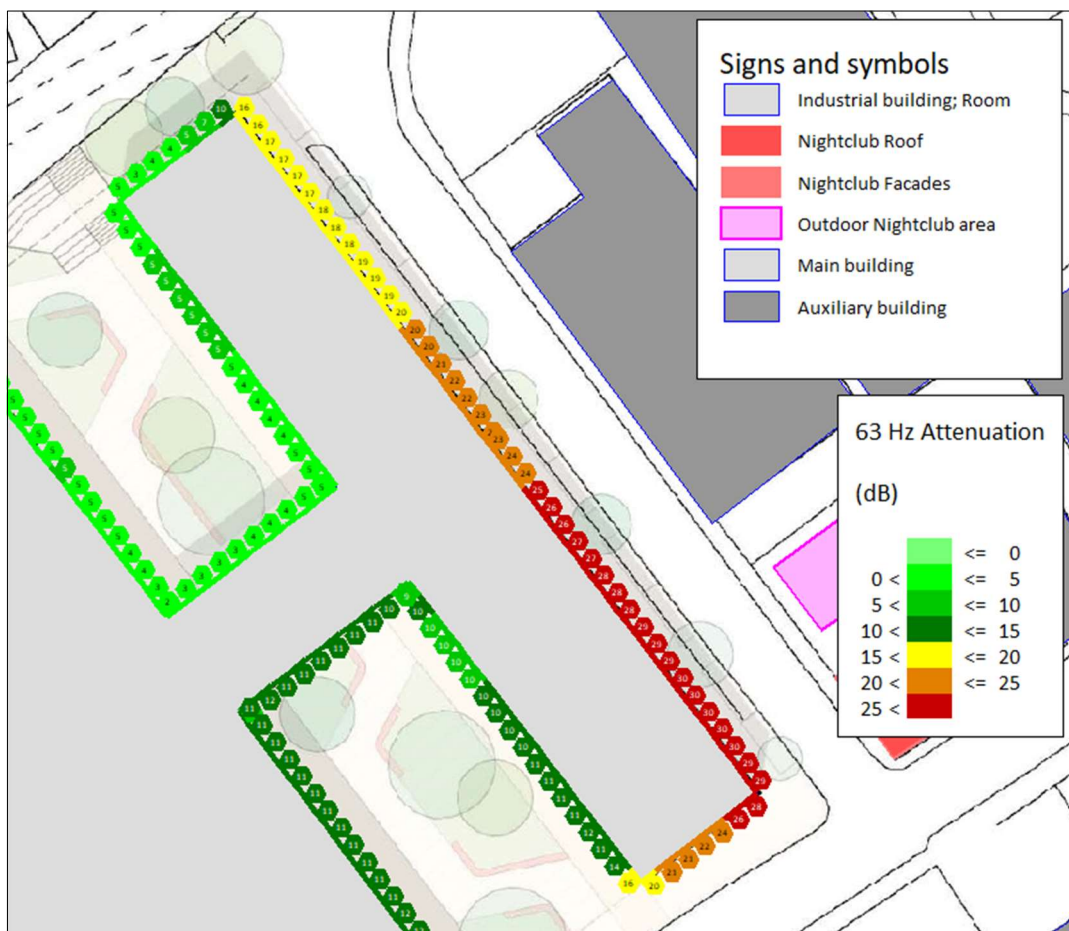
6.15 On the basis of the above, Table 6.2 below shows the NR20 octave band curve values, compared to the calculated highest façade levels.

Table 6.2 Low Frequency Noise Assessment

	Frequency (Hz)				
	63	125	250	500	1,000
NR20 Curve (dB)	51	39	31	24	20
Highest Façade Level (dB)	80	77	61	57	54
Required Reduction (dB)	29	38	30	33	34

- 6.16 On the basis of the above, provided facades marked as red on Figure 6.3 below are designed to provide an outside to inside sound reduction level equal to the required reduction row in Table 6.2, then appropriate internal sound levels will be achieved, i.e. below Noise Rating Curve NR20 at all times.
- 6.17 This would be achievable with high specification acoustic glazing, accompanied with a MHVR type ventilation system providing the required ventilation, i.e. windows and any façade openings would need to be closed.

Figure 6.3 High Specification Areas



- 6.18 The amount of low frequency noise attenuation would be appropriately lower further away from the nightclub, with the most northerly facades on Alfred Street requiring a 16 dB outside to inside sound

reduction level at 63 Hz, compared to 29 dB at the nearest facades. At this location appropriate internal noise levels, below NR20, would be achievable with more standard/typical double glazing.

- 6.19 Intermediate facades, where the required low frequency noise attenuation is approximately 25 dB, would require acoustically treated double glazing, or other similarly specified glazing.

External Noise Assessment

- 6.20 ProPG refers to the design ranges in BS 8233 with respect to the assessment of external amenity. ProPG also refers to guidance in the PPGN. Based on these two documents, the following guidance is provided with respect to the assessment of noise in external amenity areas:

“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 $L_{Aeq,16hr}$.”

- 6.21 With reference to Table 4.3, baseline daytime noise levels within the courtyard area are generally below 55 dB $L_{Aeq,16h}$; therefore noise levels should be considered acceptable.

- 6.22 However, the ProPG does consider that, even if external noise levels are above the ideal range:

“...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, protected, publicly accessible, external amenity space (e.g. a public park).”

- 6.23 On this basis, the publicly accessible external amenity area of ‘Newtown Park’, is located approximately 200 m north east of the proposed development site.

Summary

- 6.24 Through appropriate design, the proposed residential development would be subject to satisfactory internal and external acoustic environments with respect to the ProPG and BS 8233, and a good standard of amenity for future occupants will be achieved.
- 6.25 The sound insulation values specified would be readily achievable, but would require the specification of high performance acoustic windows and ventilation panels.
- 6.26 Baseline external daytime amenity space noise levels are below 55 dB $L_{Aeq,16h}$ and these should be considered acceptable. However, the publicly accessible external amenity area of ‘Newtown Park’, is also located approximately 200 m north east of the proposed development site which would provide residents with additional/alternative relatively quiet external amenity space.
- 6.27 On the basis of the above, the proposed development accords with national guidance NPSE and NPPF and, with reference to the PPGN, it is considered that internal levels will result in effects below the LOAEL and are therefore acceptable.

6.28 Consequently, the proposed development would provide acceptable living standards, in terms of noise, for future residents.

7 Existing and Proposed Commercial/Industrial Noise

Existing Commercial/Industrial Land Uses & Agent of Change

- 7.1 Land uses in the immediate vicinity to the site are characterised by predominately light industrial / commercial uses to the north, east, and west. To the south and to the south-west lies residential uses.
- 7.2 Site visits conducted during the noise survey periods concluded that the dominant source of noise affecting the site on a regular basis was road traffic movements Kingsland Road, rather than any specific business or 'day to day' industrial/commercial activity. During periods the nightclub was in operation, noise associated with this use was the dominant source of noise affecting the site, particularly in areas closest to the nightclub.
- 7.3 In order for the proposed development to be compliant with the NPPF, the existing businesses should not have unreasonable restrictions placed on them as a result of the proposed development.
- 7.4 Potential restrictions may include: limiting the nature or timing of activity undertaken, or relocating where activity takes place. If restrictions would likely be required, then the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.
- 7.5 With regard to the above, noise from nearby 'day to day' commercial/industrial uses is unlikely to have a significant impact on internal noise levels, as detailed above. As external noise levels are primarily affected by road traffic movements on Kingsland Road, it is unlikely that specific commercial/industrial activity would be audible within proposed dwellings.
- 7.6 With reference to paragraph 5.5, internal ambient noise levels would normally be 35 and 30 dB $L_{Aeq,T}$ day/night respectively (note the façade would be designed to prevent night-time maximum noise levels not exceeding 45 dBA L_{AFmax}).
- 7.7 With regard to the nightclub specifically, provided that facades of the proposed development are designed to provide an outside to inside sound reduction level equal as detailed in Table 6.2, resultant internal noise levels would be below Noise Rating Curve NR20 at all times.
- 7.8 This would be achievable with very high specification acoustic glazing, accompanied with a mechanical ventilation system, removing the need for any façade openings.
- 7.9 As such, noise emissions from the operation of existing businesses would very likely not be of a magnitude to result in internal noise levels of a magnitude that would result in needing to turn up the volume of the television, speaking more loudly etc, i.e. significant adverse effects would be avoided.

- 7.10 Consequently, no unreasonable restrictions would be required to be placed on existing business and the proposed development, therefore, accords with Paragraph 187 of the NPPF.

Proposed Commercial/Industrial Development

- 7.11 The proposed development may include external plant and service vehicle movements serving the ground floor commercial space, including deliveries/collection.
- 7.12 Noise levels associated with servicing type activities are normally characterised by a series of 'loud' noise events having "impulsive" characteristics (e.g. 'bangs' and 'crashes'). As such, it is clear that servicing activities have the potential to be audible at and/or cause disturbance to both existing dwellings and noise-sensitive accommodation that will be created by the development.
- 7.13 Notwithstanding the above, it is inevitable that any form of commercial or residential development will create some noise, and this is readily acknowledged in governmental planning guidance. Development proposals should therefore aim to minimise the impacts of such noise, either through the design of the development or management controls to govern the way it operates.
- 7.14 On the basis of the above, it is recommended that an appropriate condition be applied to any planning permission that may be granted, regarding the operation of the proposed commercial/industrial development.
- 7.15 A suggested condition is provided below. Provided the example condition is complied with, operation of the proposed commercial/industrial development would be unlikely to adversely affect the residential amenity of existing or proposed NSRs.

"Noise emissions associated with any fixed plant items installed as part of the development (air handling units, extract fans etc.) and/or activities undertaken shall be controlled such that the free-field equivalent Rating Level, measured or calculated, shall not exceed a level of 5 dB above the representative background sound level at 1-metre from the façade of any proposed or existing noise sensitive building. The Rating Level and representative background sound level shall be determined as per the guidance provided in British Standard 4142:2014+A1:2019, or other relevant Standard."

- 7.16 Current proposals do not outline the specific end use of the ground floor commercial space, although it is currently planned to be for employment uses (Use Class E). Sufficient sound insulation will be required to minimise noise impact on the residential upper floors of the development; further details of this can be submitted pursuant to a planning condition.
- 7.17 On the basis that activities undertaken in the ground floor area may, at times, be relatively noisy, it is recommended that the proposed separating floor between the first floor flats and the ground floor space is designed to achieve an airborne sound insulation values of at least 5 dB above the minimum Building Regulations 2010 value, i.e. at least 50 dB $D_{nT,W} + C_{tr}$.

- 7.18 Such a design would minimise the risk for ground floor activity to adversely affect the residential amenity of the first floor flats above.

8 Overheating Risk & Design

- 8.1 The required façade attention specified in Section 7 is based on windows being closed with background ventilation provided by MVHR, meeting the ADF requirement.
- 8.2 The facades will be fitted with openable panels, as opposed to openable windows. With panels open fully (as may be required at residents discretion for purge ventilation or similar), which would be required to achieve compliance with ADO using the simple method, internal ambient noise levels would be above guidance levels for both the high noise facades and low noise facades.
- 8.3 Consequently, the proposed development will need to take into consideration measures to prevent panels needing to be fully open to prevent overheating.
- 8.4 Such an approach would allow for compliance with both ADO and the NPPF, i.e. rooms to not overheat and internal noise levels of a magnitude below the SOAEL.
- 8.5 All dwellings will, as a matter of course, be provided with ventilation in accordance with the story requirements of Approved Document F.
- 8.6 Detailed design of the overheating strategy can be provided pursuant to a planning condition and it is recommended that an overheating assessment is undertaken during the detailed design phase by a suitably qualified person.

9 Summary & Conclusions

- 9.1 The Savills Acoustics Team has been appointed by Dominus Bristol Limited to undertake a noise assessment to be submitted as part of the planning application for a proposed mixed use development called New Henry Street, located at Kingsland Road, Bristol. The site lies within the administrative area of the Bristol City Council (BCC).
- 9.2 The site is currently occupied by an industrial warehousing area (Calor Centre (depot) and scrap metal yard). The scheme regenerates the 0.75 ha plot by providing 705 student accommodation units, alongside commercial units, community space and a courtyard garden.
- 9.3 Existing noise levels were determined through a combination of attended and unattended surveys. The dominant noise source affecting the site was road traffic movements on Kingsland Road. Whilst noise associated with activity within the surrounding industrial estate was noted, this was not observed to be dominant, intrusive, incongruous with residential development, or associated with any particular business/activity, or land use.
- 9.4 Due to the proximity of a nearby nightclub to the site, proposed facades close to the club have potential to be exposed to high levels of low frequency noise. This has been assessed, and appropriate, high specification glazing specifications have been recommended, such that internal noise levels would not exceed Noise Rating Curve NR20.
- 9.5 With respect to the Professional Practice Guidance on Planning and Noise (ProPG), the proposed residential development is of medium to high risk. Through appropriate design, the proposed residential development would be subject to satisfactory internal and external acoustic environments with respect to the ProPG and British Standard (BS) 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'.
- 9.6 Daytime noise levels in external amenity areas are within 55 dB $L_{Aeq,16h}$; and therefore should be considered in line with guidance within the ProPG and BS 8233.
- 9.7 Noise associated with the operation of existing businesses, with an appropriate high specification glazing system, is unlikely to have a significant impact on proposed residential amenity. Consequently, no unreasonable restrictions would be required to be placed on existing business.
- 9.8 During the detailed design phase, appropriate measures can be included within the design to ensure that operation of the proposed commercial uses at ground floor level does not adversely affect the residential amenity of proposed or existing NSRs.
- 9.9 Due to existing noise levels at the site, compliance with 'Approved Document O: Overheating' cannot be achieved with ventilation panels open. Consequently, the detailed design of the proposed development will need to take into consideration measures to prevent overheating with closed windows, which can be provided pursuant to a planning condition.

9.10 Consequently, the proposed development accords with national planning policy and guidance (Noise Policy Statement for England, NPPF, Planning Practice Guidance on Noise) and local planning policy. Therefore, there are no reasons, with regards to noise, why planning permission should not be granted for the proposed development.

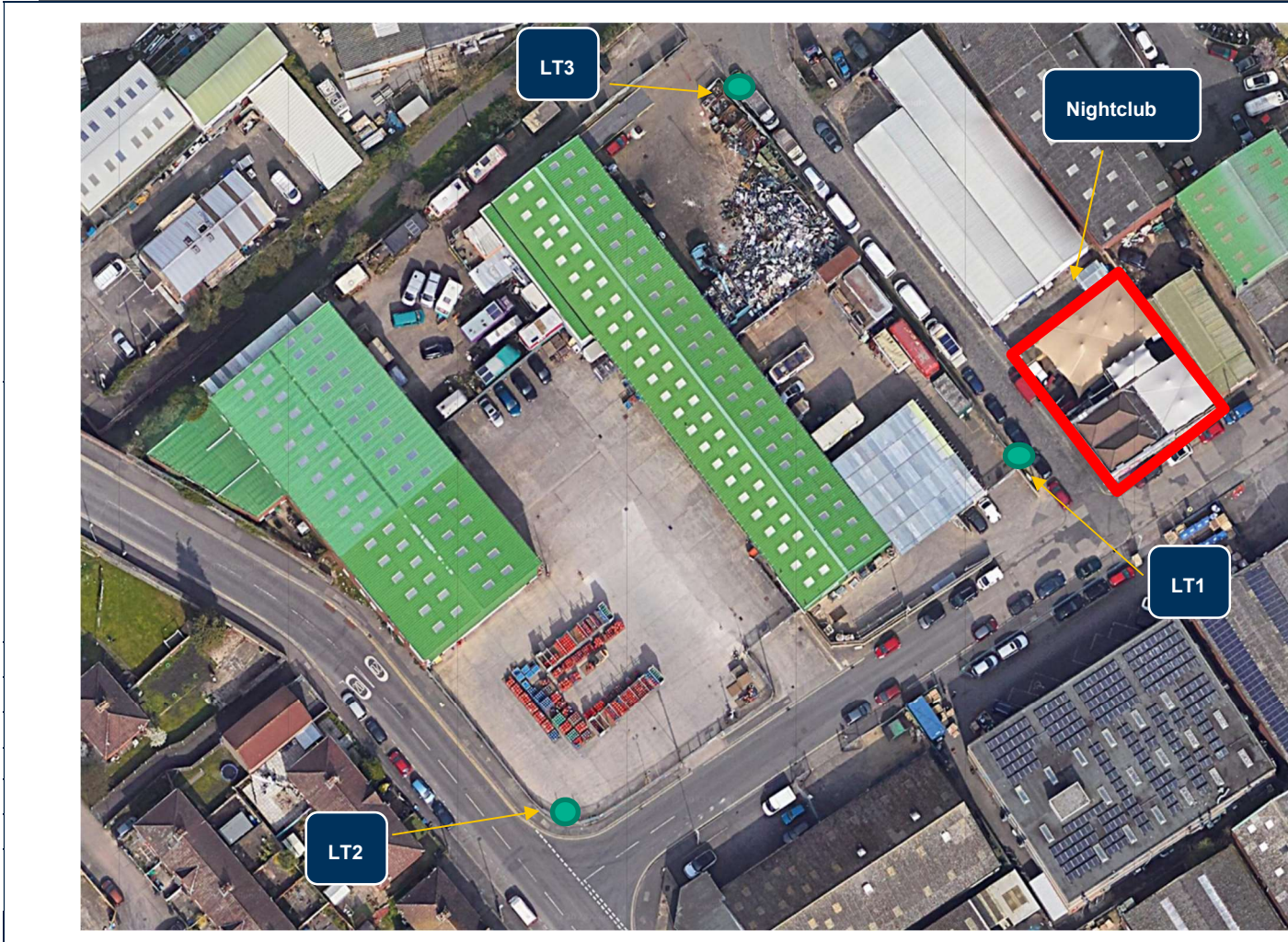
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- 7 British Standards Institution. British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings'.
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- 9 Building Regulations 2010. Approved Document O: Overheating. 2021.
- 10 Association of Noise Consultants. Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O. July 2022
- 11 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.
- 12 ISO. International Standard ISO 9613-2:1996. Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation.



Figures

**NOISE ASSESSMENT FOR A PROPOSED MIXED USE DEVELOPMENT AT NEW HENRY STREET, BRISTOL
FOR DOMINUS BRISTOL LIMITED**



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 Brighton, East Sussex BN1 4DU

Client: Dominus Group

Project: For Dominus Bristol Limited

Job Ref: 629383_Report01_R04

File location: Premier Business Park

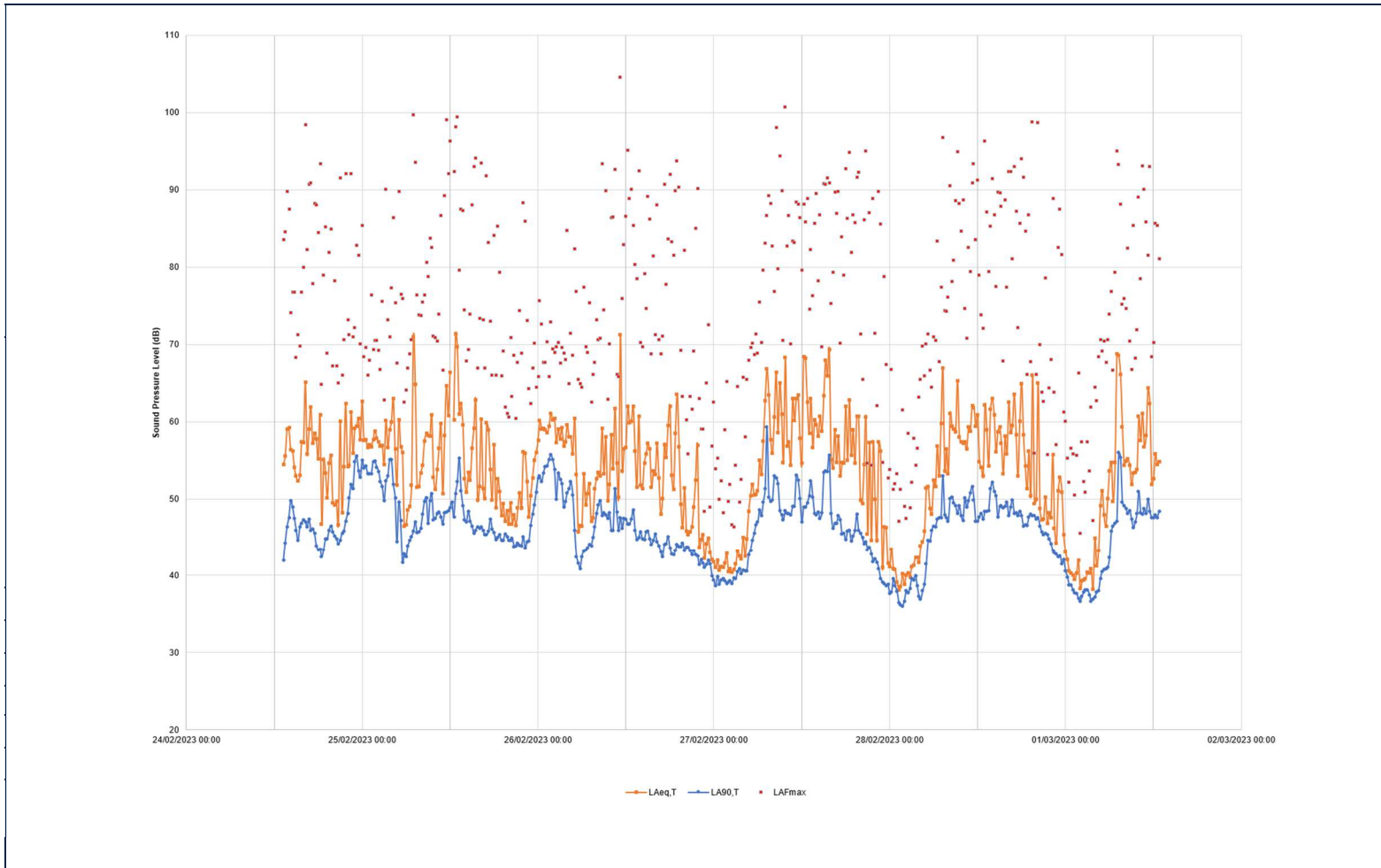
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Figure 1: Site & Survey Locations

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Job Ref:
 629838_Premiere_Business_Park_Report
 File location: Premiere Business Park

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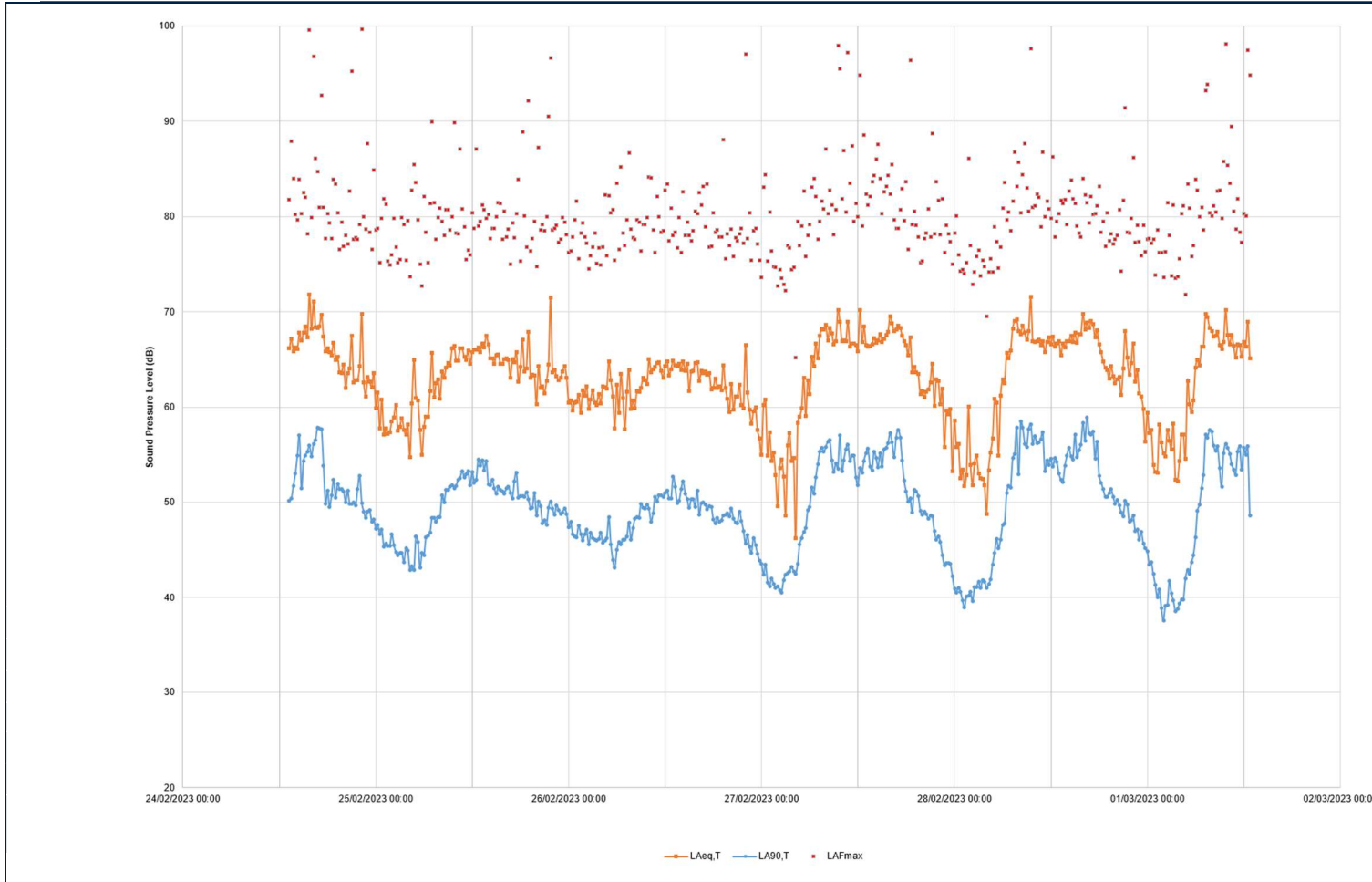
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Figure 2: LT1 Survey Graph

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Project: Premiere Business Park

Job Ref: 629383_Report01_R04

File location: Premiere Business Park

Date: 27/03/2023

Rev:0

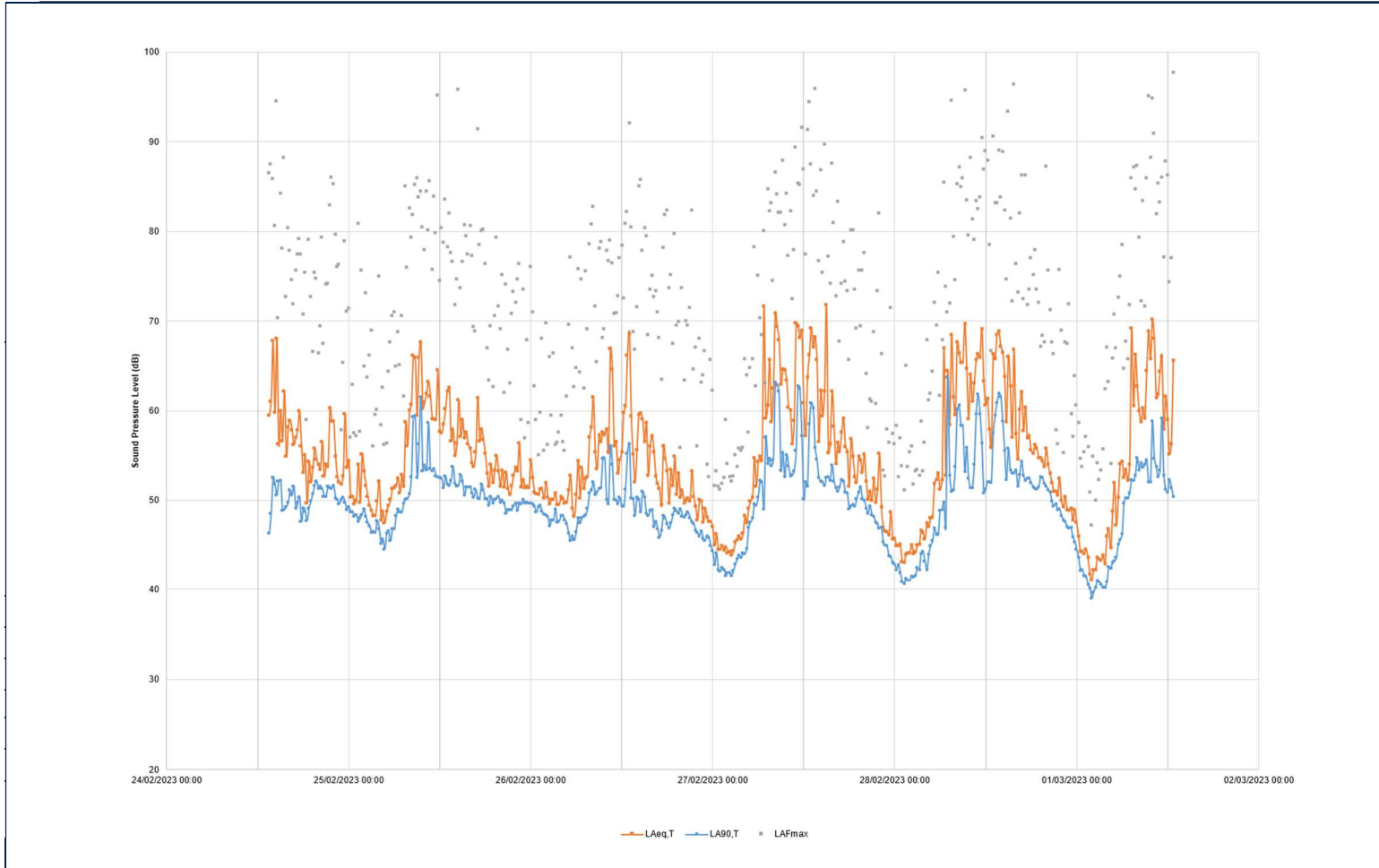
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Figure 3: LT2 Survey Graph

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Client: Dominus Group

Project: Premiere Business Park

Job Ref: 629383_Report01_R04

File location: Premiere Business Park

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Figure 4: LT3 Survey Graph

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