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UNIT 2, STRATEGIC PARK, HEDGE END
NOISE ASSESSMENT

Technical Report: R9751-3 Rev 1

Date: 28th November 2022

For: Real Estate Strategies Ltd
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1.0 INTRODUCTION AND SITE DESCRIPTION

- 1.1 24 Acoustics Ltd has been instructed by Real Estate Strategies Ltd to undertake a noise assessment of the refurbished Unit 2 warehouse at Strategic Park, Hedge End. The unit will comprise flexible commercial, business and service use classes E (g) (i - iii) and B2 general industrial / B8 storage or distribution use classes.
- 1.2 Strategic Park is located in a mixed-use area with residential properties to the south, the Ageas Bowl golf course to the north/west and the M27 to the east with retail and commercial buildings further east. The site contains two large warehouse units (Unit 2 to the north, Unit 1 to the south), previously containing research and development operations and a storage and distribution warehouse.
- 1.3 Proposals comprise refurbishment of the Unit 2 warehouse building and include installation of replacement plant and use of the existing service yard / HGV bays. A Noise Management Plan accompanies the proposals (reference R9751-1 Rev 1) and includes the provision of a solid acoustic barrier, of height 3 m, to be installed to the southern boundary as shown in Figure 1.
- 1.4 This report reviews noise emissions from the proposed external plant and HGV movements within the service yard.
- 1.5 An explanation of acoustical terms used in this report is provided in Appendix A. All sound pressure levels in this report are given in dB re: 20 μ Pa.

2.0 CRITERIA

NPPF

- 2.1 The National Planning Policy Framework (NPPF) [Reference 1] states that planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely 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:
- 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 quality of life;

- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.
- 2.2 The NPPF refers to the Noise Policy Statement for England (NPSE) [Reference 2] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development' which is supported by the following aims.
- Avoid significant adverse impacts on health and quality of life;
 - Mitigate and minimise adverse impacts on health and quality of life.
- 2.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'. The following guidance is provided within the NPSE:
- 2.4 "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."
- 2.5 In 2014 the Planning Practice Guidance (PPG) was finalised [Reference 3]. This is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The PPG states that noise can over-ride other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.
- 2.6 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.

Replacement Plant Noise

- 2.7 BS 4142:2014 [Reference 4] provides a method for rating and assessing industrial and commercial sound in relation to residential properties. The standard advocates a comparison between the typical measured L_{A90} background noise level and L_{Aeq} noise level from the source being considered.
- 2.8 For rating purposes if the noise source is tonal, impulsive or otherwise distinctive in character, a rating correction may be applied depending on the severity of the character. The standard states that a difference between the rating level and the background level 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, and where the rating level does not exceed the background level it is an indication of a low impact, depending on the context.
- 2.9 Based on the above, replacement plant should be designed to achieve a rating noise level no greater than the existing background noise level at surrounding residential properties.

Noise from HGV Movements

- 2.10 The NPPF currently provides no technical guidance on planning noise values. Therefore, it is appropriate to refer to methodologies used in planning appeals which have considered similar scenarios.
- 2.11 The assessment of noise from HGV movements is usually best assessed (ie, achieve a better correlation with subjective response) by a comparison with prevailing ambient (L_{eq}) noise levels. This approach has been used and accepted at several Planning Inquiries (further details are available).

3.0 ENVIRONMENTAL NOISE MEASUREMENTS

- 3.1 An environmental noise survey was undertaken between 14th and 20th October 2022 to determine the ambient noise levels at the site. Noise monitoring equipment was set up on the southern site boundary at approximately 1.5 metres above local ground level.
- 3.2 Background noise levels were measured using the following equipment:
- Rion precision sound level meter Type NL-52
 - Norsonic acoustic calibrator Type 1252
- 3.3 Noise measurements were undertaken in samples of 5 minutes in terms of the overall free-field A-weighted L_{eq} , L_{90} and $L_{max,f}$ noise levels. Measurements were made in accordance with BS 7445:1991 "Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use" [Reference 3].
- 3.4 The instrumentation's calibration was checked before and after the survey in accordance with the manufacturer's instructions. No significant drift in calibration was recorded. Calibration of 24 Acoustics' equipment is traceable to National Standards. All instruments were fitted with environmental weather shields during the surveys.
- 3.5 Weather conditions during the survey were variable but were not found to have significantly affected the measured noise levels.
- 3.6 It is relevant to note that measurements were carried out after the existing plant had been de-commissioned and when the site was vacant. Therefore, the measured noise levels are likely to be lower than when the site and existing plant was in operation.
- 3.7 Measurement results are shown graphically in Appendix B. Typical background noise levels during daytime (07:00 to 19:00 hours), evening (19:00 to 23:00 hours) and night-time (23:00 to 07:00 hours) periods are shown in Table 1 below.

Measured Typical Background Noise Level		
Daytime (07:00 to 19:00 hours) dB LA90 1 hour	Evening (19:00 to 23:00 hours) dB LA90 1 hour	Night-Time (23:00 to 07:00 hours) dB LA90 15 min
52	50	40

Table 1 - Measured Background Noise Levels

- 3.8 24 Acoustics determines the typical background noise level to be the average minus one standard deviation over the relevant period.

3.9 Measured ambient noise levels were 56 dB $L_{Aeq, 1 \text{ hour}}$ during daytime periods (07:00 to 19:00 hours), 55 dB $L_{Aeq, 1 \text{ hour}}$ during evening periods (19:00 to 23:00 hours) and 51 dB $L_{Aeq, 15 \text{ min}}$ during night-time periods.

3.10 Noise levels on site are determined by road traffic on M27 and surrounding road network.

4.0 NOISE ASSESSMENT

Replacement Plant

4.1 A large amount of plant, associated with the previous use of the site, has been decommissioned and removed. Replacement plant will include mechanical ventilation units to the mezzanine office spaces, a single toilet extract fan and two condenser units located to the northern façade.

4.2 Proposed plant selections and manufacturer's noise data have been provided by ION Building Services Consulting Engineers and comprise the following:

- External Condensers: Mitsubishi PURY-P1100YSNW 73 dBA at 1m
Mitsubishi PUZ-ZM100VKA2 51 dBA at 1m
- Extract Fan: AIRE-VOLVE AT4 36 dBA at 3m (breakout)
- Office Ventilation Lossnay LGH100RVX 18 to 37 dBA at 1.5m
(fan speed dependant)

4.3 Typical noise emissions from small toilet extract fans and mechanical ventilation units serving office spaces are low and will not cause disturbance to the nearest residential properties. Therefore, these items have not been considered further.

4.4 Based on the above, calculations have been undertaken to determine noise levels from replacement external plant at the nearest residential property and include corrections for distance and screening provided by intervening large warehouse buildings. The resultant noise level during all periods is given in Table 2.

Receiver Location	Resultant Noise Level dB $L_{Aeq, T}$
Properties on West Road	24

Table 2: Predicted Noise Levels from External Plant

- 4.5 Table 3 below shows the assessment for the selected receiver location considered. New plant is not considered to contain any tonal or otherwise distinctive noise characteristics, therefore, character corrections are not applicable.

Period	Specific Source Noise Level dB L_{Aeq, T}	Rating Level	Background Noise Level dB L_{A90, T}	Difference
Daytime (07:00 – 19:00)	24	24	52	-28
Evening (19:00 – 23:00)	24	24	50	-26
Night-time (23:00 – 07:00)	24	24	40	-16

Table 3: Assessment, Replacement Plant – Properties on West Road

- 4.6 Under BS 4142, a rating noise level which does not exceed the background level is an indication of a low impact and therefore noise from replacement plant will result in a low impact at the nearest residential properties. The values in Table 3 are significantly lower than the prevailing background noise level.
- 4.7 BS 4142 requires uncertainty to be considered as part of the assessment. At this site an extended background noise survey has been undertaken and the data analysed to ensure that background noise data influenced by meteorological conditions has not affected the assessment. The sound level meters were calibrated before and after the survey and no significant drift in calibration was recorded. Standard acoustic theory has been used in the calculations. It is therefore considered that the uncertainty associated with the assessment has been kept to a minimum.

HGV Movements

- 4.8 The Highways and Transport Statement by I-Transport (technical note reference: SJ/GT/ITB18447-001A) provides predicted maximum HGV movements of 8 per hour based on 24-hour Class B8 operations. I-Transport have further predicted 10 HGV movements per hour during evening (19:00 to 23:00 hours) and night-time (23:00 to 19:00 hours) periods.
- 4.9 Based on the above, the following number of HGV movements have been used in the assessment:

- 8 HGV movements per hour during daytime periods (07:00 to 19:00 hours);
 - 10 HGV movements per hour during evening periods (19:00 to 23:00 hours);
 - 10 HGV movements per hour during night-time periods (23:00 to 07:00 hours).
- 4.10 I-Transport notes that evening and night-time HGV movements have been derived from much larger sites, leading to a possible over prediction of HGV movements.
- 4.11 Calculations have been undertaken to predict the level of HGV movement noise associated with the proposed development and include corrections for distance and screening provided by the intervening warehouse buildings and the proposed 3m acoustic barrier.
- 4.12 Calculations have been undertaken to habitable windows in properties on West Road, closest to the yard, using a source noise level of 72 dB L_{Aeq} at 5m from a slow-moving HGV (taken from 24 Acoustics' library database).
- 4.13 Table 4 below shows the assessment for the selected receiver location considered.

Period	Number of HGV Movements	HGV Movement Noise Level	Existing Ambient Noise Level	Increase in Noise Level
Daytime (07:00 – 19:00)	8	12 dB L_{Aeq} , 1 hour	56 dB L_{Aeq} , 1 hour	0.0 dB
Evening (19:00 – 23:00)	10	13 dB L_{Aeq} , 1 hour	55 dB L_{Aeq} , 1 hour	0.0 dB
Night-time (23:00 – 07:00)	10	19 dB L_{Aeq} , 15 min	51 dB L_{Aeq} , 1 hour	0.0 dB

Table 4: Assessment, HGV Movement Increase in Noise Level – Properties on West Road

- 4.14 As shown in Table 4, noise levels from the HGV movements associated with the use of the service yard will be significantly lower than the prevailing ambient noise levels and, therefore, the increase in noise levels will be negligible.
- 4.15 Based on the predicted HGV noise levels, an assessment has been undertaken using the principles of BS 4142 and is shown in Table 5. Due to the significant screening and distances involved, tonal or otherwise distinctive noise characterises will not be noticeable at nearby residential properties. Therefore, a noise rating correction is not applicable.

Period	Specific Source Noise Level dB LAeq, T	Rating Level	Background Noise Level dB LA90, T	Difference
Daytime (07:00 – 19:00)	12	12	52	-40
Evening (19:00 – 23:00)	13	13	50	-37
Night-time (23:00 – 07:00)	19	19	40	-21

Table 5: Assessment, HGV Movement – Properties on West Road

- 4.16 As shown in Table 5, noise levels from the HGV movements associated with the use of the service yard will be significantly lower than the prevailing background noise levels and demonstrates a low impact under BS 4142.

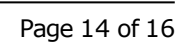
5.0 CONCLUSIONS

- 5.1 Real Estate Strategies Ltd has instructed 24 Acoustics to undertake a noise assessment for external plant and HGV movement operations associated with the proposed change of use at Unit 2, Strategic Park, Hedge End.
- 5.2 An assessment has been undertaken to determine the noise level from proposed external plant. The assessment demonstrates a low impact at nearby residential properties.
- 5.3 Calculations have been undertaken to determine the increase in noise levels due to HGV movements associated with the proposals. Results demonstrate that noise from HGV movements within the service yard will be very low at nearby residential properties and will not cause disturbance.
- 5.4 On the above basis, the proposed operations will not cause a significant adverse impact at nearby existing residential properties and are acceptable.

REFERENCES

1. National Planning Policy Framework, Department for Communities and Local Government, 2021.
2. Noise Policy Statement for England (NPSE), Department for Environment, Food and Rural Affairs, 2010.
3. Planning Practice Guidance, Department of Communities and Local Government March 2014.
4. British Standards Institution. BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.





APPENDIX A: ACOUSTIC TERMINOLOGY

Voices, hi-fi systems, television and radio sound and musical instruments are all sources of airborne sound. They excite the air around them and the vibration of the air molecules can be transmitted to surrounding surfaces, such as walls, ceilings and floors. This causes these constructions to vibrate and this vibration is re-radiated in neighbouring rooms as sound. Energy is lost in the transmission path and this is referred to as transmission loss or more generally, airborne sound insulation. The most simple measure of sound insulation between two rooms is the sound level difference, D , which is the arithmetic difference between the sound level, in dB, in the source room and the sound level in the receiving room.

Other measures of sound insulation include the sound reduction index (R , obtained by laboratory test), the apparent sound reduction index (R' , obtained in field tests) and the standardised level difference (D_{nT} , used mainly in the sound insulation of rooms in dwellings and other cellular rooms). For D_{nT} , the result is adjusted to a reference reverberation time in the receiving room (see below). The relevant test procedures are laid down in ISO 140. The results are obtained over a range of frequencies. A single-figure "weighted" result is obtained from one-third octave band results measured over the frequency range 100 - 3150Hz by using a curve-fitting procedure advocated in ISO 717-1. The subscript "w" is added to the descriptors above to produce the standardized weighted level difference $D_{nT,w}$. The C_{tr} figure is a correction that penalises poor low frequency insulation.

Impact Sound Isolation

In the case of impact sound, the building elements vibrate as a result of a physical impact from another source of vibration. Footsteps on floors are the most obvious example. The vibration is radiated as sound in to neighbouring rooms. Impact insulation is measured using a standard tapping machine, which drops 500 g weights cyclically onto a floor. The sound pressure level is measured in the receiving room below and the result is known as the impact level, L_i . This test is used in the evaluation of domestic separating floors. As with airborne sound, the test procedures are set out in ISO 140 and the single-figure weighting of the results is described in ISO 717-2. The descriptor for the final result of a field test is the standardized weighted impact sound pressure level L'_{nTw} .

Reverberation Time

The reverberation time is a measure of the rate of decay of sound in a room and this influences the sound pressure level of noise in that room. It is defined as the time taken, in seconds, for the level of sound in a room to decrease by 60 dB (a millionth of its original energy value) after the discontinuation of a sound.

APPENDIX B: MEASUREMENT RESULTS

