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ENVIRONMENT

Henry Boot Developments Ltd

Tewin Road, Welwyn Garden City,
London

Noise Assessment

LNH2043

www.bwbconsulting.com

ENVIRONMENT

Henry Boot Developments Ltd
Tewin Road, Welwyn Garden City, London
Noise Assessment

Birmingham
Livery Place, 35 Livery Street, Colmore Business District
Birmingham, B3 2PB
T: 0121 233 3322

Leeds
Whitehall Waterfront, 2 Riverside Way
Leeds, LS1 4EH
T: 0113 233 8000

London
11 Borough High Street
London, SE1 9SE
T: 0207 407 3879

Manchester
11 Portland Street
Manchester, M1 3HU
T: 0161 233 4260

Nottingham
5th Floor, Waterfront House, Station Street
Nottingham, NG2 3DQ
T: 0115 924 1100

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Notice

EXECUTIVE SUMMARY

BWB Consulting was instructed by Henry Boot Developments Ltd to undertake a Noise Assessment for a proposed industrial/commercial development at Welwyn Garden City, London

The existing noise environment at the nearby receptors is dominated by road traffic noise and movements at nearby existing industrial units.

The results of a baseline noise survey, undertaken in September 2021 have been used as a basis for the noise assessment work undertaken in accordance with current standards and guidance.

The results of the noise impact assessment indicate that operations associated with the development are likely to result in a low impact at Noise Sensitive Recepors during the daytime period. In addition, appropriate noise limits have been determined to be achieved by fixed plant items associated with the proposed development.

Based on the results of the assessment, it is considered that noise not be a determining factor in granting planning consent.

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1. INTRODUCTION

Appointment & Background

1.1 BWB Consulting (BWB) was instructed by Henry Boot Developments Ltd (the Client) to undertake a Noise Assessment for a proposed industrial/commercial development located at an existing industrial estate at Welwyn Garden City, London (the Site).

1.2 This report is necessarily technical in nature, so to assist the reader, a glossary of acoustic terminology can be found in **Appendix A**.

Site Setting

1.3 The Site currently comprises open land and is bordered by existing industrial/commercial units to the north, south and west. To the east the site is bordered by Tewin Road with further existing commercial premises situated beyond.

1.4 The location of the site is shown in **Figure 1.1.**

Figure 1.1: Site Location

Proposed Development

1.5 The proposed development consists of 3 indsutrial units and associated delivery bays and car parking.

1.6 The proposed Site Plan is detailed in **Figure 1.2**.

Figure 1.2: Site Plan

Existing Sensitive Receptors

1.7 Noise from any proposed sources will be assessed at nearby Noise Sensitive Receptors (NSRs). The nearest existing NSR is located to the south east, off Tewin Road, and is detailed below in **Table 1.1** and shown in **Figure 1.3**.

Table 1.1: Nearest Noise-Sensitive Receptor

NSR Number	Description	Bearing from Site	Distance from Site Boundary
A	NHS Trust Office Building	South East	~31m

1.8 The remaining noise sensitive receptors are located approximately 267m to the south, and therefore any impact is likely to be less than at those stated above.

Figure 1.3: Existing Noise Sensitive Receptors

2. STANDARDS AND GUIDANCE

National Planning policy Framework (NPPF)

2.1 Published in July 2021, this document sets out the Government's planning policies for England and supersedes the previous NPPF published in 2012. It makes the following reference to noise in the section entitled Conserving and enhancing the natural environment:

"*174. 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."

2.2 It also makes the following references to noise in the Section entitled *Ground conditions and pollution*:

"*185. 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[60];

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.

[60] See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."

BS 4142: 2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

2.3 The BS 4142 Standard describes methods for rating and assessing the following:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;

- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train movements on or around an industrial and/or commercial site.

2.4 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The Standard advises the purpose of the methodology includes the assessment of sound from any plant and activities associated with existing industrial and/or commercial uses at proposed residential dwellings.

2.5 If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the specific sound and the typical background sound level ($L_{A90,T}$) in the absence of the specific sound.

2.6 The Standard advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future.

2.7 Comparing the rating level with the background sound level, BS 4142 states:

> *"Typically, the greater this difference, the greater the magnitude of 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.*
>
> *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."*

BS 8233:2014: Guidance on Sound Insulation and Noise Reduction for Buildings

2.8 This standard provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.

2.9 To help control of noise outside and in the building, reference has been made to relevant and credited guidance documents, notably, British Council for Offices (BCO) and BS 8233:2014, which recommend suitable external noise intrusion and internal

ambient noise level (IANL) criteria to be met within commercial buildings to ensure the acoustic environment within different room spaces are appropriate to their function. The noise level criteria relevant to the development are presented in **Table 2.1**.

Table 2.1 - Internal Noise Criteria in Unoccupied Spaces

Room Space	BS8233 $L_{Aeq,T}$ Design Range	Criterion
Meeting Rooms, Executive Offices	35-45 35-40	Reasonable conditions for study and work requiring concentration
Cellular Offices	40-50	
Open Plan Offices, Reception Rooms	45-50 45-50	Reasonable acoustic privacy in shared spaces

3. BASELINE NOISE MONITORING

3.1 A baseline noise survey has been undertaken to measure the existing background noise levels at a location considered representative of the nearest NSR to the Site.

3.2 The Measurement Location (ML) adopted during the survey is shown in **Figure 3.1**. Details of the monitoring undertaken at the ML is also provided below.

Figure 3.1: Baseline Noise Measurement Location

Survey Methodology

ML1

3.3 ML1 was adopted to determine the noise levels at the nearest NSR to the Site. Monitoring at ML1 was undertaken over a 24-hour period commencing at 12:00 on 13th September 2021. The microphone was at a height of 1.5 m above local ground in free-field conditions. The noise climate at ML1 was dominated by road traffic from Tewin Road and noise from a nearby café to the north of the site during attended periods at the start and end of the survey.

Measurement Equipment

3.4 The baseline noise survey was undertaken using the Class 1 noise measurement equipment detailed in **Table 3.1**. Equipment was calibrated using a portable calibrator immediately before and after the measurements with no significant drift in calibration observed. The sound level meters, pre-amplifiers and microphones were calibrated to traceable standards within the 24 months prior to the measurements. The portable calibrator was calibrated within the 12 months preceding the date of the survey.

Table 3.1 Noise measurement equipment

Equipment	Make and Model	Serial Number	Calibration Due Date
Sound Level Meter	01dB Fusion + DMK	12077	19/02/2022
Microphone	GRAS 40CD	224357	
Calibrator	Cirrus CR:515	96164	28/06/2022

Weather Conditions

3.5 During the survey period weather conditions were generally conducive to environmental noise monitoring, it being dry with low wind speeds. There were some rain showers commencing at approximately 0200, therefore results after this time have been excluded from the assessment.

Measurement Results

3.6 A summary of measured sound pressure levels is presented in **Table 3.2** to **Table 3.3**. As the NSR only operates during the daytime period between 0830 and 1630 hours, the night-time noise levels and L_{AFmax} have not been considered and therefore have not been included in the tables below.

Table 3.2: Summary of measured sound pressure levels at ML1

Start Date and Time	Period	dB $L_{Aeq,T}$	dB $L_{A90,T}$	dB L_{AFmax}
13/09/2021 12:00	Daytime (07:00 – 23:00)[1]	54	48[2]	-

[1] Includes periods between 12:00 and 23:00 on the 13th September only due to bad weather on 14th September.

[2] Mean of measured $L_{A90,1hour}$ during the daytime period (1200 – 1700).

Table 3.3: Summary of measured octave band sound pressure levels at ML1

Period	Octave Band Sound Pressure Levels (L_{eq} dB)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz	
Daytime	63	58	53	50	50	46	39	33	54

4. ASSESSMENT

4.1 The results of the baseline noise survey have been used as a basis for the noise assessment. As the NSR is a commercial building operating between 0830 and 1630 hours, noise levels during the night-time period have not been considered in this assessment.

4.2 This assessment considers noise from HGV movements (i.e. arrivals, departures, loading and unloading activities) generated by the proposed development. The assessment is undertaken based on the following information received from the Client:

- HGV operations are assumed to take place between 0600 - 2100.
- A maximum of 5 HGV movements will take place in any one hour period as a worst case assessment.

Noise Model

4.3 A detailed noise model has been generated in order to calculate the daytime noise propagation from the proposed development Site on the NSR to the south-west. The following prediction methodologies were adapted for the modelling exercise:

- For industrial/commercial noise sources, the noise model was set to apply the noise prediction methodology set out in ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation;
- Mapping of the Site and the surrounding area was calibrated into the noise model based on known Ordinance Survey grid reference points;
- Indicative ground topography was approximated using the LIDAR Composite 2m DTM information freely available from the data.gov website;
- Off-site buildings which would provide screening to the Site have been incorporated as reflective façades;
- To reflect the local ground cover, ground absorption was set to G = 0.5 (50% acoustically absorptive ground).
- The model was set to include second order reflected noise from solid structures; and
- The noise contour has been modelled at a height of 1.5m for the daytime period.

Noise from Operational Activities

4.4 Noise emissions from the loading and unloading of vehicles within the proposed service area have been assessed in accordance with BS 4142:2014+A1:2019.

4.5 As the proposed Units are not currently operational, the assessment has been based on noise data from historical measurements, which has been collected during surveys undertaken at similar developments, including HGVs arriving, departing, manoeuvring and loading/unloading operations.

4.6 A sensitivity test has been undertaken based on 5 no. HGV movements on the access road, and 5 no. unloading/loading operations during any 1-hour period as a worst-case

assessment. The purpose of this scenario is to demonstrate that noise associated with HGV movements should not result in a significant adverse impact at the NSR.

4.7 **Table 4.1** presents noise measurement data for a HGV pass-by, to represent HGVs travelling along the Site access road.

Table 4.1: Summary of historic HGV pass-by noise data used in assessment

Source	Measurement distance (m)	Measurement duration (s)	Measured sound pressure level	
			dB, $L_{Aeq,T}$	dB, $L_{Af,max}$
HGV Pass-by	5	6	73	78

4.8 For HGV movementss, the calculation detailed in BS5228:2009+A1:2014 for calculating sound power levels (SWL) from mobile plant and haulage routes has been used, which is reproduced in equation (a) below.

(a) SWL = L_{Amax}@10m + 28

4.9 In calculating the level of noise produced by the site access road, vehicle quantities and vehicle speed of 10mph (16kmph) have been accounted for. The following equation has been used:

$$L_{Aeq,1hr}=L_{WA}-33+10\log_{10}Q-10\log_{10}V-10\log_{10}(d)$$ (BS5228-1:2009+A1:2014(F.6)).

Where:

L_{WA}	*sound power level of the plant;*
Q	*number of vehicles per hour; and*
V	*average vehicle speed in km/h.*
d	*distance in m.*

4.10 **Table 4.2** calculates the level of noise from the site access road as per the calculation detailed in BS5228-1:2009+A1:2014. The sound power level used in the equation above has been derived from the sound pressure level in **Table 4.1** assuming point source attenuation.

Table 4.2: Calculation of noise level from the access road

Event	L_{WA}	Number of vehicles per hour	Average vehicle speed in km/h	Sound pressure level of access road at 10m $L_{Aeq,1hr}$
Access road	100	5	16	52

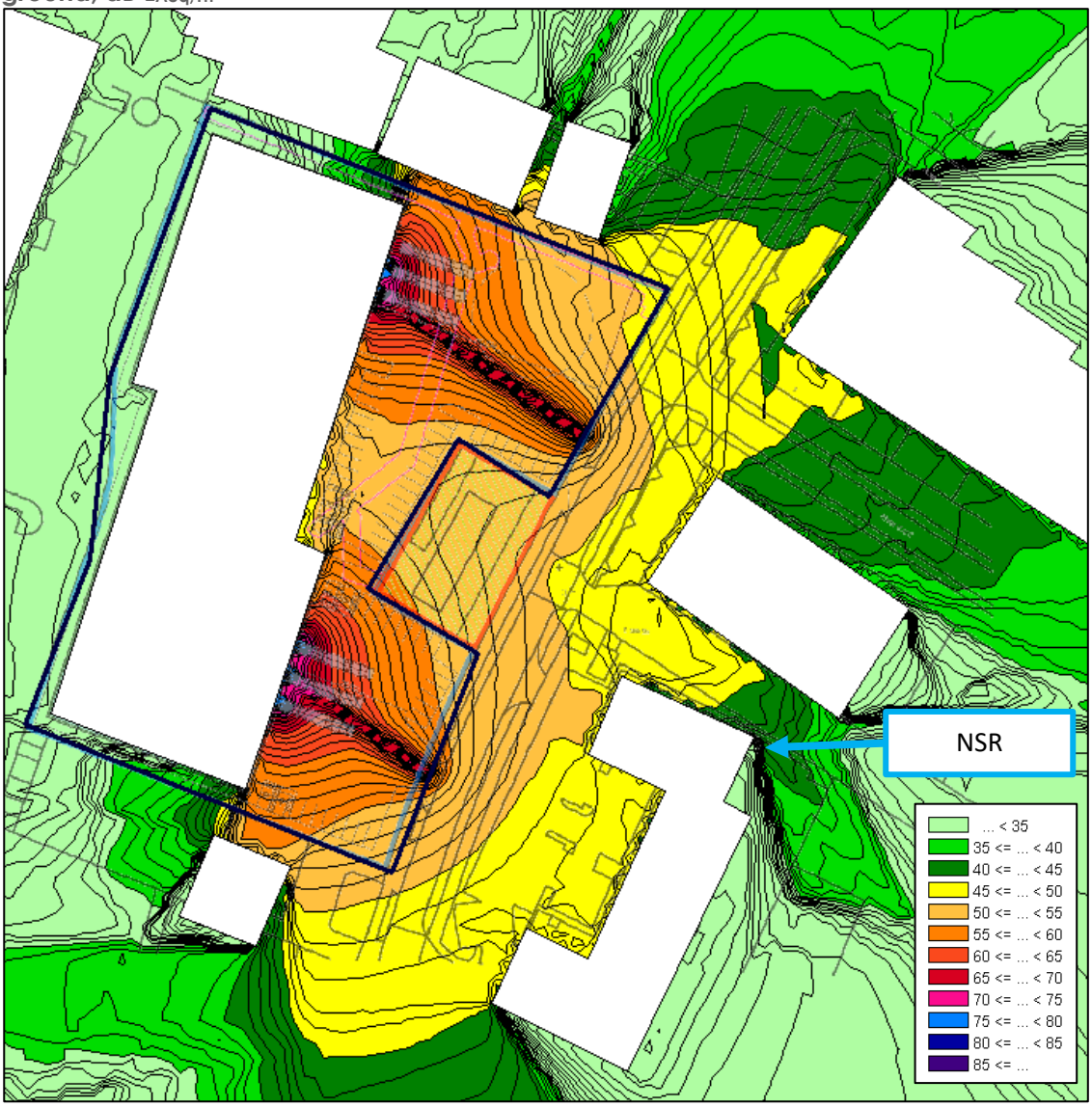
4.11 A summary of the source noise data used within the assessment of noise from deliveries is presented in **Table 4.3**.

Table 4.3: Summary of Historic Loading and Unloading Noise Data used in the Assessment – Entry Level Door

Description	Time	$L_{Aeq,T}$ at 10m (dBA)
Daytime (0700-2300)		
HGV Delivery including arriving/departing, impact noise and crates being wheeled	46 minutes	59

4.12 Noise contour maps have been generated at a height of 1.5m. The resultant daytime noise at the NSR is shown in **Figure 4.1** below.

Figure 4.1: Daytime noise contours of specific noise levels – calculation at 1.5m above ground, dB $L_{Aeq,1h}$



4.13 The specific sound levels at the NSR have been calculated as receiver points at 1.5m above ground for the daytime, The calculated levels due to operations are presented in **Table 4.4**.

Table 4.4: Predicted specific sound level at NSR.

Event	Daytime
Predicted Cumulative Specific Noise Levels Ls dB	49

4.14 The predicted noise levels at the NSR in the CadnaA® model have been included within the subsequent assessment.

4.15 As the delivery bays are located at a distance from the receptorit is considered that any impulsive characteristics of the delivery process, will be at worst, just perceptible. Therefore, a 3dB correction has been applied, in accordance with BS 4142.

4.16 The background sound level used within the following assessment has been derived from the measured data captured during the baseline noise survey. As the NSR is only operational between the hours of 0830 and 1630 hours, a statistical analysis of the L_{A90} values the during these hours has been undertaken. The periods of rain experienced during the baseline survey have been excluded, therefore the hours of 1200 and 1700 have been used in the assessment.

Table 4.5: BS 4142 Assessment of HGV operations at NSR

Description	HGV operations Weekday Daytime (1200:1700) Sound Levels (dB)	Relevant BS 4142 Clause
Specific sound level	49 $L_{Aeq,1hour}$	7.3.5
Acoustic feature correction[1]	+3	9.2
Rating level	52 $L_{Ar,1hour}$	9.2
Background sound level	48 $L_{A90,1hour}$ [2]	8
Excess over background	+4	-
BS 4142 impact	**Adverse Impact**	
Commentary	[1]+3 dB penalty applied for just perceptible impulsivity [2] based on representative $L_{A90,1hr}$ levels during the daytime period	

4.17 When assessed in accordance with BS 4142+A1:2019, this would demonstrate an adverse impact during the daytime period, depending on the context. Further consideration of context has been provided below.

Context

4.18 The results of the assessment indicate that an adverse impact may be experienced at the NSR during the daytime period. However, BS4142 states that:

> *'the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs'.*

4.19 BS4142 goes on to state that:

> *'where background 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'.*

4.20 To put into context for the daytime, considering that occupants are likely to be inside, and not in external amenity areas to which BS 4142 relates, it is considered prudent to assess internal noise levels. Accordingly, **Table 4.6** considers the internal rating level in meeting rooms, assuming a sound reduction of 15dB with a partially open window, as per BS8233:2014.

Table 4.6: Internal assessment for NSRA $L_{Aeq,T}$ dB

Time period	Parameter	Scenario	External Rating Noise Level dB, $L_{Ar,Tr}$	Internal rating level dB, $L_{Ar,Tr}$	Internal Criteria dB, $L_{Aeq,\ T}$
Daytime 16-hour (07:00 – 23:00)	$L_{Aeq,T}$	Meeting Rooms, Executive Offices	52	37	35-45

4.21 A partially opened window typically provides approximately 15dB of attenuation from external free-field levels to internal levels, therefore it is considered that the internal criterion is likely to be below the upper limit of 45dB assuming a partially opened window. The rating level is below existing daytime noise levels, therefore it is considered proposed operations should be of "Low Impact" during the daytime period.

4.22 This assessment has been undertaken based on a worst-case scenario for a worst-case hour. It is considered likely that levels at the NSR will be lower than those calculated in **Table 4.5**.

Uncertainty

4.23 Reasonably practicable steps have been taken to reduce the level of uncertainty with respect to the measurements and assessment calculation methodology. The level of uncertainty of the measurement is considered low given the length of the measurement period and intervals, and the non-differing weather condition. It should be noted that the specific noise source is significantly low in the context of the existing noise climate, therefore the risk of uncertainty causing adverse impact is considered very unlikely.

4.24 The level of uncertainty from the calculation is considered low. The resultant levels have been derived using acoustic modelling software, which uses industry recognised standard IOS 9613-2 calculation method. Notwithstanding this, uncertainty in the operation or sound emission characteristics of the specific source remains, albeit a low risk for this particular assessment given the greater margin for non-compliance.

Noise from fixed plant

4.25 It is anticipated that there may be fixed plant and equipment associated with the proposed development that may have the potential to generate noise. However, at this stage details of the proposed type, number, and precise location of any such plant or the nature of its operation are not available. In the absence of detailed information, it is appropriate to specify suitable noise control limits to which any plant and equipment should conform. These limits should include any appropriate corrections for acoustic characteristics, in accordance with BS 4142.

4.26 It is considered that the rating level of fixed plant noise sources should not exceed the prevailing background sound level when measured at the nearest receptors. The cumulative effect of all external plant should be specified so that the rating level is less than or equal to the prevailing background noise level.

4.27 Noise from external plant on the development site should achieve the following noise level limit, shown in **Table 4.7**.

Table 4.7: Noise Limits from Fixed Plant

Rating Level Limit to be Achieved at NSR (dB $L_{A,Tr}$) Daytime (0700-2300)
48

4.28 The above rating level limit will apply at least 3.5 metres from the façade of NSR A i.e. in free-field conditions.

4.29 In accordance with BS 4142, the assessment of plant noise emissions should include appropriate rating corrections for tonal, irregular, or intermittent plant where applicable, before comparison with the above limits.

4.30 Once the detailed nature of such future uses is confirmed, noise from any fixed plant can be considered to ensure that the limits can be met.

4.31 It should be noted that the derived rating level limits would be applicable to the total noise from the simultaneous operation of all external plant serving the Proposed Development. As such, noise emissions from individual items of plant will need to be lower than the given limit, although the exact limit for each individual item of plant will be dependent upon its type, noise characteristics, location etc.

5. CONCLUSION

5.1 BWB Consulting was instructed by Henry Boot Developments Ltd to undertake a Noise Assessment for a proposed industrial/commercial development at Welwyn Garden City, London

5.2 The existing noise environment at the nearby receptors is dominated by road traffic noise and movements at nearby existing industrial units.

5.3 The results of a baseline noise survey, undertaken in September 2021 have been used as a basis for the noise assessment work undertaken in accordance with current standards and guidance.

5.4 The results of the noise impact assessment indicate that operations associated with the development are likely to result in a low impact at Noise Sensitive Recepors during the daytime period. In addition, appropriate noise limits have been determined to be achieved by fixed plant items associated with the proposed development.

5.5 Based on the results of the assessment, it is considered that noise not be a determining factor in granting planning consent.

APPENDICES

APPENDIX A: Glossary of Terms

Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Acoustic Terminology

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Façade Level	A sound field determined at a distance of 1m in front of a large sound reflecting object such as a building façade.

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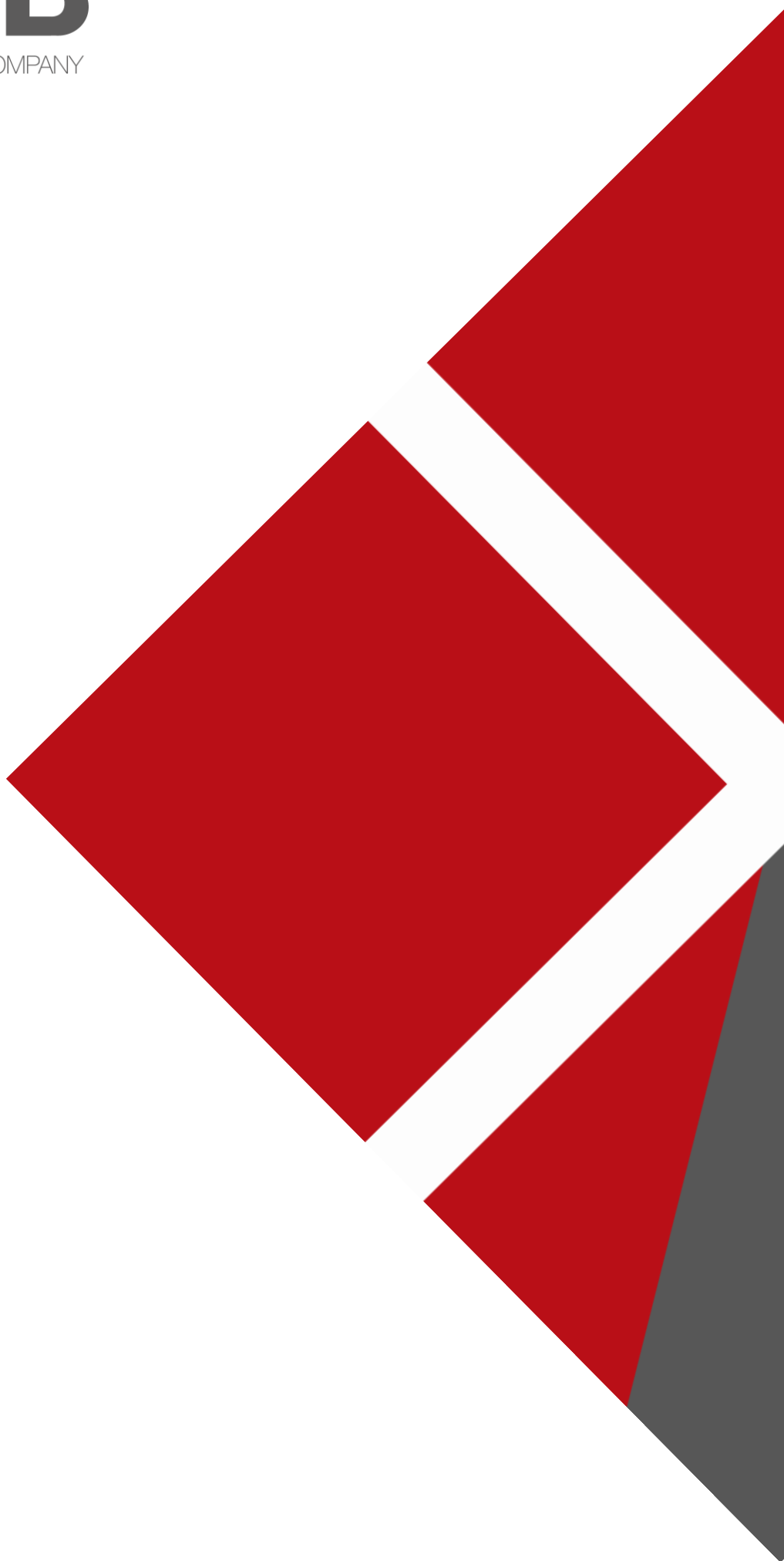

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