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Project:

Waitrose Northwood

Title:

Plant Noise Impact Assessment

quietly moving forward

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Report Title	Waitrose Northwood Plant Noise Impact Assessment
Reference	EEC/EC20848-2
Version	0
Issue Date	24 January 2025
Client	Waitrose Ltd
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Revision	Date	Author	Checked

CONTENTS:

1 INTRODUCTION

1.01 Environmental Equipment Corporation Limited has been commissioned by Waitrose Ltd to undertake a noise assessment of a number of new proposed plant items to serve Waitrose Northwood.

1.02 This noise assessment has been conducted in accordance with the policies and requirements of London Borough of Hillingdon (LBH) and is based on a noise survey carried out at the site over a typical weekend period.

1.03 This assessment includes:

- the setting of plant noise limits in accordance with the requirements of LBH and national planning policy, standards and guidance; and
- the prediction of noise impacts at the worst affected noise sensitive receptors based on the proposed items of plant and their location.

1.04 This report is prepared solely for Waitrose Ltd. Environmental Equipment Corporation Limited accepts no responsibility for its use by any third party. Note that the contents contained herein are produced for the purposes of review by relevant Planning Authority departments and do not constitute a detailed design or specification document to be used for the purposes of construction. Subsequent development of noise mitigation schemes shall engage EEC Ltd and Waitrose Ltd so as to support the conclusions of this report.

1.05 Whilst every effort has been made to ensure that this report is easy to understand, it is necessarily technical in nature. To assist the reader, an explanation of the terminology used in this report is contained in Appendix A.

2 SITE

2.01 The Waitrose store is situated in a mixed commercial and residential area within Northwood. The store has a service yard at the southern end of the western elevation.

2.02 The property is bound by the following:

- North – Commercial buildings along Green Lane;
- East – Northwood Underground Rail Station;
- South – Waitrose car park and dwellings of Murray Road beyond; and
- West – Dwellings along Murray Road.

2.03 This application is for two Weatherite Dry air coolers (DAC), which are to be located on the roof of the Waitrose store, and five SCM Frigo CUBO refrigeration condenser units which are to be

installed in place of an existing generator in the ground floor service yard as presented in Appendix B.

2.04 It is proposed that the condenser units in the service yard will be installed with a four-sided open top acoustic screen around the plinth.

2.05 The closest noise sensitive receptor to the proposed plant items is would be the rear window of No. 3 Murray Road.

2.06 All other noise sensitive receptors are at a greater distance from the proposed location of the units, or are protected by more screening by the intervening structures, and as such will be subject to lower levels of noise.

3 GUIDANCE

3.01 National Planning Policy is presented in Appendix C of this document.

3.02 The London Boroughs of Hillingdon, Hounslow and Richmond Upon Thames *"Development Control for Noise Generating and Noise Sensitive Development"* (2016) provides guidance for noise criteria for the assessment of new noise generating industrial and commercial development. Section 6.1 stipulates:

"All industrial and commercial development with the potential to generate noise will be assessed and, where relevant, controlled by planning conditions in order to protect residential amenity. Conditions may be used, for example, to restrict noise levels and to control hours of operation. The most relevant standard for assessing new industrial and commercial development is BS:4142:2014"

3.03 Section 6.2 of the document provides external noise standards for new industrial and commercial development shown below.

As a general rule, the Boroughs will seek to achieve the external noise standards detailed in **Table 2** below (all terms are as defined in BS4142).

Table 2: New Industrial and Commercial Development - External Noise Standards

Noise Impact From Relevant Proposed Industrial Or Commercial Premises Or Plant	Development Outcome
Rating Level (LAr,Tr) is at least 5 dB(A) below the Background Level LA90	Normally acceptable
Rating level (LAr,Tr) is no more than 5 dB(A) above the Background Level LA90	Acceptable only if there are overriding economic or social reasons for development to proceed
Rating level (LAr,Tr) is more than 5 dB(A) above the Background Level LA90	Normally unacceptable

Note: All terms as defined in BS4142

4 MEASUREMENTS

4.01 Environmental noise measurements were carried out over an extended weekend period, between 13:15 hours on Friday 9th August 2024 and concluded 12:25 hours the following Monday, to establish the existing noise levels at the site. The survey methodology and results are set out below.

4.02 Noise measurements have been carried out at the following position, as shown in Appendix B and described as:

- Position 1: located at a height of approximately 1.5 metres above the top of the ground just outside the service yard. The measurement was not located within 3.5 metres of any reflecting surfaces, other than the mounting surface.

4.03 This position is considered to be representative of the nearest windows to the proposed plant unit locations.

5 EQUIPMENT

5.01 The equipment used for the survey was as follows:-

- 01dB Fusion Integrating Sound Level Meter conforming to Class 1 BS EN 61672, Type 1 BS EN 60804 & BS EN 60651: 1994;
- GRAS 40CD Condenser Microphone, PRE22 S Pre-amp and Connecting Leads;
- Tripod.

5.02 The equipment holds current UKAS or equivalent accreditation and serial numbers as follows:

Sound Level Meter 01dB Fusion	Serial No.	12241
	Calibration Date	21st May 2024
	Cal Certificate No.	U47874
½" Condenser Mic. GRAS 40CD	Serial No.	330667
	Calibration Date	21st May 2024
	Cal Certificate No.	47873
Calibrator CAL 31	Serial No.	89090
	Calibration Date	3rd May 2024
	Cal. Certificate No.	U47718

N.B. Copies of calibration certificates are available upon request.

5.03 The equipment was calibrated both before and after the survey with no difference noted in the levels.

6 RESULTS

6.01 The weather during the survey was suitable for noise measurement, it being dry with little wind for the duration of the survey.

6.02 Noise sources at the site include local and distant road traffic, and plant noise from units understood to serve the Tesco Express on Maxwell Road. There were no other significant sources of noise during the survey.

6.03 A list of the levels measured is included in Appendix D and represented graphically in Appendix E.

6.04 A summary of the time averaged ambient levels and lowest measured background levels over the measurement periods are shown in Table 6.1. The minimum L_{A90} is the lowest fifteen minute measurement in the specified period.

Position	Period	Average $L_{Aeq,T}$ – dB	Minimum L_{A90} – dB
1	Day time (0700-1900 hrs)	54	37
	Evening (1900-2300 hrs)	52	46
	Night-time (2300-0700 hrs)	45	31

Table 6.1: Free-Field Measured Ambient and Lowest Background Noise Levels

7 PLANT ASSESSMENT

7.01 This application is for the installation of two DAC units to be located on the rooftop and five refrigeration condenser units to be located at ground level in the service yard replacing the existing standby emergency generator.

7.02 Based on the standard requirements of London Borough of Hillingdon (LBH) and the lowest measured background noise level in each time period, Table 7.1 sets out the recommended noise limits that the proposed items of plant should meet.

7.03 In accordance with the requirements of LBH, the proposed noise limits are based on being 5 dB below the lowest measured background noise level.

Location	Period	Measured Existing $L_{A90,T}$	Proposed Noise Limit L_{Ar}
1	Day	37 dB	32 dB
	Evening	46 dB	41 dB
	Night	31 dB	26 dB

Table 7.1: Suggested Plant Noise Emission Limits Based on Lowest Measured L_{A90}, Free-field dB

7.04 Note that the limits suggested above are rating levels and as such any design should take into account the acoustic characteristics of the plant. In this instance the proposed units display none of the characteristics whereby the acoustic correction should be applied.

7.05 Assuming the proposed items meet the noise limits set out in Table 7.1 noise will be approaching the NOEL with respect to the NPPF.

7.06 The manufacturer stated sound pressure level measured at a distance of 10m for each item of plant is presented in Table 7.2 below.

Plant Reference Number	Description	Operating Period	Model Reference	Manufacturer Stated Sound Pressure Level at 10m
Rooftop Plant				
DAC1	Dry Air Cooler for Refrigeration	24 hours	Weatherite WDAC134DB	37 dB(A)
DAC2	Dry Air Cooler for Refrigeration	24 hours	Weatherite WDAC134DB	37 dB(A)
Ground Level – Service Yard				
LT1	Condenser for Coldroom	24 hours	CUB02 AQUA UMT WG T067 BTDX	41 dB(A)
LT2	Condenser for Coldroom	24 hours	CUB02 AQUA UMT WG T067 BTDX	41 dB(A)
HT1	Condenser for Coldroom	24 hours	CUB02 UMT WG T100 MTDX	41 dB(A)
HT2	Condenser for Coldroom	24 hours	CUB02 UMT WG T100 MTDX	41 dB(A)
HT3	Condenser for Coldroom	24 hours	CUB02 UMT WG T067 MTDX	41 dB(A)

Table 7.2: Proposed Plant Items and Installation Locations

7.07 It is proposed that the condenser units in the service yard will be installed with a four-sided open topped screen around the plinth formed with acoustic louvres and acoustic panelwork.

7.08 In order to mitigate structure borne noise, it is proposed that the units will be installed on suitable anti vibration mounts.

7.09 Predicted noise levels have been calculated at the closest noise sensitive window, the rear window of No. 3 Murray Road.

7.10 Other residential receptors located further from the site will be subject to lower noise levels than those predicted at the above locations.

7.11 Tables 7.3-7.6 present the results of worst-case plant noise predictions at the worst-case locations.

Item	Noise Level	Notes
2 No. Rooftop DAC units	40 dB(A)	Cumulative sound pressure level at 10m
Barrier Effect	- 5 dB	Partial screening from rooftop edge
Conformal area Losses over 60 metres	- 14 dB	Distance to closest window
Resultant Noise Level	21 dB(A)	Third floor window of No. 3 Murray Street

Table 7.3: No. 3 Murray Street Plant Noise Calculation – Rooftop Plant

Item	Noise Level	Notes
5 No. refrigeration condensers	48 dB(A)	Cumulative sound pressure level at 10m
Barrier Effect	- 13 dB	Four-sided screen acoustic louvred screen around units
Conformal area Losses over 37 metres	- 11 dB	Distance to closest window
Resultant Noise Level	24 dB(A)	Third floor window of No. 3 Murray Street

Table 7.4: No. 3 Murray Street Plant Noise Calculation – Service Yard Plant

Item	Noise level at Receiver
DAC units	21 dB(A)
Condenser units	24 dB(A)
Cumulative Level at Receiver	26 dB(A)

Table 7.5: Cumulative noise levels to No. 3 Murray Street

Property	Period	Proposed Noise Limit L_{Ar}	Predicted $L_{Aeq,T}$	Exceedance of noise limit
Third floor window of No. 3 Murray Street	Daytime	32 dB	26 dB	- 6 dB
	Evening	41 dB	26 dB	- 5 dB
	Night-time	26 dB	26 dB	0 dB

Table 7.6: Assessment of Predicted Noise Levels Based on Proposed Noise Limit, Free-field dB(A)

7.12 Assuming that the proposed condenser units in the service yard are installed with a four-sided, open topped acoustic screen, predicted noise levels will meet the requirements of the Local Authority during all periods of operation and at the closest noise sensitive receptor.

7.13 With respect to the NPPF, achieving the noise limits would be classified as approaching the NOEL.

8 CONCLUSIONS

8.01 Waitrose Ltd has appointed Environmental Equipment Corporation Limited to undertake a noise assessment for proposed dry air coolers and condensers to serve Waitrose Northwood.

8.02 The assessment has been carried out in accordance with national planning guidance and the requirements of the London Borough of Hillingdon (LBH), and is based on an environmental noise survey conducted at the site over a weekend period.

8.03 A noise assessment has been undertaken to evaluate the potential noise impact of the proposed condensers at the closest existing residential receptor.

8.04 Plant noise limits have been set based on the methodology contained in BS4142, the results of a background noise survey and the requirements of LBH, to control the noise from the proposed condenser units. In accordance with the LBH, the noise limit has been set 5 dB below the lowest measured background noise level.

8.05 Predictions have shown that the noise criteria are met at the nearest, most affected noise sensitive property during all periods of the plants' proposed operation, assuming, that the proposed condensers in the service yard will be installed with a four-sided, open topped acoustic screen on the plinth which they are to sit.

8.06 Assessing the site in accordance with the principles of the National Planning Policy Framework has shown that predicted noise levels would be below the lowest observed adverse effect level, the LOAEL.

8.07 On the basis of this assessment it is considered that noise does not pose a material constraint to the operation of the proposed new replacement plant.

APPENDIX A

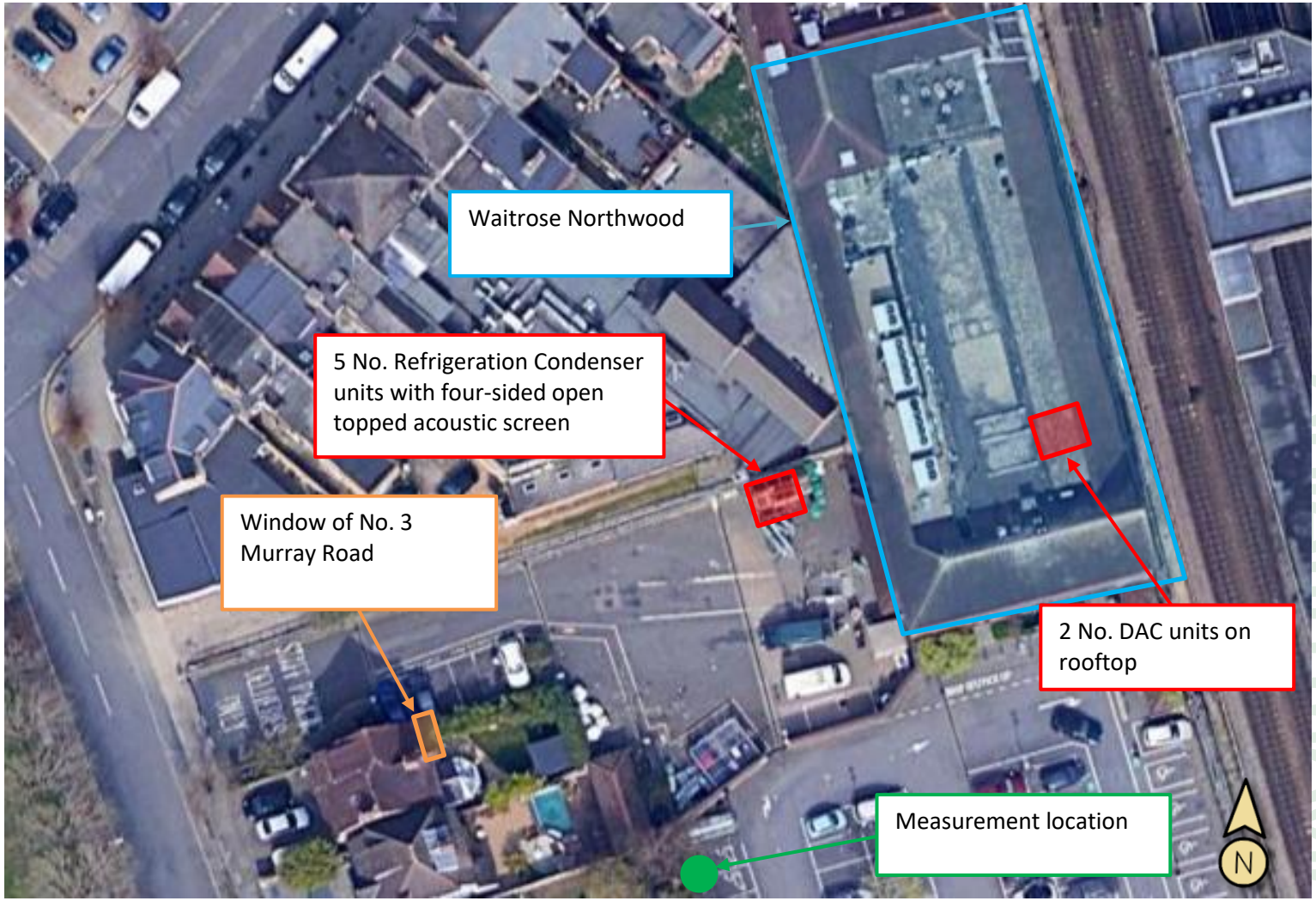
GLOSSARY OF TECHNICAL TERMS

ACOUSTIC TERMINOLOGY

Absorption Classes	The sound absorption of a material is rated from Class A to Class E, where Class A materials provide the highest level of sound absorption.
Ambient Noise Levels	Noise levels measured in the absence of noise requiring control, frequently measured to determine the situation prior to the additional of a new noise source.
dB	Decibel. The logarithmic unit of sound level.
dB(A)	A-weighted decibel. The A-weighting approximates the response of the human ear.
$D_{nT,w}$	Weighted standardized level difference. A single number quantity of the sound level difference between two rooms. $D_{nT,w}$ is typically used to measure the on-site sound insulation performance of a building element such as a wall, floor or ceiling. Measured in accordance with BS EN ISO 16283-1 and weighted in accordance with BS EN ISO 717-1.
$D_{n,e,w}$	The weighted element-normalized level difference. A single number rating of the sound reduction provided by a sound passing through an individual element. $D_{n,e,w}$ is typically used to define the sound insulation provided by ventilators. Measured in accordance with BS EN ISO 10140-2:2010 and rated in accordance with BS EN ISO 717-1.
Flanking	Transmission of sound energy through paths adjacent to the building element being considered. For example, sound may be transmitted around a wall by travelling up into the ceiling space and then down into the adjacent room.
Frequency	Sound can occur over a range of frequencies extending from the very low, such as the rumble of thunder, up to the very high such as the crash of cymbals. Sound is generally described over the frequency range from 63Hz to 4kHz, roughly equal to the range of frequencies on a piano.
Impact Sound	Sound produced by an object impacting directly on a building structure, such as footfall noise or chairs scrapping on a floor.
$L_{Aeq,t}$	The equivalent continuous sound level measured in dBA. This is commonly referred to as the average noise level. 't' is the interval time for the measurement. Typically 't' of 16hrs and 8hrs is used for day and night time ambient noise respectively or 't' is defined by the period of interest in BS4142 assessments.
$L_{A90,t}$	The noise level exceeded for 90% of the measurement period, measured in dBA. This is commonly referred to as the background noise level.
$L'_{nT,w}$	Weighted, standardized impact sound pressure level. A single number rating of the impact sound insulation of a floor/ceiling when impacted on by a standard "tapper" machine. The lower the $L'_{nT,w}$, the better the acoustic performance. Measured in accordance with BBS EN ISO 140-7 and rated in accordance with BS EN ISO 717-2.
NR	Noise Rating. A single number rating which is based on the sound level in the octave bands 31.5Hz – 8kHz inclusive, generally used to assess noise from mechanical services in buildings.
Octave Band	Frequencies are often grouped together into octaves for analysis. Octave bands are labelled by their centre frequency which are: 63Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz and 4kHz.
Reverberation Time (T_{mf})	Reverberation time is used for assessing the acoustic qualities of a space. It is defined as the time it takes for an impulse to decay by 60dB. T_{mf} is the arithmetic average of the reverberation time in the mid frequency bands (500Hz, 1kHz and 2kHz).
R_w	Weighted sound reduction index. A single number rating of the sound insulation performance of a specific building element. R_w is measured in a laboratory. R_w is commonly used by manufacturers to describe the sound insulation performance of building elements such as plasterboard and concrete. Measured in accordance with BS EN ISO 10140-2:2010 and rated in accordance with BS EN ISO 717-1.
Sound Absorption	When sound hits a surface, some of the sound energy is absorbed by the surface material. Sound absorption refers to the ability of a material to absorb sound, rated from 0, complete reflection, to 1, complete absorption.
Sound Insulation	When sound hits a surface, some of the sound energy travels through the material. 'Sound insulation' refers to the ability of a material to prevent the travel of sound.
Structure-borne transmission	Transmission of sound energy as vibrations via the structure of a building.

APPENDIX B

SITE PLAN
&
MEASUREMENT LOCATION


Waitrose Northwood
5 No. Refrigeration Condenser units with four-sided open topped acoustic screen
Window of No. 3 Murray Road
2 No. DAC units on rooftop
Measurement location
N

APPENDIX C

PLANNING POLICY AND GUIDANCE

PLANNING POLICY AND GUIDANCE

National Planning Policy Framework and the Noise Policy Statement for England

The Department for Communities and Local Government published the National Planning Policy Framework (NPPF) on 27th March 2012 (as amended on 12th December 2024) and upon its publication, the majority of planning policy statements and guidance notes were withdrawn, including Planning Policy Guidance 24 Planning and Noise, which previously presented the government's overarching planning policy on noise.

Paragraph 187 in Section 15 of the NPPF , entitled Conserving and enhancing the natural environment, states that:

> *"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…"*

Paragraph 198 in Section 15 also states that:

> "*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;

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…"

The Department for Environment Food and Rural Affairs published the Noise Policy Statement for England (NPSE) in March 2010. The explanatory note of NPSE defines the following terms used in the NPPF:

"NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

2.21 Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur."

The NPSE does not define any of the above effect levels numerically.

The NPSE presents the Noise Policy Aims as:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy and 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."

It can be seen that the first two bullet points are similar to Section 11 of the NPPF, with a third aim that seeks to improve health and quality of life. The NPSE later expands on the Noise Policy Aims, stating:

2.23 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development (paragraph 1.8).

2.24 The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

2.25 This aim (the third aim)*, seeks where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding*

principles of sustainable development (paragraph 1.8), recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

It is clear that noise described in the NPSE as SOAEL that would lead to significant adverse effects should be avoided, although there is no definition as to what constitutes a significant adverse effect. Similarly, noise should be mitigated where it is high enough to lead to adverse effects, termed the LOAEL, but not so high that it leads to significant adverse effects.

British Standard 4142

To assess the acceptability of the resultant noise levels we have consulted the relevant standards. BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' has been used to assess the likelihood any adverse impacts based on the resultant noise level from the new plant item, including any corrections for the character of the noise against the existing background noise level.

BS4142 gives guidance on assessing the likelihood of adverse impacts by calculating a 'rating level' of the new noise source and comparing its magnitude at noise sensitive locations to the existing or underlying background noise level. The background noise level is subtracted from the 'rating level' to assess the likelihood of complaints:

- The greater the difference the greater the likelihood of complaints.
- A difference of around +10dB or more is an indication of a significant adverse impact, depending on the context.
- A difference of +5dB 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 noise level, the less likely it is that the specific sound source will have an adverse impact or 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 sound impact, depending on the context.

This assessment is carried out over a one hour period for the daytime and a fifteen minute period for the night-time. For the purposes of the standard it states that daytime and night-time are typically 07:00 to 23:00 hours and 23:00 to 07:00 hours respectively.

The 'rating level' of the noise source is obtained taking the following factors into consideration:

- The new plant noise (the specific noise) is measured or predicted in terms of L_{Aeq}.
- An additional correction shall be included if the noise contains a distinguishable, discrete continuous note, if the noise contains distinct impulses or if the noise is irregular enough to attract attention. The value for any tonal noise can be an addition of up to 6dB and for impulsive noise of up to 9dB.

BS 4142 goes onto state 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. An effective assessment cannot be conducted without an understanding of the reason(s) for the

assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.'

BS4142 has been referenced in setting noise limits for any fixed plant proposed as part of the proposed development.

APPENDIX D

SURVEY RESULTS
(TABULAR)

EC 20848 - Waitrose Northwood

Monaghans

Tabulated Noise data

Time	L_{Aeq}	L_{AMax}	L_{A90}
13:15	58	82	52
13:30	55	80	48
13:45	53	75	49
14:00	59	86	49
14:15	55	78	49
14:30	57	80	49
14:45	56	79	46
15:00	52	72	46
15:15	52	79	46
15:30	51	65	47
15:45	51	74	46
16:00	50	68	46
16:15	52	82	47
16:30	53	69	49
16:45	58	79	48
17:00	57	77	48
17:15	61	75	50
17:30	54	72	49
17:45	52	72	48
18:00	53	79	48
18:15	56	79	48
18:30	53	75	48
18:45	54	76	48
19:00	52	65	48
19:15	53	80	48
19:30	55	80	48
19:45	56	81	48
20:00	54	73	48
20:15	50	74	47
20:30	51	65	47
20:45	50	68	47
21:00	49	68	46
21:15	50	67	47
21:30	49	65	46
21:45	49	65	46
22:00	49	66	46
22:15	54	73	47
22:30	50	69	46
22:45	48	60	47
23:00	48	62	46
23:15	50	69	46
23:30	50	70	40
23:45	43	56	39
00:00	43	56	39
00:15	48	70	39
00:30	43	57	39
00:45	43	60	37
01:00	42	61	33

Time	L_{Aeq}	L_{AMax}	L_{A90}
01:15	41	61	35
01:30	41	57	33
01:45	38	42	32
02:00	38	45	31
02:15	38	49	31
02:30	37	42	32
02:45	39	52	32
03:00	38	46	36
03:15	38	44	32
03:30	37	45	31
03:45	38	45	31
04:00	38	58	31
04:15	38	57	35
04:30	39	50	33
04:45	41	59	33
05:00	40	62	31
05:15	40	68	32
05:30	47	71	33
05:45	46	61	34
06:00	44	58	35
06:15	44	59	35
06:30	44	60	35
06:45	46	62	36
07:00	54	70	38
07:15	49	68	37
07:30	55	74	40
07:45	54	69	38
08:00	47	65	41
08:15	47	63	39
08:30	50	67	41
08:45	49	69	42
09:00	48	68	41
09:15	48	68	42
09:30	51	82	42
09:45	49	68	44
10:00	49	64	43
10:15	53	76	45
10:30	52	73	48
10:45	57	81	47
11:00	56	77	47
11:15	56	82	47
11:30	56	82	48
11:45	59	83	48
12:00	58	80	48
12:15	53	78	45
12:30	53	75	46
12:45	54	79	46
13:00	56	77	47

EC 20848 - Waitrose Northwood

Monaghans

Tabulated Noise data

Time	L_{Aeq}	L_{AMax}	L_{A90}
13:15	55	82	47
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14:00	54	74	50
14:15	53	72	50
14:30	54	76	51
14:45	61	72	51
15:00	57	75	46
15:15	56	78	46
15:30	51	70	45
15:45	51	68	45
16:00	49	65	45
16:15	52	74	48
16:30	52	71	48
16:45	52	74	48
17:00	52	73	48
17:15	51	69	48
17:30	53	81	48
17:45	53	81	48
18:00	55	83	48
18:15	51	71	48
18:30	50	65	48
18:45	51	68	48
19:00	52	70	48
19:15	51	67	48
19:30	51	70	48
19:45	50	65	48
20:00	55	76	48
20:15	51	73	48
20:30	50	65	47
20:45	51	70	47
21:00	49	65	47
21:15	50	66	47
21:30	50	64	47
21:45	51	71	47
22:00	53	79	47
22:15	50	68	46
22:30	51	68	47
22:45	49	66	46
23:00	51	69	47
23:15	47	52	47
23:30	47	51	47
23:45	48	59	46
00:00	45	59	40
00:15	44	61	39
00:30	44	62	40
00:45	43	58	39
01:00	40	44	39

Time	L_{Aeq}	L_{AMax}	L_{A90}
01:15	40	45	39
01:30	40	48	38
01:45	40	46	38
02:00	40	43	38
02:15	40	46	38
02:30	40	44	38
02:45	40	43	39
03:00	40	43	39
03:15	40	46	38
03:30	40	44	39
03:45	40	48	39
04:00	53	76	39
04:15	40	45	39
04:30	40	43	39
04:45	43	63	39
05:00	42	69	38
05:15	39	43	34
05:30	40	47	37
05:45	41	58	35
06:00	47	64	36
06:15	46	60	40
06:30	46	65	40
06:45	45	59	40
07:00	45	60	40
07:15	45	60	40
07:30	45	59	41
07:45	46	59	40
08:00	49	69	41
08:15	50	70	41
08:30	54	77	40
08:45	54	70	39
09:00	55	78	41
09:15	53	73	44
09:30	58	77	43
09:45	51	69	43
10:00	60	84	42
10:15	54	71	45
10:30	52	69	48
10:45	58	80	49
11:00	59	71	50
11:15	55	72	50
11:30	58	74	51
11:45	56	77	49
12:00	60	81	50
12:15	53	77	49
12:30	52	74	49
12:45	53	76	49
13:00	54	72	49

EC 20848 - Waitrose Northwood

Monaghans

Tabulated Noise data

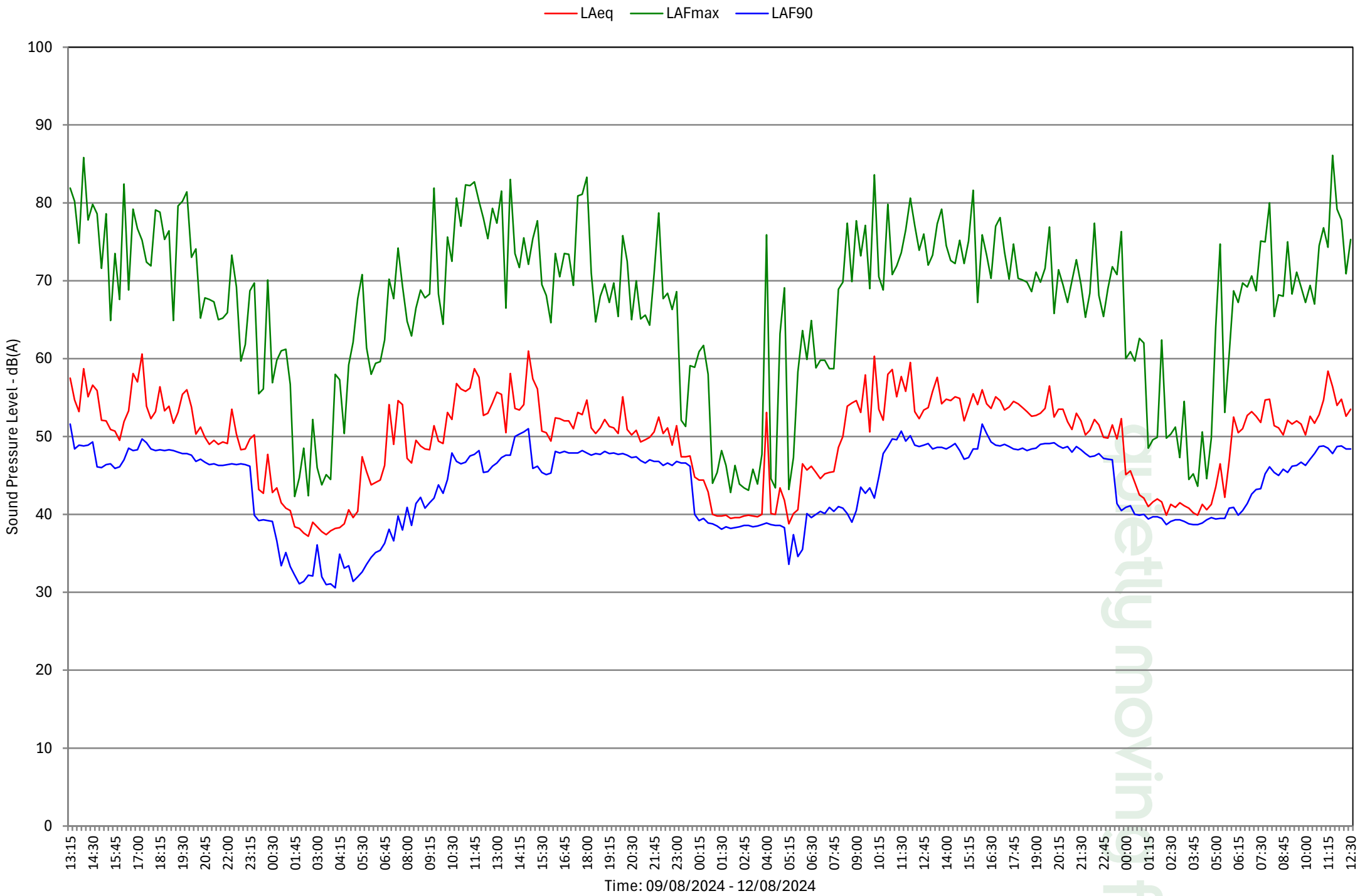
Time	L_{Aeq}	L_{AMax}	L_{A90}
13:15	56	73	48
13:30	58	77	49
13:45	54	79	49
14:00	55	75	48
14:15	55	73	49
14:30	55	72	49
14:45	55	75	48
15:00	52	72	47
15:15	54	75	47
15:30	56	82	48
15:45	54	67	48
16:00	56	76	52
16:15	54	73	50
16:30	54	70	49
16:45	55	77	49
17:00	55	78	49
17:15	53	74	49
17:30	54	70	49
17:45	55	75	48
18:00	54	70	48
18:15	54	70	49
18:30	53	70	48
18:45	53	69	48
19:00	53	71	49
19:15	53	70	49
19:30	54	72	49
19:45	57	77	49
20:00	53	66	49
20:15	54	71	49
20:30	54	70	49
20:45	52	67	49
21:00	51	70	48
21:15	53	73	49
21:30	52	70	48
21:45	50	65	48
22:00	51	68	47
22:15	52	77	48
22:30	52	68	48
22:45	50	65	47
23:00	50	69	47
23:15	52	72	47
23:30	50	71	41
23:45	52	76	41
00:00	45	60	41
00:15	46	61	41
00:30	44	60	40
00:45	43	63	40
01:00	42	62	40

Time	L_{Aeq}	L_{AMax}	L_{A90}
01:15	41	49	39
01:30	42	50	40
01:45	42	50	40
02:00	42	62	40
02:15	40	50	39
02:30	41	50	39
02:45	41	51	39
03:00	42	47	39
03:15	41	55	39
03:30	41	45	39
03:45	40	45	39
04:00	40	44	39
04:15	41	51	39
04:30	41	45	39
04:45	41	50	40
05:00	44	64	39
05:15	47	75	40
05:30	42	53	40
05:45	47	61	41
06:00	53	69	41
06:15	51	67	40
06:30	51	70	41
06:45	53	69	41
07:00	53	71	43
07:15	53	69	43
07:30	52	75	43
07:45	55	75	45
08:00	55	80	46
08:15	51	65	45
08:30	51	68	45
08:45	50	68	46
09:00	52	75	45
09:15	52	68	46
09:30	52	71	46
09:45	52	69	47
10:00	50	67	46
10:15	53	69	47
10:30	52	67	48
10:45	53	75	49
11:00	55	77	49
11:15	58	74	49
11:30	56	86	48
11:45	54	79	49
12:00	55	78	49
12:15	53	71	48
12:30	54	75	48

APPENDIX E

SURVEY RESULTS
(GRAPHICAL)

Noise Level Time History at Waitrose Northwood



APPENDIX F

PUBLISHED PLANT NOISE DATA

DRY AIR COOLER (DAC) SELECTION

STORE RELATED			PLANT SELECTION					
DAC REFERENCE NUMBER	YEAR OF INSTALL	STATUS Existing New	SUPPLIER	DAC MODEL REFERENCE	COASTAL / CORROSIVE ATMOSPHERE	COIL / FIN MATERIAL CONSTRUCTION	APPROXIMATE UNIT WEIGHT INCLUDING FLUID (KG)	UNIT NOISE RATING DB(A) @ 10M
DAC1	2025	NEW	WEATHERITE	WDAC134DB	NO	Cu/AlMg	1662.44	37
DAC2	2025	NEW	WEATHERITE	WDAC134DB	NO	Cu/AlMg	1662.44	37

PLANT REFERENCE NUMBER	YEAR OF INSTALL	STATUS Existing New Refurbished Offsite Ref.	SUPPLIER	PLANT MODEL REFERENCE	SST (°C)	APPLICATION	APPROXIMATE UNIT WEIGHT (KG)	UNIT NOISE RATING DB(A) @ 10M
LT1	2025	NEW	SCM FRIGO	CUBO2 AQUA UMT WG T067 BTDX	-30	FROZEN	176	41
LT2	2025	NEW	SCM FRIGO	CUBO2 AQUA UMT WG T067 BTDX	-30	FROZEN	176	41
HT1	2025	NEW	SCM FRIGO	CUBO2 AQUA UMT WG T100 MTDX	-8	MEAT, FRV	150	41
HT2	2025	NEW	SCM FRIGO	CUBO2 AQUA UMT WG T100 MTDX	-8	DAIRY, MEAT	150	41
HT3	2025	NEW	SCM FRIGO	CUBO2 AQUA UMT WG T067 MTDX	-5	DAIRY, FRV	150	41