

Plant Noise Impact Assessment Report for Planning

Greggs, Spring Gardens, Buxton

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EXECUTIVE SUMMARY

ES Acoustics Ltd have been commissioned by JMS Planning to undertake an environmental noise survey and prepare a plant noise impact assessment for the installation of external building services plant serving the proposed Greggs bakery at Greggs, Spring Gardens, Buxton.

An environmental noise survey has been undertaken to establish background sound levels representative of the closest noise sensitive receptor locations relative to the proposed plant location.

Noise criteria for the proposed units have been based on the guidance of High Peak Borough Council and the guidance of BS 4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*', and informed by the findings of the noise survey, alongside consultation of additional relevant planning policy.

It is understood that the proposed plant units would only be required to run during the daytime operational hours of the Greggs bakery. A summary of the relevant survey measurement results is therefore summarised in the table below.

Period	Ambient Sound Level	Representative Background Noise Level
	$L_{Aeq, T}$ (dB)	L_{A90} (dB)
Daytime 07:00-23:00	58	48

Based on the analysis above, ESA would consider the representative background noise levels of L_{A90} 48dB during daytime hours, to ensure a robust assessment is provided.

The manufacturer's noise data of the proposed external building services plant have been used to calculate expected noise levels at the closest noise sensitive receptor positions. The calculated rating levels are shown below with comparison to the representative background noise level.

Period	Representative Background Sound Level	Worst-case Mitigated Specific Level at 1m from Receptor	Acoustic Feature Corrections	Calculated Rating Level at 1m from Receptor Façade	+/- compared against background
	L_{A90} (dB)	dB $L_{Aeq, Tr}$	dB	dB $L_{Ar, Tr}$	dB
Daytime 07:00-23:00	48	39	0	39	-9

Considering the calculated Rating Levels compared to the background sound level and the context in which the sound occurs, transmission of noise to the closest sensitive receptor windows due to the effects of the proposed external building services plant installations would satisfy the noise emissions requirements of the Local Authority, during the plant's daytime operational hours, and would be expected to be indicative of a **low likelihood of adverse impact**, as per the guidance of BS 4142:2014+A1:2019, provided the mitigation measures outlined in Section 5.2 are implemented.

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1 INTRODUCTION

ES Acoustics Ltd have been commissioned by JMS Planning to undertake an environmental noise survey and prepare a noise impact assessment for the proposed installation of external building services plant serving the proposed Greggs bakery at Greggs, Spring Gardens, Buxton.

The purpose of this report is to;

- Review relevant national and local planning policy and guidance;
- Undertake an environmental noise survey on site to determine background noise levels at nearby noise sensitive receptor locations;
- Establish relevant noise guidance for the proposed installation of the new plant at nearby receptors in accordance with High Peak Borough Council's requirements and the guidance of BS 4142:2014+A1:2019; and
- Undertake a noise impact assessment and, where appropriate, provide outline mitigation advice to demonstrate compliance with the relevant guidance.

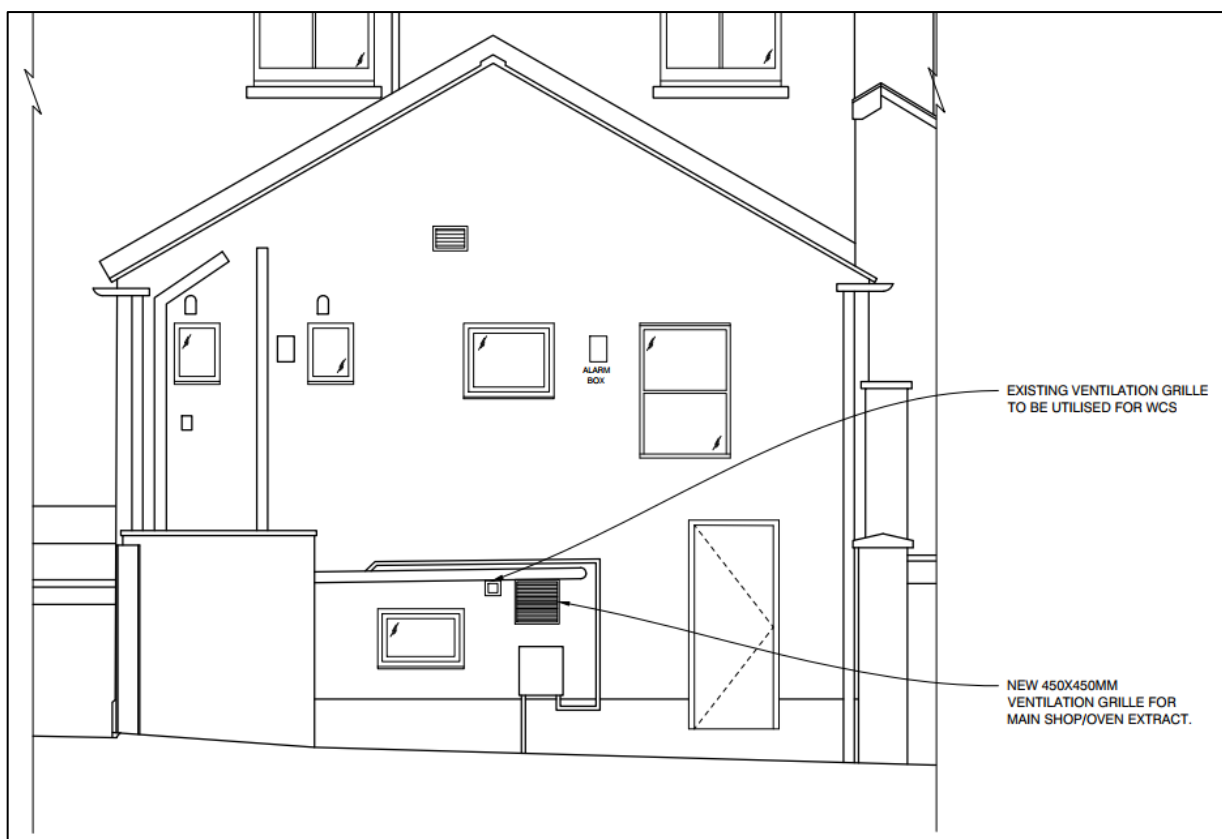


Figure 2 Proposed rear elevation detailing installation location of plant (image ref: Greggs Plc)

Based on the proposed installation location of the extract grille, the closest noise sensitive receptor windows would be the first and second floor windows on the rear facades of 16-22 Hardwick Street, located to the south of the plant installation location at a minimum distance of approximately 12 metres and with direct line of site to the plant installations, as shown in Figure 3 below.

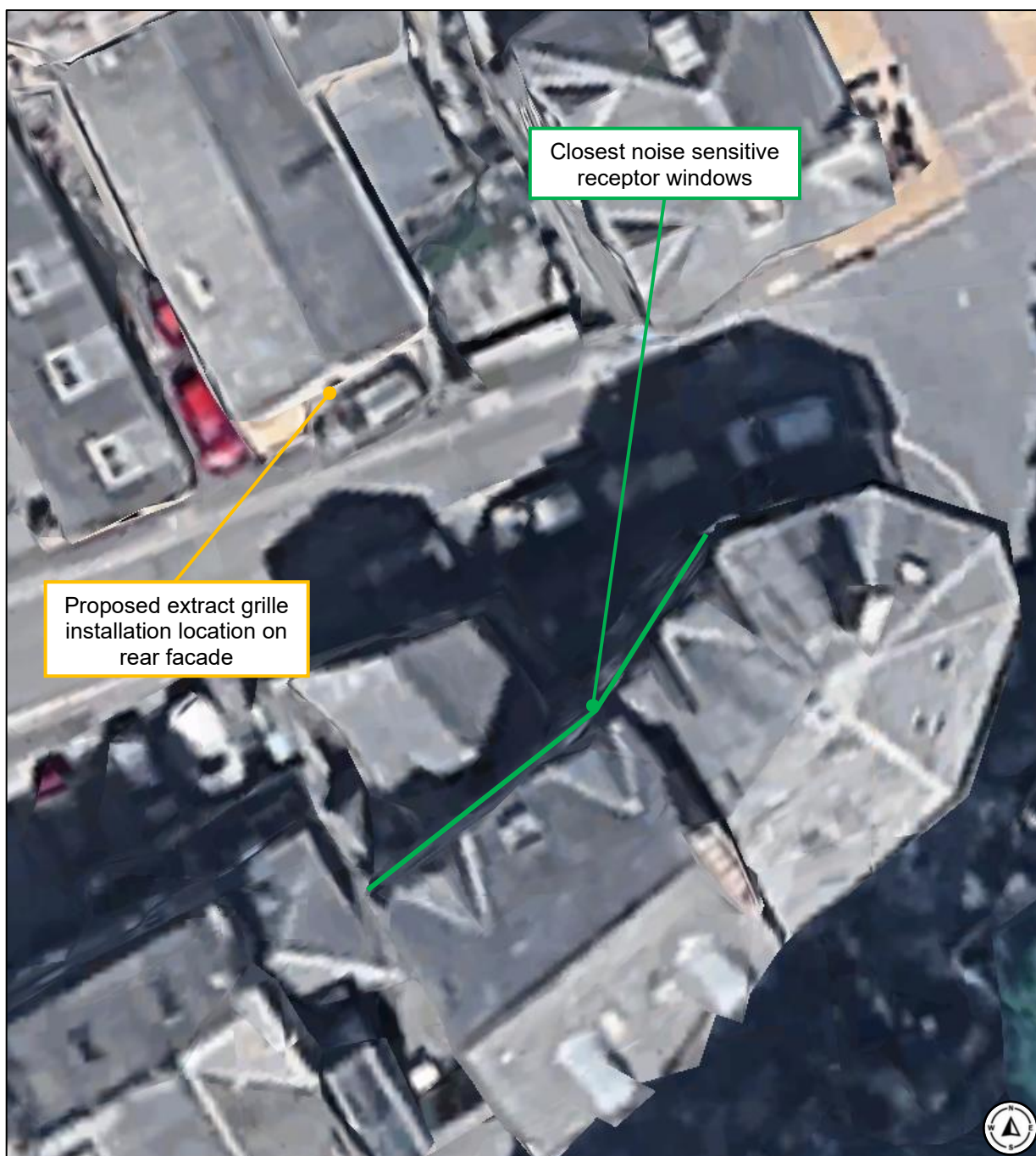


Figure 3 Closest noise sensitive receptor location (image ref: Google Maps)

In addition to the plant items described above, the proposals also include the installation of a toilet extract system within the development, as visible within the proposed plans. However, considering the relatively small scale and limited number of the proposed toilet extract units, their internal installation location, the presence of intervening ductwork between the fans and the external discharge points, and the separation distance to the nearest noise-sensitive receptor, it is the opinion of ES Acoustics Ltd that the toilet extract system is not expected to contribute materially to the overall plant noise emissions.

Accordingly, noise emissions from the toilet extract system are anticipated to be negligible and have not been considered further within the following assessment.

3 RELEVANT PLANNING POLICY AND GUIDANCE

A full review of relevant National Policy and Good Practice Guidance has been undertaken, as outlined in Appendix C. For ease of reference, the following documentation has been reviewed:

- *National Planning Policy Framework (NPPF)*
- *Noise Policy Statement for England (NPSE)*
- *National Planning Practice Guidance (NPPG)*
- *BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'*
- *BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'*

The site falls within the jurisdiction of High Peak Borough Council.

Relevant guidance has been obtained from the Council's official website, with specific reference to published information associated with planning applications involving the installation of building services plant.

The Council's recommended methodology for the assessment of plant noise sources is summarised as follows:

"Any machinery, plant or equipment including air conditioning units installed or operated in connection with the carrying out of this permission shall be so enclosed and/or attenuated that the noise generated by the operation of the machinery shall not increase the background noise levels during day time expressed as LA90 [1hour] (day time 07:00-23:00 hours) and/or (b) LA90 [15 mins] during night time (night time 23:00-07:00 hours) at any adjoining noise sensitive locations or premises in separate occupation above that prevailing when the machinery is not operating. Noise measurements for the purpose of this condition shall be pursuant to BS 4142:2014+A1:2019. The details and location of any plant or machinery to be installed under this permission shall be submitted for the written approval of the Local Planning Authority and shall be installed and operated within the development only as subsequently approved.

Reason: To safeguard the amenity of local residents and that of the surrounding area from noise disturbance."

The following assessment will therefore be based on the requirements of the local authority, and the guidance of BS 4142:2014+A1:2019.

4 ENVIRONMENTAL NOISE SURVEY

4.1 Measurement Location and Procedure

A noise survey was undertaken at the rear of the site, which was considered representative of the closest noise sensitive receptor windows, as indicated in Figure 4 below:



Figure 4 Environmental noise survey position (image ref: Google Maps)

An initial appraisal of the site during the site visit determined road traffic noise from the adjacent roads to be the principal noise source to the rear of the site, in addition to the noise of the existing building services currently installed at the rear of the Greggs site, consisting of 4 No. AC condenser units.

It is understood that the existing condenser units are to be retained as part of the proposed development. As such, they are considered to form part of the prevailing acoustic environment and have been taken into account in the characterisation of the baseline noise profile at the rear of the site.

The measurement procedure complied with ISO 1996-2:2017 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels*', with automated monitoring undertaken between 14:00 on Monday 16th March and 13:00 on Wednesday 18th March 2026.

The key acoustic descriptors measured for this assessment are as follows:

- $L_{Aeq,T}$ (the continuous equivalent A-weighted noise level over a given time period, T); and

- $L_{A90,T}$ (the noise level exceeded for 90% of the measurement period T , referred to as the 'background' noise level).

4.2 Measurement Equipment

The table below presents the equipment used for the baseline noise survey. The equipment calibration was verified before and after use, and no abnormalities were observed.

Equipment	Make and Model	Serial Number
Sound Level Meter	NSRT MK4	AHN8hfUYW9c9KLNC76rZFD
Calibrator	Hangzhou Aihua Instruments Co. Ltd AWA 6021A	1008779

Table 2 Noise survey equipment

4.3 Weather Conditions

Weather conditions during the automated monitoring were generally dry with light winds and therefore suitable for the measurement of environmental noise.

Data on temperature, wind speed and precipitation has been sourced from the closest weather station¹ with accessible data.

Analysis of the time history and measurement results show that the levels of wind speed and precipitation have had no impact on the measured results.

A summary of the weather data is reported in Table 3.

Description	Installation Date 16/03/2026	Interim Date 17/03/2026	Collection Date 18/03/2026
Average Wind Speed (m/s)	7	7.5	5
Average Temperature (°C)	10	9	9
Precipitation (mm)	1.2	0	0

Table 3 Weather conditions

4.4 Survey Results

The environmental noise time histories of the measurement result data are presented in Appendix D.

With regards to the background sound level, BS 4142:2014+A1:2019 notes that “...it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.”

Concerning particular circumstances and periods of interest, as the proposed plant is serving a commercial bakery, it is understood that the units would only be required to run during the daytime operational hours of the Greggs.

¹ Weather Station: FW0705 Whaley Bridge UK ID: F0705, located 10 km from the site at Latitude 53.333, Longitude -1.991

In terms of quantifying typical background sound levels during particular time periods, ESA has derived representative background sound levels via a statistical analysis of L_{A90} 5-minute values, shown in Figure 5. Full charts are presented within the attached Appendix E.

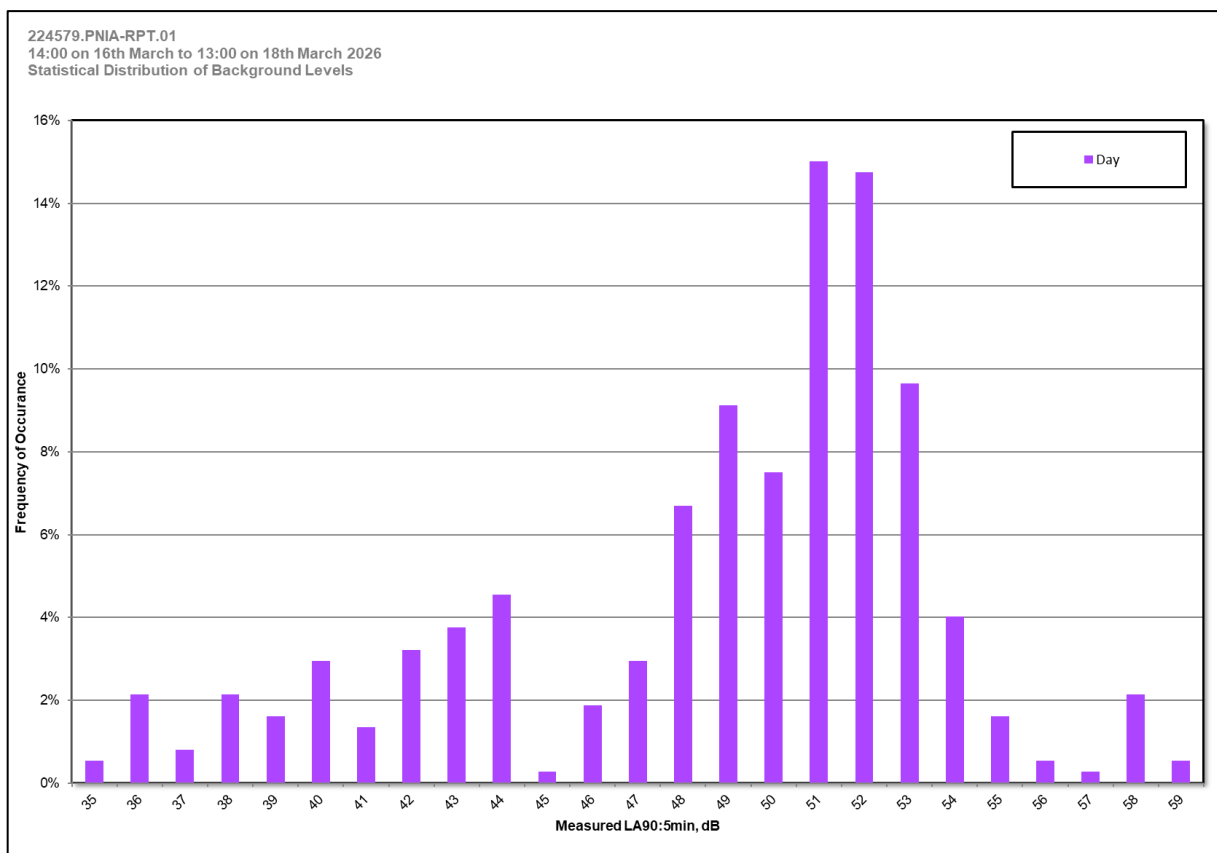


Figure 5 Statistical distribution of background sound levels

As demonstrated by the analysis above, it is clear that the minimum background sound levels are not representative of the wider daytime assessment period in question. ESA would therefore propose that representative background sound levels for daytime periods during the sites operational hours would be L_{A90} 48 dB(A), as the lowest single value occurring over more than 6% of the measurements taken.

A summary of the measurement results is presented in Table 4.

Period	Ambient Sound Level	Representative Background Sound Level
	$L_{Aeq, T}$ (dB)	L_{A90} (dB)
Daytime 07:00-23:00	58	48

Table 4 Measured noise levels

5 NOISE IMPACT ASSESSMENT

5.1 Predicted Unmitigated Rating Level at the Closest Receptor Façade

The Specific Sound Level of the external building service plant has been assessed at the closest noise sensitive receptor (NSR) window.

To establish the Rating Level as required by BS 4142:2014+A1:2019, appropriate acoustic feature corrections should be applied to the Specific Sound Level. It must be noted that the acoustic feature corrections are applied based on the level at the receptor location, not at the source, as they are reflective of the sound perceived by the receptor.

It would be proposed to apply the following acoustic feature corrections, considering the operation of the proposed plant installation.

Acoustic Feature	Description	Correction
Impulsivity	The operational noise emissions of the kitchen extract fan would not be considered impulsive, and therefore no correction is applied.	0dB
Intermittency	The operation of the kitchen extract fan would not be considered intermittent as it is expected that the units would run continuously during their operational hours, therefore no correction for intermittency has been applied.	0dB
Tonality	Tonality is commonly defined as being present when a single octave band sound level is 6 dB higher than the adjacent octave bands. The spectral content of the plant noise emissions at the receptor façade shows that no frequency band exceeds those adjacent, and therefore no correction is applied.	0dB
Other	No additional acoustic feature corrections would be applied.	0dB
Total Acoustic Feature Corrections added to Specific Sound Level		0dB

Table 5 Acoustic feature corrections

Table 6 compares the resultant Rating Level of each plant location calculated at the receptor positions against the representative background noise level. Full calculations are presented in Appendix F1.

In this instance, as the proposed kitchen extract system will be installed internally and ducted to the external exhaust points, the acoustic calculations will account for the attenuation associated with the internal ductwork, exhaust grille and duct end reflection.

The calculations consider a 350mm diameter circular duct and duct grille within the kitchen extract system, as per the provided plans.

Period	Representative Background Sound Level	Worst-case Specific Level at 1m from Receptor	Acoustic Feature Corrections	Calculated Rating Level at 1m from Receptor Façade	+/- compared against background
	LA90 (dB)	dB LAeq, Tr	dB	dB LA _r , Tr	dB
Daytime 07:00-23:00	48	53	0	53	+5

Table 6 Summary of the Rating Level at receptor

As shown in Appendix F1 and the table above, transmission of noise to the closest noise sensitive receptor windows due to the effects of the proposed external building services plant installations would exceed the representative background noise level by 12dB during daytime hours.

It would therefore be recommended to install mitigation measures as outlined in Section 5.2 below.

5.2 Noise Mitigation Measures

In order to reduce the transmission of noise to the closest noise sensitive receptor window, additional mitigation measures would be required in the form of an acoustic silencer to attenuate the noise emissions of the extraction system exhaust. The minimum insertion loss values required are shown in the table below:

Unit	Example Unit to Provide Mitigation	Insertion Loss levels in each octave band centre frequency, dB							
		63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Kitchen Extract	900mm Acoustic Silencer, 50% Free Area	2	4	9	15	17	14	10	8

Table 7 Require insertion loss levels of acoustic silencer

For optimal effectiveness, the silencer should be positioned directly at, or as close as practicable to, the fan outlet, ensuring minimal intervening duct length between the unit fan and the silencer.

The silencer should be of rigid construction and internally lined with acoustically absorbent material to provide effective broadband attenuation. Connections between the silencer and adjoining duct sections should be airtight and securely fitted to prevent leakage and flanking transmission. The selected unit should be sized to achieve the required insertion loss while maintaining acceptable pressure drop and system performance. Where relevant, the silencer should be installed in accordance with manufacturer guidance to ensure optimal acoustic effectiveness.

It is recommended that consultation be undertaken with a specialist manufacturer and supplier of acoustic silencers to develop a bespoke solution tailored to the specific operational and acoustic requirements of the installation, such as Environmental Equipment Corporation (EEC), Noico, Wakefield, or Environ.

5.3 Predicted Mitigated Rating Level at the Closest Receptor Façade

Table 8 compares the resultant mitigated Rating Level calculated at the receptor against the measured representative background noise level, following the installation of the above recommended acoustic silencer. Full calculations are presented in Appendix F2.

Period	Representative Background Sound Level L _{A90} (dB)	Worst-case Mitigated Specific Level at 1m from Receptor dB L _{Aeq, Tr}	Acoustic Feature Corrections dB	Calculated Rating Level at 1m from Receptor Façade dB L _{Ar, Tr}	+/- compared against background dB
Daytime 07:00-23:00	48	39	0	39	-9

Table 8 Summary of the mitigated Rating Level at receptor

As shown in Appendix F2 and the table above, transmission of noise to the closest sensitive receptor windows due to the effects of the proposed external extraction exhaust would be 9dB below the representative background noise level during the plant's daytime operational hours, provided the mitigation measures outlined in Section 5.2 are implemented.

BS4142 states the following in regards to assessing the rating level against the existing background noise level:

'The standard notes that a noise source under assessment will have a 'low impact' when the 'rating level' of a noise source is less than the existing background sound. It is also important to note that any quantitative assessment results are assessed considering the context in which the sound occurs.'

In accordance with the results presented above and the guidance set out in BS 4142, noise emissions from the proposed external plant installations are anticipated to result in a low likelihood of adverse impact, when considering the relevant context, as discussed in Section 5.4 below.

5.4 Context

BS 4142:2014+A1:2019 requires that any quantitative results are assessed considering the context in which the sound occurs.

As outlined within the attached Appendix C, the three types of contexts which should be considered are:

- *aspects of the absolute level;*
- *aspects of character; and*
- *aspects of the receptor, including physical measures designed to reduce noise.*

With respect to the absolute sound levels, as advised within BS 4142, the predicted Specific Sound Level of 39 dB L_{Aeq} at the residential façade is low in magnitude and typical of a quiet daytime environment. By way of context, guideline values published by the World Health Organization prescribe internal daytime ambient noise levels of approximately 35 dB L_{Aeq} as protective of health and amenity. Even allowing for modest attenuation through a partially open window, internal noise levels would reasonably be expected to fall comfortably below, the WHO guideline values, further information regarding this conclusion are presented within the following Section 5.5.

With regard to the acoustic character of the sound source, the context of the surrounding environment must be considered. The assessment location is within a town centre location, where the dominant and persistent source of background sound is road traffic from adjacent roads, in addition to contribution from existing plant installations. The presence of existing plant within the area means that the character of noise produced by the proposed extraction exhaust is already familiar within the local soundscape, further reducing potential sensitivity.

The proposed units have also been determined to not contain any significant tonal features and therefore the continuous and broadband spectral content of the units is acoustically similar to, and expected to assimilate with, the existing broadband noise contribution from road traffic.

On this basis, it is reasonable to conclude that the specific sound will not be subjectively distinguishable in character against the existing ambient noise profile.

In terms of the sensitivity of the receptor, reference is made to the guidance in BS 8233:2014. Further assessment considering this standard is provided within the following Section 5.5.

In consideration of the above context, the proposed plant installation is not expected to give rise to a negative noise impact and would be considered indicative of a **low likelihood of adverse impact**, provided the mitigation measures outlined in Section 5.2 are implemented.

5.5 Further Calculations

BS 8233:2014 provides guidance on recommended internal ambient noise levels in residential spaces based on World Health Organisation (WHO) research (see Appendix C). The guidance notes that a partially open window would provide up to 15dB attenuation from outside to inside.

Based on the levels calculated above, expected internal noise levels would be as shown in the table below:

Period	BS 8233 Internal Noise Level Recommendation dB(A)	Calculated Rating Level at 1m from Receptor Façade dB L _{Aeq, T}	Min. Attenuation Provided by Partially Open Window dB	Expected Internal Noise Level Within Receptor Property dB(A)
Daytime 07:00-23:00	35	39	-15	24

Table 9 Summary of expected internal sound level within receptor properties due to proposed plant

As per the table above, the predicted internal noise levels within the closest receptor spaces would be approximately 11dB below the relevant internal guideline value for daytime resting spaces of ≤ 35 dB L_{Aeq}, as set out in BS 8233:2014. Such a margin indicates a negligible risk of adverse impact, even under conditions with windows partially open. With windows closed, the additional attenuation provided by the building envelope would further reduce internal noise levels to well below the guideline thresholds, reinforcing the conclusion that the impact would not be significant.

5.6 Assessment of Impacts

Considering the calculated Rating Levels compared to the background sound level and the context in which the sound occurs, transmission of noise to the closest sensitive receptor windows due to the effects of the proposed external building services plant installations would satisfy the noise emissions requirements of the Local Authority, during the plant's daytime operational hours, and would be expected to be indicative of a **low likelihood of adverse impact**, as per the guidance of BS 4142:2014+A1:2019, provided the mitigation measures outlined in Section 5.2 are implemented.

6 CONCLUSION

An environmental noise survey has been undertaken at Greggs, Spring Gardens, Buxton to establish background sound levels representative of the closest noise sensitive receptor locations relative to the proposed external building services plant installation.

Noise guidance for the proposed external building services plant have been proposed based on the findings of the noise survey, alongside consultation of relevant planning policy and the guidance provided by the Local Authority.

Manufacturer's noise data of the proposed external building services plant have been used to calculate expected noise levels at the closest noise sensitive receptors for compliance with the established noise guidance.

It has been concluded that transmission of noise to the closest sensitive receptor windows due to the effects of the proposed external building services plant installations would satisfy the noise emissions requirements of the Local Authority, during the plant's daytime operational hours, and would be expected to be indicative of a **low likelihood of adverse impact**, as per the guidance of BS 4142:2014+A1:2019, provided the mitigation measures outlined in Section 5.2 are implemented.

GLOSSARY OF ACOUSTIC TERMINOLOGY

Decibel scale - dB

The decibel (dB) is a relative unit of measurement used in acoustics. The dB is a logarithmic ratio between a measured level and a reference level of 0 dB (i.e the threshold of human hearing). Simply put, the decibel compresses the wide range of sounds we hear into more manageable numbers.

Addition of noise from several sources

Sound produced by multiple sound sources are added logarithmically e.g. power ratio of 2 = 3dB, power ratio of 10 = 10dB. Therefore, two equally intense sound sources operating simultaneously produce a sound level which is 3dB higher than a single source e.g. 60dB + 60dB = 63dB.

Subjective impression of noise

Human response to sound is highly individualized and often based on psychological factors such as emotion and expectation. Sensitivity to sound typically depends on the loudness, pitch, duration of the occurrence, and time of occurrence (e.g. a sound source could cause annoyance during the night where it would not during the day). The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level	Change in perceived loudness
1 dB	Imperceptible
3 dB	Just barely perceptible
6 dB	Clearly noticeable
10 dB	About twice as loud

'A' Weighted Frequency Filter - dB(A)

The human ear is not equally sensitive in all frequencies. The A-weighting filter was devised to take this into account when undertaking noise measurements and allows a sound level meter to replicate the human ears response to sound.

$L_{Aeq, T}$

Sound can fluctuate widely over a given period. L_{Aeq} is the A-weighted equivalent continuous sound level, with T denoting the time period over which the fluctuating sound levels were averaged e.g. $L_{Aeq, 16h}$ is the equivalent continuous noise level over an 16 hour period.

L_{A90}

A-weighted sound level exceeded for 90% of the measurement period, calculated via statistical analysis. The L_{A90} descriptor is typically used to establish background sound levels for noise impact assessments

L_{A10}

A-weighted sound level exceeded for 10% of the measurement period, calculated via statistical analysis.

L_{AFmax}

A-weighted sound level maximum sound pressure level that has been measured over a given time period

GLOSSARY OF ACOUSTIC TERMINOLOGY

Octave Bands

The audio or frequency spectrum of the human ear is in the range of 20Hz to 20 kHz. The spectrum tells how the energy of the sound signal is distributed in frequency. Octave bands divides the audio spectrum into 10 equal parts. The International Standards Organisation defines the centre frequency of these bands as 31.5Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1kHz, 2kHz, 4kHz, 8kHz and 16kHz.

Noise Rating (NR) Curves

A method of rating noise using a set of curves relating octave band sound pressure levels. Typically used for building services systems within offices

Airborne sound

Sound radiated from a source into the surrounding air e.g. musical instruments, tv/radio, machinery/equipment. Airborne sound insulation refers to the reduction or attenuation of airborne sound, usually via a solid partition between a source and receiver.

Impact sound

Sound resulting from the impact between colliding objects, e.g. footfall impact upon a floor. Impact sound insulation refers to the resistance of a floor to the transmission of impact sound, typically via the installation of a 'resilient layer'

Flanking sound

The transmission of airborne sound between two adjacent rooms by paths other than via the separating partition between the rooms, e.g. the abutment point of a wall and floor.

Structure-borne noise

Noise caused by the vibration of elements of a structure. This can result in reradiated noise, whereby the vibrating element transmits airborne sound into a space e.g. vibration caused by mechanical plant installed within a plant room which is not adequately isolated from the structure, or construction/demolition work in an adjacent building.

Reverberant sound

Sound in an enclosed space (usually a room), which results from repeated reflections at the boundaries. Reverberation time is the time taken for a steady sound level in an enclosed space to decay by 60dB, measured from the moment the sound source is switched off. A example of a typically reverberant space would be a classic church. Absorptive materials can be used to reduce reflections and reverberation times.

APPENDIX B

Plant Manufacturer Data Sheets on Following Pages

PLANNING POLICY AND RELEVANT ACOUSTIC GUIDANCE REVIEW

1 NATIONAL POLICY

1.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) covers issues relating to noise and planning in England.

The paragraphs relating to noise state:

187. *Planning policies and decisions should contribute to and enhance the natural and local environment by; [...]*
- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans*
198. *Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
- a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and 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; [...]*
200. *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.*

1.2 Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE) was developed by DEFRA and published in March 2010. The long-term vision of the Government noise policy is to '*Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development.*'

The NPSE vision noted above is supported by the following 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;*

PLANNING POLICY AND RELEVANT ACOUSTIC GUIDANCE REVIEW

- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life*

The NPSE outlines observed effect levels relating to the above, as follows:

- *No observed effect level (NOEL): this is the level of noise exposure below which no effect at all on health or quality of life can be detected;*
- *Lowest observed adverse effect level (LOAEL): this is the level of noise exposure 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 exposure above which significant adverse effects on health and quality of life occur;*

Noise effect levels are not set at absolute noise level targets, but instead vary depending on the context and character of the noise and site-specific factors which may impact on the severity of the effect. The NPSE 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.'

1.3 National Planning Practice Guidance (NPPG)

The NPPG provides practical guidance on how the NPPF should be applied as well as and guidance on the factors influencing whether noise may be a concern at the planning stage and how adverse effects can be mitigated. The table below summarises the effect levels presented within the NPSE, as follows:

Response	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
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 & reduce to a minimum

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Response	Examples of Outcomes	Increasing Effect Level	Action
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 1 Noise exposure hierarchy

2 BEST PRACTICE AND GUIDANCE

2.1 BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

BS 4142:2014+A1:2019 provides a methodology for rating and assessing the impacts of industrial and commercial sound at noise sensitive receptors. In the context of this report, this guidance would be relevant for any new fixed plant installations that might be installed for the scheme.

The methodology involves comparing the Rating Noise Level due to the sound source/s under assessment with the existing background sound level (L_{A90}) when the noise source is not operating to estimate the initial impact, as follows (Typically, the greater this difference, the greater the magnitude of the impact):

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context*
- A difference of around +5 dB could be an indication of an adverse impact, depending on the context*
- The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context*

The standard notes that a noise source under assessment will have a 'low impact' when the 'rating level' of a noise source is less than the existing background sound. It is also important to note that any quantitative assessment results are assessed considering the context in which the sound occurs.

The standard notes three types of context within Clause 11, which are:

- The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

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Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

- 2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*
- 3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as i. facade insulation treatment, ii. ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation, and iii. acoustic screening.*

The definitions noted above are described below:

- **Specific sound** – sound source being assessed ($L_s = L_{Aeq, T_r}$)
- **Residual sound** – Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound ($L_r = L_{Aeq, T}$)
- **Ambient sound** – totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far ($L_a = L_{Aeq, T}$)
- **Background level** – sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval ($L_{A90, T}$)
- **Rating level** – specific sound level plus any adjustment for the characteristic features of the sound (L_{Ar, T_r})

With regards to background sound levels, BS 4142:2014+A1:2019 notes:

“In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.”

With regards to the ‘rating level’, the adjustments for the characteristic features of the sound are outlined below:

- **Tonality** – +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** – +3 dB for a tone which is ‘just perceptible’ at the noise receptor, +6 dB where it is ‘clearly perceptible’, and +9 dB where it is ‘highly perceptible’

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- *Intermittency – +3 dB if the intermittency is readily distinctive against the residual acoustic environment*
- *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.*

It must be noted that as the rating level is determined at the closest noise sensitive receptor, the acoustic feature corrections should be applied based on the level at receptor location, not at source. This is particularly relevant when noise propagation characteristics cause differences in sound reduction at various frequency bands.

Note that the assessment reference periods that should be considered for daytime and night-time, as defined within the standard, are:

- *One hour period for a sound source operating during daytime hours (07:00-23:00 hours)*
- *Fifteen-minute period for a sound source operating during the night-time (23:00-07:00 hours)*

ES Acoustics Notes regarding Context:

The notes presented below are informed by the BS 4142:2014+A1:2019 Technical Note prepared by the Association of Noise Consultant Good Practice Working Group. Assessment context is often misunderstood or applied incorrectly, and the notes are therefore presented to provide a clear picture on what aspects of context should be considered when assessing the overall impact of a particular scenario:

Subclause 11(1)

The second paragraph notes that absolute levels may be as, or more, important than relative outcomes where background and rating levels are low. It is important to note that both background and rating levels would need to be low for this particular caveat to apply.

BS 4142 does not indicate how the initial estimate of impact should be adjusted when background and rating levels are low, only that the absolute levels may be more important than the difference between the two values. It is likely that where the background and rating levels are low, the absolute levels might suggest a more acceptable outcome than would otherwise be suggested by the difference between the values. For example, a situation might be considered acceptable where a rating level of 30dB is 10dB above a background sound level of 20dB, i.e. an initial estimate of a significant adverse impact is modified by the low rating and background sound levels. However, there may be situations where the opposite is true, and it is for the assessor to justify any modifications to the initial estimate of impact.

BS 4142 does not define 'low' in the context of background sound levels nor rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30 dB L_{A90} , and low rating levels as being less than about 35 dB $L_{A_{r,Tr}}$. We would consider that similar values would not be unreasonable in the context of the current edition of BS 4142.

The third paragraph states that "where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts".

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In the ordinary application of BS 4142 the residual sound level is not compared with the background sound level to determine the level of impact. The third paragraph is therefore taken to mean that the level of impact caused by the residual level has been determined by professional judgement or with reference to another document, such as the Noise Insulation Regulations 1975 (as amended 1988). Where professional judgement is used, it should be appropriately justified.

Where the residual sound levels are very high, a significant adverse impact might be declared in a situation where the rating level exceeds the background sound level by, say, 4dB, i.e. since the residual sound levels are already considered to cause a significant impact, any worsening of the situation would be considered a significant adverse impact, even if the difference between the rating level and background sound level would not suggest this to be the case.

Subclause 11(2)

The second aspect of context described in BS 4142 relates to the character and level of the specific sound. In essence, whether or not the character of the sound is distinguishable from the character of the ambient or residual acoustic environment or is incongruous.

BS 4142 does not provide instruction as to how to treat the assessment outcomes in these circumstances, nor does it explain how to distinguish between this contextual consideration and the process for applying rating penalties. The latter is itself informed by the distinctive characteristics of the specific sound in the context of the residual sound environment.

Where character-based contextual matters are taken into account, the assessor should make it clear how these matters are distinct from those that informed the rating level corrections, and what the implications of these further character assessments should be. For example; new deliveries on an estate entailing rating penalties for reversing alarms and impulsive noise but these types of noise are already present at other existing premises, so contextually the impact is reduced. Conversely, where the residual level is largely comprised of natural sounds, such as the sea or birdsong, so the impact from the specific source might be increased.

Subclause 11(3)

The third contextual matter described in Clause 11 relates to the receptor itself. It is important to note that the reference at the start of this section of BS 4142 to 'the sensitivity of the receptor' refers to a generic receptor type, i.e. a dwelling, and not to the particular attitudes or responses of a particular person (although if the residential receptor type is specific it may have a bearing e.g. student accommodation).

The ANC working group notes that this part of BS 4142 allows the internal noise environment to be considered, despite BS 4142 excluding such matters from its Scope (Subclauses 1.1, 1.2 and 1.3). The working group considers that the consideration of the internal noise environment is only valid in a BS 4142 assessment where it relates to the contextual elements of the assessment.

2.2 BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Table 4 of BS 8233:2014 (reproduced below) provides guidance on recommended internal ambient noise levels in residential spaces based on World Health Organization (WHO) research.

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Room	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Living Room	$\leq 35 \text{ dB } L_{Aeq,16hr}$	N/A
Dining Room	$\leq 40 \text{ dB } L_{Aeq,16hr}$	N/A
Bedroom	$\leq 35 \text{ dB } L_{Aeq,16hr}$	$\leq 30 \text{ dB } L_{Aeq,8hr}$

Table 2 BS 8233:2014 indoor ambient noise levels for dwellings

The following notes should be considered alongside the levels presented above:

- The levels presented above are for steady external noise sources without a specific character. Noise is considered to have 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*
- The levels are based on annual average data and do not have to be achieved in all circumstances e.g. it is normal to exclude occasional events, such as fireworks night or New Year's Eve*
- 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*
- If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*
- The levels outlined above are not applicable under "purge ventilation" conditions as defined by Approved Document F of the Building Regulations, as this should only occur occasionally e.g. to remove odour from painting or burnt food). However, the levels above should be achieved whilst providing sufficient background ventilation, either via passive or mechanical methods*

It should be noted that the 2014 version of BS 8233:2014 does not include any specific requirement for maximum instantaneous noise levels (L_{max}) within dwellings. However, methodology for the assessment of maximum noise levels is included in ProPG and referenced in WHO guidelines.

Section 7.7.3.2 of BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' presents desirable guideline levels for amenity areas. The section is presented in its entirety below:

"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

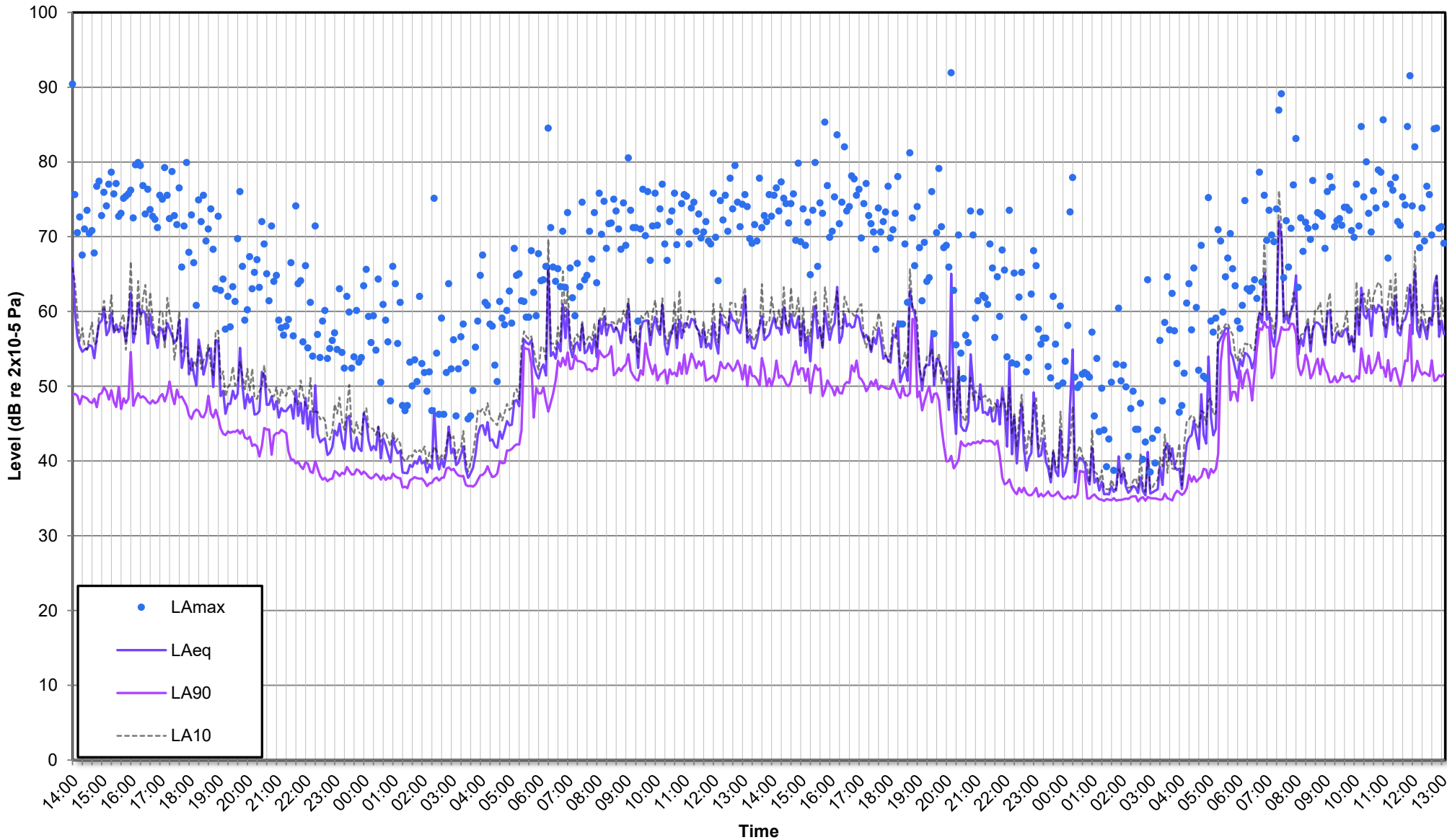
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locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on 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.”

APPENDIX D

ENVIRONMENTAL NOISE TIME HISTORY

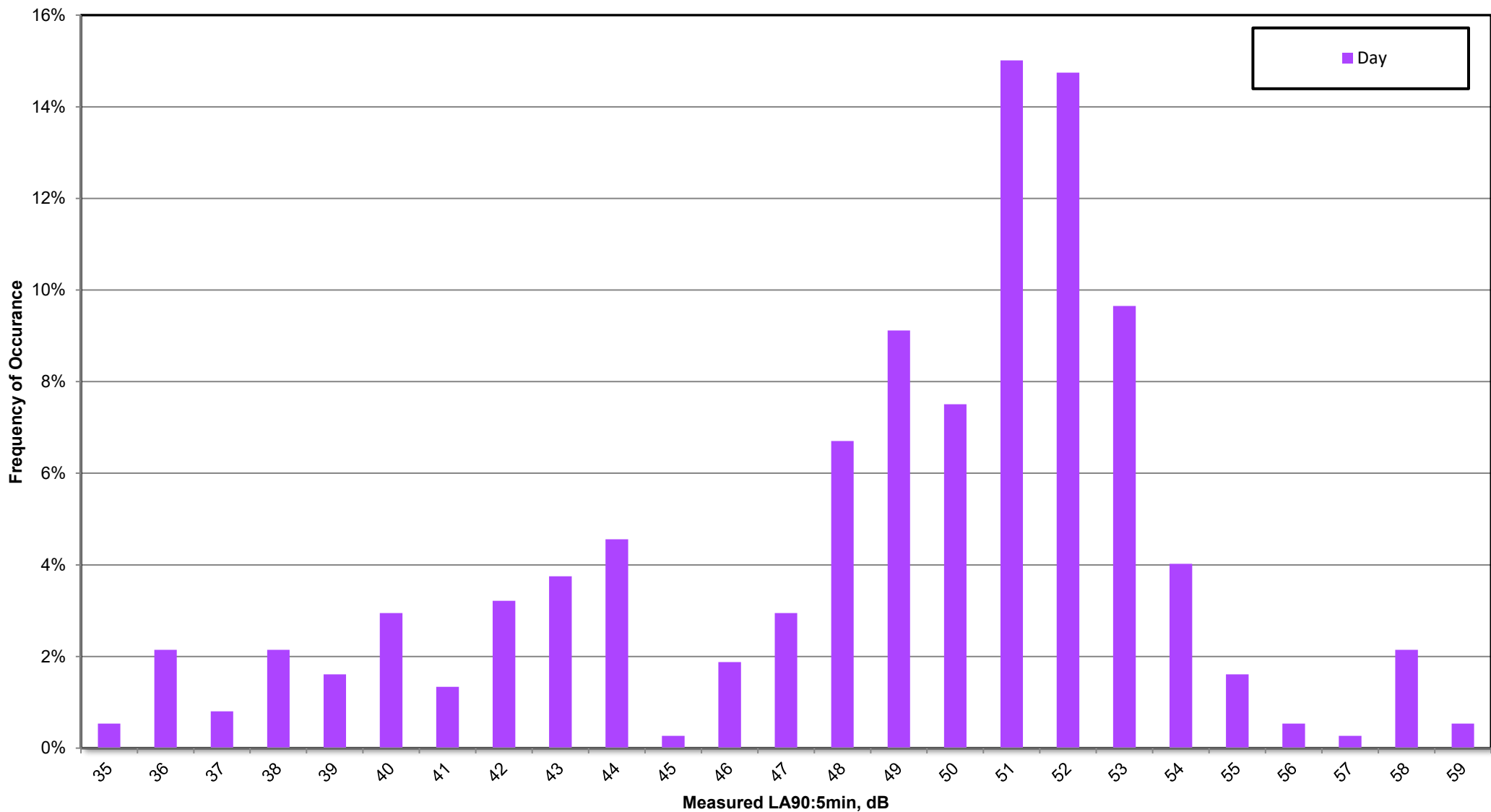
22579.PNIA-RPT.01
14:00 on 16th March to 13:00 on 18th March 2026



APPENDIX E

BACKGROUND NOISE STATISTICAL DISTRIBUTION CHART

22579.PNIA-RPT.01
14:00 on 16th March to 13:00 on 18th March 2026
Statistical Distribution of Background Levels



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Daytime Representative Background Noise Level	48
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Daytime Representative Background Noise Level	48
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