24Acoustics
Armstrong House
3 Bassett Avenue
Southampton
SO16 7DP

T: 02381 555000

MANOR LODGE, RICKMANSWORTH ROAD, NORTHWOOD

PLANT NOISE ASSESSMENT

Technical Report: R10958-1 Rev 0

Date: 27th February 2025

For: Merchant Land Investments Limited
61 Charlotte Street
London
W1T 4PF

24 Acoustics Document Control Sheet

Project Title: Manor Lodge, Rickmansworth Road, Northwood – Plant Noise Assessment

Report Ref: R10958-1 Rev 0

Date: 27th February 2025

	Name	Position	Signature	Date
Prepared by	Miles Hodge BSc(Hons) MIOA	Consultant		27/02/2025
Reviewed by	Chris McConnell BSc MSc MIOA	Principal Consultant		27/02/2025
Approved by	Stephen Gosling BEng MIOA	Principal Consultant		27/02/2025
For and on behalf of 24 Acoustics Ltd				

Document Status and Approval Schedule

Revision	Description	Prepared By	Reviewed By	Approved By
0	Approved for issue	Miles Hodge	Chris McConnell	Stephen Gosling

DISCLAIMER

This report was completed by 24 Acoustics Ltd on the basis of a defined programme of work and terms and conditions agreed with the Client. The report has been prepared with all reasonable skill, care and diligence within the terms of the Contract with the Client and taking into account the project objectives, the agreed scope of works, prevailing site conditions and the degree of resources allocated to the project.

24 Acoustics Ltd accepts no responsibility whatsoever, following the issue of the report, for any matters arising outside the agreed scope of the works.

This report is issued in confidence to the Client and 24 Acoustics Ltd has no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

Unless specifically assigned or transferred within the terms of the agreement, 24 Acoustics Ltd retains all copyright and other intellectual property rights, on and over the report and its contents.

CONTENTS **PAGE**

1.0 INTRODUCTION

1.1 24 Acoustics Ltd has been instructed by Merchant Land Investments Limited to undertake an assessment of noise from proposed new air source heat pumps (ASHPs) associated with 6 new residential properties on the land of Manor Lodge, Rickmansworth Road, Northwood.

1.2 This report presents the results of the assessment, following site visits and background noise surveys undertaken between 6th and 12th February 2025.

1.3 All noise levels in this report are presented in dB relative to 20 µPa.

2.0 SITE DESCRIPTION AND PROPOSALS

2.1 The site is located in Northwood on Rickmansworth Road. To the north-west is Moray House with Kiln Farm to the south-east. To the north-east is Northwood College.

2.2 It is proposed to demolish the existing Manor Lodge and replace it with 6 new semi-detached residential properties. A new ASHP is proposed to be installed at each new property.

2.3 A site overview is shown in Figure 1.

3.0 CRITERIA

NPPF & NPSE

3.1 The National Planning Policy Framework (NPPF) [Reference 1] states that planning policies and decisions should aim to:

- 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 quality of life.
- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

3.2 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 2] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development' which is supported by the following aims.

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life.

3.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'.

3.4 The Planning Practice Guidance (PPG) [Reference 3] is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The NPPG states that noise can over-ride other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.

3.5 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.

3.6 The documents described above do not refer to specific noise criteria, and no formal guidance has been published by Hillingdon Borough Council in relation to the assessment of noise from services plant. 24 Acoustics considers that the spirit of the requirements of the NPPF and NPSE will be complied with if criteria from British Standard 4142:2014 [Reference 4] are adopted.

<u>BS 4142: 2014+A1:2019 - Methods for Rating Industrial and Commercial Sound</u>

3.7 BS 4142: 2014+A1:2019 [Reference 4] provides a method for rating the effects of industrial and commercial sound on residential areas. The standard advocates a comparison between the typical measured L_{A90} background noise level and L_{Aeq} noise level from the source being considered. For rating purposes if the noise source is tonal, intermittent or otherwise distinctive in character, a rating correction of up to 15 dBA is applied.

3.8 The standard states that a difference between the rating level and the background level of around +10 dBA is an indication of a significant adverse impact, depending on the context and a difference of around +5 dBA is likely to be an indication of an adverse impact again depending on the context. Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact (depending upon the context).

3.9 The standard also states:

> *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.*

IoA Heat Pumps Professional Advice Note

3.10 The Heat Pumps Professional Advice Note published by the Institute of Acoustics in 2022 [Reference 5], recognises the risk of permitted development rights (the MCS scheme) not avoiding the creation of significant adverse effects from noise and vibration.

3.11 The document states that where it is practical to do so, it is recommended that the Rating Level (reference BS 4142), does not exceed 35 dB at one metre from any noise sensitive façade of neighbouring residential premises.

3.12 The document goes on to say:

> *"If it can be demonstrated that it is not practical to achieve this value, and the local context supports a relaxation, then a higher criterion may be suitable. Under those circumstances it is recommended that the reasons for the relaxation are fully set out and justified. Nevertheless, it is recommended that the sound rating level should not exceed 40dB."*

4.0 ENVIRONMENTAL NOISE MEASUREMENTS

Measurement Instrumentation and Procedure

4.1 An environmental noise survey was undertaken between the 6th and 12th February 2025 in order to determine the typical background noise levels in the area.

4.2 The measurement equipment was located to the rear of the existing property on the north-western boundary at an approximate height of 2m. The microphone was positioned in free-field conditions, and is representative of the nearest habitable receptors.

4.3 The instrumentation was set up to monitor background noise levels and store data in 5-minute intervals of the overall A-weighted L_{90} using fast time weighing. The following instrumentation was used during the survey:

- Rion NL52 Type 1 sound level meter;
- Brüel & Kjær type 4231 acoustic calibrator.

4.4 Calibration of the equipment was checked before and on completion of the measurements and no drift was recorded. Noise measurements were made in accordance with BS 7445: 1991 'Description and measurement of environmental noise Part 2 – Acquisition of data pertinent to land use' [Reference 6].

4.5 Weather conditions during the measurements were mostly fine and dry with wind speeds generally below 5 m/s.

4.6 The measured background noise levels are summarised in Table 1 and shown graphically in Appendix B. 24 Acoustics' interpretation of the typical background noise level is the average of the range of levels less one standard deviation.

Date	**Measured Typical Background Noise Level**	
	Daytime (07:00 to 23:00) dB $L_{A90\ 1\ hour}$	**Night-time (23:00 to 07:00) dB $L_{A90\ 15\ min}$**
Thursday 6/2/2025	42*	31
Friday 7/2/2025	46	30
Saturday 8/2/2025	44	29
Sunday 9/2/2025	44	30
Monday 10/2/2025	45	26
Tuesday 11/2/2025	44	25
Wednesday 12/2/2025	48*	-
Representative Level	**44**	**28**

Table 1 - Measured background noise levels *Incomplete measurement periods

4.7 The background noise climate at the measurement location is influenced by road noise using Rickmansworth Road.

4.8 From the results in Table 1 it is noted that background noise levels are relatively low during night-time hours. On this basis, in accordance with the guidance in BS 4142: 2014 for night-time operation, noise from plant at this site should not exceed 25 dB $L_{Aeq,\ 15\ mins}$, at the nearest existing residential properties.

4.9 The cumulative noise levels from all plant must be considered with any necessary rating corrections in accordance with BS 4142.

4.10 In line with the guidance provided in the IoA document it is considered appropriate to set a target of 35 dB $L_{Aeq,T}$ for the new heat pumps when assessed 1 m from the new, proposed properties which are part of this development.

5.0 PLANT NOISE ASSESSMENT

5.1 The new plant will comprise 6 new ASHP units, located in the gardens of each of the new residential properties, as shown in Figure 2. It is assumed that the plant will be in operation on demand on a 24-hour basis.

Plant Noise Levels at Existing Residential Properties

5.2 The nearest existing receptors are located to the north-west at Moray House and to the south-east at Kiln Farm. The nearest habitable windows from the nearest plant are approximately 8 m at Moray house and 16 m at Kiln Farm.

5.3 The proposed ASHP units are to be LG HM091MR U44 units. The A-weighted sound pressure level at 5 m as stated by the manufacturer is presented below:

- Sound Pressure Level @ 5 m: 35 dBA

5.4 The new plant is not expected to contain tonal or otherwise distinctive noise characteristics that are sufficiently perceptible at the nearest residential property.

5.5 Calculations have been undertaken, based on the manufacturer's stated plant noise levels, to determine the cumulative level of noise from new plant at the nearest existing residential properties. Calculations include distance and screening provided by the existing boundary walls and proposed new garden fences (minimum 1.8m high close-boarded timber fence)

5.6 The calculated cumulative plant noise levels at the nearest existing residential windows are shown in Table 2.

Receptor	**Predicted Maximum Plant Noise Level, dB 24 Hour Operation [$L_{Aeq,T}$]**
Moray House	21
Kiln Farm	16
Plant Noise Limit	**25**

Table 2 - Predicted Maximum Plant Noise Levels at Nearest Existing Properties

5.7 The calculations demonstrate that noise levels associated with the proposed plant would achieve the established maximum noise levels at the nearest existing properties.

Plant Noise Levels at New Residential Properties

5.8 The calculated cumulative plant noise levels at the windows of the new properties, including for distance losses and screening provided by the new garden fences are shown in Table 3.

Receptor	**Predicted Maximum Plant Noise Level, dB 24 Hour Operation [$L_{Aeq,T}$]**
New Properties	30
Plant Noise Limit	**35**

Table 3 - Predicted Maximum Plant Noise Levels at Proposed Properties

5.9 The calculations demonstrate that noise levels associated with the proposed plant would achieve the established maximum noise levels at the proposed properties.

Summary

5.10 Based on the above assessments, noise from the proposed air source heat pumps would achieve the established noise criteria at existing and proposed properties and is, therefore, acceptable.

6.0 CONCLUSIONS

6.1 24 Acoustics Ltd have been instructed by Merchant Land Investments Limited to undertake a noise assessment for new ASHPs at Manor Lodge, Rickmansworth Road, Northwood.

6.2 An environmental noise survey has been undertaken to determine the existing background noise levels representative of nearby residential properties.

6.3 Suitable criteria have been established for noise from the new ASHPs, based on guidance from BS 4142: 2014 and the Institute of Acoustics' published guidance.

6.4 Calculations have been undertaken, based on manufacturers' noise data, to determine the plant noise levels at both the existing and proposed properties.

6.5 The assessment demonstrates that the proposed plant will achieve the established noise criterion at all times, and is therefore acceptable.

REFERENCES

1. Department for Communities and Local Government. National Planning Policy Framework, 2025.

2. DEFRA, Noise Policy Statement for England, March 2010.

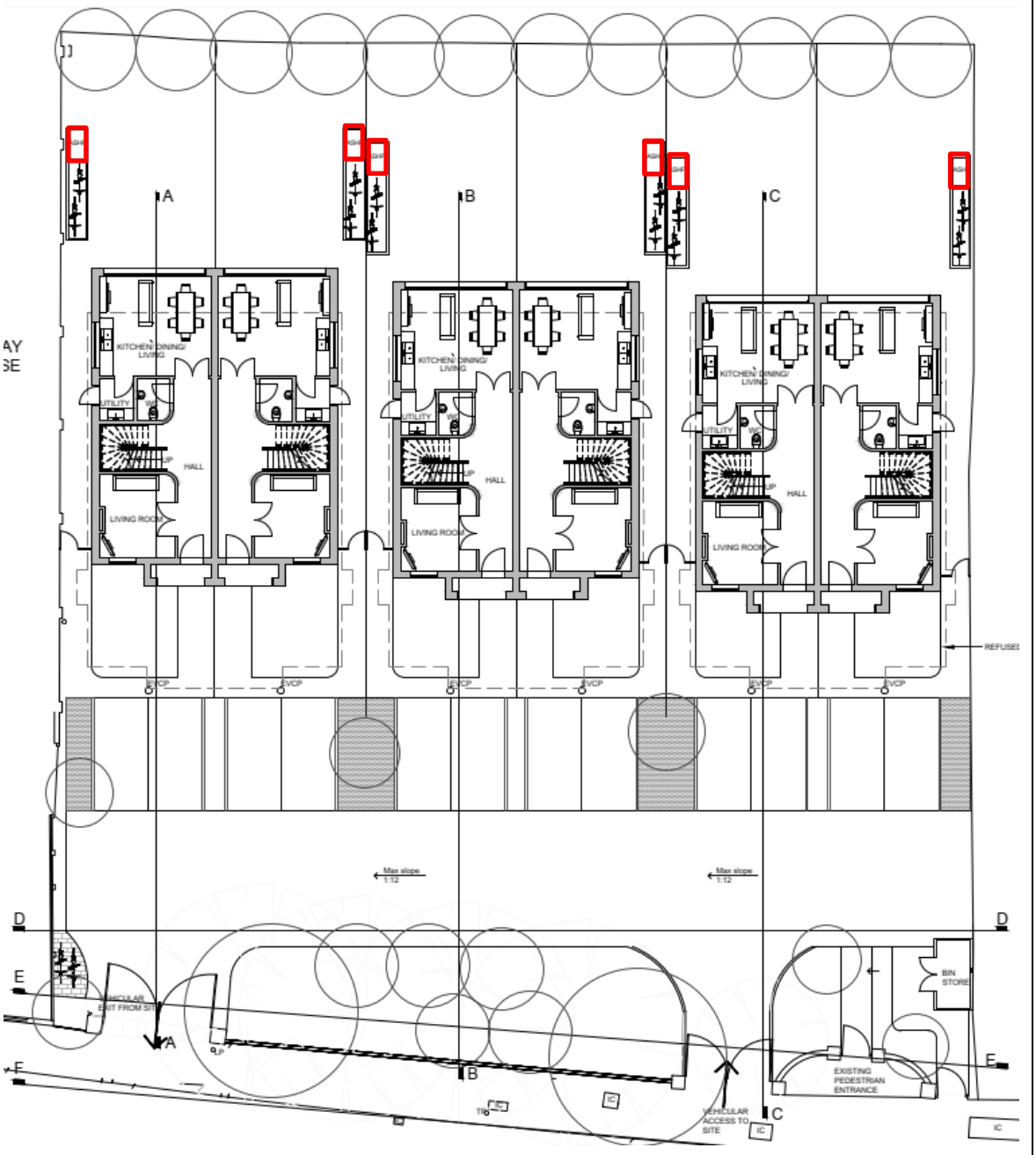
3. Planning Practice Guidance - Noise, Department of Communities and Local Government (revised July 2019).

4. British Standards Institution. British Standard 4142: Methods for rating and assessing commercial and industrial sound, 2014. BS 4142:2014+A1:2019.

5. Institute of Acoustics. IoA Heat Pumps Professional Advice Note, 2022.

6. British Standards Institution. British Standard 7445: 1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use.

Project: Manor Lodge, Rickmansworth Road	**Title:** Aerial site plan & measurement location		
DWG No: Figure 1	**Scale:** N.T.S.	**Rev:** 0	
Date: February 2025	**Drawn By:** MH	**Job No:** 10958	



Location of ASHPs:

Project: Manor Lodge, Rickmansworth Road	**Title:** Proposed plant locations		24Acoustics
DWG No: Figure 2	**Scale:** N.T.S.	**Rev:** 0	
Date: February 2025	**Drawn By:** MH	**Job No:** 10958	

APPENDIX A – ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time internal, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

APPENDIX B – ENVIRONMENTAL NOISE MEASUREMENTS