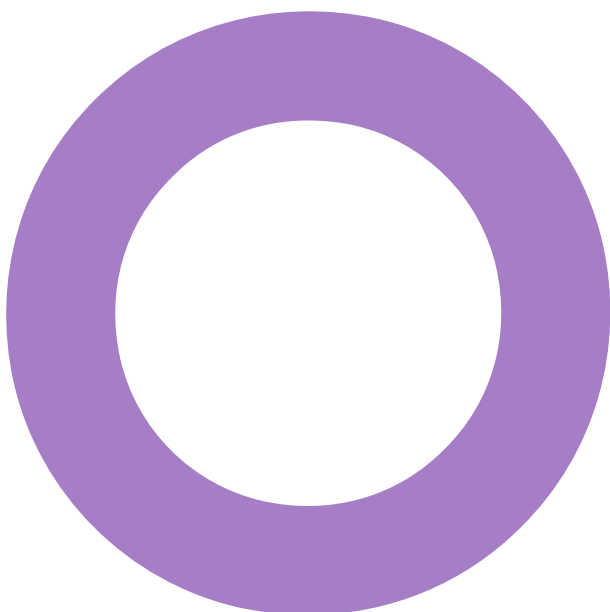


**One Piccadilly Gardens - New
ASHP.
Manchester.**
**Legal & General Investment
Management.**

ACOUSTICS

NOISE ASSESSMENT PLANNING REPORT

REVISION 00 – 21 JUNE 2023



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	21/06/2023	Initial issue	AP	PM	PM

This document has been prepared for Legal & General Investment Management only and solely for the purposes expressly defined herein. We owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by us in signed writing, we hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law. The consequences of climate change and the effects of future changes in climatic conditions cannot be accurately predicted. This report has been based solely on the specific design assumptions and criteria stated herein.

Project number: 10/14709

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Executive summary.

Hoare Lea have been appointed to provide acoustic advice for the proposed installation of new air source heat pumps to replace existing boiler plant at One Piccadilly Gardens.

An environmental noise survey has been carried out between 27 April and 5 May 2023.

The representative background sound levels measured during the survey were 51 dB $L_{A90,15min}$ during the daytime (07:00 to 23:00 hrs) and 46 dB $L_{A90,15min}$ at night-time (23:00 to 07:00 hrs).

Based on BS 4142:2014 and Manchester City Council guidance, all plant, equipment and machinery associated with the development shall be controlled to ensure that the overall sound pressure levels at 1 m from the façade of the nearest noise sensitive premises do not exceed 46 dB $L_{A,r,Tr}$ during the daytime (07:00 to 23:00 hrs) and 41 dB $L_{A,r,Tr}$ during the night (23:00 to 07:00 hrs). If the plant contains any tonal characteristics a further correction will be required.

A 10 dBA relaxation of the above limits is applicable to back-up emergency plant.

A summary of the new plant proposals is provided with noise limits provided for then new plant to ensure compliance with the noise limits. These noise limits are understood to be in line with the current selections.

1. Introduction.

Hoare Lea have been appointed to provide acoustic advice for the proposed installation of new air source heat pumps to replace existing boiler plant at One Piccadilly Gardens.

An environmental noise survey has been carried out on site over 5 days commencing on Thursday 16 March 2023. The aim of the survey was to determine the existing noise levels around the site, with the purpose of establishing the prevalent ambient and representative background noise levels to set maximum noise egress limits for plant and machinery associated with the development.

This report presents the findings of the noise survey and sets out the permissible maximum plant noise egress limits in accordance with BS 4142:2014 guidance.

2. Site and development details.

2.1 Site location and proposals.

The proposed scheme comprises the installation of new ASHPs to replace existing boiler plant. The existing plant is located within the plant well highlighted below. The replacement plant is proposed to also be located within the plant well.

The nearest noise sensitive receptor to the new plant is considered to be the Ibis Styles Manchester Portland hotel, also highlighted below. The worst affected window is approximately 45 m from the plant area with direct line of sight to it.

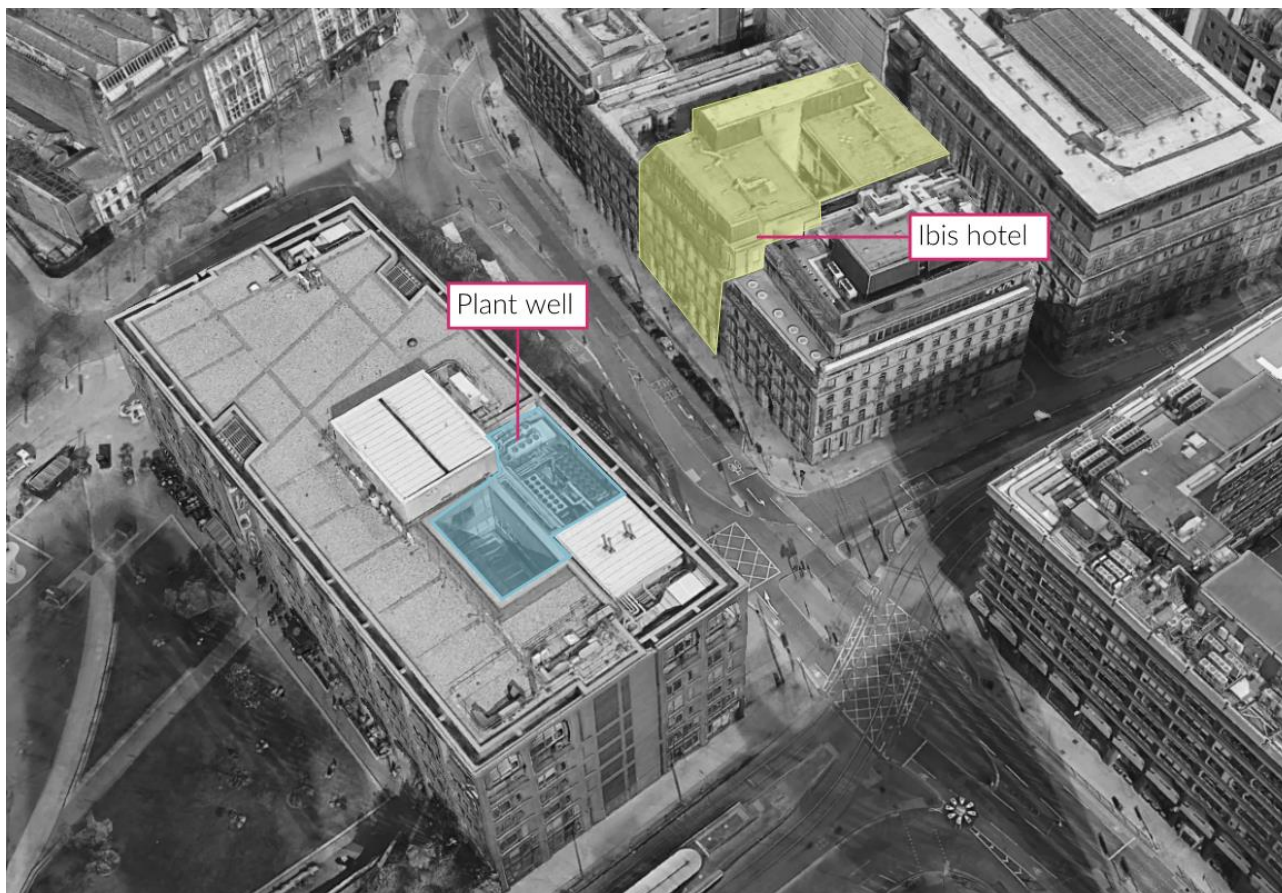


Figure 1 Aerial photograph indicating nearby noise sensitive premises (courtesy of Google Earth)

2.2 Surrounding area & noise climate.

The site is located within a relatively noisy area of central Manchester, with road traffic, including a high proportion of buses and HGVs, along Portland Street.

At roof level, existing plant from the One Piccadilly Gardens are contributing noise sources, with constant noise from the ventilation plant noted as dominant during the site visits.

3. Acoustic criteria.

3.1 Local Authority planning guidance.

3.1.1 General plant noise.

Criteria for plant noise egress are provided in the Manchester City Council (MCC) "Planning & Noise Technical Guidance (October 2022)" document.

With regards to noise from fixed plant/equipment, MCC refers to BS 4142:2014 and also states the following:

"Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location."

A brief summary of the standard guidance is presented below for reference.

3.1.2 Back-up / standby plant.

Following on from discussions with Lisa Jones of Manchester City Council in the meeting of 9 December 2020 in relation to a different scheme, it is understood that MCC allow a 10 dB relaxation to noise limits for standby generators and back-up plant on the basis that they only operate during temporary / emergency situations.

3.2 BS 4142:2014.

Noise egress from any plant and machinery associated with the development should not cause disturbance at nearby sensitive premises.

The rating level for all new plant and machinery should be no more than equal to the existing representative background sound levels.

Further corrections should be applied if the plant noise contains tonal and/or impulsive characteristics. The magnitude of these corrections is dependent upon the subjective perceptibility of the tones/impulses present.

Where the Rating Level exceeds the background, the level of impact increases as shown below.

Table 1 BS 4142 assessment criteria

Comparison with background	Indicative assessment
+0 dB or below measured background	Low impact
+ 5 dB	Adverse impact
+ 10 dB or more above measured background	Significant adverse impact

4. Environmental noise survey.

4.1 Summary.

An environmental noise survey was carried out on site over a period of 8 days between 27 April and 5 May 2023. During this time, long-term unattended measurements were carried out. Full details of the equipment used, as well as weather information are provided in Appendix B. Detailed survey results are presented in Appendix C.

The survey measurement position is presented in the annotated aerial photograph presented in Figure 2.

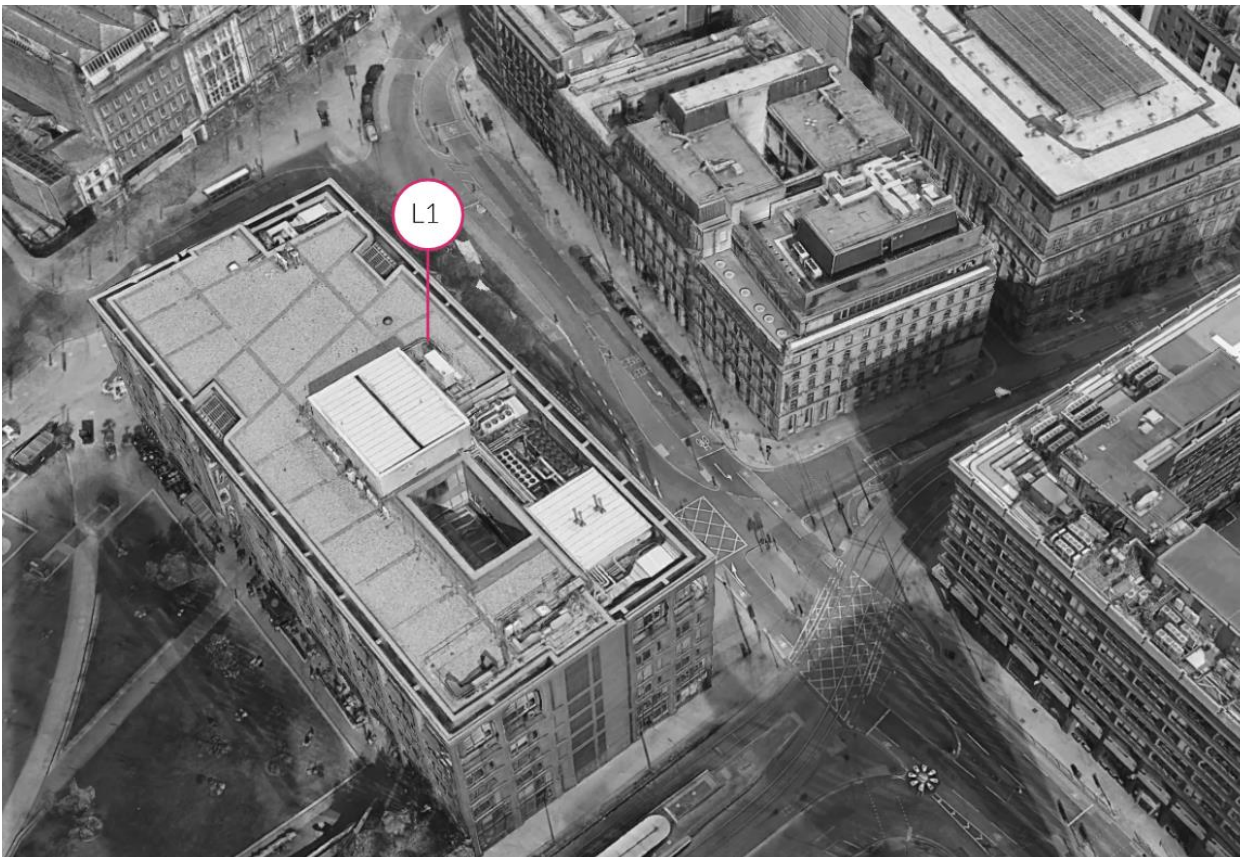


Figure 2 Aerial photograph indicating measurement positions and prevalent sound levels (courtesy of Google Earth)

In line with BS 4142:2014, for the purpose of analysis and establishing representative background sound levels during the periods of interest, the background sound levels have been quantified using statistical analysis from the continuous logging measurements. These are presented in Appendix D.

From the analysis carried out, the representative background sound levels measured during the survey were respectively 51 dB $L_{A90,15min}$ during the daytime period, and 46 dB $L_{A90,15min}$ during the night-time period.

5. Plant noise emissions.

5.1 Plant noise limits.

5.1.1 Typical plant.

Based on the criteria set out in Section 3 and the survey results, the cumulative maximum sound pressure levels for fixed plant, equipment and machinery associated with the development shall not exceed the levels presented in Table 2 at 1 m from the nearest noise sensitive premises.

Table 2 Maximum permissible sound pressure levels at 1m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1 m from the nearest noise sensitive premises ($L_{Ar,T}$, dB) *
07:00 to 23:00 hours	46
23:00 to 07:00 hours	41

*If plant noise contains any tonal or impulsive characteristics, a further correction shall be applied to the levels set out above in accordance with BS 4142:2014.

5.1.2 Back-up / standby plant.

The applicable noise limits for back-up plant are presented in Table 2 based on the requirements discussed in Section 3.1.2.

Table 3 Maximum permissible sound pressure levels at 1m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1m from the nearest noise sensitive premises (L_{Aeq} , dB)
07:00 to 23:00 hours	56
23:00 to 07:00 hours	51

5.2 Proposed plant.

It is understood that the following new external plant is proposed:

Unit	Proposed operation
ASHP 01	Not anticipated to operate at greater than 80% load between 23:00 – 07:00.
ASHP 02	Resilience unit, only understood to operate as a temporary emergency measure if there is an operational issue with ASHP 01.

On the basis of the proposed operation, ASHP 01 is required to comply with the limits set out in Section 5.1.1 whereas ASHP 02 is to comply with the limits set out in Section 5.1.2.

To comply with the noise limits, it is recommended that the plant selections be limited to the below levels:

Unit	Noise limit
ASHP 01	At 100% duty – 59 dB L_{Aeq} at a distance of 10 m. At 80% duty (duty not to be exceeded between 23:00 – 07:00) – 53 dB L_{Aeq} at a distance of 10 m
ASHP 02	58 dB L_{Aeq} at a distance of 10 m.

These are in line with the current selections for the proposed new external plant.

Appendix A: Policy and guidance.

National policy.

Noise Policy Statement for England.

The *Noise Policy Statement for England* (NPSE) advises that noise impacts should be assessed on the basis of adverse and significant adverse effects but does not provide any specific guidance on assessment methods or noise limits.

The NPSE introduces the concepts summarised in Table 4 that can be applied when considering the significance of noise impacts, which are applied by the World Health Organization.

The document advises that it is not possible to have '*a single objective noise based measure.... that is applicable to all sources of noise in all situations*'. It further advises that the sound level at which an adverse effect occurs is likely to be different for different noise sources, for different receptors at different times.

Effect Level 1	Description
No Observed Effect Level (NOEL)	This is the noise level below which no effect can be detected. In simple terms, below this level of noise, there is no detectable effect on health and quality of life due to the noise being assessed.
Lowest Observed Adverse Effect Level (LOAEL)	This is the level of noise above which adverse effects on health and quality of life can be detected.
Significant Observed Adverse Effect Level (SOAEL)	This is the level of noise above which significant adverse effects on health and quality of life occur.

Table 4: NPSE observed effect levels.

National Planning Policy Framework.

National Planning Policy Framework (NPPF) sets out the Government's planning policies and how these are expected to be applied. In relation to noise and vibration, NPPF section 15 paragraphs 170, 180 and 182 are presented below:

'170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e. preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability'

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

- 1. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- 2. 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

- 3. limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

'182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs).

Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'

Planning Practice Guidance.

Online Planning Practice Guidance (PPG) has been published to provide greater details in relation to the relevance of noise to the planning process following the introduction of the NPPF and NPSE.

This guidance states, under the heading '*How to Determine the Noise Impact*', that the following should be considered by Local Authorities:

- *'whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.'*

In line with NPSE, this includes identifying where noise exposure is above or below the significant observed adverse effect level and the lowest observed adverse effect level for a given situation during the operation of the Proposed Development.

Further guidance on each of the various observed effect levels set out in the NPSE is provided in the table detailed in the section headed 'How to Recognise when Noise could be a concern?' which is reproduced in Table 5.

It is important to note that no specific noise parameters are defined in the text or target noise levels provided. Under the heading 'What factors influence whether noise could be a Concern?', the subjective nature of noise is discussed. It is stated that there is no simple relationship between noise levels and the impact on those affected. This depends on how various factors combine in particular situations.

In respect of mixed-use developments, the following guidance is provided:

'When proposed developments could include activities that would be covered by the licensing regime, local planning authorities should consider whether the potential for adverse noise impacts will be addressed through licensing controls (including license conditions). Local planning authorities should not however presume that license conditions will provide for noise management in all instances and should liaise with the licensing authority.'

Perception	Example of outcomes	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not Intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.		No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. 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 Level	Avoid
Noticeable and disruptive	Extensive and regular changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Table 5: PPG observed effects.

Local policy.

Manchester Core Strategy.

Manchester's Local Development Framework Core Strategy Development Plan Document was adopted in 2012. The document outlines the Council's vision for Manchester in 2027 and includes planning policies to be followed within the Manchester City Council area. The document includes two policies relating to noise and this development. The key paragraphs are presented below:

Policy SP1

The key spatial principles which will guide the strategic development of Manchester to 2027 are:

- *The City is covered by regeneration areas including the City Centre. All development should have regard to the character, issues and strategy for each regeneration area as described in the North, East, Central and South Manchester and Wythenshawe Strategic Regeneration Frameworks and the Manchester City Centre Strategic Plan.*

Development in all parts of the City should make a positive contribution to neighbourhoods of choice including:

- *creating well designed places that enhance or create character.*
- *making a positive contribution to the health, safety and wellbeing of residents*
- *considering the needs of all members of the community regardless of age, gender, disability, sexuality, religion, culture, ethnicity or income.*
- *protect and enhance the built and natural environment.*

Policy DM1

All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:

- *Impact on the surrounding areas in terms of the design, scale and appearance of the proposed development. Development should have regard to the character of the surrounding area.*
- *Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise.*
- *Design for health.*

Unitary Development Plan for the City of Manchester.

Although the Unitary Development Plan for the City of Manchester (1995) has been superseded by the Manchester Core Strategy, some policies have been retained. One saved policy relates to noise and the key paragraphs are presented below:

Policy DC26

The Council intends to use the development control process to reduce the impact of noise on people living and working in, or visiting, the City. In giving effect to this intention, the Council will consider both:

- a. the effect of new development proposals which are likely to be generators of noise; and*
- b. the implications of new development being exposed to existing noise sources which are effectively outside planning control.*

Developments likely to result in unacceptably high levels of noises will not be permitted:

- a. in residential areas;*
- b. near schools, hospitals, nursing homes and similar institutions;*
- c. near open land used frequently for recreational purposes.*

The Council will control noise levels by requiring, where necessary, high levels of noise insulation in new development as well as noise barriers where this is appropriate.

Manchester City Council Noise and Planning Technical Guidance.

The Manchester City Council have produced supplementary technical guidance on noise and planning, released in 2022. This considered assessment methodologies and criteria for various aspects of noise within planning. The key paragraphs in relation to the proposed development are presented below:

3.6.1.5.1 Noise and Vibration from Fixed Plant / Equipment

Noise from fixed plant, equipment or machinery can be very annoying and disruptive to people living nearby particularly where that item involved emits a noise with impulsive or tonal characteristics.

Many of the noise complaints Environmental Health receive about noise from plant, equipment and machinery specifically concern the character of the noise emitted. Any noise assessment needs to consider not only the overall level of noise emitted but also its particular characteristics. The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:

'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.

By designing the sound pressure level of any plant items to generate a noise impact of at least 5dB below the existing background level, any plant noise impact should be of a negligible level which should not give rise to complaints from users or occupiers of existing noise-sensitive usages.

Past experience has shown that this criterion can be readily achieved. Where available, product specification data for new items should be submitted with the acoustic report. Consultants should be using these to compare with data from the noise survey, and propose mitigation where the levels are above those specified in the criterion. Where this information is not available a consultant may choose to measure the noise levels generated by the equipment in question where the equipment has already been installed elsewhere (and in accordance with the guidance in BS 4142).

Where fixed plant, equipment or machinery is attached to a building the vibration caused by it can pass through the building structure and cause structure borne noise elsewhere in the building. Where it is to be installed in or on a building containing a noise sensitive use structure borne noise should be considered in the noise assessment and adequate control measures should be proposed. An example of where this would be required is where there is a proposal to install fixed plant or equipment on the roof of a residential apartment block.

5.1.2 Noise generated within the development

The existing and expected noise source/s should first be identified and the following procedures should be applied:

- 1) select metrics to use for measuring or predicting noise levels (e.g. LAeq,T)*
- 2) assess effects of topography and other features, such as noise screens or reflecting surfaces.*
- 3) measure or predict noise levels at strategic points. In some complex situations it might be beneficial to produce a contour map of external noise levels.*
- 4) if appropriate, assess noise levels due to user activities around the development.*

The levels of existing noise and noise expected in the foreseeable future should be based on measurement where practicable, or may be predicted if there is reliable information.

5.2 Assessing noise

The following information MUST be included in all acoustic reports:

- *A statement of the reason for and scope of the report.*
- *Details of the proposed development to which the report relates.*
- *A location and development plan.*
- *A description of the area and environment surrounding the development site*
- *The methodology used to carry out the noise survey including the location of any noise monitoring locations, the equipment used and details of its last accredited calibration, and the weather conditions at the time the survey was carried out*
- *Full table of results.*
- *Assessment of the results in accordance to the relevant standards and policies.*
- *Recommendations for noise control measures if needed.*

- Full calculations of the noise reductions expected to support any suggested noise control measures.

5.3.1.4 Plant and Equipment

Noise from external plant, equipment or servicing items are assessed when determining planning applications. Typical equipment in both commercial and residential developments includes items such as air conditioning plant, retail refrigeration plant or lift motors.

Industrial developments are much more varied with the types of plant and equipment being entirely related to the industry in question.

The design aim here should be to meet the criterion in section 3.6.1.5.1. Consideration should initially be given to selecting the most low noise emitting models of plant and equipment possible. If this is not feasible, then it may be advisable to consider relocating noisy plant and equipment to a less noise sensitive area of the site and/or away from multiple reflecting surfaces.

It may also be possible to erect acoustic shielding around any necessary plant and equipment to contain noise and prevent it causing problems off-site. Some equipment may require additional acoustic mitigation measures to control the impacts from tonal noise or intermittent operation.

The use of any plant and equipment overnight usually causes an increase in noise sensitivity, so it may be advisable to limit use during night time periods if possible.

Consideration of the above measures at an early stage of the planning process is likely to progress an application more swiftly.

Recognised guidance.

British Standard 4142.

Current Government advice to Local Planning Authorities in both England and Wales refers to British Standard 4142:2014 (BS 4142) as being the appropriate guidance for assessing commercial operations and fixed building services plant noise. The British Standard provides an objective method for rating the significance of impact from industrial and commercial operations. It describes a means of determining sound levels from fixed plant installations and determining the background sound levels that prevail on a site.

The assessment of the impacts is based on the subtraction of the pre-existing background sound level ($L_{A90,T}$) from the rating level ($L_{A,r,T,r}$).

The standard does not give a definitive method for determining the background sound level but instead, as a commentary, states that “the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods”.

Clause 8.1.4, which discusses the monitoring duration, states “there is no “single” background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.” As a note to this clause the following commentary is given on obtaining a representative background sound level:

“To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value.”

The rating level is defined objectively as the specific source noise level in question (either measured or predicted) with graduated corrections for tonality (up to +6 dB(A)), impulsivity (up to +9 dB(A)), intermittency (+3 dB(A)) and other sound characteristics (+3 dB(A)) which may be determined either subjectively or objectively, if necessary.

The background sound level is subtracted from the rating level. The following is considered when evaluating the potential impact:

- A difference of around +10 dB is likely to be an indication of a significant adverse impact, depending on context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on context; and
- A difference of +0 dB or less is an indication of the specific sound source having a low impact, depending on the context.

It also states '*where background sound levels and rating levels are low, absolute levels might be as, or more, relevant that the margin by which the rating level exceeds the background. This is especially true at night.*'.

Appendix B: Survey and equipment details.

Equipment details

The details of the equipment used during the environmental noise survey.

All equipment used was within dates of calibration and calibration certificates are available on request.

Table 6 Equipment used during environmental noise survey

Description	Serial Number	Calibration Date
Rion - Sound Level Meter: NL-52	00297868	14/04/2023
Rion - Microphone: UC-59	14887	
Rion - Pre-amplifier: NH-25	88079	

Weather information

Weather reports for the area indicate that temperatures ranged between approximately 6 °C to 17 °C. Wind speeds were low and periods of rain were not sufficiently long to adversely affect the measurement results.

The measured data is therefore considered suitable as being representative of typical conditions.

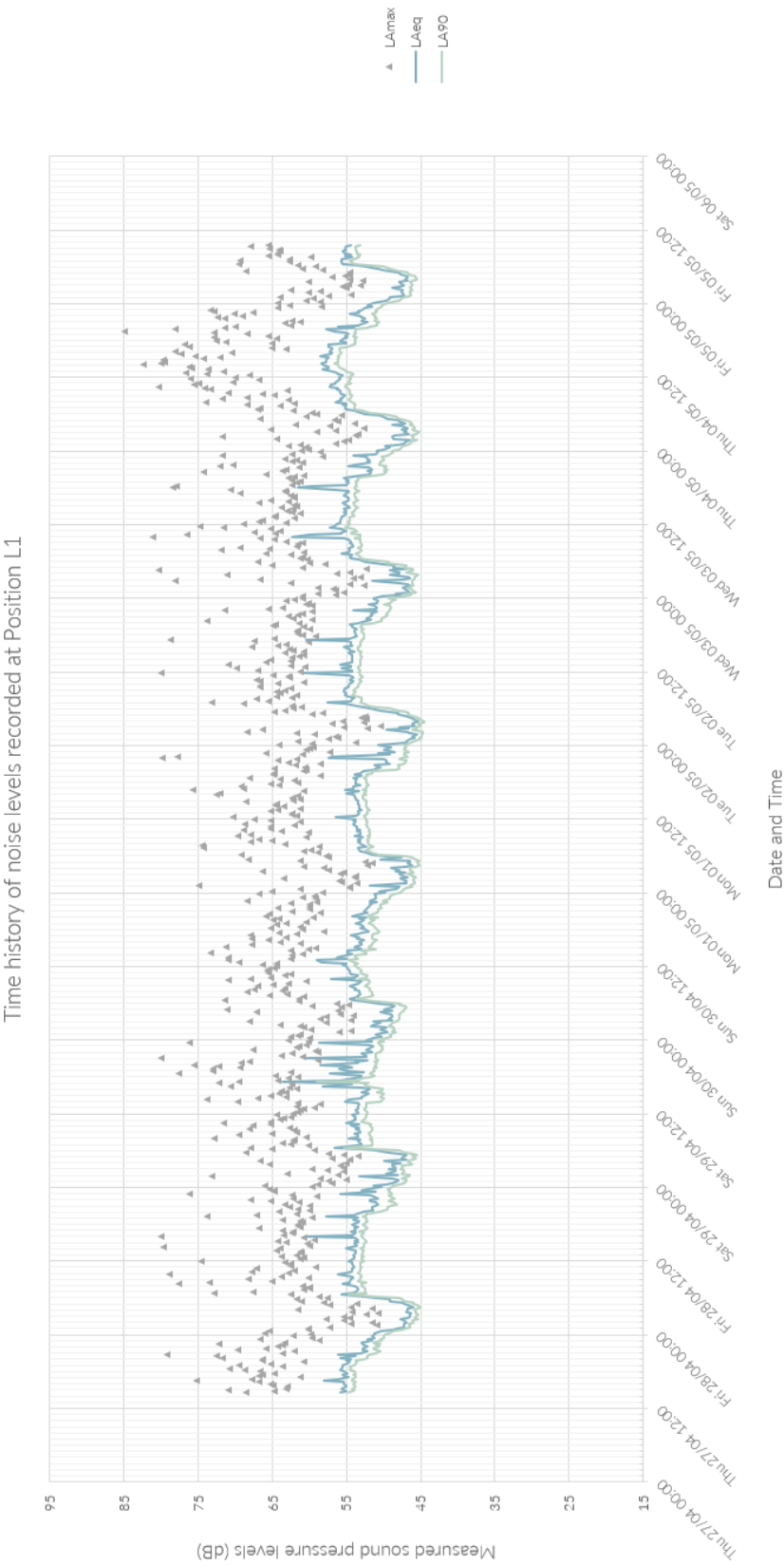
Appendix C: Detailed survey results.

Results.

Table B1 Ambient noise levels measured during unattended measurements

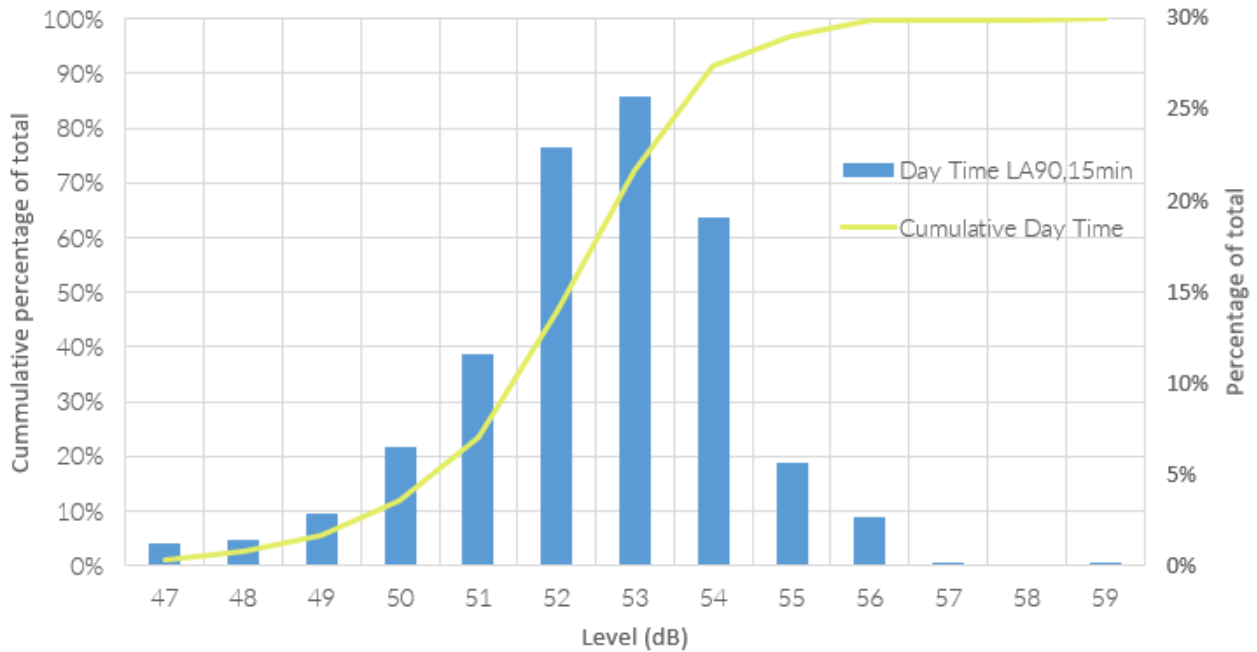
Date	Day time (07:00-23:00)	Night time (23:00 - 07:00)
	L _{Aeq,16hr} (dB)	L _{Aeq,8hr} (dB)
27/04/2023	55	50
28/04/2023	54	51
29/04/2023	55	51
30/04/2023	54	49
01/05/2023	53	49
02/05/2023	55	50
03/05/2023	56	50
04/05/2023	56	50
05/05/2023	55	-

Time history graph at unattended position L1

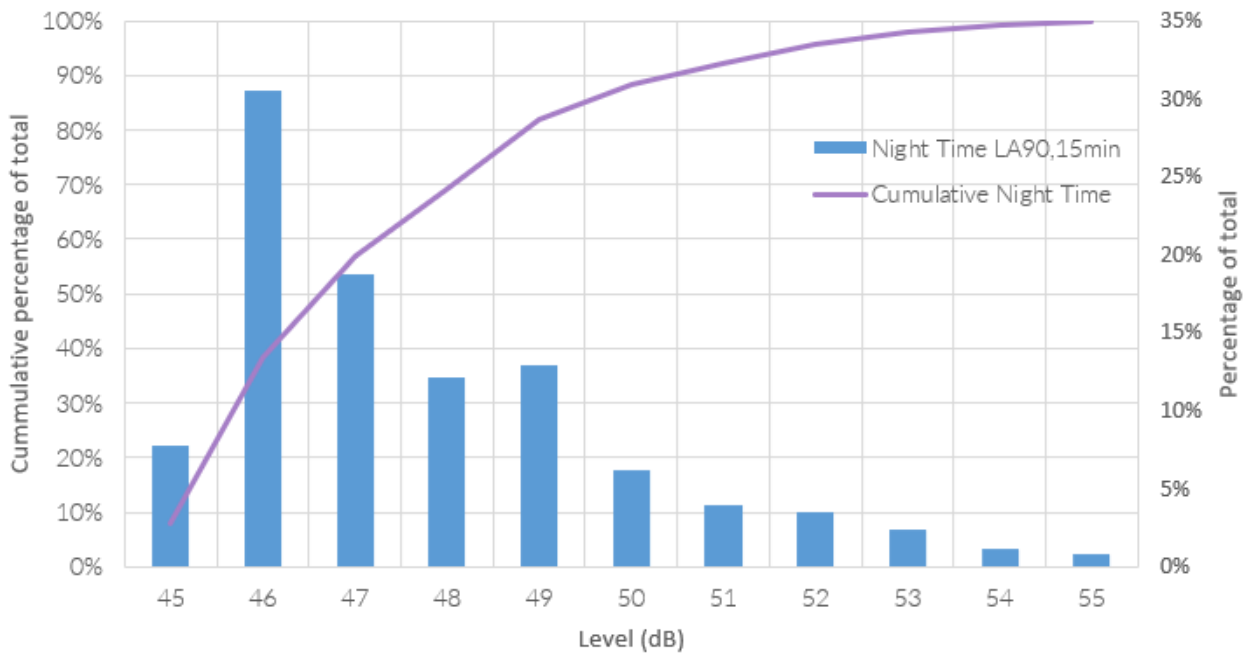


Appendix D: Statistical analysis of background levels measured.

Day (16hr) LA90,15min at L1



Night LA90,15min at L1





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