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PLANT NOISE ASSESSMENT

# THAMES QUARTER, READING

03 INTERIORS LTD

OCTOBER 2023

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# PLANT NOISE ASSESSMENT THAMES QUARTER, READING

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## REVISION HISTORY

| Version | Comments             | Changes made by | Approved by |
|---------|----------------------|-----------------|-------------|
| 1.0     | First issued version | JN              | JB          |
| 2.0     | Plant data updated   | JN              | JB          |

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## 1 INTRODUCTION

Anderson Acoustics Ltd was commissioned to undertake a noise impact assessment to support a planning application for the operation of new plant which will serve a coffee shop in a currently vacant commercial premises in the Thames Quarter, Reading.

An assessment of the impact of noise at the nearest noise sensitive premises from the proposed plant has therefore been conducted in accordance with Planning Condition 29 of application no. 190809 and is reported herein.

This report is technical in nature and, as such, a summary of noise units and acoustic terminology can be found [here](#) for reference.

## 2 LOCAL AUTHORITY REQUIREMENTS

### 2.1 Planning Condition 29

Planning condition 29 of application ref 190809 states the following:

*No mechanical plant shall be installed until a noise assessment of the proposed mechanical plant has been submitted and approved by the Local Planning Authority. The assessment shall be carried out for in accordance with BS4142:2014 methodology. The predicted specific sound level ( $L_{Aeq,Tr}$ ) (with reference to BS:4142) as measured at a point 1 metre external to the nearest noise-sensitive facade shall be at least 10dB below the pre-existing background sound level,  $L_{A90,T}$  when all plant/equipment (or any part of it) is in operation. The predicted rating level,  $L_{Ar,Tr}$  (specific sound level plus any adjustment for the characteristic features of the sound) as measured at a point 1 metre external to the nearest noise-sensitive facade (habitable window of a dwelling) shall not exceed the pre-existing background sound level,  $L_{A90,T}$  when all plant/equipment (or any part of it) is in operation. The plant shall thereafter only be installed in accordance with the assessment and shall thereafter be maintained so that it operates to the same standard.*

It should be noted that the wording of this standard is somewhat unusual in that it presents two criteria; the first that the specific sound level should be 10dB below existing background noise levels, the second that the rating level should not exceed existing background noise levels.

Assuming that any corrections to account for the acoustic character of the proposed plant do not exceed 10dB, which based on our experience of similar items is unlikely, the first criteria would be more stringent and will be used within this assessment from here on in.

### 2.2 British Standard 4142

Guidance on the rating of noise from fixed installations and sources of an industrial nature is provided in BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound', which provides a procedure for the measurement and rating of sound levels outside dwellings from such sources. A methodology for predicting the likelihood of adverse impact is also provided in this document; although, the assessment of nuisance explicitly falls outside the scope of this British Standard.

Relevant to this development, this Standard can be used for assessing the impact of sound at either existing or proposed residential dwellings from new fixed plant (as well as other site-based sources of an industrial and/or commercial nature).

It must be borne in mind that the assessment is limited to considering sound/noise levels outside only. When it comes to considering noise levels inside, the methodology has some relevance when windows are assumed to be open, but not when closed, which can be necessary as a mitigation measure. It is stated in the Standard that where the "primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows... Other guidance, such as BS 8233, might also be applicable in this instance." The suggestion being to consider not just the comparison of the rating level with the background level, but also the specific level with the absolute levels in BS 8233 (see below), as per examples given in BS 4142. This is all the more the case when considering windows being closed.

The Standard describes how the rating level ( $L_{Ar,Tr}$ ) of the source(s), should be determined, which is effectively a combination of the sound level of the source(s) in question at the dwelling (known as the specific sound level,  $L_{Aeq,T}$ ) and any adjustment for characteristic features. The 'subject method' for the latter recommends adjustments of between 0 and 6 dB for tonal noise sources and between 0 and 9 dB for impulsive sources. Additionally, corrections of 3 dB can be made for other sound characteristics and intermittency of the noise source. Where no adjustment is necessary, which can be the case, the rating level is equivalent to the specific level.

Reference time intervals, 'Tr', of 1 hour and 15 minutes are specified for the determination of specific/rating levels during the day and night, respectively. Where the operation of source is less than these periods, a time correction is made. If longer, then no correction is necessary.

The method for predicting the likelihood of complaints is based on differences between the rating level and the background  $L_{A90,T}$  noise level. The standard states that:

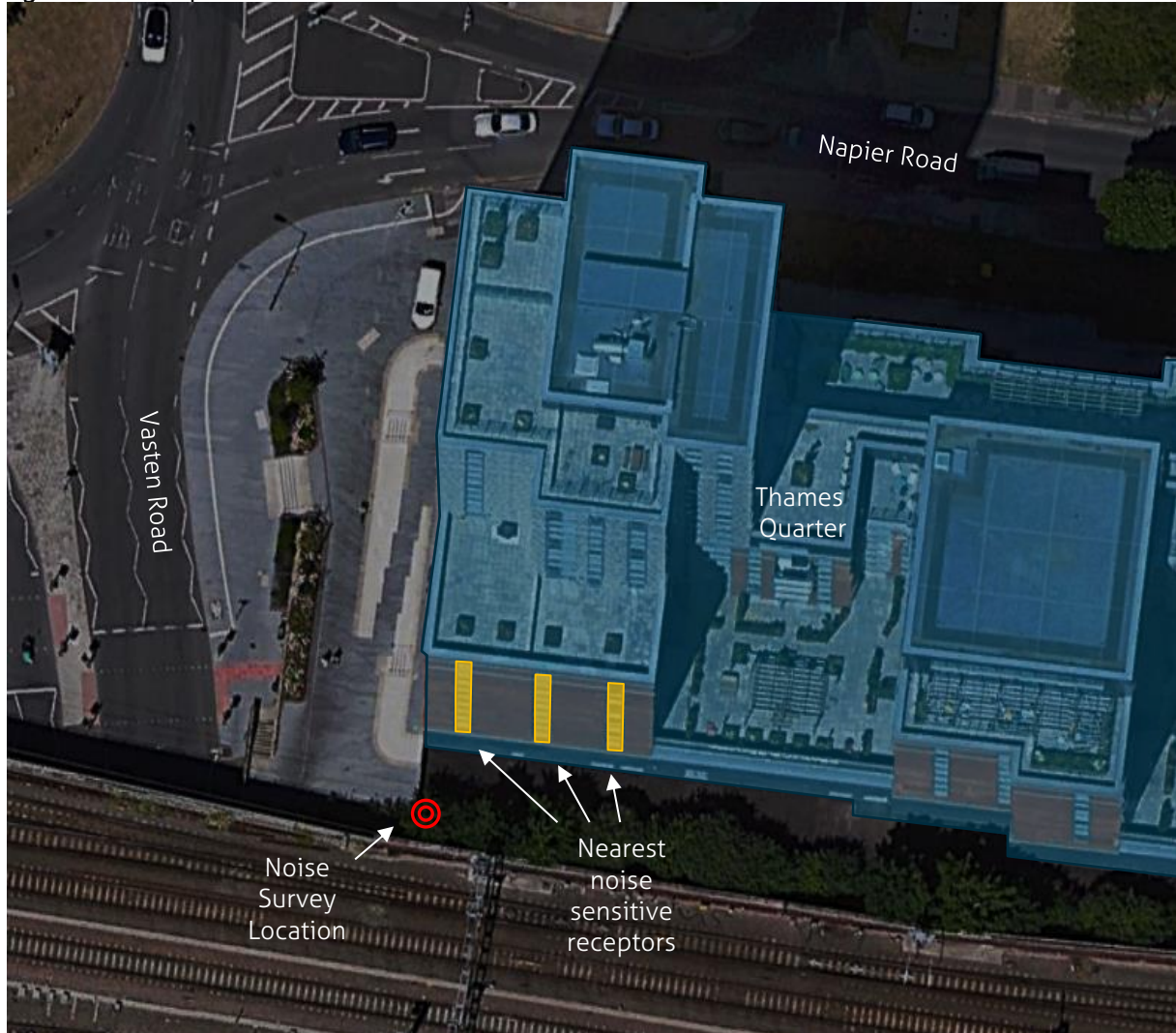
- a) Typically, the greater this difference, the greater the magnitude of the impact.
- b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on 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 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 impact depending on the context."

### 3 SITE DETAILS

The site in question is Thames Quarter, Reading. The site, noise survey location and nearest noise sensitive receptors are presented below in Figure 3.1.

During the site visit, the noise environment was noted to be dominated by vehicle movements on the surrounding road network, bird noise and some distant construction activities.

Figure 3.1: Satellite photo of Kenilworth House



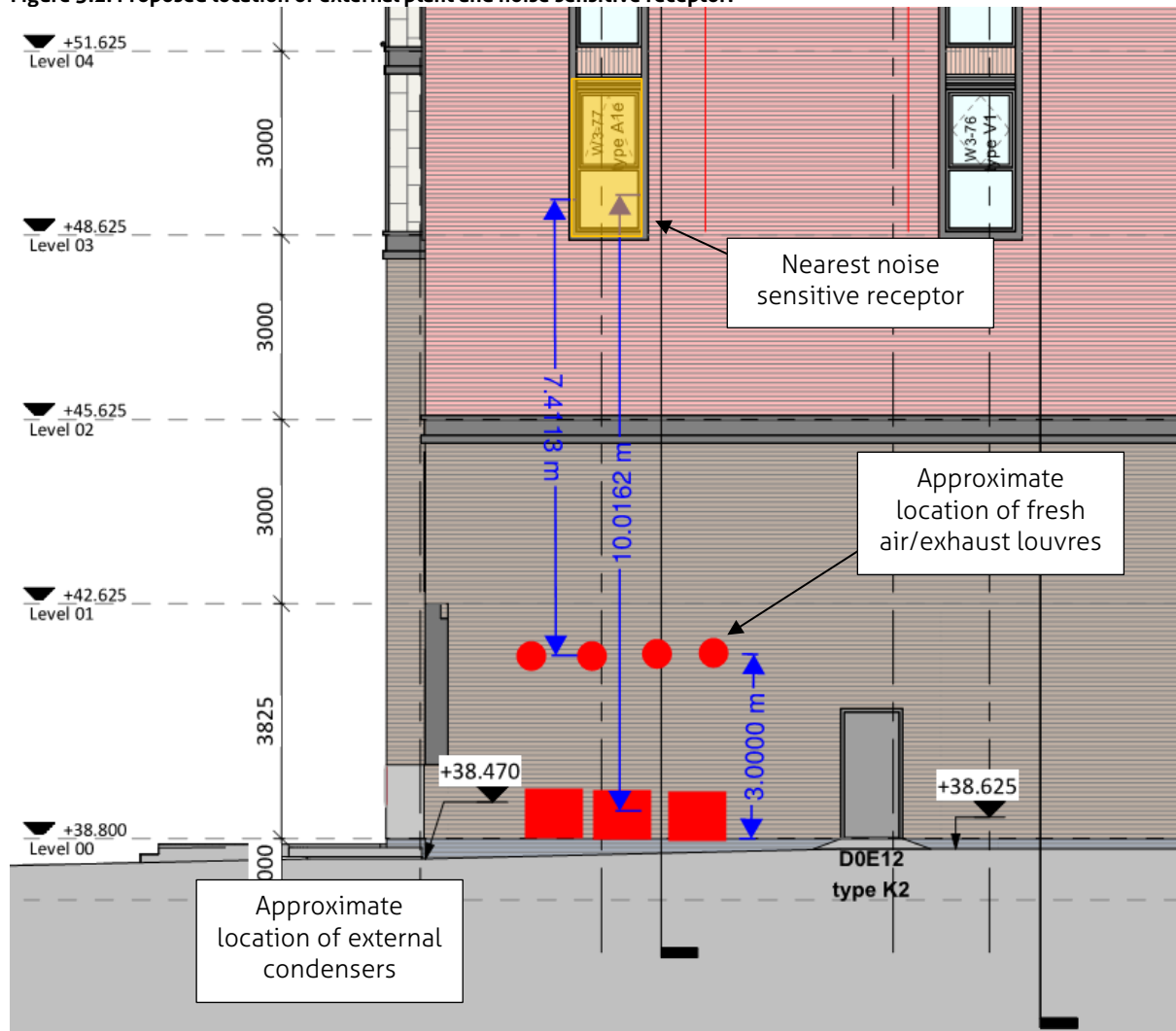
It is understood that the plant installation will comprise the following:

- 3no. Midea MOD30U-36HFN8-Q external condensers
- 2no. 210mm diameter fresh air intake louvres serving Midea HRV-D1000(B) MVHR units via 600mm length of circular ducting.
- 2no. 210mm diameter fresh air intake louvres serving Midea HRV-D1000(B) MVHR units via 600mm length of circular ducting.

The exact position the plant is to be installed is unknown however Figure 3.2 shows the likely positions. The positions shown in Figure 3.2 represent a worst case for the identified noise sensitive receptor. Should the plant be more spread out than indicated, the resultant noise levels at the receptor will be reduced. The plant is to serve a commercial premises (coffee shop) and will not operate during night hours (23:00 – 07:00).

The nearest noise sensitive receptors are the windows to the residential premises on the southern façade of the Thames Quarter development (highlighted in yellow in Figure 3.1 and 3.2). They are approximately 10m and 7.5m from the condensers and the louvres respectively.

**Figure 3.2: Proposed location of external plant and noise sensitive receptor.**



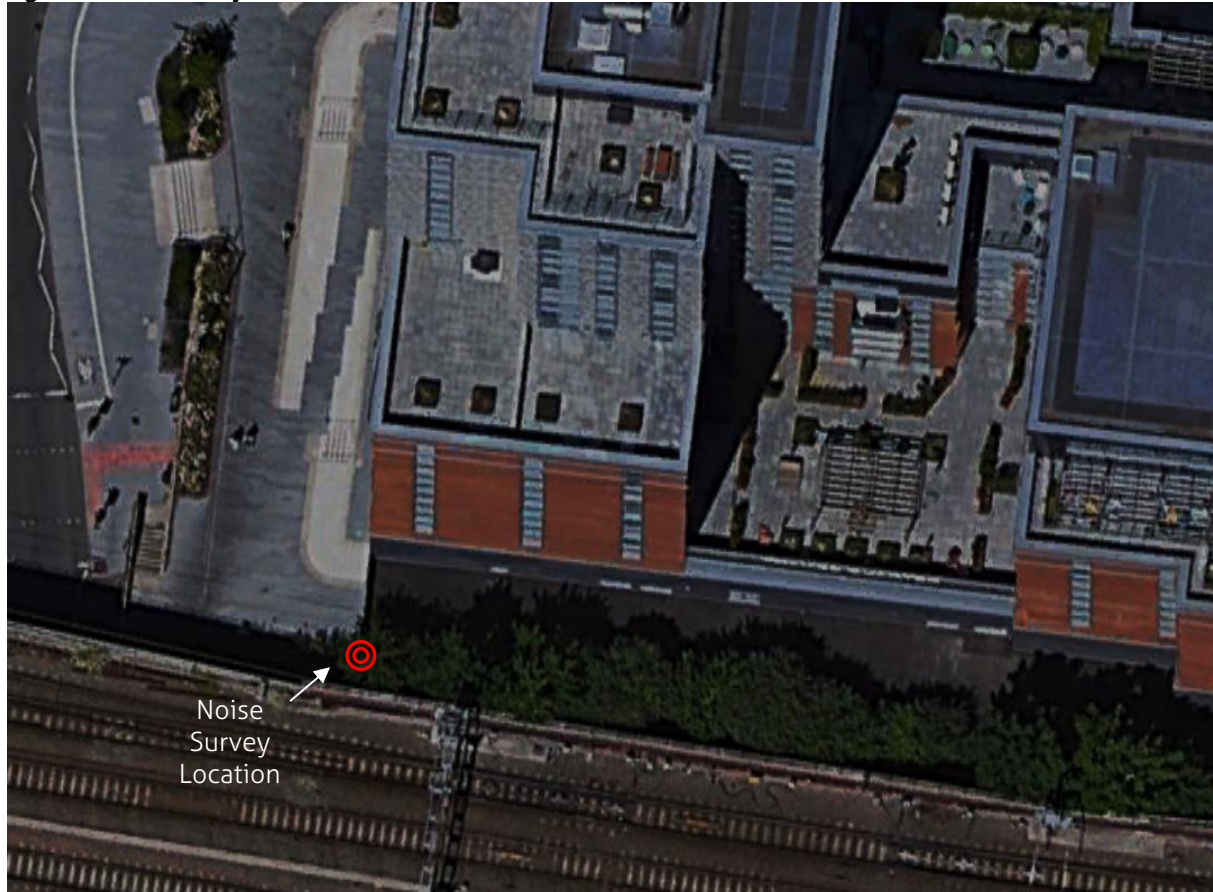
## 4 NOISE MEASUREMENTS

### 4.1 Continuous Noise Monitoring

A noise survey was conducted on site to capture ambient and background noise data.

Consecutive 15-minute measurements of the  $L_{Aeq,T}$  and  $L_{A90,T}$  noise indices were obtained using the 'F' time weighting between approximately 10:45 hrs on 28<sup>th</sup> September and 12:00 hrs on 2<sup>nd</sup> October 2023 at the location shown in Figure 4.1. The microphone was approximately 10m from the nearest residential window.

**Figure 4.1: Noise survey location**



Free-field noise levels were measured using a Rion NL-52 precision integrating sound level meter powered by dry cell batteries and stored inside a weatherproof security box with a weatherproof windshield fitted to the microphone.

The equipment was calibrated before and after the survey using a Svantek SV36 sound calibrator to generate a calibration level of 94.0 dB at 1 kHz. No significant calibration drift was observed.

## 4.2 Equipment Details

**Table 4.1: Equipment details**

| Equipment                    | Serial no. | Date calibrated | Calibration certification number |
|------------------------------|------------|-----------------|----------------------------------|
| Rion NL-52 sound level meter | 00732147   | 12/01/2022      | TCRT22/1046                      |
| Svantek SV36 calibrator      | 112518     | 28/08/2023      | 1506292-1                        |

## 4.3 Weather Conditions

Weather conditions during the survey period were obtained from an internet source [www.wunderground.com](http://www.wunderground.com) (weather station at London Heathrow Airport) which indicated dry conditions with low to moderate breezes occasionally exceeding 5 m/s during the survey period. At the time of setting up the noise monitor, weather conditions were clear.

It is considered that the weather conditions for the survey did not affect the noise measurements.

## 4.4 Noise Survey Results

The results of the continuous noise monitoring survey are presented graphically in Appendix A and summarised below in Table 4.2.

**Table 4.2: Unattended noise survey results (free-field)**

| Time period         | $L_{Aeq,T}$ dB | Typical $L_{A90,15min}$ dB |
|---------------------|----------------|----------------------------|
| Day (07:00 – 23:00) | 71             | 57                         |

## 5 NOISE IMPACT ASSESSMENT

### 5.1 Design Criteria

The predicted specific sound level ( $L_{Aeq,TR}$ ) (with reference to BS:4142) as measured at a point 1 metre external to the nearest noise-sensitive facade shall be at least 10dB below the pre-existing background sound level,  $L_{A90,T}$  when all plant/equipment (or any part of it) is in operation.

Therefore, the predicted specific sound level should not exceed 47dB  $L_{Aeq,1hr}$  at the nearest sensitive receptor.

### 5.2 Source levels

The condensers have a published sound pressure level of 60dB(A). The distance at which this has been measured is not specified but it is assumed to be at 1m. This level is typical of similar sized units.

In-duct sound power levels are not available for the selected MVHR units. However, the data sheet notes that measured sound pressure levels 1.5m below the air outlet duct are 44/39/33.5dB under high, medium and low loads respectively.

Any duct work and termination grilles will only serve to reduce these levels. Therefore as a worst case, the sound pressure levels at the termination grilles have been assumed to be 44dB  $L_{Aeq,T}$  measured at 1.5m.

### 5.3 Environmental Noise Model

The noise assessment was performed using a 3D noise model. The potential impact of noise generated by the proposed plant has been predicted using the CadnaA 2023 software by Datakustik.

The software allows the site topography, existing buildings and sound sources to be built into the model such that the propagation of the various sound sources generated by the proposed development can be simulated and predicted at the nearest Noise Sensitive Receptors (NSR's). Calculations are carried out using the methodology outlined in ISO 9613, which considers the effects of the topographical conditions throughout the area, ground absorption, atmospheric absorption, acoustic reflections and acoustic screening, as well as applying a light downwind propagation correction to represent a worst-case.

The results of the noise modelling are used to determine the likely impact of noise levels incident on each NSR surrounding the site during its proposed operation.

The following general settings were used in the model:

- All plant was modelled as point sources at a height representative of the dominant source (i.e. the fans at the front of the condensing units)
- Ground absorption has been set to acoustically hard ground for the entire site and the surrounding areas, to provide a worst-case assessment.
- Buildings were set as reflecting with an absorption coefficient of 0.21.
- Buildings were imported from OpenStreetMap and modified to match architect's drawings where possible.

### 5.4 Assessment

An example 3D view of the noise model showing the results is shown in Figure 5.1.

Figure 5.1: 3D view of predicted plant noise level at the nearest receptors (free-field)

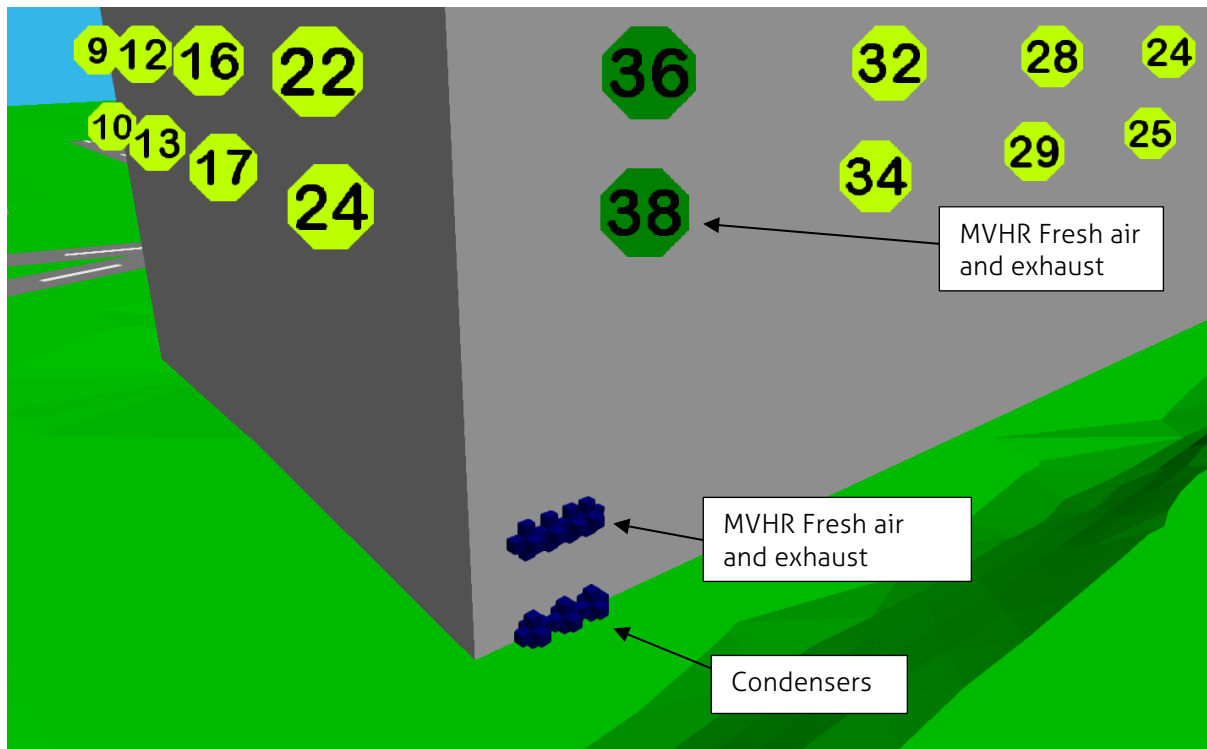


Figure 5.1 shows that when all plant is operating, the proposed installation would meet the adopted plant noise limits. No additional mitigation measures are required.

## 6 CONCLUSION

Anderson Acoustics has completed a noise impact assessment for the installation of fixed plant serving a new coffee shop at the Thames Quarter development, Reading.

An assessment of the noise impact from the operation of the proposed plant has been undertaken in accordance with Reading Borough Council criteria which requires that the noise level from the plant is less than 47 dB  $L_{Aeq,1hr}$  at the nearest noise sensitive receptors.

It has been demonstrated that the noise levels limit of the proposed plant would likely exceed the criteria detailed in planning condition 29 and planning permission should not be refused on noise grounds.

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# APPENDIX A

## NOISE SURVEY RESULTS

## Unattended Survey Results

