GILLIERON SCOTT
ACOUSTIC DESIGN

Report No:
26 New End Square – Noise Impact Assessment 20122024

Date:
20/12/2024

For:
Dominic McKenzie Architects

26 NEW END SQUARE
NOISE IMPACT ASSESSMENT

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REVISION SCHEDULE

Document Revision	Date	Document Title	Details	Prepared by	Approved by
00	09/12/2024	26 New End Square – Noise Impact Assessment 09122024	DRAFT FOR COMMENT	Jake Telford	Lucie Zalberg 
01	20/12/2024	26 New End Square – Noise Impact Assessment 20122024	ISSUED	Matias Duarte 	Lucie Zalberg 

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INTRODUCTION

No.26 New End Square, London NW3 1LS is a proposed residential house in the London Borough of Camden. It is proposed that an air source heat pump (ASHP) is to be installed in the garden area. It is understood that the plant will have the facility to operate 24hrs, Monday to Sunday.

Gillieron Scott Acoustic Design (GSAD) have been commissioned to undertake a background noise survey at the site and a noise impact assessment, in accordance with London Borough of Camden's noise policy, in order to ensure the necessary requirements are met for this project.

GSAD have carried out a background noise survey at one fixed monitoring location between 19:00 on the 20th of November 2024, and 09:00 on 22nd November 2024 to measure background noise levels on site. The microphone location was chosen to be representative of the closest noise sensitive receptor (NSR). The site location, plant area and nearest residential receptors are indicated in Appendix A.

1.0 BRIEF

- Undertake long term unattended noise measurements at a fixed monitoring location over an extended period.
- Identify noise-sensitive dwellings located close to the site and assess the topography of the intervening ground.
- Analyse the site-acquired data and determine the appropriate criteria to adopt from London Borough of Camden's noise policy.
- Undertake a noise impact assessment for noise from proposed item of fixed plant, according to the methodology contained within British Standard 4142: 2014+A1:2019 and Local Authority noise policy.
- Provide a technical report detailing findings of the noise survey.

2.0 CONTEXT

The development is for a newly built 3-bedroom house and will consist of four levels: basement level, with a split lower and upper ground level and first floor.

The nearest noise sensitive property (NSR) has been identified as No.26 New End Square which is facing the house and garden on the eastern side (shown in Appendix A).

The development is located in a street that is relatively quiet for the area, the main background noise consists mainly of road traffic noise and infrequent air traffic.

3.0 SUMMARY

A background noise survey was undertaken during the period between 19:00 on the 20th of November 2024, and 09:00 on 22nd November 2024 at one fixed monitoring location.

The Local Authority (London Borough of Camden), requires any installation of new plant machinery to be in accordance with BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound', and the National Planning Policy Framework (NPPF). Appendix 3 of the Camden Local Plan 2017 specifies noise thresholds for fixed plant installations. In the case of the former, the 'rating level' must not exceed 10 dB below the background sound level.

Results from the survey show representative background sound levels of 35 dB $L_{A90,15min}$ during the daytime, and 32 dB $L_{A90,15min}$ at night.

The site location, measurement positions and measured results are detailed in the following sections and appendices.

4.0 ASSESSMENT CRITERIA

4.1 British Standard 4142:2014+A1:2019 "Methods for rating and assessing industrial and commercial sound"

London Borough of Camden's noise policy requires new plant machinery installations to be in accordance with BS 4142:2014 + A1:2019.

BS 4142:2014 + A1:2019 provides methods for rating and assessing industrial and commercial sound. The standard is used to rate sound from fixed installations and sound from the loading and unloading of goods and materials at commercial premises. The standard requires a 'specific sound level', in terms of L_{Aeq}, to be determined either by measurement or calculation at a receptor location. The specific sound level may then be corrected for the character of sound, following which it is termed the 'rating level'.

Once the rating level has been determined, the background sound level is subtracted from it – with a larger or smaller difference between the two indicating a larger or smaller likelihood of an 'adverse impact' respectively. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact. The standard advocates that each site and situation should take the context of the scenario into consideration and that "not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact".

- A difference 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.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a 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 impact, depending on the context.

The standard provides reference periods over which the assessment should take place which have been reproduced in the table below.

Table 1: Reference periods

Period	Hours
Typical Daytime	07:00 – 23:00
Typical Night-time	23:00 – 07:00

4.2 Local Authority Noise Policy

The London Borough of Camden's noise policy provides limits for noise from industrial and commercial sources. These are stated in Appendix 3 of the Camden Local Plan 2017 and are reproduced below.

Figure 1: Camden Local Plan noise limits for industrial & commercial sources

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{Amax}

In addition to the standard criteria of BS 4142, the London Borough of Camden's policy requires that the rating level of the plant noise is at least 10 dB below the background sound level. The guidance goes on to state that, "10 dB should be increased to 15 dB if the noise contains audible tonal elements."

5.0 SURVEY DETAILS ANS RESULTS

A background noise survey was undertaken between 19:00 on the 20th of November 2024, and 09:00 on 22nd November 2024 at one fixed monitoring location. The microphone positions are shown in Appendices A and B.

The levels were recorded in octave bands as L_{eq}, L_{max} and L_{90} with fast time-weighting, along with their respective A-weighted single-figure values. The clock on the sound level meter was synchronised to the correct time before deployment. The meter was then set to integrate sound levels over 15-minute periods in synchronisation mode. A list of the measurement equipment is reported in

A weather station was also deployed alongside the sound level meter during the long-term measurement. The wind speed did not exceed 0.4 m/s for the duration of the survey; the temperature varied between 0 and 3°C, and no rainfall was recorded. Conditions were generally considered conducive to acoustic measurement.

Full survey results to one decimal place are presented in Appendix E. Graphical representations of the measurement results are presented in Appendices C and D, and of weather data in Appendix F: Weather Data Summary.

Table 2: Summary of Representative Background Sound Levels

Representative Background Sound Level L_{A90}	
Daytime (07.00-23.00hrs)	**Night-time (23.00-07.00hrs)**
35 dB(A)	32 dB(A)

6.0 PLANT NOISE ASSESSMENT

We understand that the proposals include installation an ASHP unit along the rear wall of the garden area, between the bin store and bike shed.

Plans showing the proposed location is included in Appendix A.

Table 3: Proposed items of plant

Description	Make & Model	Sound power level, dB(A)	Location
AHSP	DAIKIN EPRA12EW1	53 (low noise mode 2)	Rear garden

The tables below detail the daytime noise impact assessment for the most sensitive receiver location (NSR).

Table 4: Noise Impact Assessment – Daytime (07:00-23:00hrs)

Element	Level dB(A)	Comments
	ASHP	
Sound Power Level (SWL)	53	SWL, as taken from manufacturer's datasheet
Sound Pressure Level (SPL)	42	-11dB from sound power to sound pressure level
Reflections	+3	1 additional acoustically hard reflective surface. Acoustic lining will be applied on hard surfaces facing the unit to reduce reflections.
Barrier correction and distance losses	-26	Unit has no direct line to NSR due to bin/bike sheds on east side, brick wall on west side and parapet above the unit. Nearest NSR approximately 5.5-11m (1m from windows ground-third floors on western side façade of No.26 New End Sq). Distance and barrier correction varies depending on receptor, from 26 to 30dB(A). Lower correction applied for third floor receptor: 5dB(A) barrier correction, 21dB(A) distance correction
Specific Sound Level, L_s	19	Specific sound level before acoustic feature corrections
Acoustic Feature Correction	0	Where the specific sound level is reduced to 10dB below the background noise, no distinguishing features are likely to be perceptible at the NSR
Rating Level, $L_{Ar,Tr}$	**19**	**At 1m from the nearest noise-sensitive receptor**
Representative background sound level	35	Representative measured $L_{A90,15min}$ during daytime reference period.
Difference (Rating Level – Background)	-16	The rating level is 16 dB below the representative background sound level; This is an indication of a low adverse impact in the context of this site and complies with the Local Authority's noise requirements.

As can be seen from Table 4 above, the rating level at the most affected residential receptor has been calculated to be 16 dB L_{Aeq} below the representative background sound level during daytime period.

Table 5: Noise Impact Assessment – Night-time (23:00-07:00hrs)

Element	Level dB(A) ASHP	Comments
Sound Power Level (SWL)	53	SWL, as taken from manufacturer's datasheet
Sound Pressure Level (SPL)	42	-11dB from sound power to sound pressure level
Reflections	+3	1 additional acoustically hard reflective surface. Acoustic lining will be applied on hard surfaces facing the unit to reduce reflections.
Barrier correction and distance losses	-26	Unit has no direct line to NSR due to bin/bike sheds on east side, brick wall on west side and parapet above the unit. Nearest NSR approximately 5.5-11m (1m from windows ground-third floors on western side façade of No.26 New End Sq). Distance and barrier correction varies depending on receptor, from 26 to 30dB(A). Lower correction applied for third floor receptor: 5dB(A) barrier correction, 21dB(A) distance correction
Specific Sound Level, L_s	19	Specific sound level before acoustic feature corrections
Acoustic Feature Correction	0	Where the specific sound level is reduced to 10dB below the background noise, no distinguishing features are likely to be perceptible at the NSR
Rating Level, $L_{Ar,Tr}$	**19**	**At 1m from the nearest noise-sensitive receptor**
Representative background sound level	32	Representative measured $L_{A90,15min}$ during night-time reference period.
Difference (Rating Level – Background)	-13	The rating level is 13 dB below the representative background sound level; This is an indication of a low adverse impact in the context of this site and complies with the Local Authority's noise requirements.

As can be seen from table 5 above, the rating level at the most affected residential receptor has been calculated to be 13 dB L_{Aeq} below the representative background sound level during night-time period.

7.0 UNCERTAINTY

The equipment was calibrated at the beginning and the end of the survey period, a maximum drift of 0.4 dB was noted. In the context of this environmental noise survey, the level of drift is not considered as significant.

Weather conditions were recorded. The wind speed did not exceed an average (15mins.) of 0.4 m/s, the maximum windspeed was below 5m/s throughout, apart from on one occasion: 5.4m/s 05:45 – 22/11/2024 (maximum windspeed of up to 5 m/s is permissible). The wind was predominantly from the N/NNE. No rainfall was recorded. The weather conditions are considered conducive to acoustic measurements.

Overall, the uncertainty within the survey procedure is deemed not to have significant influence on the outcome of the assessment.

8.0 CONCLUSION

GSAD has undertaken a background noise survey at the site and the survey results are presented within this report, together with a noise impact assessment in accordance with BS 4142:2014+A1:2019 and London Borough of Camden's noise policy. The assessment covers all proposed items of fixed plant, and accounts for a worst-case scenario based on the proposed operating times.

Representative background sound levels of 35 dB $L_{A90,15min}$ during the daytime and 32 dB $L_{A90,15min}$ have been determined.

With mitigation measures described under 6.0, the plant noise impact assessment has determined that the rating level from the ASHP unit would be 16 and 13 dB L_{Aeq} below the representative measured background sound level during daytime and night-time hours respectively, which is an indication of a low adverse impact on nearby noise sensitive receptors and demonstrates compliance with the Local Authority's noise requirements.

9.0 STATEMENT OF COMPETENCE

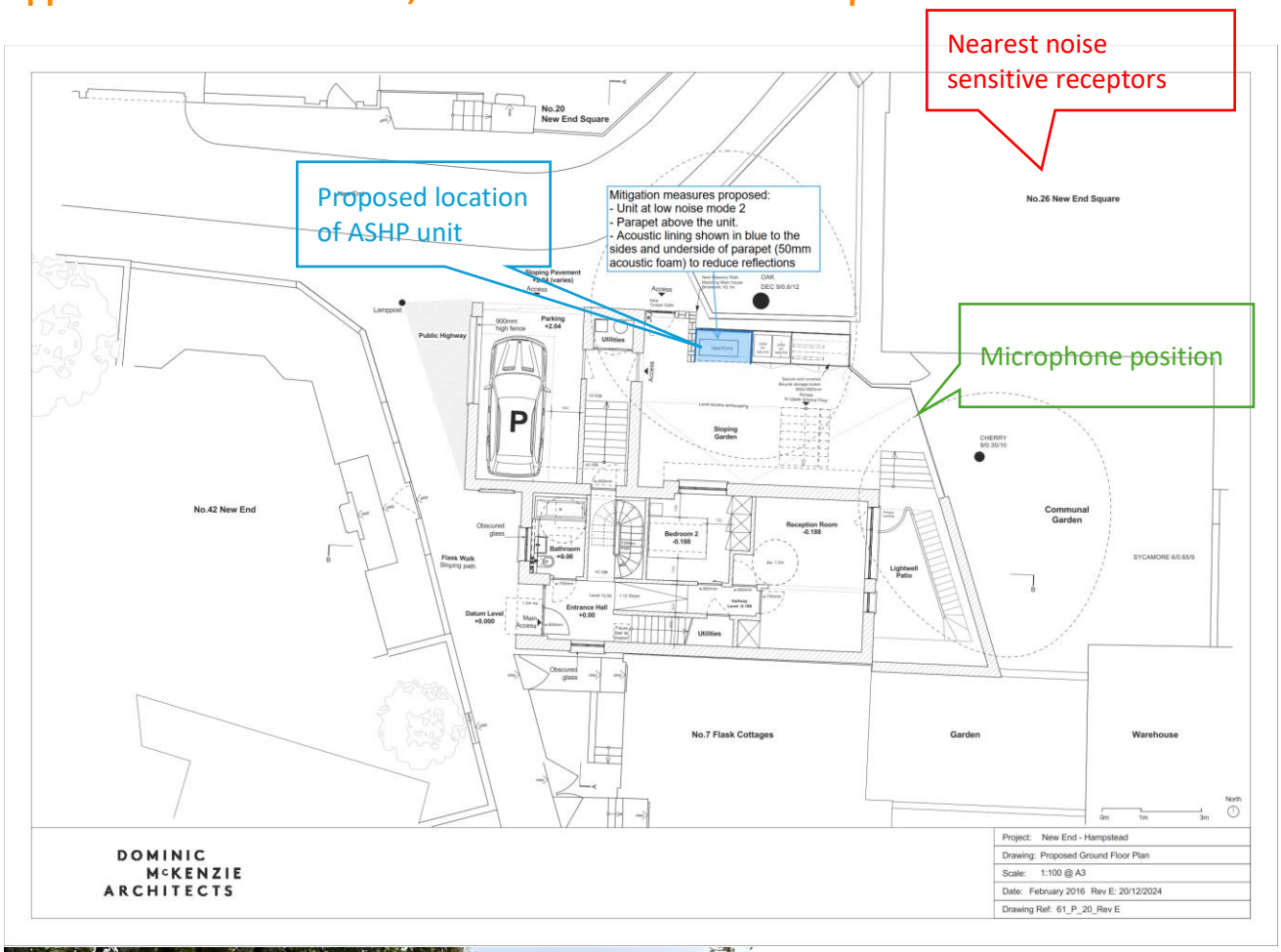
The assessment has been undertaken by the author of this report: Jake Telford, AMIOA, MSc - Environmental and Architectural Acoustics, BA (Hons): Consultant Acoustician at Gillieron Scott Acoustic Design.

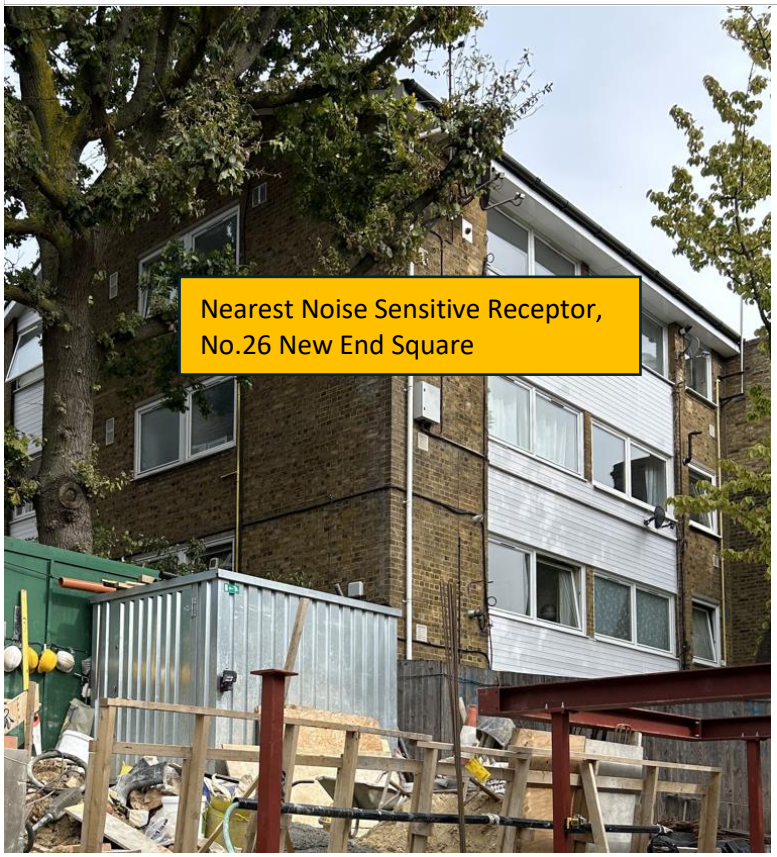
The revision to the assessment has been undertaken by: Matias Duarte, BSc (Music Technology) MSc (Environmental and Architectural Acoustics) AMIOA. The author is an Acoustic Consultant at Gillieron Scott Acoustic Design. Matias has undertaken several noise surveys according to the BS 4142:2014 standard.

The assessment has been checked by: Lucie Zalberg, BSc (Physics) MSc (Architectural Acoustics) MIOA. The author is a Director of Gillieron Scott Acoustic Design with 15+ years' experience since completing a degree at Pierre et Marie University in Paris and Bath University. Lucie has undertaken numerous noise assessments according to the 1997 revision of the British Standard and the most recent 2014 revision of the standard.

APPENDICES

Appendix A: Site Overview, Nearest noise sensitive receptor

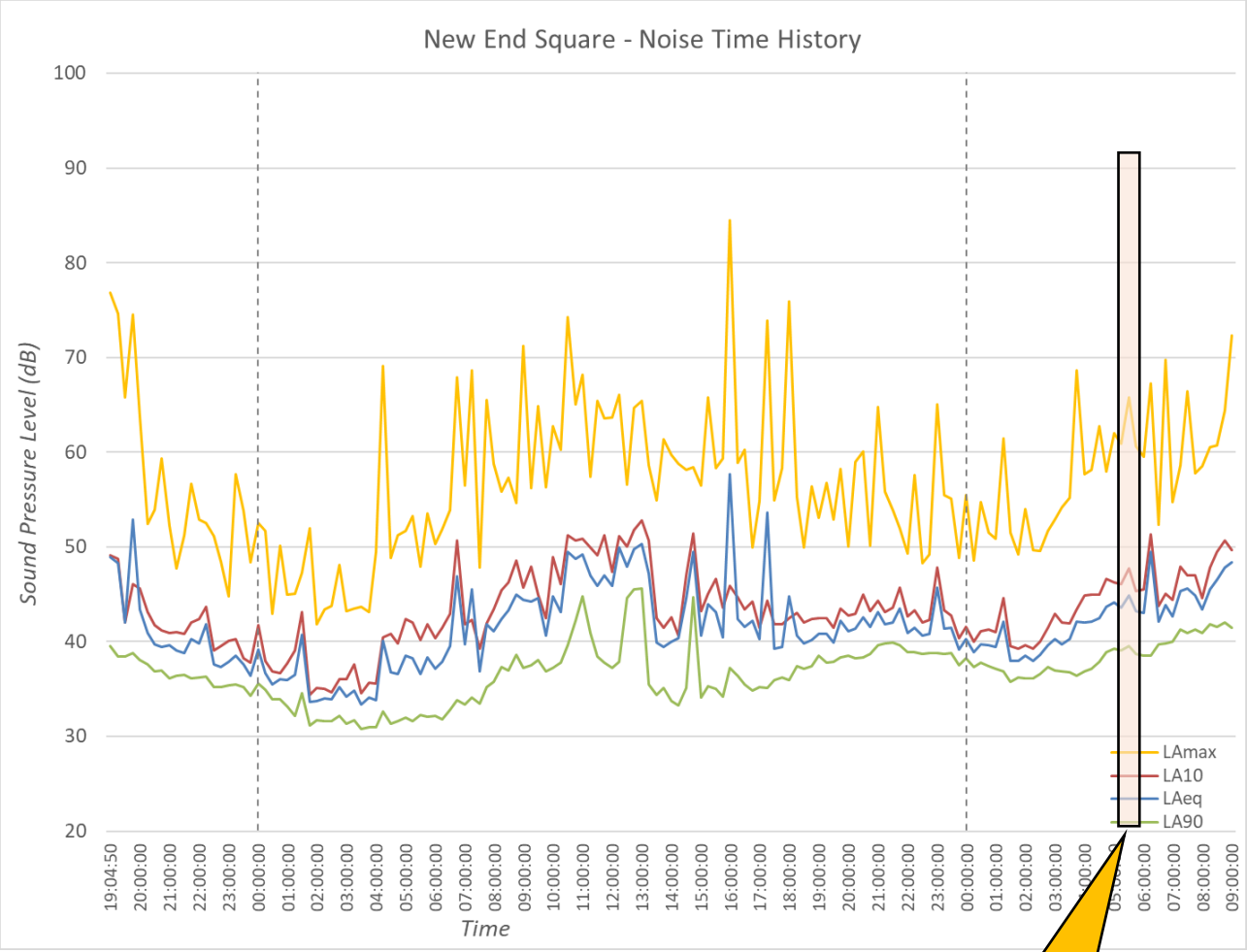




Appendix B: Survey Arrangement

Appendix C: Long-term Measurement Time Series Graph

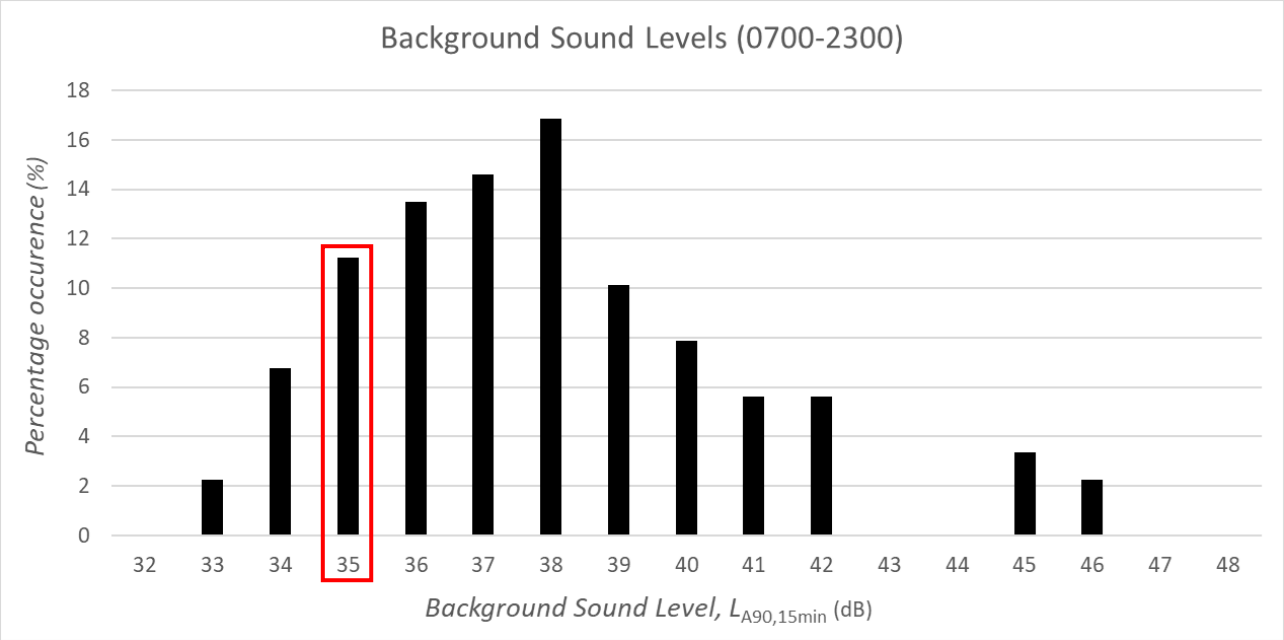
Long Term Environmental Noise Survey History (20/11/2024-22/11/2024)



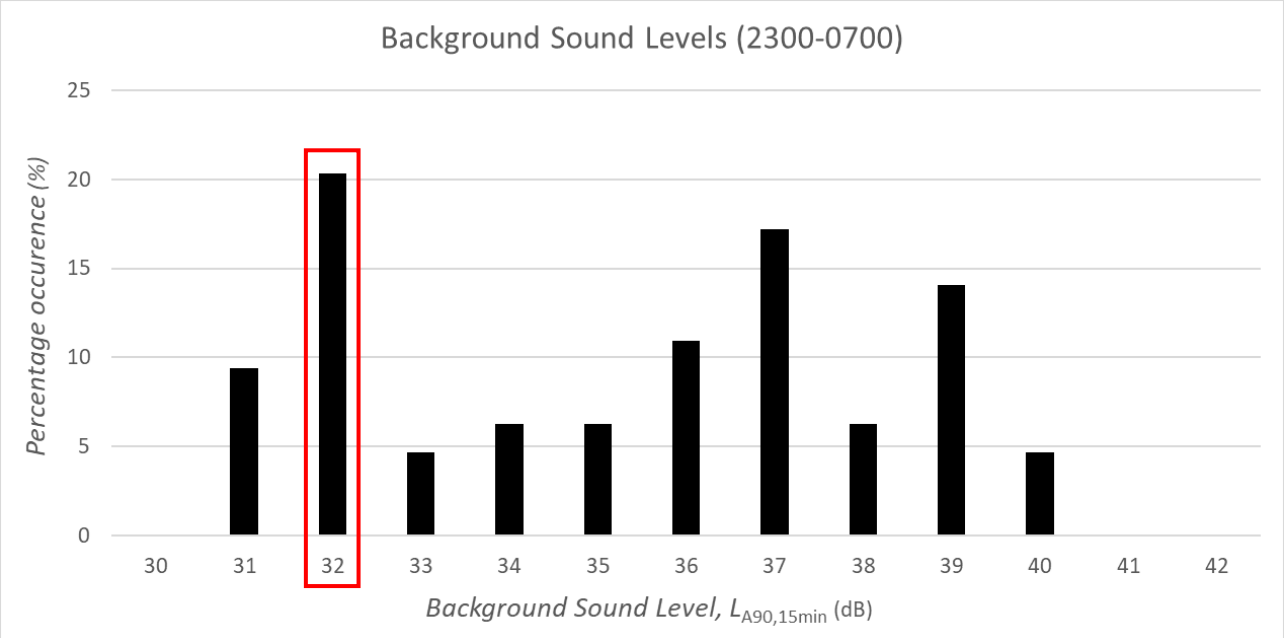
High wind speed above 5m/s noted here.

Appendix D: Histogram Plots

Representative Background Noise Level Daytime 07:00-23:00 (20/11/2024-22/11/2024)



Representative Background Noise Level Nighttime 23:00-07:00 (20/11/2024-22/11/2024)



Appendix E: Full Survey Data

Long-term Measurement Data (20/11/2024-22/11/2024)

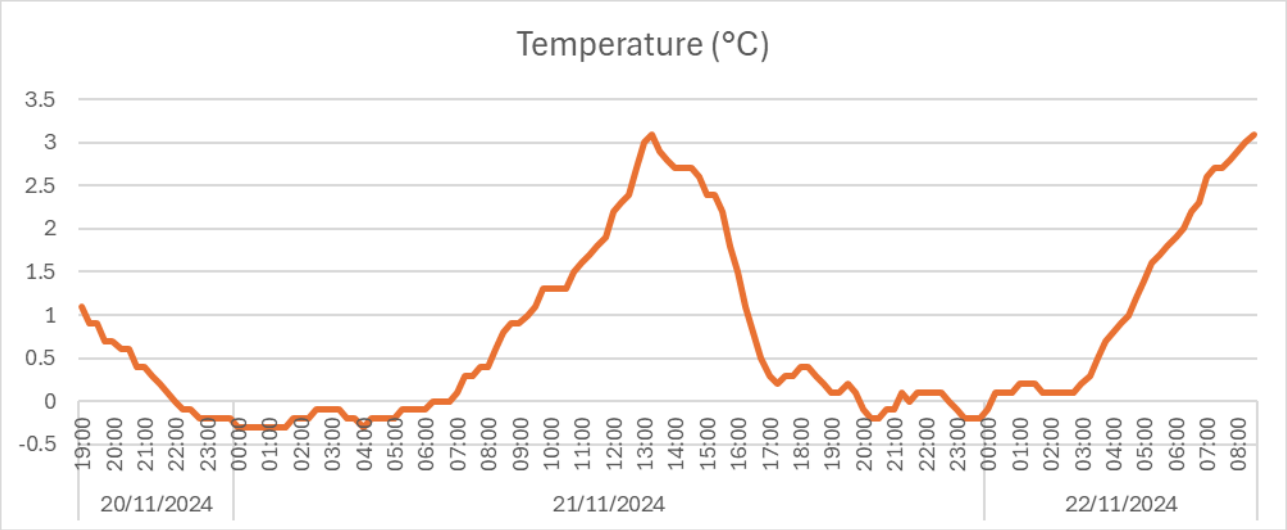
Date	Time	$L_{Aeq,15\ min}$ [dB]	L_{Amax} [dB]	L_{A10} [dB]	L_{A90} [dB]
20/11/2024	19:04:50	48.9	76.8	49.1	39.5
20/11/2024	19:15:00	48.3	74.6	48.7	38.4
20/11/2024	19:30:00	42	65.8	42	38.4
20/11/2024	19:45:00	52.9	74.5	46.1	38.8
20/11/2024	20:00:00	43.4	63.8	45.6	38.1
20/11/2024	20:15:00	40.9	52.4	43.1	37.6
20/11/2024	20:30:00	39.7	53.9	41.7	36.9
20/11/2024	20:45:00	39.4	59.3	41.2	37
20/11/2024	21:00:00	39.6	52.2	40.9	36.1
20/11/2024	21:15:00	39.1	47.7	41	36.4
20/11/2024	21:30:00	38.8	51.2	40.8	36.5
20/11/2024	21:45:00	40.3	56.7	42	36.1
20/11/2024	22:00:00	39.8	52.9	42.4	36.2
20/11/2024	22:15:00	41.8	52.5	43.7	36.3
20/11/2024	22:30:00	37.6	51.1	39.1	35.2
20/11/2024	22:45:00	37.3	48.5	39.5	35.2
20/11/2024	23:00:00	37.9	44.8	40.1	35.4
20/11/2024	23:15:00	38.5	57.7	40.3	35.5
20/11/2024	23:30:00	37.6	53.8	38.2	35.2
20/11/2024	23:45:00	36.4	48.4	37.8	34.3
21/11/2024	00:00:00	39.2	52.5	41.7	35.6
21/11/2024	00:15:00	36.7	51.7	38	34.9
21/11/2024	00:30:00	35.5	42.9	36.9	33.9
21/11/2024	00:45:00	36	50.1	36.7	33.9
21/11/2024	01:00:00	35.9	45	37.7	33.2
21/11/2024	01:15:00	36.5	45.1	39.1	32.2
21/11/2024	01:30:00	40.7	47.3	43.1	34.6
21/11/2024	01:45:00	33.6	52	34.4	31.2
21/11/2024	02:00:00	33.7	41.8	35.1	31.7
21/11/2024	02:15:00	34	43.4	35	31.6
21/11/2024	02:30:00	33.9	43.8	34.7	31.6
21/11/2024	02:45:00	35.2	48.1	36	32.2
21/11/2024	03:00:00	34.2	43.2	36	31.3
21/11/2024	03:15:00	34.8	43.5	37.6	31.7
21/11/2024	03:30:00	33.4	43.7	34.6	30.8
21/11/2024	03:45:00	34.1	43.1	35.7	31
21/11/2024	04:00:00	33.8	49.5	35.6	31
21/11/2024	04:15:00	40.1	69.1	40.5	32.6
21/11/2024	04:30:00	36.8	48.8	40.8	31.3
21/11/2024	04:45:00	36.6	51.2	39.8	31.6

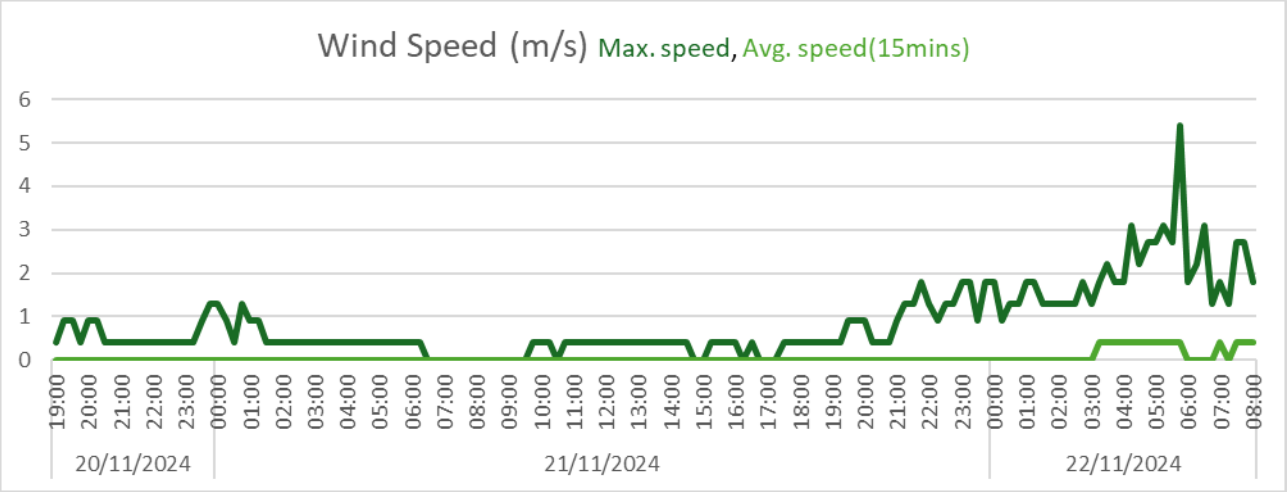
Date	Time	$L_{Aeq,15\ min}$ [dB]	L_{Amax} [dB]	L_{A10} [dB]	L_{A90} [dB]
21/11/2024	05:00:00	38.5	51.7	42.4	32
21/11/2024	05:15:00	38.2	53.3	42	31.6
21/11/2024	05:30:00	36.6	47.9	40.2	32.3
21/11/2024	05:45:00	38.3	53.5	41.8	32.1
21/11/2024	06:00:00	37.1	50.3	40.4	32.2
21/11/2024	06:15:00	37.9	51.9	41.5	31.8
21/11/2024	06:30:00	39.5	53.9	42.9	32.8
21/11/2024	06:45:00	46.9	67.9	50.7	33.8
21/11/2024	07:00:00	39.7	56.5	41.8	33.4
21/11/2024	07:15:00	45.5	68.6	42.3	34.1
21/11/2024	07:30:00	36.9	47.8	39.3	33.5
21/11/2024	07:45:00	41.8	65.5	41.9	35.2
21/11/2024	08:00:00	41.1	58.8	43.4	35.8
21/11/2024	08:15:00	42.4	55.8	45.4	37.3
21/11/2024	08:30:00	43.3	57.3	46.3	37
21/11/2024	08:45:00	45	54.6	48.6	38.6
21/11/2024	09:00:00	44.4	71.2	45.7	37.2
21/11/2024	09:15:00	44.2	56.2	47.9	37.5
21/11/2024	09:30:00	44.6	64.9	45	38.1
21/11/2024	09:45:00	40.6	56.3	42.5	36.9
21/11/2024	10:00:00	44.8	62.7	48.9	37.2
21/11/2024	10:15:00	43.1	60.3	46.1	37.8
21/11/2024	10:30:00	49.5	74.3	51.2	39.6
21/11/2024	10:45:00	48.7	65	50.7	42.2
21/11/2024	11:00:00	49.2	68.2	50.9	44.8
21/11/2024	11:15:00	47	57.4	49.9	40.9
21/11/2024	11:30:00	45.9	65.4	49.1	38.4
21/11/2024	11:45:00	47	63.6	51.2	37.8
21/11/2024	12:00:00	45.9	63.7	47.4	37.2
21/11/2024	12:15:00	49.9	66.1	51.1	37.9
21/11/2024	12:30:00	47.9	56.6	50	44.6
21/11/2024	12:45:00	49.8	64.7	51.8	45.5
21/11/2024	13:00:00	50.3	65.4	52.8	45.6
21/11/2024	13:15:00	47.2	58.6	50.7	35.5
21/11/2024	13:30:00	39.9	54.9	42.5	34.4
21/11/2024	13:45:00	39.4	61.4	41.5	35.1
21/11/2024	14:00:00	40	59.7	42.6	33.7
21/11/2024	14:15:00	40.4	58.8	40.6	33.3
21/11/2024	14:30:00	44.6	58.1	47	35.1
21/11/2024	14:45:00	49.5	58.4	51.4	44.7

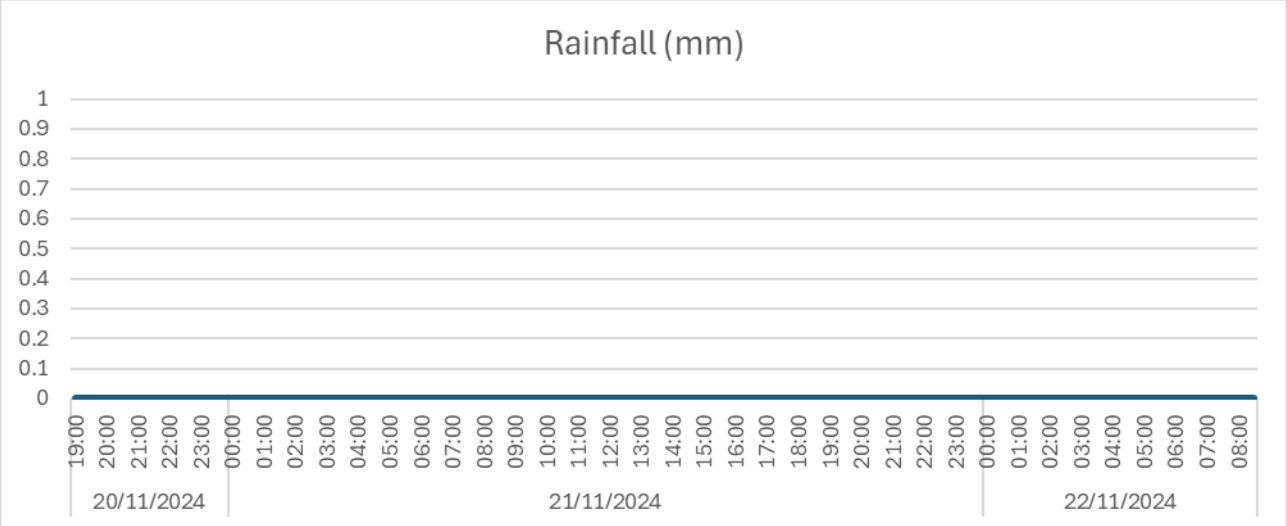
Date	Time	$L_{Aeq,15\ min}$ [dB]	L_{Amax} [dB]	L_{A10} [dB]	L_{A90} [dB]
21/11/2024	15:00:00	40.6	56.5	43.2	34.1
21/11/2024	15:15:00	44	65.8	45.1	35.3
21/11/2024	15:30:00	43.1	58.3	46.6	35
21/11/2024	15:45:00	40.5	59.3	43.6	34.2
21/11/2024	16:00:00	57.7	84.5	45.9	37.2
21/11/2024	16:15:00	42.4	58.9	44.7	36.4
21/11/2024	16:30:00	41.6	60.3	43.4	35.5
21/11/2024	16:45:00	42.2	49.9	44.2	34.8
21/11/2024	17:00:00	40.3	54.8	41.5	35.2
21/11/2024	17:15:00	53.6	73.9	44.3	35.1
21/11/2024	17:30:00	39.3	54.9	41.8	35.9
21/11/2024	17:45:00	39.4	58.3	41.8	36.2
21/11/2024	18:00:00	44.8	75.9	42.5	35.9
21/11/2024	18:15:00	40.6	55.3	43	37.4
21/11/2024	18:30:00	39.8	49.9	42	37.1
21/11/2024	18:45:00	40.2	56.4	42.4	37.4
21/11/2024	19:00:00	40.8	53.1	42.5	38.5
21/11/2024	19:15:00	40.8	56.8	42.5	37.8
21/11/2024	19:30:00	39.9	52.9	41.5	37.9
21/11/2024	19:45:00	42.2	58.2	43.5	38.3
21/11/2024	20:00:00	41.1	50	42.8	38.5
21/11/2024	20:15:00	41.4	59	42.9	38.2
21/11/2024	20:30:00	42.6	60.1	45	38.3
21/11/2024	20:45:00	41.6	50.1	43.2	38.7
21/11/2024	21:00:00	43.1	64.8	44.3	39.6
21/11/2024	21:15:00	41.8	55.8	43.1	39.8
21/11/2024	21:30:00	42	53.9	43.6	39.9
21/11/2024	21:45:00	43.5	52	45.7	39.6
21/11/2024	22:00:00	40.9	49.3	42.7	38.9
21/11/2024	22:15:00	41.5	57.6	43.3	38.9
21/11/2024	22:30:00	40.6	48.3	42	38.7
21/11/2024	22:45:00	40.8	49.2	42.3	38.8
21/11/2024	23:00:00	45.7	65	47.8	38.8
21/11/2024	23:15:00	41.4	55.5	43.3	38.7
21/11/2024	23:30:00	41.5	55.1	42.8	38.8
21/11/2024	23:45:00	39.2	48.8	40.4	37.5
22/11/2024	00:00:00	40.3	55.5	41.6	38.2
22/11/2024	00:15:00	38.9	48.6	40	37.3
22/11/2024	00:30:00	39.7	54.7	41.1	37.8
22/11/2024	00:45:00	39.6	51.5	41.3	37.4
22/11/2024	01:00:00	39.4	50.9	41	37.1
22/11/2024	01:15:00	42.1	61.5	44.6	36.9
22/11/2024	01:30:00	38	51.5	39.5	35.8
22/11/2024	01:45:00	38	49.2	39.3	36.2
22/11/2024	02:00:00	38.5	54	39.6	36.1
22/11/2024	02:15:00	38	49.7	39.3	36.1
22/11/2024	02:30:00	38.6	49.6	40	36.6
22/11/2024	02:45:00	39.6	51.7	41.5	37.3
22/11/2024	03:00:00	40.3	52.9	42.9	37
22/11/2024	03:15:00	39.7	54.2	42	36.9
22/11/2024	03:30:00	40.3	55.2	41.9	36.8
22/11/2024	03:45:00	42.1	68.6	43.4	36.4
22/11/2024	04:00:00	42	57.7	44.9	36.9
22/11/2024	04:15:00	42.1	58.1	45	37.1
22/11/2024	04:30:00	42.5	62.7	45	37.9
22/11/2024	04:45:00	43.7	58	46.6	38.9
22/11/2024	05:00:00	44.1	62	46.3	39.3
22/11/2024	05:15:00	43.6	60.9	46.1	39.1
22/11/2024	05:30:00	44.9	65.8	47.7	39.5
22/11/2024	05:45:00	43.2	60.6	45.3	38.7
22/11/2024	06:00:00	43	59.5	45.5	38.5
22/11/2024	06:15:00	49.5	67.3	51.3	38.5
22/11/2024	06:30:00	42.1	52.3	43.8	39.7
22/11/2024	06:45:00	43.9	69.7	45.1	39.8
22/11/2024	07:00:00	42.7	54.7	44.4	40
22/11/2024	07:15:00	45.3	58.6	47.9	41.3
22/11/2024	07:30:00	45.6	66.4	47	40.9
22/11/2024	07:45:00	44.9	57.8	47	41.3
22/11/2024	08:00:00	43.4	58.5	44.6	40.9
22/11/2024	08:15:00	45.5	60.5	47.8	41.8
22/11/2024	08:30:00	46.5	60.7	49.5	41.6
22/11/2024	08:45:00	47.8	64.4	50.7	42
22/11/2024	09:00:00	48.4	72.3	49.7	41.5

Appendix F: Weather Data Summary

Localised Weather Data (20/11/2024-22/11/2024)







Appendix G: Equipment

- NTi XL2 Real Time Analyser
- Norsonic 1251 Calibrator
- NTi outdoor kit
- Tripod
- Davis Vantage Vue Weather Station

All sound level meters are Class 1 and within 2 years of their most recent laboratory calibration. Calibration certificates are available on request.

Calibration Data

	Date	Time	$L_{eq,T}$ @ 1kHz [dB]
Survey Start	20/11/2024	18:42:56	113.9
Survey End	22/11/2024	09:14:38	113.5

Appendix H: Manufacturer's Noise Data

Proposed ASHP unit – DAIKIN EPRA12EA

		Maximum sound day			Maximum sound night		
		Sound Power Level [dBA]			Sound Power Level [dBA]		
Maximum sound day	Maximum sound night	EPRA08EA*	EPRA10EA*	EPRA12EA*	EPRA08EA*	EPRA10EA*	EPRA12EA*
Default	Low noise level -1-	62	62	62	58,5	58,5	58,5
Low noise level -2-	Low noise level -3-	53	53	53	49,8	49,8	49,8
Full load (maximum fan rps and maximum compressor rps for the dedicated low noise mode)							

Notes
- Data is valid at free field condition.
- Data is valid at nominal operation condition.
- Conditions: Ta DB/WB -7-/-6-°C - LWC -55-°C
- dBA = A-weighted sound pressure level (A scale according to IEC).
- Reference acoustic pressure 0 dB = 20 µPa
- If the sound is measured under actual installation conditions, the measured value will be higher due to environmental noise and sound reflections.

DAIKIN Daikin Altherma mid temperature split • EPRA08-12EV

2 Specifications

2 - 1 Specifications

Technical specifications					ETBH12E6V + EPRA08EV3	ETBH12E6V + EPRA10EV3	ETBH12E6V + EPRA12EV3
Heating capacity	Min.			kW		3.44 (1)	
	Nom.			kW		6.17 (2)	
	Max.			kW	7.95 (1)	9.25 (1)	9.97 (1)
Power input	Heating	Min.		kW		0.72 (3)	
		Nom.		kW		1.25 (2)	
		Max.		kW	1.69 (3)	2.04 (3)	2.28 (3)
COP						4.92 (2)	
Pump	Type					Grundfos UPM3LK	
	Nominal ESP unit	Heating		kPa		63.0 (4)	
Water side Heat exchanger	Water flow rate	Heating	Nom.	l/min		18.3 (2)	
General	Supplier/ Manufacturer details	Name and address				Daikin Europe N.V. - Zandvoordestraat 300, 8400 Oostende, Belgium	
		Name or trademark				Daikin Europe N.V.	
	Product description	Air-to-water heat pump				Yes	
		Brine-to-water heat pump				No	
		Heat pump combination heater				No	
		Low-temperature heat pump				No	
		Supplementary heater integrated				Yes	
		Water-to-water heat pump				No	
	LW(A) Sound power level (according to EN14825)	Indoor		dB(A)		44.0	
LW(A) Sound power level (according to EN14825)	Outdoor			dB(A)		53.0	
Sound condition Ecodesign and energy label						Sound power in heating mode, measured according to the EN12102 under conditions of the EN14825	
Space heating general	Air to water unit	Rated airflow (outdoor)		m^3/h		3,542	
	Other	Capacity control				Inverter	
		Pck (Crankcase heater mode)		kW		0.000	
		Poff (Off mode)		kW		0.021	
		Psb (Standby mode)		kW		0.021	
		Pto (Thermostat off)		kW		0.024	
	Integrated supplementary heater	Psup		kW		6.0	
		Type of energy input				Electrical	
Space heating	Average climate water outlet 55°C	General	Annual energy consumption	kWh	5,142	5,120	
			ηs (Seasonal space heating efficiency)	%		134	
			Prated at -10°C	kW		8.5	
			Qhe Annual energy consumption (GCV)	Gj	19	18	
			SCOP		3.41	3.43	
			Seasonal space heating eff. class			A++	
		A Condition (-7°CDB/-8°CWB)	Cdh (Degradation heating)			1.0	

Appendix I: Acoustic Feature Correction

Tonality
For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity
A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Intermittency
When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Other sound characteristics
Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.

Appendix J: Glossary of Acoustic Terms

DECIBEL (dB) - A unit of sound pressure measurement
Sound Pressure Level in dB (*L*p) = 20 log (Measured sound pressure/Reference sound pressure = 20 µPa)

dB(A) - The A -weighted sound pressure level, the weighting network reduces low frequency sound in a similar way to the human ear.

REVERBERATION TIME (RT or *T*) – decay of sound in rooms
The time taken for a sound, once terminated, to fall through 60dB i.e. to one millionth of its original sound intensity. *T*30 – RT for first 30dB of decay. RT_{500} - Mid frequency RT.

HERTZ (Hz) - a unit of frequency measurement. The normal range of hearing is from 20Hz to about 15kHz.

ABSORPTION COEFFICIENT – degree to which a material absorbs sound.
The ratio of absorbed to incident sound energy (perfect absorber = 1)

SOUND REDUCTION INDEX *R* – quantity which describes a material's ability to reduce the sound pressure level across it (e.g. a wall or floor)

$R = L1 - L2 + 10\log (S/A)$

*L*1 - Average sound pressure level in source room (averaged from 100 Hz – 3150 Hz)
*L*2 - Average sound pressure level in receiving room (averaged from 100 Hz – 3150 Hz)
S – Wall Area (m^2)
A – Total absorption in receiving room (m^2 units)

***R*w** – weighted sound reduction index

AVERAGE ROOM TO ROOM LEVEL DIFFERENCE – *D*, dB = *L*1 – *L*2, averaged 1/3 octave bands from 100Hz – 3150kHz.

***D*w** – weighted value of D (usually 2 - 3dB higher)

***D*nT, w** – *D*w corrected for reverberation time of receiving room

NOISE RATING CURVES (NR CURVES) – set of curves used to describe optimum background noise levels for different tasks.

***L*10/90 LEVEL (dB)** - The level in dB of a time varying sound pressured level (e.g. traffic) exceeded for 10%/90% of the time of measurement.
*L*90 is usually called the BACKGROUND NOISE LEVEL.

***L*eq AVERAGE SOUND PRESSURE LEVEL** – level dB of a time varying sound pressure level with equal amounts of energy above and below it, for the time of measurement.

TONAL NOISE – noise of a single frequency (or a narrow band of frequencies that can be perceived as a tone), audible above the broad band noise background. Noise which is at least 5dB above the average of the 1/3 octave band sound pressure levels immediately on either side of it.