# NOISE IMPACT ASESSMENT REPORT FOR OXFORD CITY COUNCIL, ST ALDATE'S CHAMBERS, 109 ST ALDATE'S, OXFORD, OX1 1DS

PREPARED ON THE INSTRUCTIONS OF
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## 1. INTRODUCTION

1.1 Hawkins and Associates Limited ('Hawkins') has been instructed, by Aurora Energy Research Limited ('AER'), to provide a noise impact assessment to satisfy BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' at St Aldate's Chambers, 109 St Aldate's, Oxford, OX1 1DS.

1.2 The intent of this report is to establish the existing ambient noise levels at the nearest noise sensitive receiver (NSR), calculate the likely 'Rating Level' of the new mechanical plant, and determine the likely noise impact resulting from the operation of the new plant.

1.3 The site was attended, and noise measurements were made between Friday 3rd and Wednesday 8th November 2023. The data collected have been used in this assessment to determine the noise impact of the new mechanical plant in accordance with BS 4142 and the National Planning Policy Framework (2023).

1.4 In addition to the noise measurements, a weather station was erected to collect rain and wind data.

1.5 A Glossary of Terms can be found at Appendix A. Test equipment details and survey noise data can be found at Appendix B. A list of references can be found at Appendix C which lists the other Standards to which the testing was conducted, as well as any additional guidance used to inform this assessment. The qualifications of the author of this report can be found at Appendix D, to demonstrate that this assessment has been supervised by a 'Suitably Qualified Acoustician'.

## 2. ACOUSTICS CRITERIA

### 2.1 National Planning Policy Framework

2.1.1 The National Planning Policy Framework (NPPF) applies generally to new developments. Current planning policy is based on the NPPF which supports a presumption in favour of development, unless the adverse impacts of that development would outweigh the benefits when assessed against the policies in the Framework, taken as a whole.

2.1.2 The implications of development with respect to noise are recognised at paragraph 185 of the NPPF, where it is stated that planning policies and decisions should aim to:

i. mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from a new development, including through the use of planning conditions;
ii. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.1.3 The NPPF also refers to advice on adverse effects of noise, given in the Noise Policy Statement for England (NPSE) (2010). This document sets out a policy 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." To achieve this, the Statement sets out the following three aims:

i. Avoid significant adverse impacts on health and quality of life;
ii. Mitigate and minimise adverse impacts on health and quality of life; and
iii. Where possible, contribute to the improvement of health and quality of life.

2.1.4 In achieving these aims, the document introduces significance criteria in the form of 'effect levels' as follows:

SOAEL – Significant Observed Adverse Effect Level

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

LOAEL – Lowest Observed Adverse Effect Level

This is the level at which adverse effects on health and quality of life can just be detected. The document states that the second aim above (at section 2.2.3ii) lies somewhere between LOAEL and SOAEL and 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. This does not mean that such adverse effects cannot occur."

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 noise. This can be related to the third aim at section 2.1.3iii, above, which 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, 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.

2.1.5 The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance for how these criteria should be interpreted. Nevertheless, it is clear that there is no requirement to achieve noise levels for which there are no observable adverse impacts, but that reasonable and practicable steps should be taken to reduce adverse noise impacts in the context of sustainable development and should ensure a balance between noise sensitivity and the requirement for noise generating developments.

## 2.2 BS 4142:2014+A1:2019

2.2.1 BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' is the current British Standard providing guidance for the assessment of noise impact from industrial and commercial sites. In general, the likelihood of adverse impact for a particular noise source is dependent upon several factors, including the margin by which it exceeds the background noise level, the character of the noise and the regularity with which it occurs. In previous versions of the Standard, the requirement was to consider the lowest measured background noise level. However, in recognition that this might lead to an unfair assessment of impact in some cases, the requirement is now to use the most representative background noise level.

2.2.2 The Standard recommends the determination of the 'rating level' of the specific source and advises a correction factor if the sound has a tonal quality, is intermittent or impulsive or has any other distinct characteristics that would make it more noticeable. The degree of impact is assessed by comparing the measured environmental background level with the rating level.

2.2.3 Where the rating level exceeds the background level, the level of impact is as follows:

i. Typically, the greater the difference between the background level and the rating level, the greater the magnitude of the impact;

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

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

2.2.4 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. It is generally accepted that a rating level that is 10 dB below the background noise level will not cause an 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.

2.2.5 The Standard also allows for an appropriate correction for the acoustic features present in the noise. A correction should be applied if one or more of the following features are present at the NSR:

i. The noise is of a tonal nature, i.e., it contains a distinguishable, discrete, continuous note such as whine, hiss, screech or hum;

ii. The noise is impulsive, i.e., it contains distinct impulses such as bangs, clicks, clatters, or thumps;

iii. The noise contains other characteristics that are neither tonal nor impulsive, but sufficiently irregular to attract attention.

2.2.6 It is important to note that the Standard states that the subjective prominence of the character of the specific sound and the extent to which the acoustically distinguishing characteristics will attract attention should be considered at the noise-sensitive locations.

2.2.7 The Standard recommends that a tonality penalty of 2 dB should be applied for a tone which is just perceptible at the noise sensitive receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

2.2.8 When correcting for impulsivity, the penalty is given as 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.

## 3. SITE LOCATION AND NOISE ENVIRONMENT

3.1 The site under consideration is St Aldate's Chambers, a 4 storey office building with basement situated at 109 St Aldate's, Oxford, OX1 1DS. To the east of the site is St Aldate's (the A420) with offices and commercial buildings opposite. To the south and west are offices and commercial buildings. To the north is a ground floor external compound (light well area) overlooked by residential windows to the north and east.

3.2 Figure 1 shows the layout of the site and locations of the NSRs (residential building). Figure 2 and Figure 3 shows the proposed mechanical services equipment and locations of the NSRs.

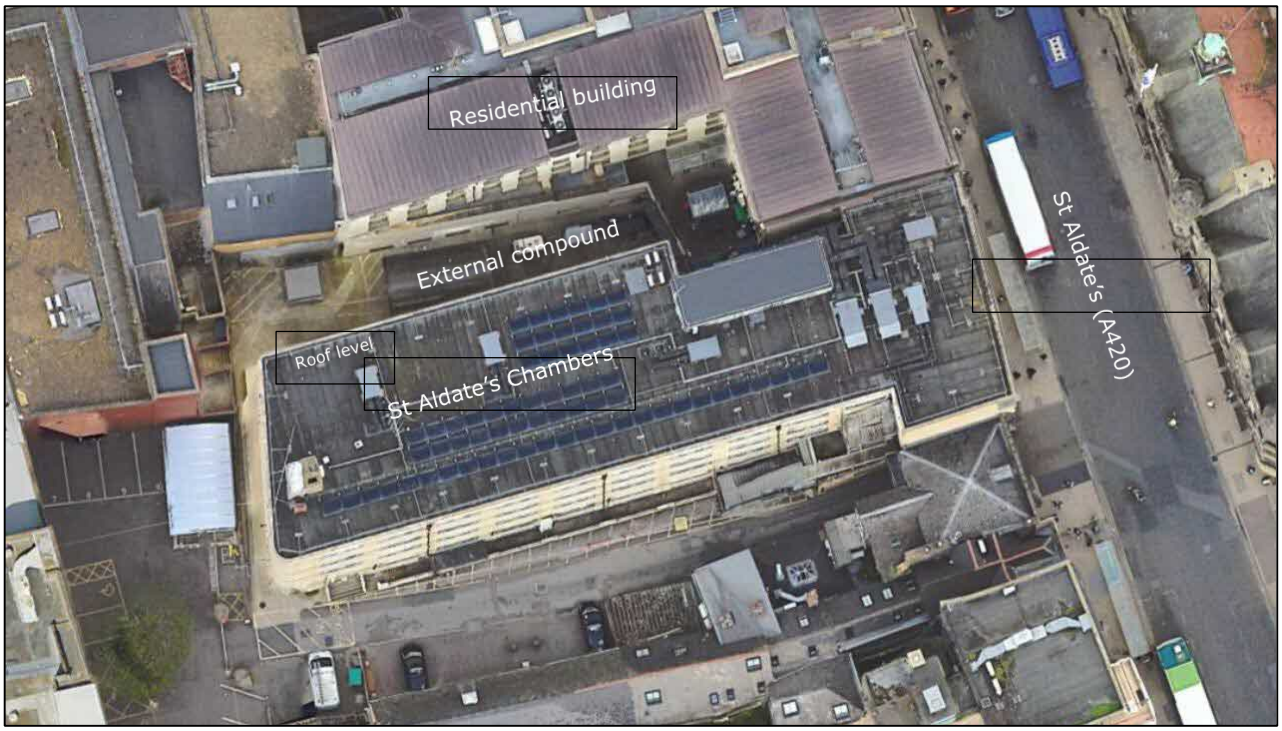


Figure 1: Layout of Site

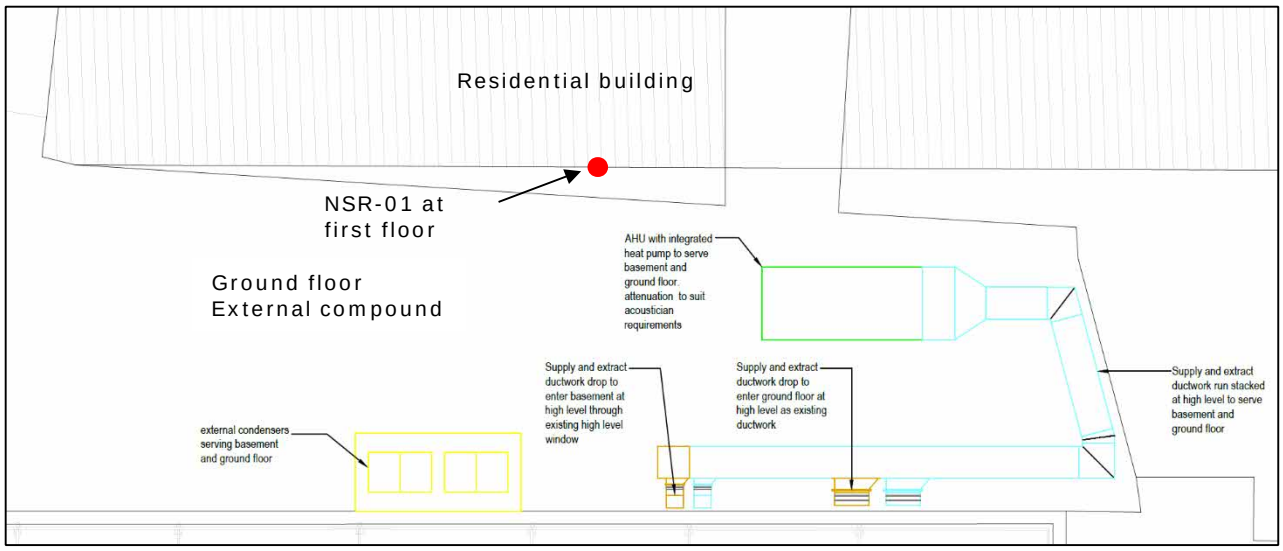


Figure 2: Locations of External Mechanical Services Equipment at ground floor level and NSR at first floor level

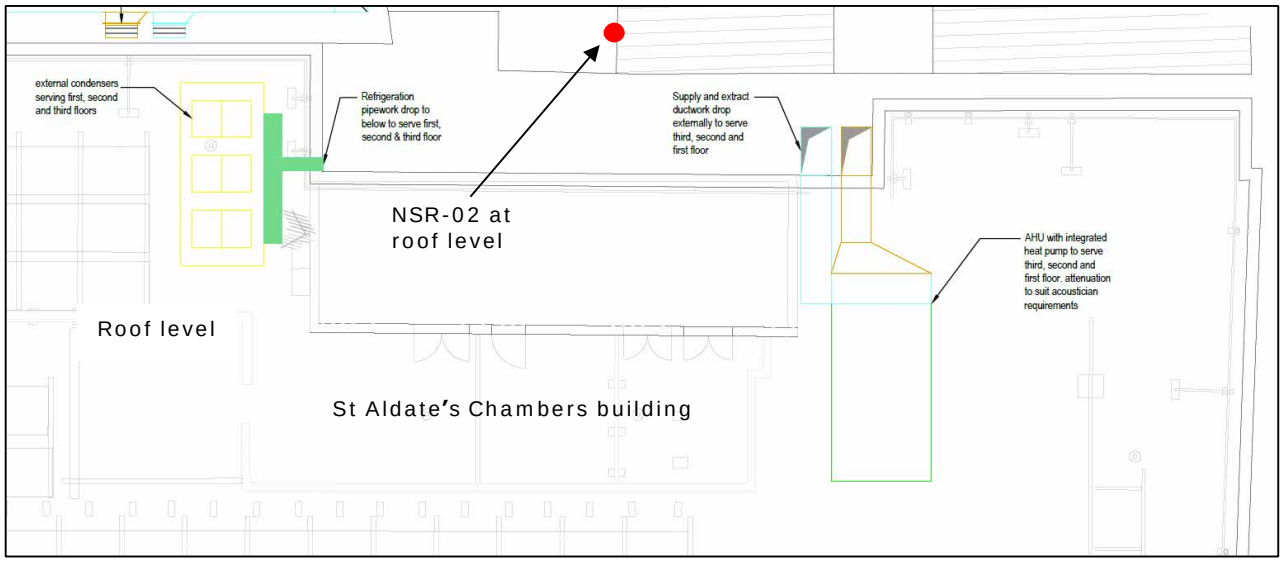


Figure 3: Locations of External Mechanical Services Equipment and NSR at roof level

3.3 The nearest NSRs to the proposed locations of the external mechanical services equipment are the windows of the residential building overlooking the ground floor external compound area. The RED dots in Figure 2 and Figure 3 show the locations of the nearest NSRs (NSR-01 and NSR-02) to the ground and roof level mechanical services equipment.

## 4. PROPOSED MECHANICAL PLANT

4.1 Ridge and Partners LLP ('Ridge') (AER's mechanical services consultants) provided drawings and an equipment schedule on 8th and 10th November 2023, respectively. Two condenser units are proposed within the ground floor external compound area serving the basement and ground floors, and three condenser units on the roof serving the first, second and third floors. There will also be one AHU with integrated heat pump within the ground floor external compound area serving the basement and ground floor, and one AHU with integrated heat pump on the roof serving the first, second and third floors. Figure 2 shows the locations of that plant.

4.2 Ridge has provided us with noise data for 'typical/expected' mechanical services equipment proposed for St Aldate's Chambers. Table 1 gives the proposed equipment and location. Table 2 and Table 3 provide the noise data.

Table 1: Proposed typical mechanical services equipment

| Location | Type | Make | Model |
|---|---|---|---|
| Ground floor external compound | Condenser | Mitsubishi | PUHY-M200YNW-A1 |
| | Condenser | Mitsubishi | PUHY-M200YNW-A1 |
| | AHU | ELTA | HPS-FLEX 50 |
| Roof | Condenser | Mitsubishi | PUHY-M200YNW-A1 |
| | Condenser | Mitsubishi | PUHY-M200YNW-A1 |
| | Condenser | Mitsubishi | PUHY-M200YNW-A1 |
| | AHU | ELTA | HPS-FLEX 50 |

Table 2: Condenser noise data

| Condensers | Mode | SPL [dB @ 1m] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | A |
| PUHY-M200YNW-A1 | Standard | 60 | 62 | 61 | 58 | 52 | 48 | 48 | 43 | 59 |
| | Low noise | 46 | 50 | 45 | 43 | 37 | 34 | 37 | 35 | 45 |

Table 3: AHU noise data

| AHUs | | SPL for Q = 2 [dB @ 1m] (dB) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | dBA |
| HPR-FLEX 50 | Outlet | 67 | 71 | 72 | 72 | 70 | 66 | 61 | 62 | 75 |
| | Inlet | 66 | 66 | 66 | 65 | 59 | 56 | 55 | 57 | 66 |
| | Breakout | 33 | 41 | 42 | 39 | 41 | 36 | 37 | 24 | 45 |

4.3 It is important to note that the mechanical services design has not yet been finalised. The above is therefore a typical selection for the AHUs and condensers. These calculations might need to be refined once mechanical services design is finalised.

## 5. SURVEY

### 5.1 Survey Description

5.1.1 A noise and weather monitoring survey was conducted between Friday 3rd and Wednesday 8th November 2023. A long-term meter, which automatically logged noise data every 15 minutes with audio recording, was left unattended outside the third floor office window of St Aldate's Chambers, overlooking the ground floor external compound area. The location of the meter is shown in Photograph 1. Due to the position of the meter, a 3 dB façade correction was subtracted from the $L_{A90}$ background noise.

Photograph 1: Location of noise monitoring meter

5.1.2 A weather station was erected on the roof of the building to monitor rain and wind. Photograph 2 shows the location of the weather station.

Photograph 2: Location of weather station

## 5.2 Survey Results

5.2.1 The measurement data collected by the meter, after removing data during rain, winds above 5 m/s, and during non-typical evens (fireworks and helicopter pass), is shown in Figure 4. A summary of the data for 'Day (07:00-23:00hrs)', 'Night (23:00-07:00hrs)', and 'Office hours (08:00-18:00hrs)' is given in Table 4. The data shows that, with the exception of a few events, $L_{A10}$ tracks well with $L_{Aeq}$, which generally indicates that road traffic noise is the dominant sound source, confirming our subjective assessment.

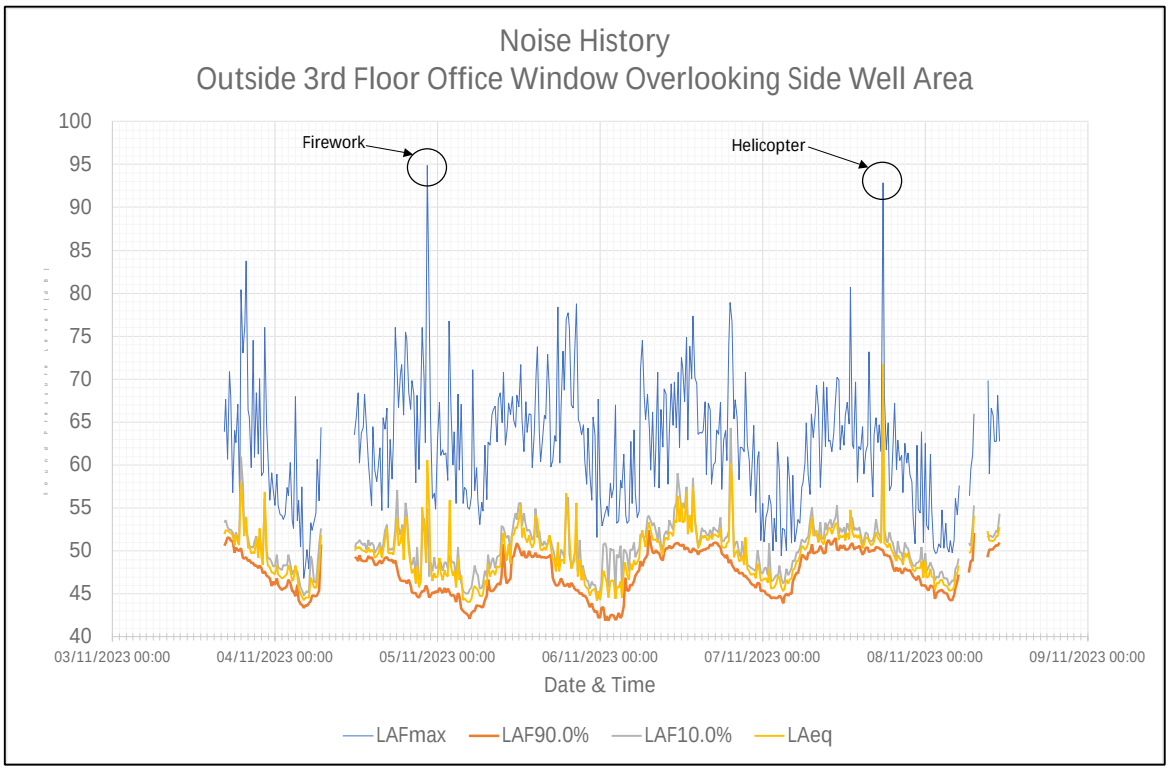


Figure 4: Data collected by noise meter

Table 4: Summary of noise data collected

| Measurement Period | $L_{Aeq}$ [dBA] | $L_{A90}$ Range [dBA] | Representative $L_{A90}$ [dBA] | $L_{Amax}$ [dBA] | Comments |
|---|---|---|---|---|---|
| Day (07:00-23:00hrs) | 51 | 44-52 | 44 | 65 | Representative $L_{A90}$ determined in accordance with BS 4142:2014. |
| Night (23:00-07:00hrs) | 47 | 42-51 | 41 | 57 | |
| Office hours (08:00-18:00hrs) | 52 | 49-52 | 47 | 65 | |

## 6. NOISE RATING LEVEL CALCULATIONS AND EXPECTED IMPACT

### 6.1 Preamble

6.1.1 As the mechanical plant has not yet been installed, the noise rating levels at the NSRs as a result of the operation of the proposed plant have been predicted by calculation. The following assumptions and corrections have been made:

i. All of the units might run simultaneously;

ii. No penalty for tonality has been applied;

iii. The noise emitted by the units will be relatively continuous and is not considered to be impulsive.

### 6.2 Results of Noise Level and Rating Predictions

6.2.1 Calculations have been carried out that predict the sound pressure levels arising as a result of the operation of the mechanical plant at the two NSRs. We have used attenuation date for acoustic hoods on all condenser units (e.g. Ambient Acoustics Standard bolt on enclosure kit), and inline attenuators are installed in the AHU inlet and outlet ducts. We have calculated the required length of the inline attenuators based on a flow rate of 1 $m^3/s$ and a static pressure loss of 300 Pa. Table 4 gives the minimum performance specification for the condenser hoods and AHU inline attenuators. In addition, we have assumed that the condensers are operated in the 'Low noise' mode during the night (23:00-07:00 hrs).

Table 5: Minimum Attenuator and Enclosure specification

| | Length [mm] | Minimum Insertion loss [dB] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| AHU Inline attenuator (inlet and outlet) | 900 | 5 | 9 | 16 | 33 | 45 | 38 | 27 | 21 |
| Condenser hood | - | 3 | 4 | 6 | 7 | 10 | 10 | 8 | 7 |

6.2.2 Using the data given above, the calculated specific sound pressure level at NSR-01 and NS2 have been calculated. The results appear in Tables 5 and 6 respectively.

Table 6: Specific noise level at NSR-01

| Predicted Sound Pressure Levels (dB) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (Hz) | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | dBA |
| PUHY-M200YNW-A1 Standard SPL [dB @ 1m] | 60 | 62 | 61 | 58 | 52 | 48 | 48 | 43 | 59 |
| PUHY-M200YNW-A1 Low Noise | 46 | 50 | 45 | 43 | 37 | 34 | 37 | 35 | 45 |
| Distance Attenuation (10 m) | -20 | -20 | -20 | -20 | -20 | -20 | -20 | -20 | - |
| Bolt on attenuator | -3 | -4 | -6 | -7 | -10 | -10 | -8 | -7 | - |
| 2 Units | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - |
| SPL at NSR (Condensers) | | | | | | | | | |
| PUHY-M200YNW-A1 Standard | 40 | 41 | 38 | 34 | 25 | 21 | 23 | 19 | 35 |
| PUHY-M200YNW-A1 Low Noise | 26 | 29 | 22 | 19 | 10 | 7 | 12 | 11 | 21 |
| | | | | | | | | | |
| AHU 1 (ground) HPR-FLEX 50 | | | | | | | | | |
| Outlet | 67 | 71 | 72 | 72 | 70 | 66 | 61 | 62 | 75 |
| Inlet | 66 | 66 | 66 | 65 | 59 | 56 | 55 | 57 | 66 |
| Breakout | 33 | 41 | 42 | 39 | 41 | 36 | 37 | 24 | 45 |
| Distance Attenuation (10 m) | -20 | -20 | -20 | -20 | -20 | -20 | -20 | -20 | - |
| In-line Attenuators | -5 | -9 | -16 | -33 | -45 | -38 | -27 | -21 | - |
| SPL at NSR (AHU) | | | | | | | | | |
| Outlet | 42 | 42 | 36 | 19 | 5 | 8 | 14 | 21 | 31 |
| Inlet | 41 | 37 | 30 | 12 | -6 | -2 | 8 | 16 | 25 |
| Breakout | 13 | 21 | 22 | 19 | 21 | 16 | 17 | 4 | 25 |
| Total SPL at NSR | | | | | | | | | |
| Total At NSR during Day | 46 | 45 | 40 | 34 | 26 | 22 | 24 | 24 | 37 |
| Total at NSR during the night | 45 | 43 | 37 | 24 | 21 | 17 | 20 | 23 | 33 |
| Background Level Day | 44 | | | | | | | | |
| Background Level Night | 41 | | | | | | | | |

Table 7: Specific noise level at NSR-02

| Predicted Sound Pressure Levels (dB) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (Hz) | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | dBA |
| PUHY-M200YNW-A1 Standard SPL [dB @ 1m] | 60 | 62 | 61 | 58 | 52 | 48 | 48 | 43 | 59 |
| PUHY-M200YNW-A1 Low Noise | 46 | 50 | 45 | 43 | 37 | 34 | 37 | 35 | 45 |
| Distance Attenuation (9 m) | -19 | -19 | -19 | -19 | -19 | -19 | -19 | -19 | - |
| Bolt on attenuator | -3 | -4 | -6 | -7 | -10 | -10 | -8 | -7 | - |
| 3 Units | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | - |
| SPL at NSR (Condensers) | | | | | | | | | |
| PUHY-M200YNW-A1 Standard | 42 | 43 | 40 | 37 | 28 | 23 | 26 | 22 | 38 |
| PUHY-M200YNW-A1 Low Noise | 28 | 32 | 25 | 21 | 13 | 10 | 15 | 14 | 24 |
| | | | | | | | | | |
| AHU 1 (ground) HPR-FLEX 50 | | | | | | | | | |
| Outlet | 67 | 71 | 72 | 72 | 70 | 66 | 61 | 62 | 75 |
| Inlet | 66 | 66 | 66 | 65 | 59 | 56 | 55 | 57 | 66 |
| Breakout | 33 | 41 | 42 | 39 | 41 | 36 | 37 | 24 | 45 |
| Distance Attenuation (8m) | -18 | -18 | -18 | -18 | -18 | -18 | -18 | -18 | - |
| In-line Attenuators | -5 | -9 | -16 | -33 | -45 | -38 | -27 | -21 | - |
| Barrier due to building corner (δ=0.05m) | -7 | -7 | -8 | -9 | -10 | -12 | -13 | -13 | |
| SPL at NSR (AHU) | | | | | | | | | |
| Outlet | 37 | 37 | 30 | 12 | -3 | -2 | 3 | 10 | 25 |
| Inlet | 36 | 32 | 24 | 5 | -14 | -12 | -3 | 5 | 19 |
| Breakout | 8 | 16 | 16 | 12 | 13 | 6 | 6 | -7 | 16 |
| Total SPL at NSR | | | | | | | | | |
| Total At NSR during Day | 44 | 44 | 41 | 37 | 28 | 23 | 26 | 22 | 38 |
| Total at NSR during the night | 40 | 39 | 32 | 22 | 16 | 11 | 16 | 16 | 28 |
| Background Level Day | 44 | | | | | | | | |
| Background Level Night | 41 | | | | | | | | |

6.2.3 For this Noise Impact Assessment, we have assumed the mechanical services equipment will be running continuously during the assessed periods (see below).

6.2.4 Table 8 summarises the results of the Noise Impact Assessment.

Table 8: Results of Noise Impact Assessment

| Noise Sensitive Receptor | Rating level [dBA] | | Representative LA90,15mins [dBA] | | | Excess [dBA] | | |
|---|---|---|---|---|---|---|---|---|
| | Standard mode | Low noise mode | Day | Night | Office hours | Day | *Night | Office hours |
| NSR-01 | 37 | 33 | 44 | 41 | 47 | -7 | -8 | -10 |
| NSR-02 | 38 | 28 | | | | -6 | -13 | -9 |

*Condensers on 'Low noise' mode

6.2.5 Table 8 suggests that the noise emitted by the mechanical plant installation will have a 'low impact' to 'no impact' at the NSR locations. The impact is, therefore, expected to be at the 'Lowest Observed Adverse Effect Level' as defined in the NPSE provided the mitigation detailed above is installed. Should the mechanical design change during its development, this opinion might need to be revised.

## 7. UNCERTAINTY

7.1 The assessment methodology in BS 4142:2014 requires the issue of uncertainty to be taken into consideration. The Standard explains how to reduce the element of uncertainty through good practice. With regards to the measured data and calculations, uncertainty has been minimised as follows:

i. Measurement was conducted over a period encompassing the quietest periods during which the plant might operate, and the representative measured background level has been used in this assessment;

ii. The measurements of background noise levels were carried out as close to the NSR's as was practicable, ensuring that they are representative;

iii. Weather conditions were checked using a locally erected weather station to ensure that adverse weather conditions that were likely to affect the noise level data could be identified;

iv. A suitable Class 1 audio recording sound level meter was used for the noise measurements. The meter complies with the relevant standards and has been calibrated at a UKAS accredited laboratory within the previous two years;

v. Field calibration of the measurement system was performed on-site at the start and end of the monitoring period. No significant calibration drift was noted;

vi. Simultaneous operation of all relevant mechanical plant has been assumed. The resulting rating level has been compared against the representative background noise level; All mechanical services noise data have been provided by Ridge.

## 8. CONCLUSIONS

8.1 An assessment of the noise impact from the new mechanical plant at St Aldate's Chambers has been conducted. The assessment is in accordance with the National Planning Policy Framework and BS 4142.

8.2 A conservative approach has been used in the prediction of the rating level of the new plant at the nearest NSRs. The noise rating level at the NSRs as a result of all mechanical plant in simultaneous operation has been calculated.

8.3 The noise from the new mechanical plant is expected to result in a 'low to no impact' as defined in BS 4142:2014. The mechanical plant noise is likely to be of the 'Lowest Observed Adverse Effect Level' at the NSRs, in accordance with the NPPF and NPSE provided the mitigation measured detailed in this report are implemented.

8.4 The mechanical services design has not yet been developed. Careful selection of equipment, attenuators, and enclosures should form a considered part of the final design. A design review and re-calculations will be required once the final mechanical services design has been completed.

8.5 Uncertainty in measurement and calculation has been considered and minimised where possible and is not expected to influence the conclusion of the noise impact assessment.

# APPENDIX A

## Glossary of Terms

## Appendix A

## Glossary of Terms

| Term | Symbol | Description |
|---|---|---|
| Decibel | dB | A unit used to quantify the pressure level of sound. Defined as 20 times the logarithm of the ratio between the root-mean-square of a given sound field and a reference pressure level ($20 \times 10^{-5}$Pa – Threshold of hearing) |
| A-Weighted Decibel | dBA | A-weighting is a correction factor applied to decibel values in order to give a more accurate representation of human hearing which compensates for the varying sensitivity of the human ear with frequency |
| Equivalent continuous A-weighted sound pressure level | $L_{Aeq,T}$ | The value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared sound pressure as the sound under consideration that varies with time |
| Background Noise Level | $L_{A90,T}$ | The sound level exceeded 90% of the time. Typically used to describe background noise, this is regarded as the 'average minimum level' and quantifies the common sound level of a fluctuating sound field within a specified time interval, T. |
| Octave band | - | A band of frequencies in which the upper limit of the band is twice the frequency of the lower limit |
| Rating Level | $L_{Ar,T}$ | The specific sound level plus any adjustment for the characteristic features of the sound |
| Percentile level | $L_{A10}$ | $L_{A10}$ is the sound pressure level exceeded for 10% of the measurement time |

# APPENDIX B

Measurement Equipment

Appendix B

Measurement Equipment

Table B1: Measurement Equipment

| Equipment | Serial Number | Calibration Due |
|---|---|---|
| NTI XL3 Class 1 Integrating Sound Level Meter | A3A-00814-D1 | October 2025 |
| Outdoor Microphone Enclosure Kit | | October 2025 |
| NTI Larson Davies Calibrator | 21037 | October 2024 |
| Youshiko YC9388 Weather Station | - | - |

The test equipment was field calibrated before and after the measurements. No significant drift was revealed by field calibration.

# APPENDIX C

List of References

## Appendix C

## References

Documents that have been referenced in this report or are applicable to it include:


BREEAM UK Refurbishment and Fitout (2014), SD216 2.0, POL 05, Reduction of Noise Pollution

BS 4142:2014, Methods for rating and assessing industrial and commercial sound.

BS 7445-1:2003, Description and measurement of environmental noise. Guide to quantities and procedures.

BS 7445-2:1991, Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use.

BS 7445-3:1991, Description and measurement of environmental noise. Guide to application to noise limits.

ISO 9613-2:1996, Acoustics - Attenuation of sound during propagation outdoors.

National Planning Policy Framework (2023).

Noise policy statement for England (2010).

# APPENDIX D

Qualifications of Author

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## Academic and Professional Qualifications

| | |
|---|---|
| BSc (Hons) | Physics – University of North London |
| FInSCVE | Institute of Sound, Communications and Visual Engineers |
| MIOA(E) | Institute of Acoustics |
| AMAES | Audio Engineering Society |
| Dip | City & Guilds – Telecommunications Level 3<br>Certificate of Competence in Environmental Noise Measurement<br>IOSH – Certificate of Management of Health & Safety |

## Career Summary

2023– present

Principal Acoustics Consultant - Hawkins & Associates

With more than 25 years' experience in acoustics, the author is a council member of the Institute of Sound, Communications and Visual Engineers and well as being Chairman of their Standards committee, is a member of their Talker Training Group.

The author is a member of the British Standards Institutes' 'BS 5839-8 - Fire detection and fire alarm systems for buildings' committee assisting them with the sections relating to acoustics and speech intelligibility.