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THE ENGINEER, PRIMROSE HILL

EXTERNAL COLD STORE NOISE IMPACT ASSESSMENT

On behalf of:

Mitchells & Butlers

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Report No P24-378-R01
October 2024

THE ENGINEER, PRIMROSE HILL

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Mitchells & Butlers to carry out a noise impact assessment of the proposed external cold store to be installed at The Engineer public house, located at 65 Gloucester Avenue, Primrose Hill, London NW1 8JH. The location is shown in Figure 1.

1.2 The assessment has been commissioned in connection with the planning application for the proposed development. The aim of this report is to assess whether the proposed new cold store will meet suitable limits for noise, and to make recommendations for noise mitigation where required.

1.3 The site is bounded by Gloucester Avenue to the northeast and Princess Road to the northwest. To the southwest and southeast is Waterside Place, with residences beyond.

1.4 The new cold store is proposed to be installed at the rear of the premises, within a small walled yard used as bin storage. The location is shown in Figure 1. The only noise source associated with the cold store is the condenser specified by the manufacturer. We understand that the condenser for the cold store will potentially operate up to 24 hours a day.

1.5 The nearest residence to the proposed cold store is 50 Princess Road. Other noise-sensitive receptors are further away and will therefore be impacted less. The nearest habitable-room window to the proposed condenser is 12 metres away based on our survey on site.

1.6 The recommendations in this report have been provided with respect to acoustics only. Compliance with all other aspects of the development’s performance (e.g. structural, drainage, fire, ventilation, overheating, etc.) must be checked by other professionals suitably qualified in their fields.

1.7 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 ACOUSTIC DESIGN CRITERIA

2.1 Camden Council has the following guidance in *Camden Planning Guidance: Amenity*, dated March 2018:

> *Developments proposing plant, ventilation, air extraction or conditioning equipment and flues will need to provide the system's technical specifications to the Council accompanying any acoustic report. 'BS4142 Method for rating Industrial and Commercial Sound'* [SIC] *contains guidance and standards which should also be considered within the acoustic report.*

2.2 The following additional guidance is included for industrial and commercial noise sources in *Appendix 3: Noise Thresholds* of the *Camden Local Plan 2017:*

> *Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15 dB if tonal components are present) should be considered as the design criterion.*

2.3 The current version of British Standard 4142 is BS 4142: 2014 + A1: 2019 '*Methods for rating and assessing industrial and commercial sound'.* This standard provides methods for rating and assessing sound of an industrial and/or commercial nature. The standard will be referred to as BS 4142 for the rest of this report for brevity.

2.4 BS 4142 requires the 'rating' noise level for the operation to be compared with the background ($L_{A90,T}$) noise level in the absence of the operational noise being assessed. The time period, T, is required to be 15 minutes at night-time, i.e. between 23:00 and 07:00, when residents are typically most sensitive to noise.

2.5 The 'rating' level is derived based on the 'specific' L_{Aeq} noise level attributable to the operation with an *'acoustic feature'* penalty added for any noise sources which give rise to tonal, impulsive, intermittent, or other characteristics readily distinctive against the residual acoustic environment.

2.6 To meet Camden Council's requirements, we have followed the guidance in BS 4142, using Camden Council's 'Rating Level' criteria stated in Paragraph 2.2 above.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Environmental noise measurements were carried out at the site at the location marked on Figure 1. This location was selected as being suitably representative of the noise environment outside the nearest residence, whilst also being secure.

3.2 Automatic data-logging noise measurements were taken for 24 hours, starting at 16:30 on Thursday 10th October 2024.

3.3 The weather conditions throughout the noise survey were mild, dry, and clear, with wind speeds below 5 m/s. Wind was from the southeast. These were considered suitable conditions for the survey.

3.4 The noise measurements were taken in 'free-field' conditions with the microphone at approximately 1.5 metres above ground level. Measurements were taken in 15-minute samples for the duration of the survey.

3.5 The results of the noise survey are detailed in Appendix II and summarised in Table 1 below.

Table 1: Noise survey summary (dB)

$L_{AMax,fast}$	$L_{Aeq,15mins}$	$L_{A90,15mins}$	
Range	Log Average	Lowest	Mean
49 – 99	55	34	46

3.6 The dominant noise source outside of the pub's trading hours was road traffic on Princess Road and Gloucester Avenue. Noise from existing mechanical plant at the site was audible intermittently. Trains were occasionally audible between lulls in traffic.

3.7 The noise monitoring was carried out using a NTi XL2 Class 1 Sound Analyser (serial no. A2A-20294-E0) fitted with a windshield.

3.8 The calibration level of the meter was checked before and after the survey with a Brüel & Kjær Type 4231 sound calibrator (serial no. 2412667). No significant calibration deviation occurred.

4.0 ASSESSMENT

4.1 The sound pressure level for the proposed cold store condenser is shown in Table 2.

Table 2: Proposed external cold store condenser noise level

Equipment	Type	Sound Pressure Level, dBA	Comment
Condenser	Storer's Integrated System	33 @ 10 metres	Manufacturer's data

4.2 Based on our experience of this type of equipment and the manufacturer's noise data, we do not expect it to feature tonal or impulsive characteristics readily distinctive against the residual acoustic environment. However, we do expect the condenser to operate intermittently so a penalty of +3 dB is considered applicable to obtain the rating level.

4.3 The predicted rating level and corresponding background noise level for the cold store condenser outside the nearest habitable room window is presented in Table 3. The lowest measured background noise level has been used, for the most conservative approach.

4.4 The assessment takes into account the distance attenuation to the nearest residential window, which is measured to be 12 metres away from the proposed new condenser. Ground attenuation has been taken as zero for a cautious approach.

4.5 There will be barrier attenuation provided by the existing 3.0 metre high boundary wall, calculated to be 12 dB(A). The calculation is shown in Appendix III.

Table 3: Summary of the Initial Assessment for the cold store condenser

Description	dB(A)
Condenser sound pressure level during operation, L_p @ 10 metres	33
Distance attenuation with hemi-spherical propagation @ 12 metres from source	-1
Barrier attenuation	-12
Specific sound level during operation (dB $L_{Aeq,15mins}$)	20
Acoustic feature correction	+3
Sound rating level (dB $L_{Ar,15mins}$)	23
Lowest measured background noise level (dB $L_{A90,15mins}$)	34
Comparison ($L_{Ar,15mins} - L_{A90}$)	-11

4.6 As can be seen from Table 3, the rating level is calculated to be 11 dB(A) below even the lowest background sound level at the nearest noise-sensitive premises. This is therefore compliant with the noise requirements of the Local Authority. Based on this, no specific noise mitigation measures are necessary.

5.0 SUMMARY AND CONCLUSION

5.1 Mitchells & Butlers appointed Hepworth Acoustics to assess the impact of noise on the neighbouring residential properties from the proposed new external cold store to be installed at The Engineer, Primrose Hill.

5.2 A noise survey has been undertaken at the site and the background noise levels have been determined in accordance with the guidance in BS 4142: 2014 + A1: 2019, as stipulated by Camden Borough Council.

5.3 Using the noise data for the proposed equipment, the rating level for the noise emission at the nearest noise-sensitive premises has been predicted. The rating level of noise emitted from the proposed new cold store is calculated to be at least 11 dB(A) below the background levels determined outside the nearest noise-sensitive receptor. This is compliant with the noise requirements of the Local Authority so we conclude that no specific noise mitigation measures are necessary.

Figure 1 – Site Layout

Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

$L_{Aeq,T}$ This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period, T. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{W} This is the sound power level of a sound source, in decibels, which is 10 times the logarithm to the base 10 of the ratio of sound power radiated by the source to a reference power. The reference power is 1 picowatt (1 x 10^{-12} watt). The sound power level is the fundamental measure of the total sound energy radiated by a source per unit time.

$L_{A90,T}$ This is the A–weighted noise level exceeded for 90% of the time period, T. L_{A90} is used as a measure of background noise.

Appendix II: Noise Survey Results

Equipment: NTi XL2 Class 1 Sound Analyser (serial no. A2A-20294-E0) with tripod and windshield.

Weather: Dry, wind speed below 5 m/s

All levels in dB(A)

Date	Time	$L_{Aeq,15mins}$	$L_{Amax,f}$	$L_{A90,15mins}$
10/10/2024	16:30:00	59	85	50
10/10/2024	16:45:00	59	88	48
10/10/2024	17:00:00	55	82	48
10/10/2024	17:15:00	59	83	48
10/10/2024	17:30:00	53	72	47
10/10/2024	17:45:00	57	73	55
10/10/2024	18:00:00	58	84	48
10/10/2024	18:15:00	70	97	54
10/10/2024	18:30:00	58	78	51
10/10/2024	18:45:00	59	83	56
10/10/2024	19:00:00	61	88	50
10/10/2024	19:15:00	60	85	52
10/10/2024	19:30:00	53	64	46
10/10/2024	19:45:00	56	71	55
10/10/2024	20:00:00	52	67	46
10/10/2024	20:15:00	56	63	55
10/10/2024	20:30:00	49	64	46
10/10/2024	20:45:00	58	86	46
10/10/2024	21:00:00	55	75	47
10/10/2024	21:15:00	57	84	43
10/10/2024	21:30:00	56	72	45
10/10/2024	21:45:00	44	55	39
10/10/2024	22:00:00	56	59	55
10/10/2024	22:15:00	47	58	40
10/10/2024	22:30:00	55	68	43
10/10/2024	22:45:00	59	92	41
10/10/2024	23:00:00	53	78	42
10/10/2024	23:15:00	54	58	41
10/10/2024	23:30:00	56	87	40
10/10/2024	23:45:00	55	58	55
11/10/2024	00:00:00	40	55	38
11/10/2024	00:15:00	55	59	41
11/10/2024	00:30:00	49	58	37
11/10/2024	00:45:00	54	58	41

11/10/2024	01:00:00	51	57	39
11/10/2024	01:15:00	53	60	38
11/10/2024	01:30:00	54	62	41
11/10/2024	01:45:00	49	64	38
11/10/2024	02:00:00	55	58	55
11/10/2024	02:15:00	40	49	35
11/10/2024	02:30:00	56	58	55
11/10/2024	02:45:00	43	56	38
11/10/2024	03:00:00	55	63	41
11/10/2024	03:15:00	53	58	39
11/10/2024	03:30:00	49	57	34
11/10/2024	03:45:00	56	58	55
11/10/2024	04:00:00	39	57	35
11/10/2024	04:15:00	55	59	40
11/10/2024	04:30:00	51	61	38
11/10/2024	04:45:00	54	62	34
11/10/2024	05:00:00	54	59	37
11/10/2024	05:15:00	49	57	38
11/10/2024	05:30:00	56	58	55
11/10/2024	05:45:00	44	58	38
11/10/2024	06:00:00	54	57	39
11/10/2024	06:15:00	54	64	42
11/10/2024	06:30:00	51	59	42
11/10/2024	06:45:00	56	59	55
11/10/2024	07:00:00	48	73	40
11/10/2024	07:15:00	55	71	45
11/10/2024	07:30:00	55	67	43
11/10/2024	07:45:00	51	65	43
11/10/2024	08:00:00	56	64	55
11/10/2024	08:15:00	48	63	45
11/10/2024	08:30:00	56	81	50
11/10/2024	08:45:00	67	98	45
11/10/2024	09:00:00	53	66	43
11/10/2024	09:15:00	56	75	46
11/10/2024	09:30:00	60	89	46
11/10/2024	09:45:00	58	77	46
11/10/2024	10:00:00	53	82	44
11/10/2024	10:15:00	57	68	56
11/10/2024	10:30:00	52	69	44
11/10/2024	10:45:00	67	95	49
11/10/2024	11:00:00	52	63	47
11/10/2024	11:15:00	59	87	49
11/10/2024	11:30:00	57	85	49
11/10/2024	11:45:00	58	86	48

11/10/2024	12:00:00	59	80	52
11/10/2024	12:15:00	59	80	54
11/10/2024	12:30:00	59	79	51
11/10/2024	12:45:00	56	70	50
11/10/2024	13:00:00	56	73	51
11/10/2024	13:15:00	58	85	52
11/10/2024	13:30:00	59	83	54
11/10/2024	13:45:00	59	77	52
11/10/2024	14:00:00	60	91	52
11/10/2024	14:15:00	56	77	50
11/10/2024	14:30:00	59	81	56
11/10/2024	14:45:00	57	82	50
11/10/2024	15:00:00	67	99	56
11/10/2024	15:15:00	62	91	51
11/10/2024	15:30:00	61	85	53
11/10/2024	15:45:00	61	88	50
11/10/2024	16:00:00	61	84	53
11/10/2024	16:15:00	60	84	51

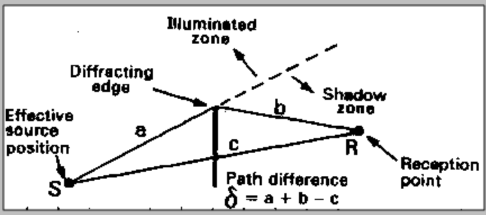
Appendix III: Barrier Calculation

Barrier Attenuation	h (Source)	h(Receiver)	h(Barrier)	d(S-B)	d(B-R)	d(S-B-R)	d(SBR)	d(SR)
	1.8	4.5	3.0	2.0	10.0	12.0	12.44	12.30

a	b	c	Path Diff	Log
2.33	10.11	12.30	0.144255	-8.41E-01

Frequency (Hz)	500	h(S)-H(R)	h(S)-H(R)/SBR	Theta	h(min shadow)	Zone
Speed (c)	344	2.7	0.225	0.221314	2.25	Shadow

		Freq Hz	Barrier Correction dB	
Fresnel	At Frequency (Hz)			-10.6
Octave Band		63		-6.1
		125	BS5228	-7.1
		250		-8.6
		500		-10.6
		1000		-13.0
		2000		-15.6
		4000		-18.5
		8000		-21.4



Minimum mass kg/m^2	10.0

	BS5228								
	63	125	250	500	1k	2k	4k	8k	A
Fresnel/BS5228	-6	-7	-9	-11	-13	-16	-18	-21	-12