RSK Acoustics

Royal Free Hospital, Imaging

Noise Survey

Report 206/0904/R1

Royal Free Hospital, Imaging

Noise Survey

Report 206/0904/R1

Royal Free Hospital

The Richard Stephens Limited

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Revision	Description	Date	Prepared	Approved
0	First Issue	6 April 2022	Fred Davies	Tim Fox

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Noise Survey

1 Introduction

1.1 It is proposed to refurbish part of the imaging suite at the Royal Free Hospital to develop new MRI and X-ray treatment rooms. As part of this external plant will be installed.

1.2 This report provides details of a noise survey undertaken on site to determine the current noise climate and the corresponding plant noise emission limits to the nearest noise sensitive receptors.

1.3 All mechanical services noise emissions should comply with the criteria set out in this report.

2 Site Description

2.1 The site is located at the Royal Free Hospital, Pond Street, London NW3 2QG. The site and its surrounds can be seen on the attached site plan 206/0904/SP1.

2.2 Pond Street runs to the north of the site. Rosslyn Hill runs to the west of the site and joins Haverstock Hill to the southwest. Both Rosslyn Hill and Haverstock Hill form part of the A502. Pond Street meets Fleet Road and Rosslyn Hill to the northeast and northwest respectively. These three roads see frequent traffic and are main roads in the Camden area.

2.3 Residential property is located across from the site on Pond Street. Hampstead Hill School is located on the corner between Pond Street and Rosslyn Hill. The recently constructed Belle Vue retirement home is located to the south of the site on a service road belonging to the site.

2.4 The site is within the jurisdiction of Camden Council.

3 Background Noise Survey

3.1 **Methodology**

3.1.1 An unattended noise survey was undertaken at the site commencing at 1200 hours on Tuesday 22nd March, concluding at 1200 hours on Wednesday 23rd March 2022.

3.1.2 Measurements of background noise levels were taken from two positions indicated on the attached site plan 206/0904/SP1 and described below:

- MP1: Free-field measurement position to the north of the site approximately 10 m from the kerb edge of Pond Street and 3 m above local ground level.
- MP2: Free-field measurement position at 4th floor roof level towards to the west side of the site approximately 80 m from Haverstock Hill opposite *Belle Vue* retirement home.

3.1.3 These positions were selected to quantify background noise levels representative of those at the nearest noise sensitive receivers to the proposed plant installation.

3.1.4 Measurements of the L_{Aeq}, L_{Amax} and L_{A90} indices were recorded over consecutive 15-minute periods for the duration of the survey using the equipment listed within table T1 (see attached Glossary of Acoustic Terms for an explanation of the noise units used).

Item	Manufacturer	Type
Sound Level Analyser x2	Rion	NL-52
Acoustic Calibrator x2	Rion	NC-74
Weatherproof windshield x2	Rion	WS-15

T1 Equipment used during unattended noise survey.

3.1.5 The microphones were fitted within weatherproof enclosures, and the sound level meters calibrated before and after the survey to confirm an acceptable level of accuracy. No significant drift was noted to have occurred.

3.1.6 The weather conditions when setting up and collecting the noise monitoring equipment were sunny, warm, clear and dry with a light breeze. These conditions are deemed acceptable and are not considered to have affected the measurement results. Publicly available weather data suggest that appropriate conditions prevailed for the duration of the survey.

3.2 Results

3.2.1 The results of the noise measurements are presented in attached time history graphs 206/0904/TH01 to 206/0904/TH02.

3.2.2 The noise climate at MP1 was affected by road noise from Pond Street and the carpark of Royal Free Hospital. The noise climate at MP2 was affected by mechanical services equipment belonging to Royal Free Hospital with some road noise from Haverstock Hill.

3.2.3 The representative[1] background noise levels derived following guidance in BS 4142:2014+A1:2019[2] are set out in table T2 below.

[1] Typical L_{A90} background levels quoted at the highest single values where the cumulative total of $L_{A90,15min}$ values in the relevant time period equals ≤20%.
[2] British Standard BS4142:2014 - Methods for rating and assessing industrial and commercial sound

Location	Representative Background Noise Level, L_{A90} dB	
	Daytime (0700-2300 only)	Night time (24-hour)
MP1: Pond Street	53	49
MP2: Belle Vue	54	53

T2 Representative measured background noise levels, L_{A90}.

4 Plant Noise Limits

4.1 Local Authority Criteria

4.1.1 Policy A4 of the London Borough of Camden's *Local Plan 2017* relates specifically to noise:

'We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity.

Planning conditions will be imposed to require that plant and equipment which may be a source of noise is kept working efficiently and within the required noise limits and time restrictions.

Conditions may also be imposed to ensure that attenuation measures are kept in place and are effective throughout the life of the development.'

4.1.2 With regard to noise from new mechanical services plant, Appendix 3 of the Local Plan sets out the following:

'A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15 dB if tonal components are present) should be considered as the design criterion).'

4.2 Noise Emission Limits

4.2.1 Based on the results of the background noise survey set out within table T2 in addition to the guidance set out above, we recommend that the following plant emission limits are to apply at the nearest noise sensitive premises, illustrated in 206/0904/SP1.

Location	Noise Emission Limit, $L_{Ar,Tr}$ dB (for plant with no distinguishing feature) Daytime (0700-2300 only)	Night time (24-hour)
MP1: Pond Street	43	39
MP2: Belle Vue	44	43

T3 Plant noise emission limits at the nearest residential properties.

4.2.2 These limits are to apply to all plant items running simultaneously in the representative time periods, when running at design duty and are to apply at 1m from the outside of nearby residential windows. Any plant with a tonal component or other distinctive feature out of character with the existing environment would be subject to a further penalty.

5 Conclusions

5.1 It is proposed to refurbish part of the imaging suite at the Royal Free Hospital to develop new MRI and X-ray treatment rooms. As part of this external plant will also be installed.

5.2 This report sets out details and results of a noise survey undertaken at the site in a location representative of the nearest noise sensitive receptors. Plant noise limits have been set in line with guidance from BS 4142:2014+A1:2019. The design of all plant (cumulatively) with external noise emissions should be made against the criteria derived in this report.

5.3 A subsequent assessment and report will be required to submit the Local Authority.

End of Section

Glossary of Acoustic Terms

L_{Aeq}:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}:

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

L_{A10} & L_{A90}:

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_{n}.

L_{AX}, L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

End of Section

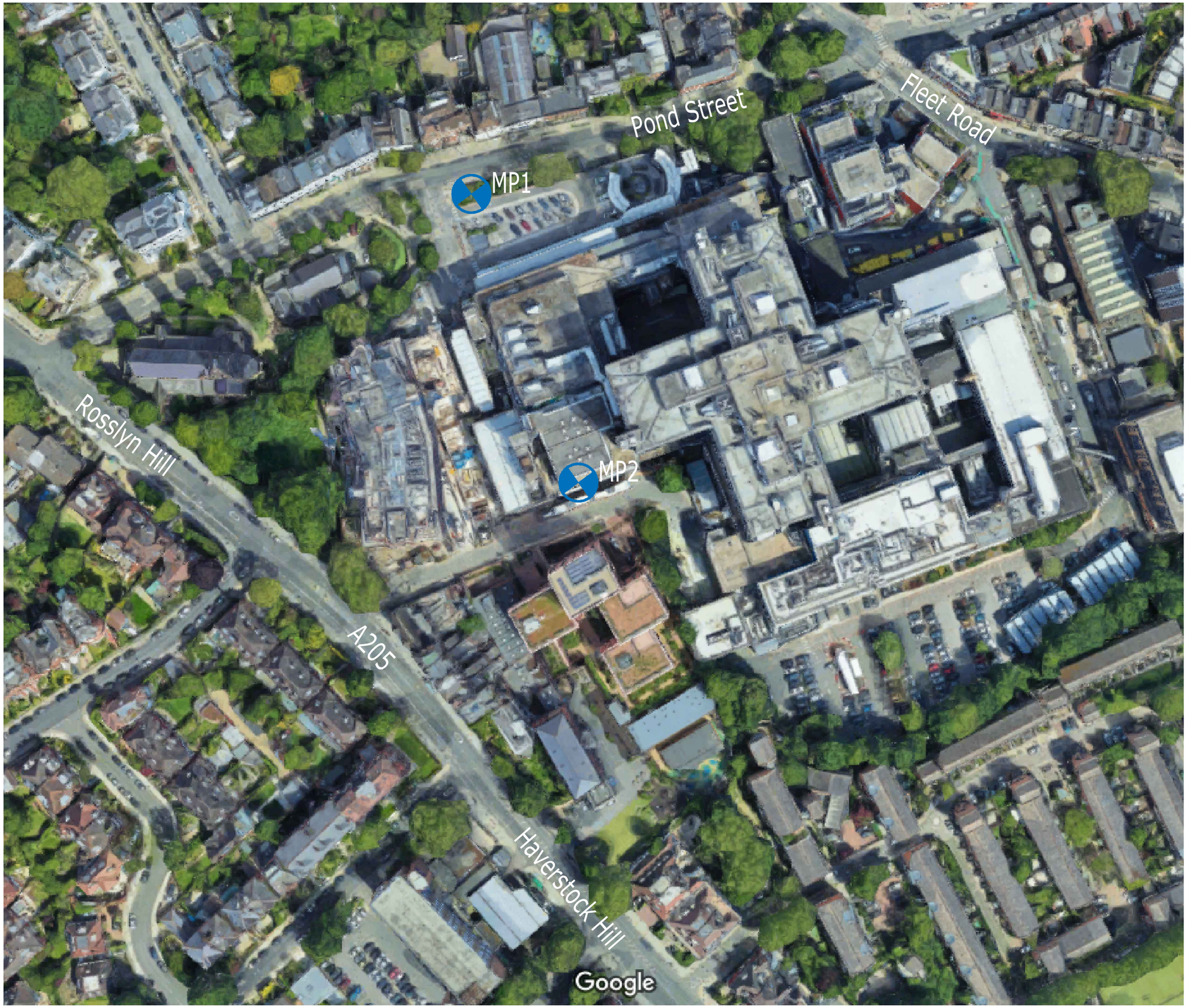

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Figure 206/0904/SP1

Title:

Site plan illustrating the measurement positions.

Key:

Measurement Position

North

Project:

Royal Free Hospital, Imaging

Date: April 2022

Revision: -

Scale: Not to scale

Image Source: -

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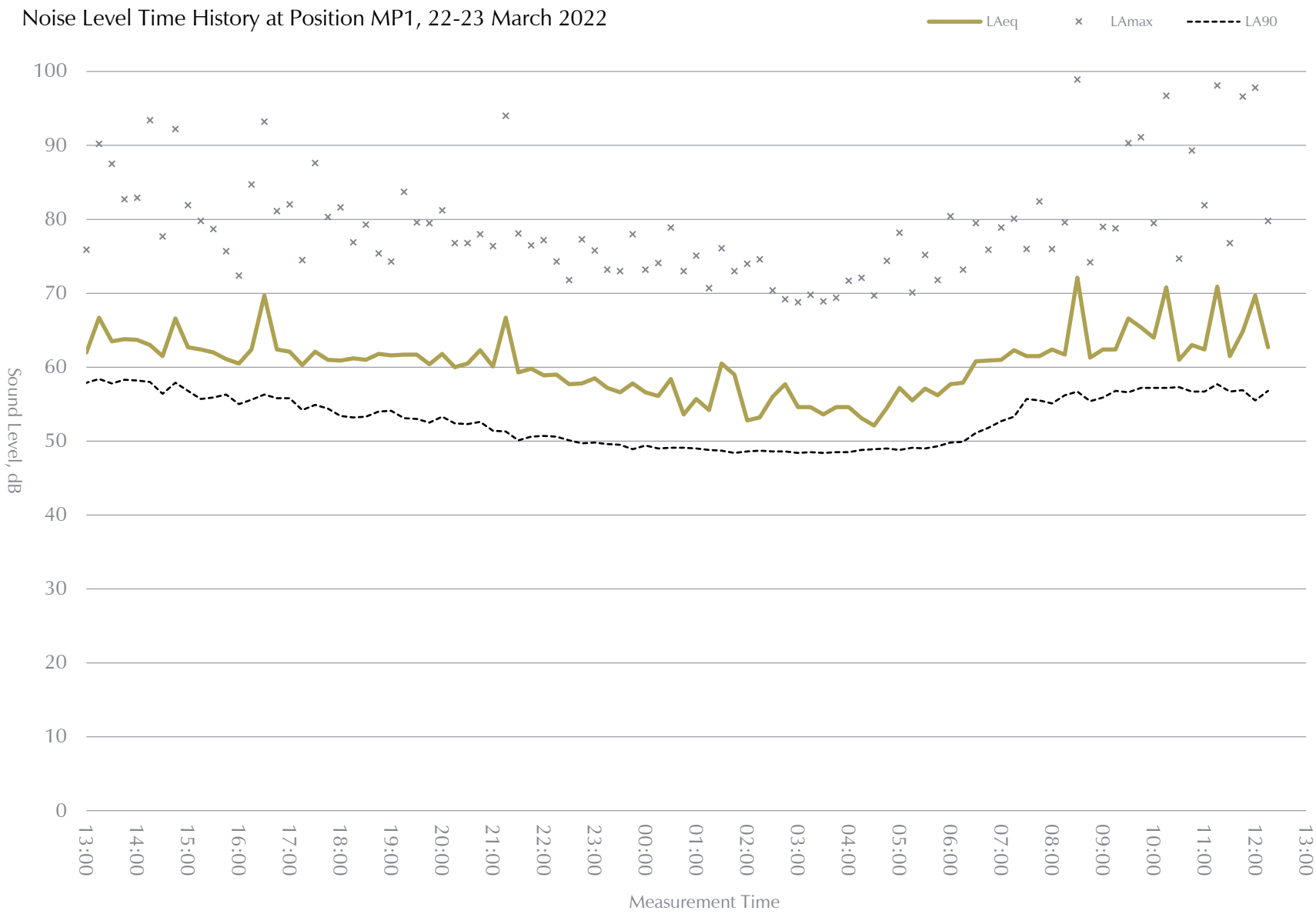

Figure 206/0904/TH01

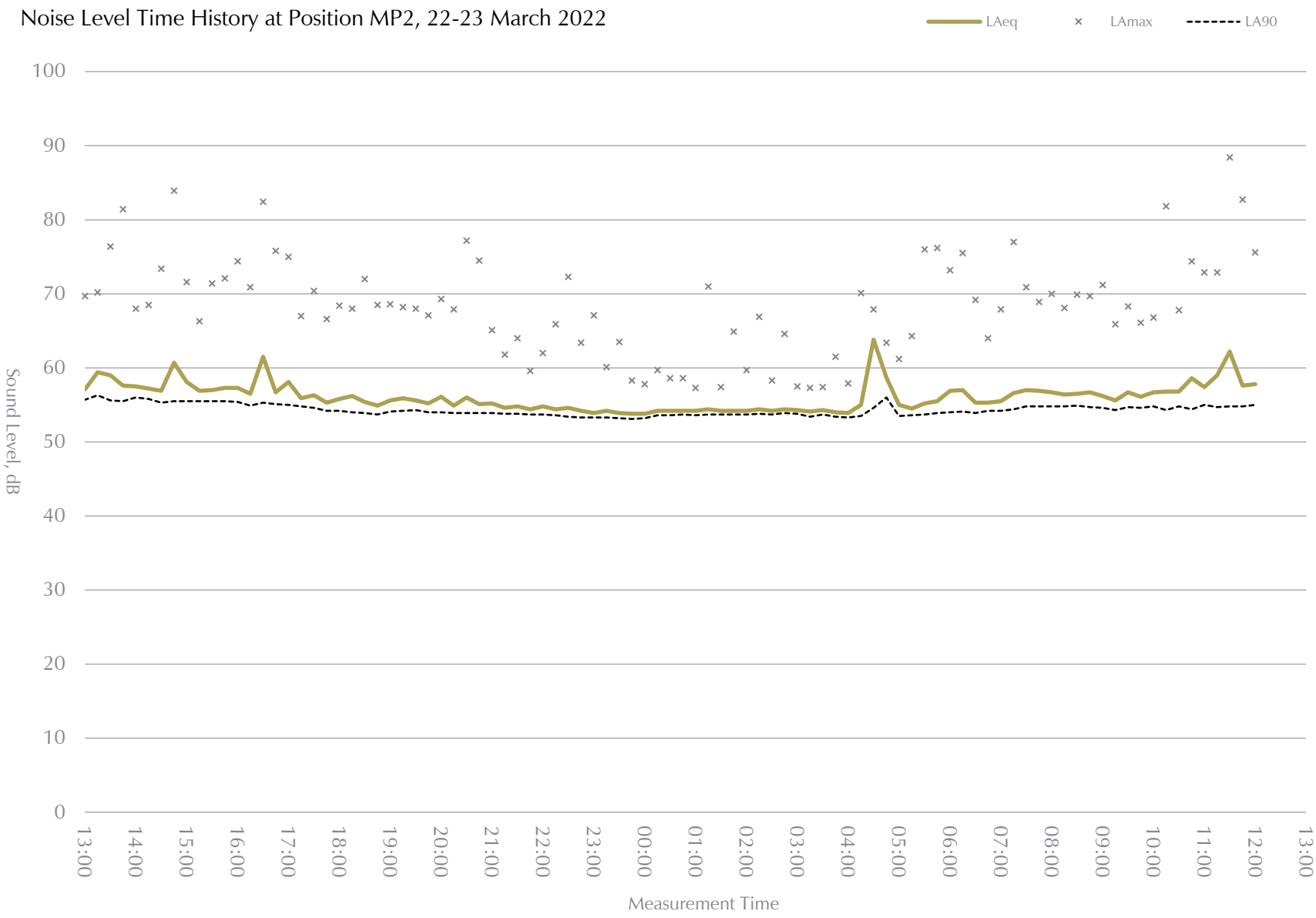

Figure 206/0904/TH02

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