DRAGONFLY

CONSULTING

The Range Home and Leisure Limited

Winchester Road, Southampton SO16 6TL

Discharge of Condition 2 (20/01317/FUL)

DC3425-R2

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This report has been prepared by Dragonfly Consulting with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client.

Dragonfly Consulting disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Limitations to this Report

This report entails a physical investigation of the site with a sufficient number of sample measurements to provide quantitative information concerning the type and degree of noise affecting the site. The objectives of the investigation have been limited to establishing sources of noise material to carrying out an appropriate assessment.

The number and duration of noise measurements have been chosen to give reasonably representative information on the environment within the agreed time, and the locations of measurements have been restricted to the areas unoccupied by building(s) that are easily accessible without undue risk to our staff.

As with any sampling, the number of sampling points and the methods of sampling and testing cannot preclude the existence of “hotspots” where noise levels may be significantly higher than those actually measured due to previously unknown or unrecognised noise emitters. Furthermore, noise sources may be intermittent or fluctuate in intensity and consequently may not be present or may not be present in full intensity for some or all of the survey duration.

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1.0 INTRODUCTION

The Range Home and Leisure Limited has appointed Dragonfly Consulting to carry out a Noise Impact Assessment to support the discharge of Planning Condition 2 (20/01317/FUL) in relation to the *"Siting of two cold storage units for use in connection with the sale of food goods from The Range".*

1.1 Planning History

A noise assessment was submitted to support the planning application *(DC3425-R1, Dragonfly Consulting, 23rd September 2020)* which identified the requirement for remedial noise mitigation measures in order to attenuate noise emissions from the cold store units to an appropriate level.

As noise contributions from the cold store units are driven by noise from the associated Thermoking compressors, acoustic louvres were recommended to be installed over the compressor outlets to improve the level of noise insulation afforded by the compressor housing.

A consultation response was issued on the 13th October 2020 on behalf of Southampton City Council (SCC) Environmental Health in support of the planning application with 2no. recommended conditions pertaining to technical details of the procured louvres (Planning Condition 1) and quantification of effects of noise post-mitigation (Planning Condition 2), shown below.

Planning Condition 2

"A supplementary report to be submitted for approval of the Local Planning Authority giving details of the noise readings taken, following installation of the acoustic louvers, to verify that the target noise levels i.e. 35/30 dB $L_{Aeq,T}$ Daytime/ Night-time as set out in Table 5.5 have actually been achieved.

Reason : To protect the amenities of the occupiers of existing nearby residential properties"

Consultation with Local Authority

The noise criteria detailed within Planning Condition 2 (35/30 dB $L_{Aeq,T}$) relates to internal noise contributions within adjacent dwellings. In light of current COVID regulations, it was not considered appropriate to monitor internally within the adjacent dwellings. Consultation was therefore undertaken between the Principal EHO at SCC and Dragonfly consulting to confirm an alternative approach. It was subsequently agreed that noise measurements would be undertaken externally and internal noise contributions from the plant calculated accounting for a nominal reduction of 15dB through a partially open window.

1.2 Site Description

The application site consists of a large warehouse/store owned and operated by the Range with an associated car park to the west. The site is bound by:

- Existing Residential Premises on Norham Avenue to the North.
- Winchester Road, a main throughfare into Southampton to the South.
- Existing Residential Premises on Vincent Avenue to the East.
- Existing Residential Premises on Dale Road to the West.

The two cold store units are located on the northern boundary of the site between the car park and store, consisting of two CRS mobile units 20ft and 40ft in length, respectively, with associated Thermoking compressors.

Operational Characteristics of Plant

Noise contributions from the plant are driven by the Thermoking compressors. The units continually emit a low hum. When the internal temperature within the cold store units exceeds a set temperature, the compressor fans "spin up" which increases both the level of noise emitted from the units and the dominant frequency of the noise output.

2.0 GUIDANCE

2.1.1 Association of Noise Consultants (ANC) and Institute of Acoustics (IOA) Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments

The ANC and IOA joint COVID-19 guidance, as amended 1st September 2020, sets out the guiding principles which have been adopted across the industry to ensure that sound and noise impact assessments are able to continue throughout the pandemic. It recommends that surveys should continue, unless they cannot be carried out in complete accordance with current Government requirements, and additional sources of data may be used to support the characterisation of the baseline.

2.1.2 BS 7445-1:2003 – Description and Measurement of Environmental Noise – Part 1: Guide to Quantities and Procedures

This document defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.

The methods and procedures described in this British Standard are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site. This British Standard does not specify limits for environmental noise.

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

BS 8233 provides a methodology to calculate the noise levels entering a building through facades and façade elements and provides details of appropriate measures for sound insulation between dwellings. It includes recommended internal noise levels which are provided for a variety of situations.

3.0 ENVIRONMENTAL NOISE SURVEY

The survey was undertaken from the 3rd to the 4th February 2021.

3.1 Survey Methodology

The equipment used during the survey is detailed in Appendix B. The sound level meters were calibrated before and after the measurements and no significant calibration drifts were found to have occurred (≤0.2dB). All of the noise monitoring equipment had been calibrated to a traceable standard within the twenty-four months preceding the survey. Calibration certificates are available on request.

- 'Location 1' – sound level meter positioned 1.5m from the ground and 1m from rear façade at no.19 Norham Avenue.
- 'Location 2' – sound level meter positioned 1.5m from the ground and 1m from rear façade (bedroom window) at no.17 Norham Avenue.
- 'Location 3' – sound level meter positioned 1.5m from the ground at far end of garden adjacent to The Range boundary at no.17 Norham Avenue.

The measurement locations are shown in Appendix C.

3.2 Survey Results

On-site weather monitoring was undertaken throughout the duration of the survey. The results of the weather monitoring concluded that the weather was suitable for noise monitoring with no significant rainfall and low wind speeds. The results of the weather monitoring have been validated using MET data obtained from a nearby weather station in Southampton city centre.

The results of the survey are presented in Table 3.1. background noise levels have been determined through statistical analysis of all 15-minute samples and are expressed as integers (with 0.5 dB being rounded up). In accordance with industry standard practice, a -3dB correction has been applied to Locations 1 & 2 to convert façade levels to free-field. Full survey data is available on request.

Table 3.1
Summary of Noise Levels – dB(A)

Location	Date	Period	Duration (hh:mm)	$L_{Aeq,\,T}$	L_{AFMax}	L_{A10}	L_{A90}
Location 1	03/02/2021 to 04/02/2021	Daytime 1800 - 2300 0700 - 0845	06:45	47.8	75.5	48.8	42
		Night-time 2300 - 0700	08:00	47.1	69.0	48.0	38
Location 2		Daytime 1800 - 2300 0700 - 0845	06:45	48.2	72.3	49.5	42
		Night-time 2300 - 0700	08:00	46.7	71.2	47.5	37

Location 3	Daytime 1800 - 2300 0700 - 0845	06:45	52.1	82.1	51.3	45
	Night-time 2300 - 0700	08:00	53.8	76.8	51.7	40

3.3 Observations

The survey was conducted on a predominantly unattended basis with audio recording enabled at all locations to assist in the determination of each respective mode of operation from the cold store compressors. The noise environment consisted of road traffic noise from Winchester Road and the surrounding road network, commercial activity at The Range, including car park operations, and contributions from the cold store compressors.

During the attended portion of the survey in the evening period, it was noted that the plant was audible at the boundary of The Range and adjacent receptor gardens in lulls between road traffic. However, audibility diminished during the morning when other operations occurred within the service yard and car park at The Range, and road traffic levels increased.

During the night-time period, road traffic levels reduce between 0000h and 0530h. In order to determine the noise contribution from the plant, it is considered that this period is most representative as less influence from extraneous noise sources are prevalent.

4.0 ASSESSMENT

4.1.1 Typical Compressor Operation

The compressors continuously emit a low hum when not under load with little to no variability in the characteristics of the noise. On this basis, the L_{A90} value is considered the most appropriate metric to apply in the determination of contributions from the compressors, as it is less likely to be influenced by intermittent or fluctuating noise sources. This approach is outlined within the *Health Technical Memoranda (HTM) 08-01* which states that *"it can be assumed that the L_{eq} of plant noise is the same value as the L_{90} for continuously operating plant".*

To assist in the determination of the typical operation of the compressors, the quietest point during the night-time period (0200h-0215h) has been analysed. A review of the audio data obtained adjacent to the boundary of The Range (Location 3), identifies that noise from the compressors is distinguishable from the rest of the acoustic environment with less influence from other fluctuating sources of noise, although intermittent car passages on the surrounding road network are still audible throughout.

Based on the methodology outlined above, Table 4.1 presents the results of the noise intrusion assessment accounting for a nominal 15dB reduction in noise through a partially open window.

Table 4.1
Noise Intrusion Levels at NSR, dB(A)

Location	External Noise Levels	Internal Noise Levels (Windows Open)	Target Internal Noise Criteria (Daytime/ Night-time)	Planning Condition 2 Criteria Achieved
Location 1	35.4	20.4	35 / 30	Yes
Location 2	33.2	18.2		Yes

As shown in Table 4.1, measured noise contributions from the plant during the compressors typical operation fall below the criteria stipulated within Planning Condition 2 (35/30 dB $L_{Aeq,T}$).

4.1.2 Compressor Under Load

To determine the noise contribution from the compressors when they are under load and subsequently outputting a higher noise level, a review of the audio data obtained at the boundary to The Range (Location 3) was undertaken. Audible characteristics of the noise from the compressors changed between 0035h-0036h. This process lasted around 40 seconds. The noise emitted from the compressors was notably higher in pitch compared to the typical operational noise. The noise environment during this period also included contributions from road traffic noise and therefore the same process has been followed. Given the relatively short duration of these occurrences, the time base for the calculation of the L_{A90} metric has been shortened to 1 minute to capture the whole period of increased noise output.

Based on the methodology outlined above, Table 4.2 presents the results of the noise intrusion assessment accounting for a nominal 15dB reduction in noise through a partially open window.

Table 4.2
Noise Intrusion Levels at NSR, dB(A)

Location	External Noise Levels	Internal Noise Levels (Windows Open)	Target Internal Noise Criteria (Daytime/ Night-time)	Planning Condition 2 Criteria Achieved
Location 1	39.6	24.6	35 / 30	Yes
Location 2	37.4	22.4		Yes

As shown in Table 4.2, measured noise contributions from the plant during the compressors increased load fall below the criteria stipulated within Planning Condition 2 (35/30 dB $L_{Aeq,T}$).

4.2 Assertion of Competence

This assessment has been completed by Mark Smith, Senior Acoustic Consultant with responsibilities for completing acoustic reports on behalf of Dragonfly Consulting.

I hold a Master of Science in Acoustics and a Bachelor of Science in Music Technology from Leeds Beckett University and the Institute of Acoustics (IoA) Diploma in Acoustics and Noise Control. I am a corporate member of the IoA (MIOA).

5.0 CONCLUSION

The Range Home and Leisure Limited has appointed Dragonfly Consulting to carry out a Noise Impact Assessment to support the discharge of Planning Condition 2 (20/01317/FUL) in relation to the *"Siting of two cold storage units for use in connection with the sale of food goods from The Range".*

A noise survey was conducted to determine the operational noise output from the cold store units. Subsequent analysis has been undertaken and determined that noise contributions from the cold stores falls below the criteria stipulated within Planning Condition 2, as recommended by SCC Environmental Health.

Appendix A – Glossary of Terminology

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A-1
Sound Levels Commonly Found in the Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

Acoustic Terminology

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2x10^{-5}$ Pa).

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} This is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

L_{10} & 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 as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background level. It is common practice to use the L_{10} index to describe traffic noise.

L_{AMax} This 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.

Appendix B – Noise Monitoring Equipment

Table B-1
Noise Monitoring Equipment

Equipment	Serial Number
Svantek SV307 Noise Monitoring Station	87841
Svantek ST30 Microphone	86127
01dB Fusion Sound Level Meter	11860
G.R.A.S 40CD Microphone	331802
01dB PRE22N Preamplifier	1707207
01dB Fusion Sound Level Meter	12080
G.R.A.S 40CD Microphone	1805334
01dB PRE22 Preamplifier	331919
Castle GA607 Acoustic Calibrator	039063

Appendix C – Figures

Figure C-1
Measurement Location Plan

Noise Measurement Location

Cold Store Location