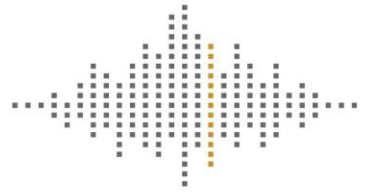


SHARPS REDMORE

ACOUSTIC CONSULTANTS ▪ Established 1990



Report

Environmental Noise Report

Benson for Beds, 233
Tottenham Court Road,
London

Prepared by

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and

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Project No 1615910

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1.0 Introduction

- 1.1 Sharps Redmore (SR) has been instructed to carry out an environmental noise assessment at the retail unit addressed 233 Tottenham Court Road. The unit is currently a Little Waitrose and has been acquired for use by Benson for Beds.
- 1.2 The retail unit is located on Tottenham Court Road in Camden, a major road in central London. Neighbouring and surrounding land usage is almost entirely commercial on ground and first floor levels. The nearest noise sensitive property to the site has been assumed by SR to be located above the Jack Horner pub (234-6 Tottenham Court Road).
- 1.3 To facilitate the use of the premises by Benson for Beds three air conditioning condenser units will be installed at the rear of the premises. The location of the plant is shown in Appendix A to this report. The mechanical plant in question will only be in operation during the trading hours of the store.
- 1.4 The purpose of this report is to assess the proposed plant installation in accordance with BS 4142:2014, to ensure the protection of the amenity of neighbouring residents. SR has carried out an environmental noise survey in accordance with BS 4142:2014 that forms the basis of this assessment.
- 1.5 Section 2.0 contains a discussion of the available methods of assessment and assessment criteria.
- 1.6 Section 3.0 of this report contains details of the environmental noise survey.
- 1.7 Sections 4.0 of the report contain an assessment of the impact of noise from the development on the surrounding residential properties.
- 1.8 A guide to the acoustic terminology used within the report is included in Appendix B.

2.0 Assessment Methodology and Criteria

National Policy

2.1 The National Planning Policy Framework (NPPF) sets out the Government's economic, environmental and social planning policies for England and "these policies articulate the Government's vision of sustainable development." In regard to noise, Paragraph 123 of the NPPF states the following:

"Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions, while recognising that many developments will create some noise; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

2.2 Guidance on the interpretation of the policy aims contained within the NPPF is contained within National Planning Practice Guidance (NPPG). The NPPG introduces the concept of a noise exposure hierarchy based on likely average response. The guidance contained in the NPPG is summarised in the table below:

Table 2.1: Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. 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
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.3 The NPPF and NPPG reinforce the March 2010 DEFRA publication, “Noise Policy Statement for England” (NPSE), which states three policy aims, as follows:

“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;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.”*

- 2.4 Together, the first two aims require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

“... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur.”

- 2.5 Therefore taking an overview of national policy it is clear that when considering the impact of noise one must consider the significance of any impact. The presence of an adverse impact in itself is not sufficient to refuse permission.

Local Policy

- 2.6 Camden Borough’s Development Policies (DP) 2010 provide guidance on how the council approach the implementation of national policy. DP28 – Noise and vibration, states the following:

“The Council will only grant permission for plant and machinery if it can be operated without causing harm to amenity and does not exceed our noise thresholds.”

- 2.7 Regard is also been had to the advice contained within Camden Planning Guidance (CPG) document 6 –Amenity which gives practical advice on the control of noise. With regard to air conditioning units it requires that the cumulative impact of both existing and proposed mechanical plant are considered.

BS 4142:2014

- 2.8 This building standard describes a method for rating and assessing sound of an industrial and/or commercial nature according to the following summary process:

- i) Determine the background sound levels, in terms of L_{A90} , at the receptor locations of interest.
- ii) Determine the specific sound level of the source being assessed, in terms of L_{AeqT} level (T = 1 hour for day or 15 minutes at night), at the receptor locations.
- iii) Apply a rating level acoustic feature correction if the source sound has tonal, impulsive, intermittent or other characteristic which attract attention.
- iv) Compare the rating sound level against the background noise level; the greater the difference between the two, the higher the likelihood of complaints of the noise.
- v) Differences (rating – background) of around +10 dB is likely to be an indication of significant adverse impact (SOAEL) depending on context; a difference of +5 dB is likely to be an indication of adverse impact, depending on context. 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 upon context.

- 2.9 The general intent of the planning system is to ensure that a development does not result in ‘significant adverse impacts on health and quality of life’ (NPPF para 123). BS 4142:2014 considers that the threshold of ‘significant adverse impact’ is likely to be around 10 dB or more... depending on upon the context.

- 2.10 As can be seen above 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 exceeds the background sound level and the context in which it is placed.
- 2.11 As stated in para 2.7 CPG 6 requires the cumulative impact of air conditioning equipment to be considered when determining the impact on neighbouring residential properties. Therefore for the purpose of this assessment the air conditioning units will be selected, installed and designed to ensure that there is no overall increase in existing background noise levels i.e. design criteria will be 10 dB below existing background noise levels.

3.0 Survey Details

- 3.1 A noise survey was undertaken at the site on 3rd March 2016 to obtain measurements of existing noise levels. Measurements were taken on South Crescent (off Store Street) as shown in Fig 1 below. This measurement location was chosen as the closest accessible measurement location suitable to represent the nearest noise sensitive properties.

Fig 1: Monitoring Location



- 3.2 Weather conditions throughout the survey period were overcast and dry with a light southerly wind (>12m/s), and overcast. Temperatures were between 10 and 14°C.
- 3.3 Measurements were taken using a Norsonic 140 sound level meter which was correctly calibrated before and after use. The survey was manned with measurements being recorded, noted and manually stored on the sound level meter at five minute intervals. The equipment used and measurement procedures employed comply with the requirements of BS 4142:2014.
- 3.4 Measurements were taken at 5 minute intervals from 1900 –1930 on Thursday 3rd March. These measurement periods were chosen to represent the quietest and most noise sensitive periods during which the proposed plant will operate. Full results of the survey are shown in Table 3.1 below.

Table 3.1: Survey results

Start Time	L_{Aeq}	L_{Afmax}	L_{Afmin}	L_{Af10}	L_{Af90}
19 : 00	65.4	79.6	59.2	68.7	60.6
19 : 05	64.4	81.3	59.6	66.4	61.1
19 : 10	66.5	82.4	59.3	68.9	60.8
19 : 16	63.6	77.5	59.0	65.3	60.6
19 : 22	65.6	84.6	58.6	65.3	60.5
19 : 27	64.1	77.4	59.4	66.8	60.7
19 : 32	62.8	74.0	58.9	64.5	60.5

3.5 The background noise level ($L_{A905min}$) measured during the survey was typically 61 dB $L_{A90,T}$ with noise levels dominated by road traffic.

4.0 Assessment Details and Conclusion

4.1 The proposed plant installation consists of three Mitsubishi Heavy Industries FDC200VS condenser units to be mounted on the existing plant platform at the rear of the building.

The manufacturer's data for the condenser units to be installed states a noise level of 57 dBA when measured at a distance of 1 metre from the units

The air conditioning units will only operate during trading hours, which are as follows:

- Monday to Friday: **1000 – 2000 hours**
- Saturday: **0900 – 1800 hours**
- Sunday: **1100 – 1700 hours**

4.2 The nearest noise sensitive property has been assumed by SR to be at first floor level above the Jack Horner pub (234-6 Tottenham Court Road). The property will be at least 10 metres from the location of the plant.

4.3 With regard to the assessment of industrial noise sources in commercial premises, BS 4142:2014 enables the resultant sound from new equipment to be compared to the existing background sound level (L_{A90}) of an area to assess the significance of impact.

4.4 As outlined in section 2 of this report to prevent adverse impacts on the health and quality of life of existing noise sensitive receptors and also ensure that there is no increase in existing background noise levels, the "rating noise level" (the predicted noise level plus any feature penalty) should be at least 10 dB below the existing background noise levels. Based on the survey data, noise from the air conditioning units should not exceed 51 dB L_{AeqT} .

4.5 For the purposes of the following assessment a +3 dB feature correction has been added the specific noise level to take into account the intermittent operation of the units.

4.6 Table 4.1 below details the BS 4142 methodology applied to this particular case:

Table 4.1: Summary of BS 4142 calculation

	FDC200VS
Baseline noise (at 1m, from manufacturer)	57 dBA
Correction for number of units (3)	+5 dB
Distance from receptor	10m
Distance attenuation ($20\log(1/10)$)	-20 dBA
Specific Noise Level	42 dBA
Feature correction for intermittency	+ 3 dBA
Rating noise level L_{Aeq1hr}	45 dBA

- 4.7 The predicted rating sound level from operation of the air condenser units will be 16 dB below the background noise level measured at the most noise sensitive time that the plant will operate.
- 4.8 It is therefore concluded that noise from the installation of the proposed plant will not cause significant adverse effect on local residents in line with both the national policy aims as set out in the NPPF and NPSE, and the local aims set out by Camden Borough Council in DP28.

APPENDIX A

PLANS (PROPOSED INSTALLATION)

APPENDIX B

ACOUSTIC TERMINOLOGY

Acoustic Terminology

- A1 Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sounds is from 0 dB to 140 dB. Two equal sources of sound, if added together will result in an increase in level of 3 dB, i.e. $50 \text{ dB} + 50 \text{ dB} = 53 \text{ dB}$. Increases in continuous sound are perceived in the following manner:
- 1 dB increase - barely perceptible
 - 3 dB increase - just noticeable
 - 10 dB increase - perceived as twice as loud
- A2 Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz (Hz) = 1 cycle/second. The range of frequencies audible to the human ear is around 20Hz to 18000Hz (or 18kHz). The capability of a person to hear higher frequencies will reduce with age. The ear is more sensitive to medium frequency than high or low frequencies.
- A3 To take account of the varying sensitivity of people to different frequencies a weighting scale has been universally adopted called "A-weighting". The measuring equipment has the ability automatically to weight (or filter) a sound to this A scale so that the sound level it measures best correlates to the subjective response of a person. The unit of measurement thus becomes dBA (decibel, A-weighted).
- A4 The second important characteristic of sound is amplitude or level. Two units are used to express level, a) sound power level - L_w and b) sound pressure level - L_p . Sound power level is an inherent property of a source whilst sound pressure level is dependent on surroundings/distance/directivity, etc. The sound level that is measured on a meter is the sound pressure level, L_p .
- A5 External sound levels are rarely steady but rise or fall in response to the activity in the area - cars, voices, planes, birdsong, etc. A person's subjective response to different noises has been found to vary dependent on the type and temporal distribution of a particular type of noise. A set of statistical indices have been developed for the subjective response to these different noise sources.
- A6 The main noise indices in use in the UK are:
- L_{A90} : The sound level (in dBA) exceeded for 90% of the time. This level gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background sound level" of an area.
 - L_{Aeq} : The equivalent continuous sound level in dBA. This unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the intermittent noise". In other words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as aircraft and trains.

L_{A10} : The sound level (in dBA) exceeded for 10% of the time. This level gives an indication of the sound level during the noisier periods of time in any given sample. It has been used over many years to measure and assess road traffic noise.

L_{AMAX} The maximum level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.

A7 The sound energy of a transient event may be described by a term SEL - Sound Exposure Level. This is the L_{Aeq} level normalised to one second. That is the constant level in dBA which lasting for one second has the same amount of acoustic energy as a given A weighted noise event lasting for a period of time. The use of this unit allows the prediction of the L_{Aeq} level over any period and for any number of events using the equation;

$$L_{AeqT} = SEL + 10 \log n - 10 \log T \text{ dB.}$$

Where

n = Number of events in time period T.

T = Total sample period in seconds.

A8 In the open, known as free field, sound attenuates at a rate of 6 dB per each doubling of distance. This is known as geometric spreading or sometimes referred to as the Inverse Square Law. As noise is measured on a Logarithmic scale, this attenuation in distance = $20 \log$ (ratio of distances), e.g. for a noise level of 60 dB at ten metres, the corresponding level at 160 metres is:

$$60 - 20 \log \frac{160}{10} = 60 - 24 = 36 \text{ dB.}$$