Sunlight House
Manchester

Environmental Noise Survey & Plant Noise Assessment Report

30453/PNA1

24 October 2024

For:
MYCO Ltd
3rd Floor
Godliman House
21 Godliman Street
London
EC4V 5BD



Hann Tucker Associates
Consultants in Acoustics Noise & Vibration

Head Office: Duke House, 1-2 Duke Street, Woking, Surrey, GU21 5BA (t) +44 (0) 1483 770 595
Manchester Office: First Floor, 346 Deansgate, Manchester, M3 4LY (t) +44 (0) 161 832 7041
(w) hanntucker.co.uk (e) enquiries@hanntucker.co.uk

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Document Control

Rev	Date	Comment	Prepared by	Authorised by
3	24/10/2024	Updated to reflect comments		
			Will Robertson Consultant BSc (Hons), TechIOA	Tom Bonnert Senior Associate BEng (Hons), MIOA
2	16/08/2024	Update to show new plant selections		
			Will Robertson Assistant Consultant BSc (Hons), TechIOA	Jake Howarth Senior Associate BEng (Hons), MIOA
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			Jake Howarth Senior Associate BEng (Hons), MIOA	
0	20/01/2023	-		
			Alex Jang Assistant Consultant BEng (Hons)	Jake Howarth Senior Associate BEng (Hons), MIOA

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1.0 Introduction

Hann Tucker Associates has been commissioned to undertake an environmental noise survey and subsequent plant noise assessment for planning purposes for a new plant installation at Sunlight House in Manchester.

This report sets out the methodology and results of the environmental noise survey carried out and provides a plant noise egress assessment in relation to the proposed plant.

2.0 Objectives

To establish by means of an unattended 24-hour noise survey the existing $L_{Amax,}$ L_{Aeq} and L_{A90} environmental road, rail and air traffic noise levels at up to 1No. secure and accessible on-site positions, using fully computerised noise monitoring equipment.

The survey will enable noise emission limits from the development to be identified with reference to the requirements of the Local Authority and/or the application of BS 4142:2014 and to minimise the possibility of noise nuisance to neighbours.

To assess the noise emissions from the proposed plant, based upon data with which we are provided, and comment upon the acceptability.

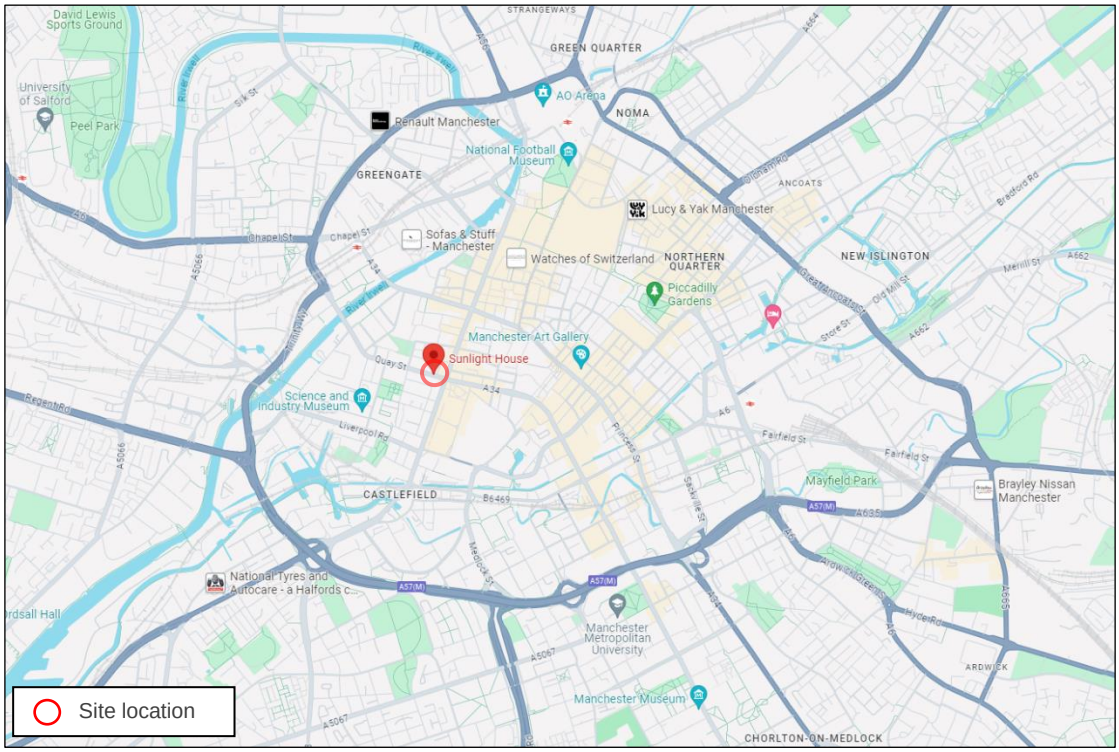
To advise on noise control measures if required with reference to the requirements of the Local Authority.

To present our methodology and findings in a detailed Environmental Noise Survey and Plant Noise Assessment Report to accompany the planning application.

3.0 Site Description

3.1 Location

The site is Sunlight House located in Manchester and falls under the jurisdiction of Manchester City Council. The Location Map is shown below.

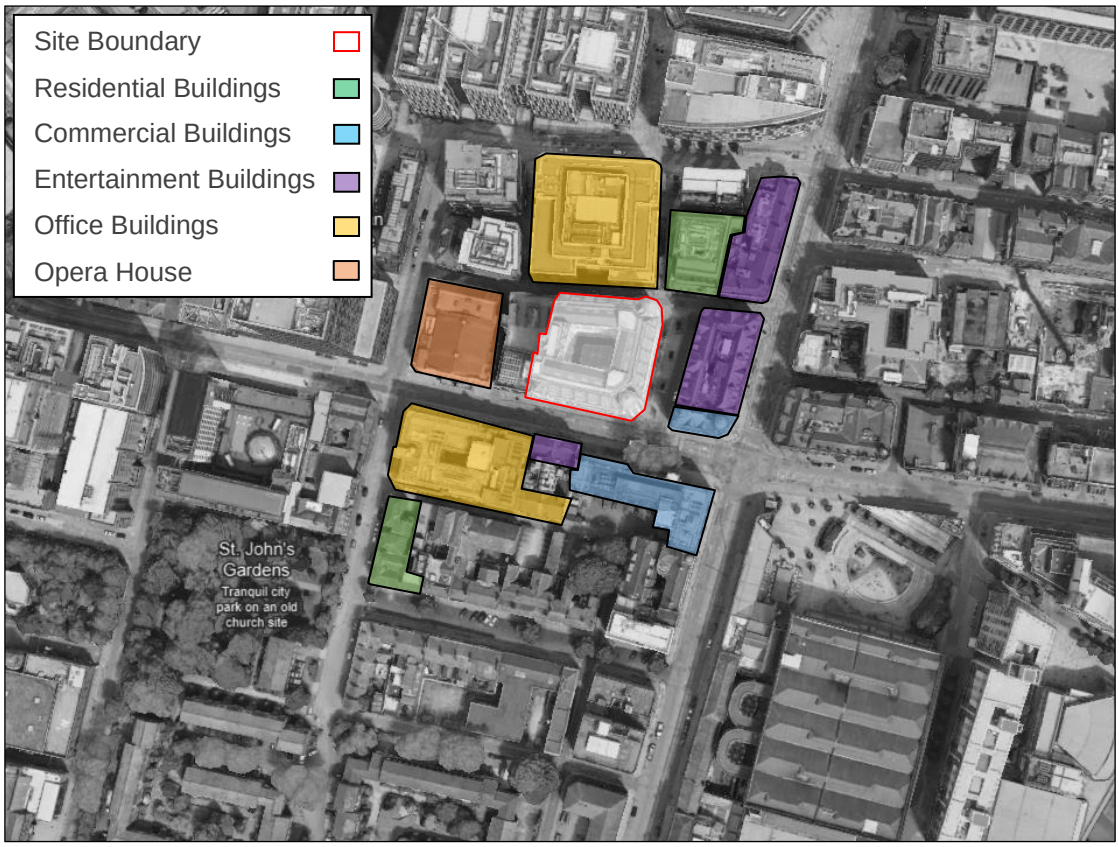


Location Map (Map Data ©2024 Google)

3.2 Description

Sunlight House is bound by Quay Street, Little Quay Street and Atkinson Street. The surrounding buildings mainly consist of office, commercial (shops) and entertainment (restaurants, pubs, bars) buildings, with the most affected office building being No1 Spinningfields approximately 80m west of the site. The most affected residential buildings are understood to be approximately 100m southwest of the site along Byrom Street.

There is also noted to be an opera house directly adjacent to the site to the west. The site is shown in the Site Plan below.



Site Plan (Imagery ©2024 Airbus, Maxar Technologies, Map data ©2024)

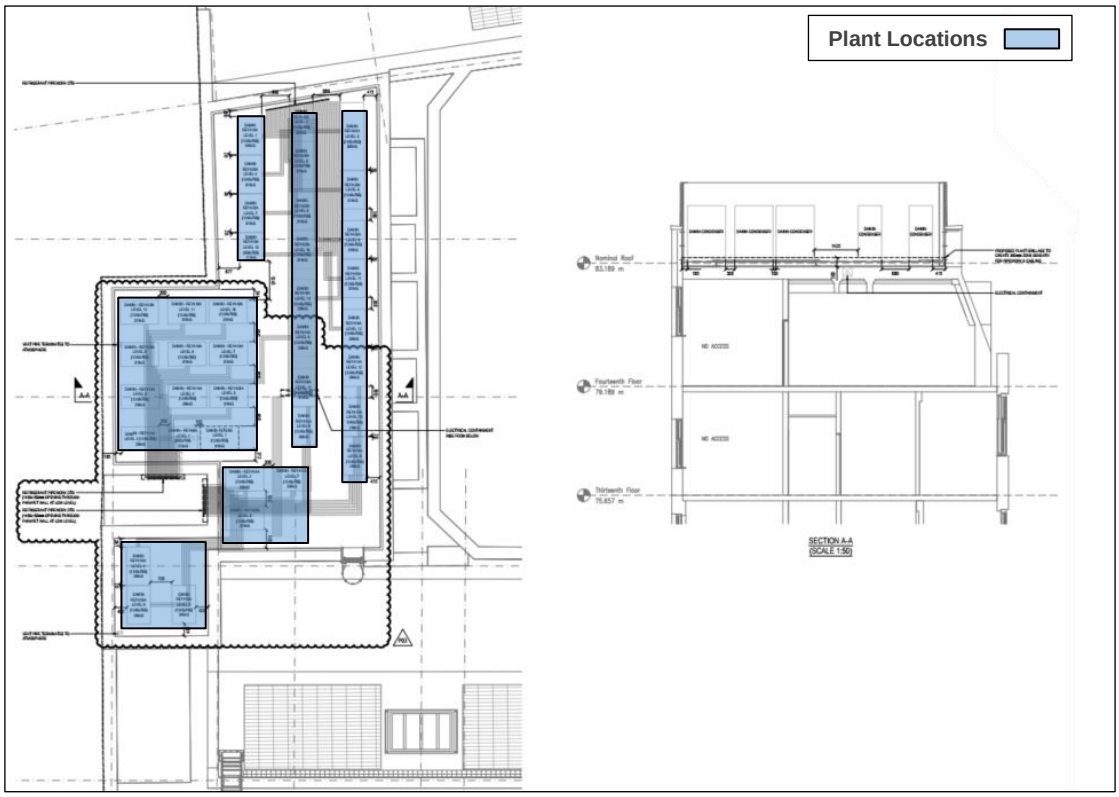
4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Project Proposals

It is understood that the proposals are for 39no new DX Condensers to be installed on the roof of the building. There is also understood to be 1no DX Condenser on the ground floor, however, at the time of writing the location of this unit is undecided, though understood that it is likely located above the basement stairs within a delivery corridor that leads to the goods lift. As such, this unit has not been assessed within this report, however, limiting noise levels at the louvre have been set.

Our understanding of the project proposals is based on the following drawing:



Proposed Roof Plant Layout (c/o Commercial Services Design Ltd)

5.1 Proposed Plant

We understand the rooftop plant comprises of the following units.

Location	Qty	Plant Make	Model Number
Rooftop Plant Deck	2	Daikin	REYA8A
	1		REYA10A
	10		REYA14A
	8		REYA16A
	7		REYA18A
	11		REYA20A

6.0 Acoustic Standards and Guidelines

6.1 Local Planning Requirements

Manchester City Council requirements are outlined in Manchester City Council's Planning & Noise Technical Guidance document (June 2022).

The document aims to provide help and advice in relation to noise in a planning context to encourage good acoustic design. It outlines what is expected in relation to current guidance and policy with the aspiration that new developments achieve the highest possible standards without compromising the health and wellbeing of people that live and work within the City of Manchester.

The following section summarises the relevant section of the above document that relate to this site.

6.1.1 Noise and vibration from fixed plan / equipment

Section 3.7.1.5 states that *"Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location".*

6.2 Pol05 – Reduction of Noise Pollution

Pol05 of BREEAM:2014 has one credit available as follows.

1. Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed development.

Or

2. Alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the development, one credit can be awarded as follows:

    a. Where a noise impact assessment in compliance with BS 7445 has been carried out and the following noise levels measured/determined:

        i. Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar.

        ii. The rating noise level resulting from the new noise source (see CN4).

3. The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body.

4. The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise-sensitive development, is a difference no greater than +5dB during the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00) compared to the background noise level.

5. Where the noise sources from the proposed site/building is greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with criterion 4.

The Pol 05 criteria is less onerous than the requirements of Manchester City Council. As such, should the MCC criteria be achieved the Pol 05 criteria will also be achieved.

6.3 BS 4142:2014

When setting plant noise emission criteria reference is commonly made to BS 4142:2014 "*Methods for rating and assessing industrial and commercial sound".*

The procedure contained in BS 4142:2014 provides an assessment of the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains "a tone, impulse or other characteristic" then various corrections can be added to the specific (source) noise level to obtain the "rating level".

BS 4142 states that: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:*

- *"Typically, the greater this difference, the greater the magnitude of the impact."*
- *"A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."*
- *"A difference of around +5dB 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 determination of the "rating level" and the "background level" are both open to interpretation, depending on the context.

7.0 Environmental Noise Survey

7.1 Procedure

Unattended noise monitoring was undertaken on site over an 8-day period to establish full daytime and night-time noise levels over a typical weekday and weekend period. The monitoring was carried out between 14:00 on Tuesday 10th January 2023 and 16:00 on Wednesday 18th September 2022, with equipment set up to record broadband and spectral (octave band) sound pressure levels over discrete 2 and 15-minute periods.

Additional time synchronised attended measurements were also taken to determine the ambient noise level of the nearest residential receptor between 14:30 and 15:00 on Tuesday 10th January 2022.

The survey was performed by Alex Jang BEng(Hons) AMIOA, George Grenfell BSc(Hons) MIOA and Jake Howarth BEng(Hons) MIOA. All measurements were collated in general accordance with BS 7445-1:2003 *Description and Measurement of Environmental Noise.*

7.2 Measurement Positions

The measurement positions were as described and illustrated below.

Position	Type	Description
1	Unattended	To the west side of the site, on the roof approximately 50m above ground level, approximately 1.5m away from the façade, overlooking the car park and Atkinson Street. This is considered to be a free field position.
2	Attended	At the nearest residential receptor, approximately 100m to the southwest of the site. Attached to a pole, approximately 2m above ground level, approximately 2m away from the façade, facing the adjacent road. This is considered to be a free field position.



Plan Showing Measurement Positions (Map Data ©2023 Google)

7.3 Weather Conditions

For the unattended survey between 14:00 on Tuesday 10th January 2023 and 16:00 on Wednesday 18th September 2022, local weather reports indicated some notable periods of prolonged and/or heavy rainfall. However, these periods have been discounted from assessment. Due to the length of the survey, the were enough periods of time that were deemed suitable for obtaining representative noise readings.

Temperatures ranged from -3°C (night) to 12°C (day) and wind speeds generally less than 5m/s. During our time on site, skies were cloudy, wind conditions were calm and from a southernly direction and road surfaces were generally dry.

7.4 Instrumentation

The instrumentation used during the survey is presented in the Table below:

Position	Description	Manufacturer	Type	Serial Number	Calibration
MP1	Sound Level Meter	Larson Davis	824	3157	10/06/2022
MP2	Sound Level Meter	Larson Davis	LxT	5111	10/06/2022

Position	Description	Manufacturer	Type	Serial Number	Calibration
MP1 & MP2	Type 1 Calibrator	Larson Davis	CAL200	3083	06/05/2021

Each sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant changes were found to have occurred (no more than 0.3 dB).

Each sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. The microphone was fitted with a windshield.

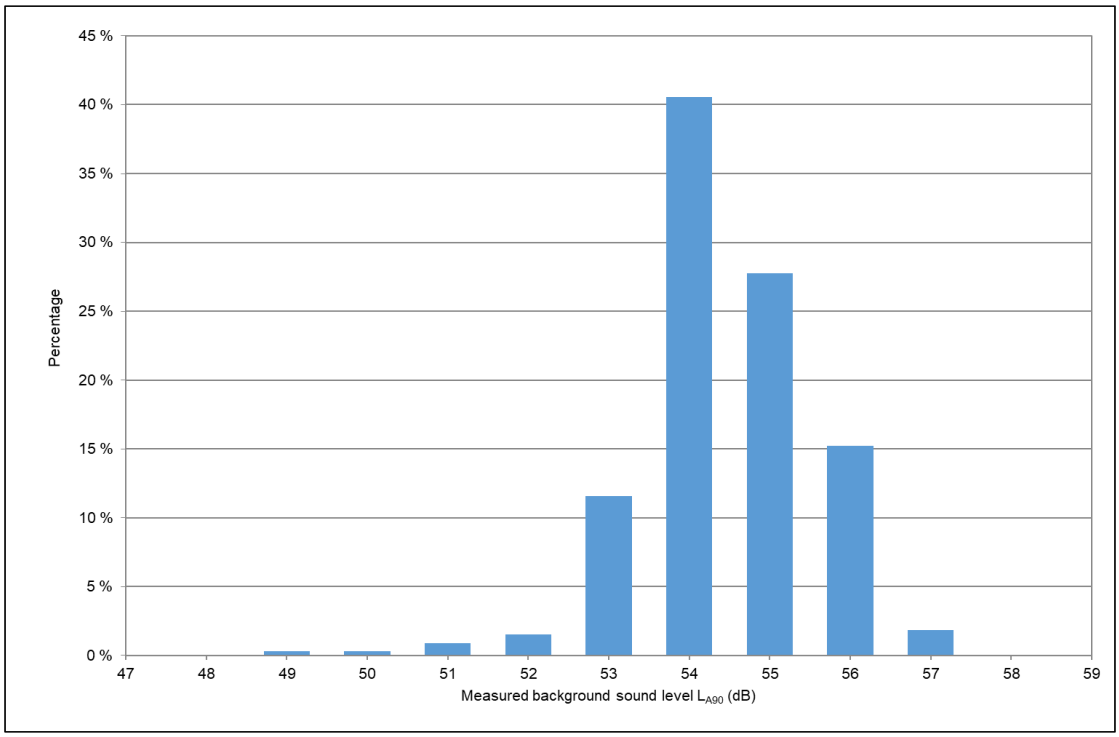
7.5 Results

7.5.1 Unattended Results

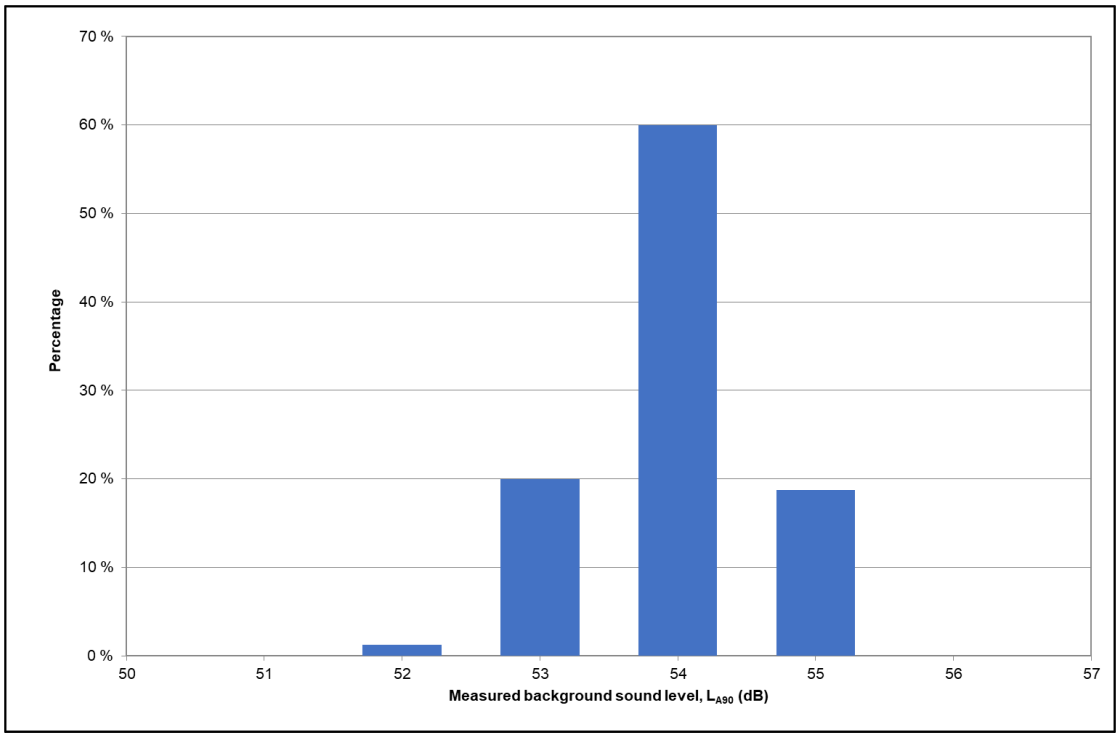
The results have been plotted on Time History Graphs 30453/TH1 enclosed, presenting the 15-minute A-weighted (dBA) L_{90} and L_{eq} façade noise levels at each measurement position throughout the duration of the survey.

BS 4142 states that "*the background sound level must be reliable and suitably represent he particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.*"

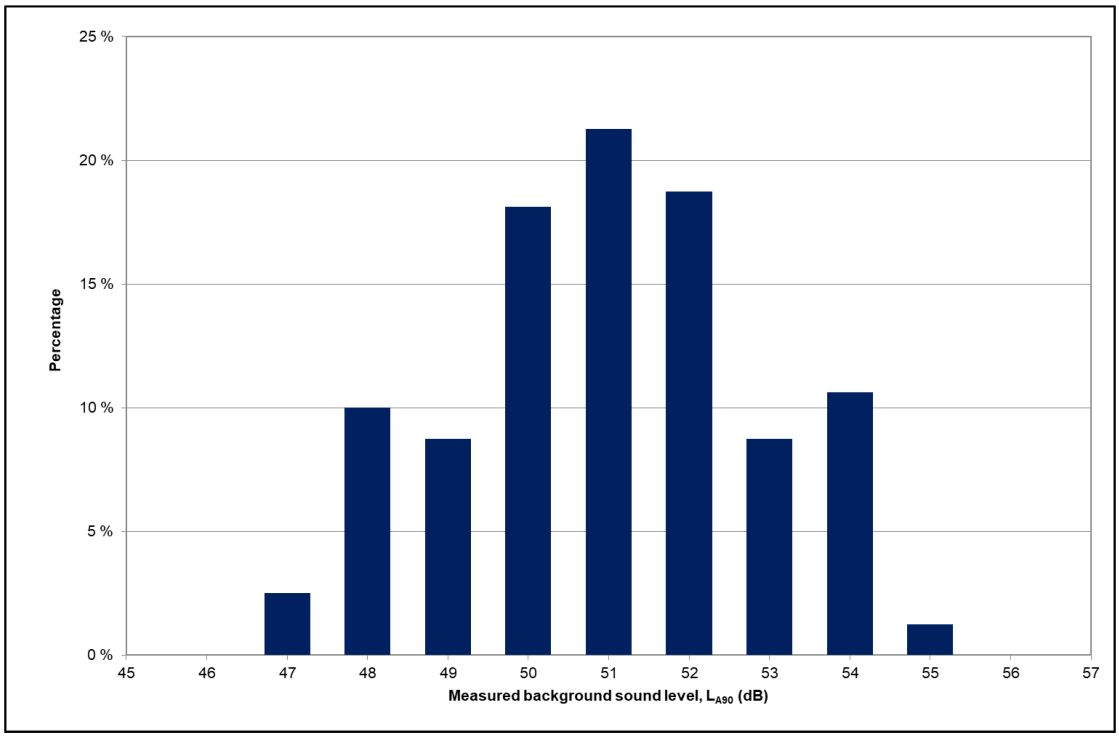
Taking this into account, the following histograms show the occurrence of each sound level (L_{90}) as a percentage for the day and night-time periods in Position 1.



Statistical Analysis of Daytime Background Façade Noise Levels (07:00-19:00)



Statistical Analysis of Evening Background Façade Noise Levels (19:00-23:00)



Night-time Background Façade Noise Levels (23:00-07:00)

Based on the above, the typical $L_{A90\,(15\,min)}$ measurements recorded during the survey have been corrected to free-field levels and are presented in the table below:

Position	Typical Measured $L_{A90(15min)}$ Background Noise Level (dB re 2 x 10^{-5} Pa)		
	Daytime (07:00 – 19:00) Hours	Evening (19:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
MP1	54	54	50

The background noise levels were also calculated in accordance with Appendix A of Manchester City Council's Planning & Noise Technical Guidance. The typical background noise levels calculated based on that method are in like with the typical background noise levels we have selected above.

7.5.2 Attended Results

Time synchronised measurements between the meter set up on site and the meter set up at the nearest residential receptor were taken and are shown in the table below:

Position	Start Time	Time Period	Sound Pressure Level (dB)		
			$L_{Aeq,T}$	$L_{A90,T}$	$L_{Amax,T}$
MP2	14:30	15 minutes	57	53	68
	14:45	15 minutes	59	54	76

7.6 Discussion Of Noise Climate

Due to the nature of the survey, i.e., unattended, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However, at the beginning and end of the survey period, the noise climate was noted to be dominated by road traffic noise, primarily from Quay Street and the main road of Deansgate.

On the day of collection of equipment, it was noted that there was noise coming from existing plant from other developments.

8.0 Fixed Plant Noise Emissions

On the basis of the aforementioned acoustic standards and guidance we propose that the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive window, in free field conditions, with all plant associated with the proposed development operating simultaneously.

Period	Cumulative Plant Rating Level $L_{Ar,Tr}$ (dB)
Daytime (07:00-19:00)	49
Evening (19:00-23:00)	49
Night-time (23:00-07:00)	45

Noise shall be assessed in accordance with BS 4142:2014 with corrections applied for any plant emitting noise of a tonal or irregular quality.

The above limits consider both MCC requirements and BREEAM requirements.

We have also calculated the plant noise emission criteria using the method stated in Manchester City Council's Planning & Noise Technical Guidance document. The levels are in line with the criteria stated above.

9.0 Plant Noise Impact Assessment

9.1 Plant Noise Data

The plant items associated with this development are provided in Section 5.1. We understand that the heating sound power levels for each unit are higher than the cooling noise levels, as such the heating data has been used for the following assessment. The manufacturer's noise data for the equipment to be as follows:

Plant Description (Heating)	Sound Power Level (dB) at Octave Band Centre Frequency (Hz)							dB(A)
	125	250	500	1000	2000	4000	8000	
REYA8A	81	81	79	71	70	65	60	58
REYA10A	81	82	79	74	71	68	62	59
REYA14A	84	81	83	76	72	71	66	61
REYA16A	87	84	86	84	76	75	68	65
REYA18A	85	83	85	77	75	76	69	64
REYA20A	90	88	89	83	68	69	71	68

9.2 Plant Operation

It is understood that the plant would generally operate during the day, between 07:00 and 18:00. However, there is potential for the units to run overnight if it is particularly hot or cold. As such, the plant could operate 24/7.

It should also be noted that the proposed plant is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. All proposed external plant will be inverter driven and, therefore, will ramp up and down depending on the demands on the various systems.

BS4142:2014 states that *"if the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."* As such, where the calculated levels of plant noise egress are such that the intermittency could be distinguishable over the residual acoustic environment (i.e., less than 10 dB below the background noise level, L_{A90}) a 3 dB correction has been applied.

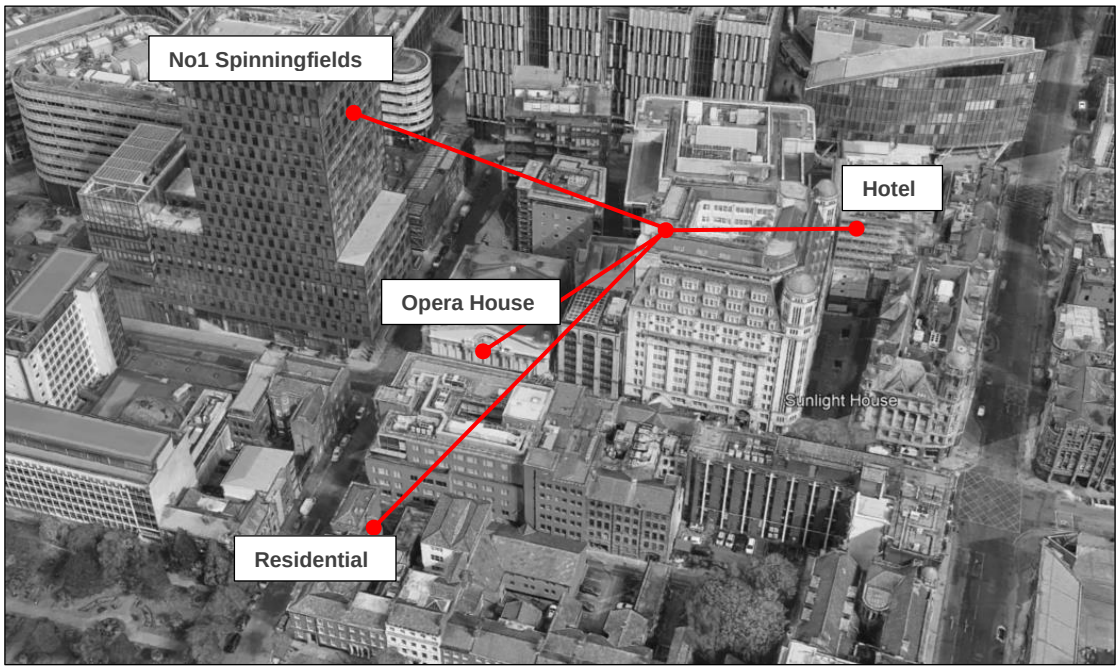
9.3 Nearest Noise Sensitive Receptors

The surrounding area is comprised of office and commercial/entertainment units. However, the nearest residential receptor (hotel) is understood to be located approximately 47m to the northeast of the site on Atkinson Street and is screened by the northern roof of Sunlight House.

The most affected noise sensitive non-residential off-site receptor is considered to be the Opera House located approximately 51m from the proposed plant and the most affected office receptor is considered to be No1 Spinningfields located approximately 83m from the proposed plant.

Other office receptors in the area would not be as affected by potential plant noise due to the plant being located on the roof of Sunlight House (ie above the height of most other receptors). As such, the proposed plant would be acoustically screened from other office receptors in the area (for example 2 Hardman Street) resulting in No1 Spinningfields being the most affected office receptor.

The location of the most affected receptors in relation to the proposed plant location are shown below for ease of reference.



Location of Noise Sensitive Receptors in Relation to Location of Proposed Plant

9.4 Plant Noise Impact Assessments

9.4.1 Residential Receptor

The results of the plant noise assessment to the most affected residential receptor (the hotel to the northeast) are set out in the table below. In the interest of brevity full calculations have been omitted from the body of the report, however, are available upon request.

	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Calculated Noise Level at Receptor, L_{ArTr} (dB)	-	35	30	28	22	15	15	10	**29**

Our calculations indicate that the proposed units should be capable of achieving both the daytime and night-time noise egress limits without any further mitigation.

As such, the MCC and POL 05 criteria are likely to be achieved.

9.4.2 Opera House

As the Opera House is understood to only be open during the day (ie up to circa 23:00), we have only assessed to daytime noise egress limits. The calculated levels of plant noise egress to the Opera House are set out in the table below:

	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Calculated Noise Level at Receptor, L_{ArTr} (dB)	-	48	44	43	36	25	23	17	**43**

Our calculations indicate that the proposed units should be capable of achieving the daytime noise egress limits without any further mitigation.

As such, the MCC and POL 05 criteria are likely to be achieved.

9.4.3 No1 Spinningfields

The receptors at No1 Spinningfields are upper floor office receptors. As such, they are noise sensitive during the day. The calculated levels of plant noise egress to No1 Spinningfields are set out in the table below:

	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
Calculated Noise Level at Receptor, L_{ArTr} (dB)	-	49	47	48	44	37	36	31	**49**

Our calculations indicate that the proposed units should be capable of achieving the daytime noise egress limits without any further mitigation.

As such, the MCC and POL 05 criteria are likely to be achieved.

9.4.4 Unselected Plant Limiting Noise Levels

At the time of writing, the ground floor plant has not been confirmed. As such, and to inform future plant selections, the proposed plant should be selected to achieve the following limiting noise level at 1-metre from the ground floor louvre (ie where the plant item connects to atmosphere):

Proposed Plant Rating Level ($L_{Ar,Tr}$) at 1-metre from Ground Floor Louvre
65

10.0 Conclusions

An environmental noise survey has been undertaken to establish the currently prevailing noise levels. Plant noise emission criteria have been recommended based on the results of the noise survey and with reference to the Local Authority and BREEAM requirements.

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive windows.

The assessment indicates that the proposed plant should be capable of achieving the proposed environmental noise criteria at the nearest noise sensitive windows.

Appendix A

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ — L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} — L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

Sound Pressure Level (L_p) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

Sound Power Level (SWL or L_w) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

Appendix B –National Planning Policies

National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) was first published in 2012, replacing the existing Planning Policy Guidance Note 24 (PPG24) "Planning and Noise", and sets out the government's planning policies for England and how these are expected to be applied.

The latest revision of the NPPF (July 2021) states that planning system should contribute to, and enhance, the natural and local environment by (amongst others) *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or noise pollution or land stability."*

NPPF advises that planning policies and decisions should ensure:

"*…new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development*." [In doing so they should] "*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 the quality of life*" and "*identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*."

"*…new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.*"

The NPPF makes reference to the Noise Policy Statement for England.

Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE) was published in March 2010 (i.e. before the NPPF). The NPSE is the overarching statement of noise policy for England and applies to all forms of noise other than occupational noise, setting out the long term vision of Government noise policy which is 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."

That vision is supported by the following NPSE noise policy aims which are reflected in three of the four aims of planning policies and decisions in the NPPF as below:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

The Explanatory Note to the NPSE has three concepts for the assessment of noise in this country:

NOEL – No Observed Effect Level
This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observable Adverse Effect Level
This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level
This is the level above which significant adverse effects on health and quality of life occur.

None of these three levels are defined numerically and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent an SOAEL for noise is acknowledged in the NPSE and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three NPSE noise policy aims listed above. It starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when *"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."* The final aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development which include the need to minimise travel distance between housing and employment uses in an area.

Planning Practice Guidance on Noise (PPG)

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource. This includes specific guidance on Noise although, like the NPPF and NPSE, the PPG does not provide any quantitative advice. It seeks to illustrate a range of effect levels in terms of examples of outcomes as set out in the following table:

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Appendix C

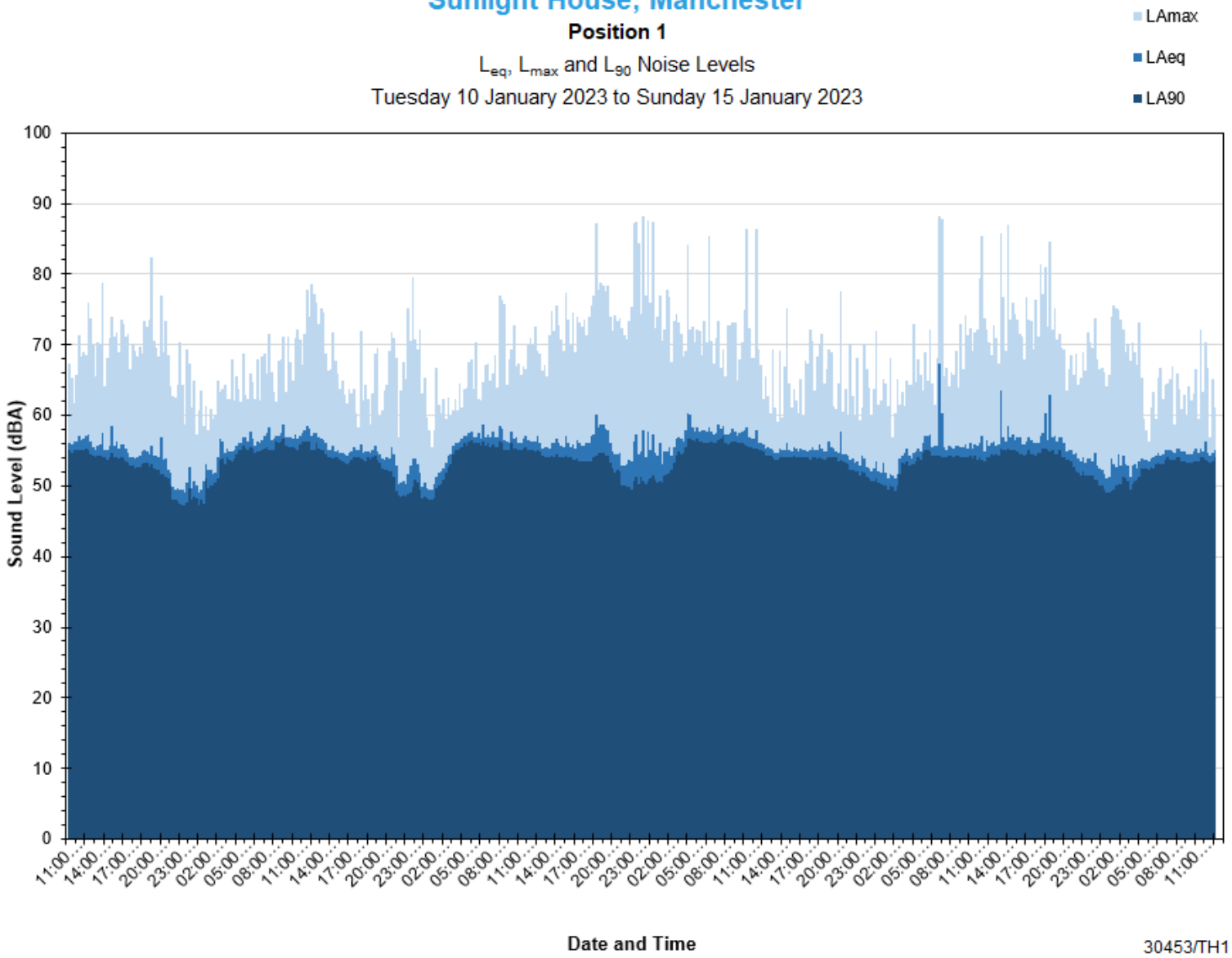
Time History Graph

Sunlight House, Manchester

Position 1

L_{eq}, L_{max} and L_{90} Noise Levels

Tuesday 10 January 2023 to Sunday 15 January 2023



30453/TH1