Honi Poke

T11492 – Norfolk House, Retail Space

14th February 2025

TENANT PLANT NOISE ASSESSMENT

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Document Control

Version No.	Date	Author	Reviewed	Approved
1.0	14/02/2025	Sam Logan	Nigel Burton	Nigel Burton

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1 Executive Summary

1.1.1 Temple Group Ltd (Temple) has been appointed by Honi Poke to undertake a noise assessment of two air conditioning units proposed as a part of the redevelopment of the existing Norfolk House, situated on the corner of High Holborn and Southampton Place, London.

1.1.2 This report presents criteria for plant noise emissions, the background noise levels in the area, and assessment of the noise impact of the proposed external plant on the nearest noise sensitive receptors.

1.1.3 London Borough of Camden policy documents express their requirement that the external rating sound level emitted from the building services plant to be at least 10 dB below background at the nearest noise sensitive receptors.

1.1.4 Based on the manufacturer's noise data, it is predicted that noise emissions from the proposed external air conditioning units will meet the noise limits set out by London Borough of Camden.

2 Introduction

2.1.1 Temple has been appointed to undertake a noise assessment of tenant plant to be installed on the roof of Norfolk House on the corner of High Holborn and Southampton Place.

2.1.2 The purpose of the noise assessment is to assess the noise impact on nearby noise sensitive receptors and, where required, to provide outline mitigation measures for further noise attenuation. The assessment has been carried out in line with the guidance from the London Borough of Camden and relevant national standards.

2.1.3 The following sections of the report describe criteria for plant noise emissions, the background noise levels in the area, and assessment of the noise impact of the proposed air conditioning units on the nearest noise sensitive receptors.

2.1.4 The acoustic terminology used in this report is explained in **Appendix A**

3 Policy Standards and Guidance

3.1 Local Policy

Camden Local Plan 2017

3.1.1 Camden Council's Local Plan[1] was adopted by council on the 3rd of July 2017. It replaces the core strategy and Camden Development Policies as the basis for planning decisions and future development in Camden.

Policy A1 Managing the Impact of development states:

"The Council will seek to protect the quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity."

Noise and vibration levels are factors that are considered under Policy A1.

Policy A4 Noise and vibration states:

"The council will seek to ensure that noise and vibration is controlled and managed.

Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:

- *Development likely to generate unacceptable noise and vibration impacts; or*
- *Development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.*

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development."

Appendix 3 of the Camden Local Plan 2017 sets out the noise thresholds for industrial and commercial noise sources, it states the following:

"A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014[2] 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will

[1] London Borough of Camden, (2017): Camden Council Local Development Plan.
[2] British Standards Institute (BSI), (2014): BS 4142 – Methods for rating and assessing industrial and commercial sound.

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."

3.1.2 It should be noted that the local plan references a version of BS 4142 which has since been superseded. A summary of the latest version of BS 4142, that this report is based on, can be seen below.

3.2 Standards and Guidance

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

3.2.1 British Standard 4142:2014+A1:2019[3] describes methods to use outdoor sound levels to assess the likely effects of sound of an industrial and/or commercial nature on people who might be inside or outside a dwelling or premises used for residential purposes upon which the sound is incident.

3.2.2 The standard requires determination of the following:

- Rating level - $L_{Aeq,Tr}$ sound level produced by the specific sound source at the assessment location with any adjustment added to the specific sound level if a tone, impulse or other acoustic characteristic occurs, or is expected to be present.
- Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T.
- T_r is the reference time interval over which the specific sound level is determined. This is 1-hour for daytime (07:00-23:00 h) and 15-minutes for night-time (23:00-07:00 h).

3.2.3 An estimate of the impact of the specific sound generated can be obtained by subtracting the measured background sound level from the rating level, and the following is considered:

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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

[3] British Standards Institute (BSI), (2014+A1:2019): BS 4142 – Methods for rating and assessing industrial and commercial sound.

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.

3.2.4 The assessment methodology considers the Specific Sound Level, as measured or calculated at a potential noise sensitive receptor, due to the sound under investigation. A correction factor is added to this level to account for the acoustic character of the sound as follows:

- Tonality – A correction of up to 6 dB depending on the prominence of tones;
- Impulsivity – A correction of up to 9 dB depending on the prominence of impulsivity;
- Other sound characteristics – A 3 dB correction may be applied where a distinctive acoustic character is present that is neither tonal nor impulsive;
- Intermittency – A 3 dB correction may be applied where the specific sound has identifiable on-off conditions.

3.2.5 All pertinent factors should be taken into consideration when assessing the impact, including the following:

- Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night-time.
- The character and level of the residual sound compared to the character and level of the specific sound.
- The sensitivity of the receptor.

3.3 Consultation

3.3.1 On Tuesday 21st January 2025, Josh Peasley, an architect with Caukin Studio contacted Adam Greenhalgh from the Camden Council planning team via email to confirm that existing 2021 noise survey data could be used for the assessment. On Tuesday 21st January 202, Adam Greenhalgh confirmed that this would be acceptable.

4 The Site and its Surroundings

4.1.1 Norfolk House is located on the corner of Southampton Place, WC1A 2AL and High Holborn, WC1V 6PS, London. The location of the site is indicated in **Appendix B**

4.1.2 The site is close to Holborn London Underground Station and the surroundings include residential and commercial use buildings. The nearest noise sensitive residential receptor to the proposed plant locations are noted to be flats above the businesses on the other side of Southampton Place; approximately 30m away from proposed plant location. Additional residential receptors were identified as the third-floor windows of the residential properties above the Princess Louise public house on High Holborn; approximately 30m away from the proposed plant location.

4.1.3 The client proposes to install two Toshiba air conditioning units at roof level, next to the existing Farmer J tenant plant.

5 Proposed Plant

5.1.1 The proposal is to install two air conditioning units (1x Toshiba RAV-GM1401ATP-E & 1x Toshiba RAV-GM1101ATP-E) on the roof of Norfolk House.

5.1.2 **Appendix C** - shows the layout of the existing and proposed air conditioning units at Norfolk House. A plant specification sheet data can be found in **Appendix D** , the noise data from which has been summarised below in **Table 1**.

Table 1 – Air conditioning units' noise data during heating (Sound pressure Level at 1m)

Model	Sound Power Level dBA	Sound Pressure Level at 1m dBA
Toshiba RAV-GM1401ATP-E	74	63
Toshiba RAV-GM1101ATP-E	74	63

6 Measured Background Noise Levels

6.1 Noise Survey

6.1.1 An unattended environmental noise survey was carried out between Wednesday 28th April and Tuesday 4th May 2021 to obtain prevailing noise levels at the site. Measurement Position 1 (MP1) was located on the southern edge of the Norfolk House roof facing High Holborn, Newton Street and the nearest residential receptor. Measurement Position 2 (MP2) was located on the north-eastern edge of the roof, north of the existing plant room facing Holborn London Underground Station and the opposite side of Southampton Place. These locations were chosen to measure noise levels representative of those at the nearest/worst affected noise sensitive receptors. The measurement microphone in each case was positioned at a height of approximately 2m above the roof level and 1m away from the roof edge, each location was considered to be under free field conditions.

6.1.2 The noise monitors were set up to automatically store statistical and spectral data every 15 minutes during the measurement period. Continuous road traffic noise from High Holborn (A40) to the south and Bloomsbury Square to the north were observed to be the dominant noise sources. Occasional traffic moved along Southampton Place and sirens were heard to the west and on High Holborn during installation and collection of the monitors. The locations of the unattended surveys are considered a worst-case assessment as they are further from the source of road traffic noise.

6.2 Equipment

6.2.1 The measurement equipment used is detailed in **Table 2**. The microphones were each fitted with a windshield and appropriate corrections applied. Field calibration checks were carried out prior to and post measurement with no significant variation observed. Calibration certificates are available upon request.

Table 2 – Survey Equipment

Manufacturer	Item	Type	Serial Number
RION	Sound Level Meter	NL-52	00410086
RION	Sound Level Meter	NL-52	00510141
RION	Calibrator	NC-74	34936353

6.3 Meteorological Conditions

6.3.1 To verify that periods of adverse weather conditions did not significantly impact the results, the local precipitation and wind speed levels were collected using Wundermap[4] weather data from weather station ILONDO341, 1.75 km from Norfolk House.

6.3.2 **Appendix E** shows the L_{A90} results and statistical analysis, and the precipitation and wind speed data for the duration of the survey. Wind speeds remained at or below the recommended maximum limits of 5 m/s set out in British Standard 4142 (BS 2014+A1:2019). It was established there were no periods of heavy precipitation during the survey and therefore, no data has been removed**.**

6.4 Background Noise Results

6.4.1 In line with BS 4142:2014+A1:2019, representative typical background sound levels have been determined using statistical analysis of the continuous measurements. Day and night-time $L_{A90,15min}$ representative background sound levels measured during the unattended survey for each measurement position are presented in

6.4.2 **Table** 3.

Table 3 - Representative typical background sound levels.

Measurement Position	Representative Receptor	Daytime (07:00-23:00) $L_{A90, 15mins}$	Night-time (23:00-07:00) $L_{A90, 15mins}$
MP1	Dwellings above Princess Louise Public House	51 dB	48 dB
MP2	Southampton Place	51 dB	49 dB

[4] Weather Underground https://www.wunderground.com/history/daily/gb/london/ILONDO341

7 Plant Noise Assessment

7.1.1 The total noise level from the two proposed air conditioning units operating simultaneously, at worst case noise levels (during heating), has been calculated at 1m from the facades of the nearest noise sensitive receptors. Calculations for the air conditioning units have been based on the manufacturer's measured octave band sound pressure level data at 1m.

7.1.2 The plant noise assessment of the proposed plant doesn't consider nighttime operation as the two air conditioning units will only function during daytime hours (0700-2300).

7.1.3 Data collected from MP1 and MP2 has been used to represent the noise climate at the nearest sensitive receptors on the opposite side of Southampton Place and High Holborn. The results for the proposed plant on the roof of Norfolk House are summarised in **Table 4** and

7.1.4 **Table** 5.

Table 4 – BS 4142 assessment of the closest residential receptor on the opposite side of Southampton Place, from MP2

Results		**dBA (day)**	
Background Sound Level	$L_{A90,15mins}$	51	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, 15 minutes.
Assessment made for seven consecutive days; reference time interval is 15mins. The plant is assumed to be operating during daytime hours only (0700-2300).			
Total Noise Level of the two Items of Plant @ 1m		66	
Distance Attenuation		-30	Distance attenuation has been calculated based on the total noise level from the combined two items of plant positioned 30m from the closest residential receptor on the east side of Southampton Place, using point source attenuation.
On Time Correction		0	Plant assumed to be operating throughout daytime hours (0700-2300).
Specific Sound Level	$L_{Aeq,T}$	36	Specific sound level at worst affected receptor.
Acoustic feature correction	Tonality	0	1/3rd Octave band data not available.
	Intermittency	0	Temple has not been provided with information on when the proposed plant is operating, so it has been assumed that the plant will operate continuously for the purposes of this assessment.
	Impulsivity	0	Temple has not been provided with information that the proposed plant will have impulsive sound features, but experience of similar equipment indicates that this is unlikely to be the case.
	Other Sound Characteristics	0	No other sound characteristics are known at this stage.
Rating Level		36	Rating level including acoustic feature corrections
Excess of rating level over background sound level		-15	The rating level is 15 dB below the daytime background sound level. The assessment indicates that noise emission from the air conditioning units will be in line with Camden Council criteria.
It should be noted that the above assessment assumes no correction for tonality, impulsivity, other distinctive acoustic character, or intermittency. Consequently, all sources should be controlled so that these issues are not present at noise sensitive locations or else corrections will need to be applied.			

Table 5 – BS4142 assessment of the 2nd closest residential receptor on the opposite side of High Holborn above the public house, from MP1

Results		**dBA (day)**	
Background Sound Level	$L_{A90,15mins}$	51	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, 15 minutes.
Assessment made for seven consecutive days; reference time interval is 15mins. The plant is assumed to be operating during daytime hours only (0700-2300).			
Total Noise Level of the two Items of Plant @ 1m		66	
Distance Attenuation		-30	Distance attenuation has been calculated based on the total noise level from the combined two items of plant positioned 30m from the closest residential receptor on the opposite side of High Holborn above the public house, using point source attenuation.
On Time Correction		0	Plant assumed to be operating throughout daytime hours (0700-2300).
Specific Sound Level	$L_{Aeq,T}$	36	Specific sound level at worst affected receptor.
Acoustic feature correction	Tonality	0	1/3rd Octave band data not available.
	Intermittency	0	Temple has not been provided with information on when the proposed plant is operating, so it has been assumed that the plant will operate continuously for the purposes of this assessment.
	Impulsivity	0	Temple has not been provided with information that the proposed plant will have impulsive sound features, but experience of similar equipment indicates that this is unlikely to be the case.
	Other Sound Characteristics	0	No other sound characteristics are known at this stage.
Rating Level		36	Rating level including acoustic feature corrections
Excess of rating level over background sound level		-15	The rating level is 15 dB below the daytime background sound level. The assessment indicates that noise emission from the air conditioning units will be in line with Camden Council criteria.
It should be noted that the above assessment assumes no correction for tonality, impulsivity, other distinctive acoustic character, or intermittency. Consequently, all sources should be controlled so that these issues are not present at noise sensitive locations or else corrections will need to be applied.			

7.1.5 The completed assessments focus on the effects of noise from the proposed plant to the residential receptors closest to Norfolk House.

8 Conclusion

8.1.1 Temple Group has been appointed by Honi Poke to undertake a noise assessment of air conditioning units proposed as part of the redevelopment of the existing retail space at Norfolk House, Holborn.

8.1.2 Based on background noise levels previously measured at the site, and manufacturer's noise data, calculations of the rating noise levels of the proposed air conditioning units have been undertaken to assess the effects of the noise impact at the nearest noise sensitive receptors. This has been assessed in line with the London Borough of Camden guidance and relevant national standards.

8.1.3 The assessment indicates that the predicted rating noise levels of the air conditioning units will be 15 dB below the representative background sound level during the daytime at the nearest noise sensitive receiver on the west façade of the residential properties on the other side of Southampton Place.

8.1.4 These results comply with the London Borough of Camden criteria during the hours of operation.

Appendix A - Acoustic Glossary

Noise/Sound

Noise and sound need to be carefully distinguished. Sound is a term used to describe wave-like variations in air pressure that occur at frequencies that can stimulate receptors in the inner ear and, if sufficiently powerful, be appreciated at a conscious level. Noise implies the presence of sound but also implies a response to sound: noise is often defined as unwanted sound.

Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic, and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 20 µPa) and the threshold of pain is around 120 dB.

Frequency, Hz

Frequency is the number of occurrences of a repeating event per unit second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is usually divided up into octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency. The bands are described by their centre frequency value. In environmental acoustics the ranges typically used are from 63 Hz to 8 kHz.

A-weighting

The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A).

Background sound level ($L_{A90,T}$)

A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90 % of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

Rating level

Specific sound level plus any adjustment for the characteristic features of the sound.

Reference time interval

Specified interval over which the specific sound level is determined. This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night-time from 23:00 h to 07:00 h.

Residual sound

Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

Residual sound level ($L_{Aeq,T}$)

Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.

Specific sound level

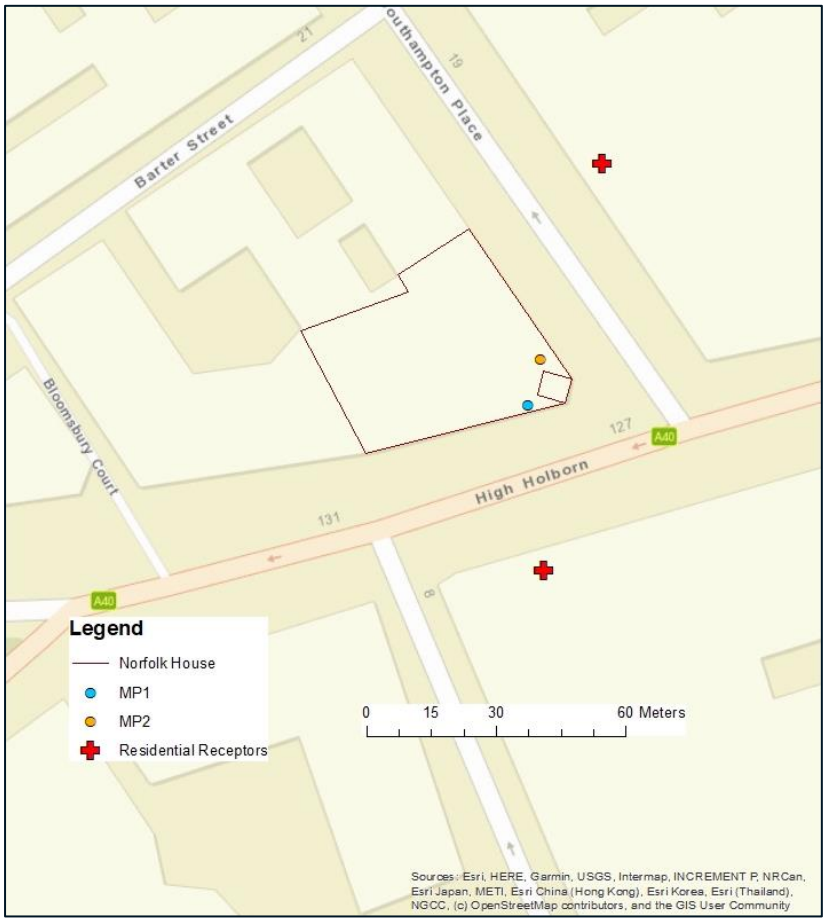
Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval.

Specific sound source

Sound source being assessed.

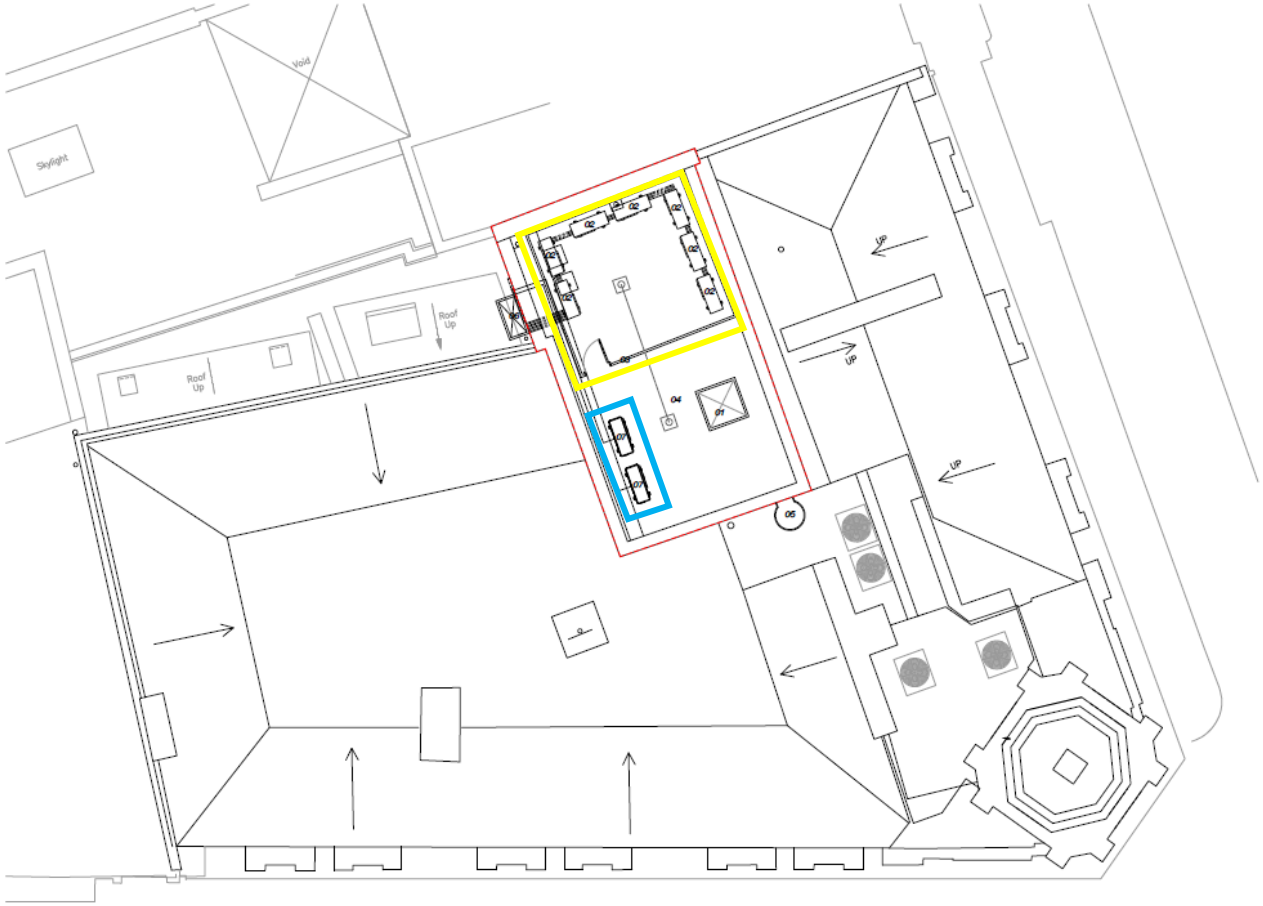
Appendix B - Site Layout

Figure 1 – Norfolk House Site Layout



Appendix C - Proposed Plant Layout

Figure 2 - Norfolk House Proposed Plant Layout with locations of proposed air conditioning plant (blue) and existing Farmer J plant (yellow)



Appendix D - Preliminary Plant Data

Figure 3 – Toshiba RAV-GM1401ATP-E & Toshiba RAV-GM1101ATP-E

Technical Data

Model reference			RAV-GM1401ATP-E
Nominal	Cooling Capacity	kW	12.0
	Heating Capacity	kW	12.8
Operating Range	Cooling/Heating	°C	-15 to 46/-15 to 15
Air Flow	High	m^3/h - l/s	4200 - 1167
Sound	Pressure High Cooling/Heating	dB(A)	55/57
	Power High Cooling/Heating	dB(A)	70/74
Unit	Height x Width x Depth	mm	890 x 900 x 320
	Weight	kg	68
Pipe Connection	Flare Connections (gas - liquid)	inch	5/8 - 3/8
	Min.-Max. Length	m	5-50
	Maximum Height Difference	m	±30
	Drain Port Connection	mm	16
Refrigerant R32	Base Charge/Chargeless Length	kg/m	2.1/30
	Additional Charge Liquid Side	g/m	35
Run Current	Maximum	A	20.75
Power Cable	Outdoor to Indoor		3 core + earth
Power Supply	Suggested Fuse Size	V/ph/Hz-A	220-240/1/50-32

16 Specifications

Model	Sound power level (dB)		Weight (kg)
	Cooling	Heating	
RAV-GM1101ATP-E	*	74	68
RAV-GM1101ATJP-E	*	74	68
RAV-GM1401ATP-E	*	74	68
RAV-GM1401ATJP-E	*	74	68

* Under 70 dBA

Product information of ecodesign requirements, (Regulation (EU) 2016/2281)
http://ecodesign.toshiba-airconditioning.eu/en

Appendix E – Measurement Data and Weather Data

Figure 4 - L_{A90} Values for the period 28/04/21 - 04/05/21

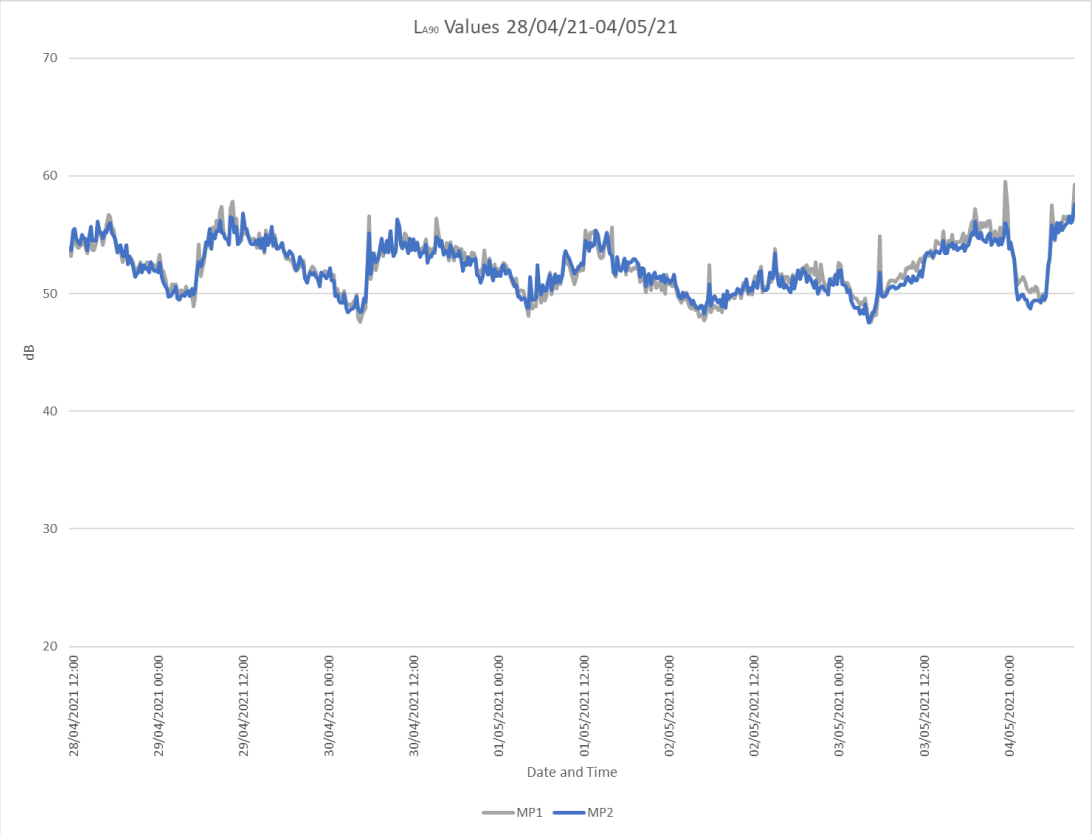


Figure 5 - Statistical analysis of the daytime (07:00-23:00) L_{A90} measurements to determine background sound level at MP1.

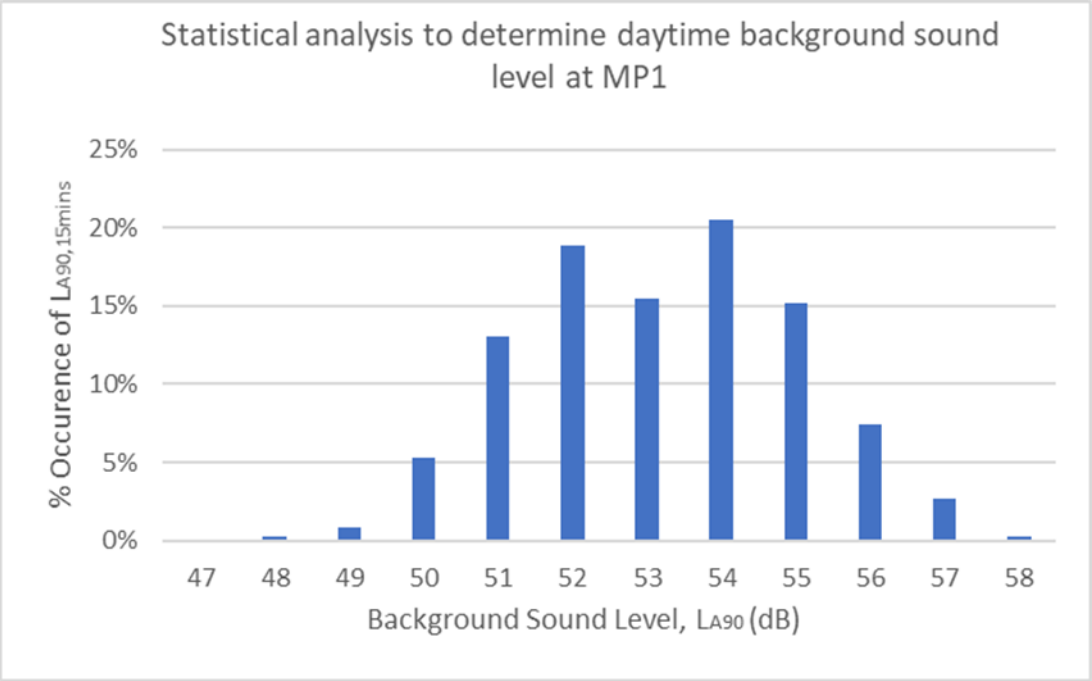


Figure 6 - Statistical analysis of the night-time (23:00-07:00) L_{A90} measurements to determine background sound level at MP1.

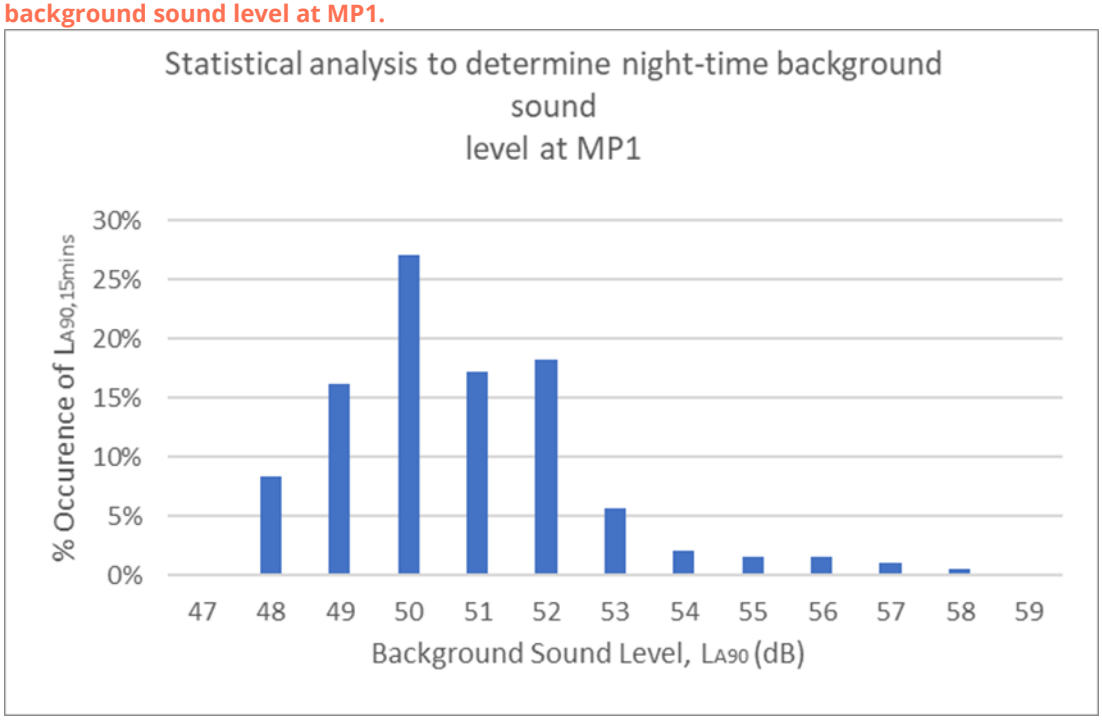


Figure 7 - Statistical analysis of the daytime (07:00-23:00) L_{A90} measurements to determine background sound level at MP2.

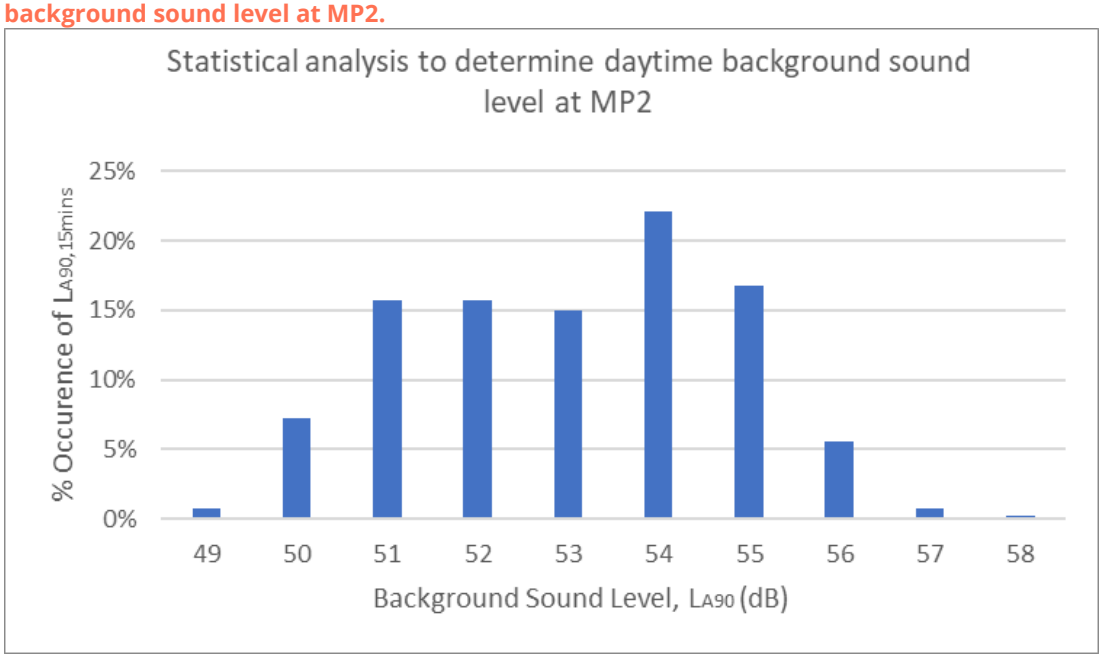


Figure 8 - Statistical analysis of the night-time (23:00-07:00) L_{A90} measurements to determine background sound level at MP2.

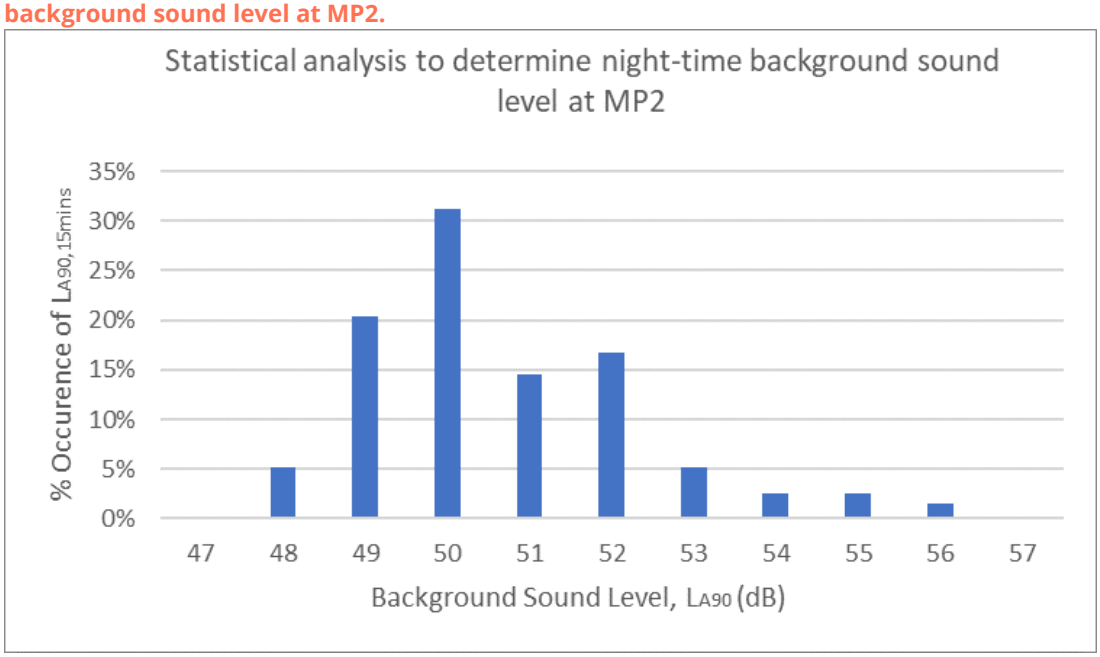
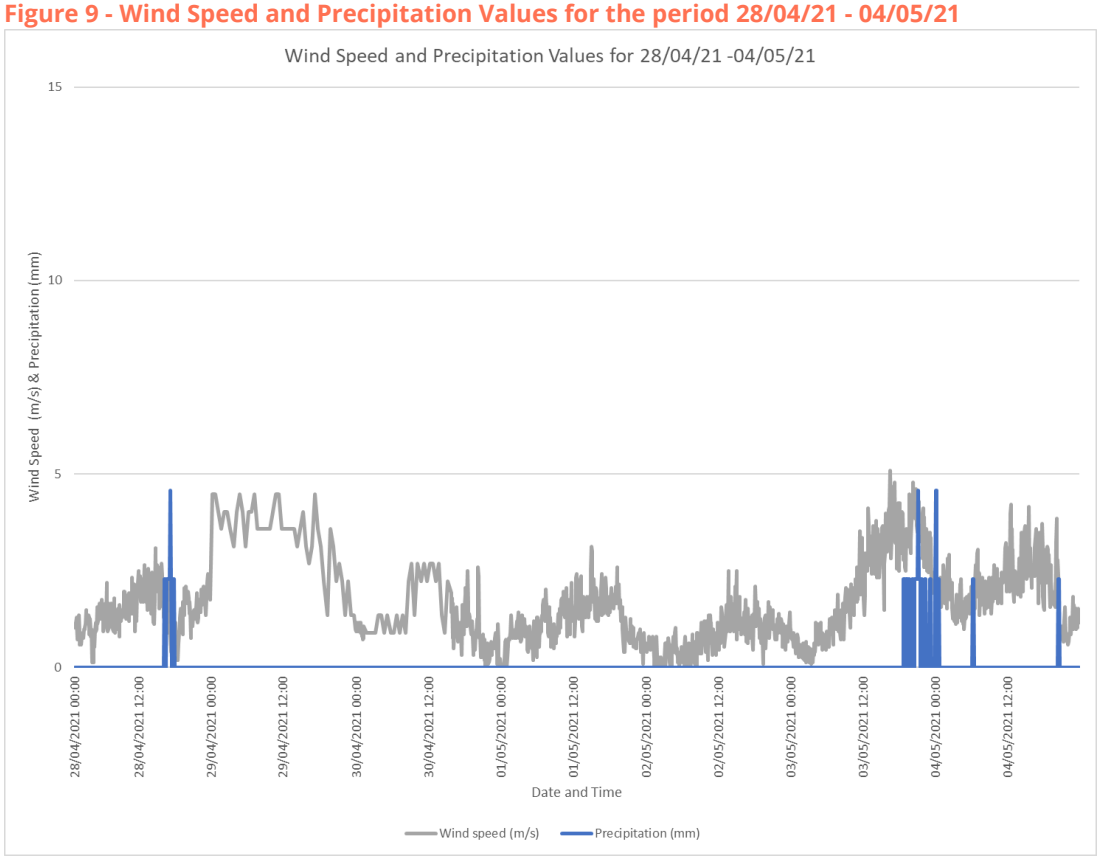


Figure 9 - Wind Speed and Precipitation Values for the period 28/04/21 - 04/05/21



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