RSK Acoustics

73-75 Avenue Road, London

Car Lift Noise Assessment

Report 18/0635/R5

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Revision	Description	Date	Prepared	Approved
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Car Lift Noise Assessment

1 Introduction

1.1 Planning permission has been granted for the erection of a single-family dwelling house including at 73-75 Avenue Road, London, NW8 6JD. The conditions attached to the planning consent reference noise emissions from the proposed car lift.

1.2 This report details a noise survey undertaken at the site to quantify the existing noise climate and derive atmospheric plant noise limits in accordance with the requirements of the Local Authority. A subsequent assessment of the noise emission levels of the proposed installation has been undertaken to confirm compliance with the plant noise limits.

2 Site Description

2.1 The site, located at 73-75 Avenue Road, London NW8 6JD, had previously been occupied by a single dwelling facing onto Avenue Road to the east of the site.

2.2 Avenue Road (B525) is a busy main road within St Johns Wood running north from Regents Park.

2.3 The surrounding area is made up of residential streets. Directly to the rear (west) of the proposed dwelling are residences facing onto Queen's Grove, to the north and east are further residences on Avenue Road.

2.4 To the south across Queens' Grove there are further residences on Avenue Road, beyond which is Primrose Hill and Regents Park.

2.5 The site falls under the jurisdiction of Camden London Borough Council.

3 Environmental Noise Survey

3.1 **Methodology & Instrumentation**

3.1.1 An unattended noise survey was undertaken at the site commencing at 14h00 on Wednesday 27th July 2022 and concluding at 10h30 on Friday 29th July 2022.

3.1.2 Additionally, an attended noise survey was undertaken at the site at 14h15 on Wednesday 27th July 2022. This noise survey was undertaken with the purpose of measuring the noise emission of the vehicle elevator under test use.

3.1.3 Measurements were undertaken at the two locations as indicated as MP1 and MP2 on the attached site plan 18/0635/R5/SP1 and described as follows.

MP1: At the property boundary to the North end of the property.
MP2: 1m from the vehicle elevator door.

3.1.4 The measurement position MP1 was selected to represent the noise climate at nearby first floor residential windows.

3.1.5 Measurements of the L_{Aeq}, L_{A90} and L_{Amax} indices were recorded over consecutive 15-minute periods (see Glossary of Acoustic Terms for an explanation of the noise units used) for the duration of the survey at MP1 using the equipment listed within table T1 below. Additionally, the equipment used for the attended survey is listed within table T2 below.

Item	Manufacturer	Type
Sound Level Analyser	Rion	NL-52
Acoustic Calibrator	Rion	NC-75
Weatherproof Windshield	Rion	WS-15

T1 Equipment used during unattended noise survey.

Item	Manufacturer	Type
Sound Level Analyser	Norsonic	140
Acoustic Calibrator	Norsonic	1251
Weatherproof Windshield	Norsonic	1451

T2 Equipment used during attended noise survey.

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

3.1.7 The weather conditions when installing and collecting the equipment were mild, partially cloudy, dry, and no wind present. No significant change in weather occurred throughout the survey period. As such, no data from the survey need be omitted due to weather conditions.

3.2 Results

3.2.1 The results of the unattended noise survey are presented in the attached time history graphs 18/0635/R5/TH01 – 18/0635/R5/TH03. The noise climate at the site was noted to be primarily affected by traffic on nearby roads. During the daytime only, the noise levels were also affected by intermittent on-site construction activities.

3.2.2 We understand that the proposed vehicle elevator will not be limited to particular time ranges for its use, as such all times within a 24-hour period have been measured. Section 8.1.3 of BS 4142:2014+A1:2019 states the following:

"… the background sound level used for the assessment should be representative of the period being assessed"

3.2.3 A representative background noise level has thus been derived for the vehicle elevator. This level should account for a range of background sound levels and should not automatically be assumed to be either the minimum or modal value.

3.2.4 Based on the above, the representative noise level is derived as the highest single figure value where the cumulative total of the $L_{A90,15min}$ levels for the relevant period is less than or equal to 25%.

3.2.5 The representative background noise levels, as derived in accordance with the guidance outlined in BS 4142:2014+A1:2019, during the proposed operating period are given in table T3 below.

Location	Representative Background Noise Level, $L_{A90,15min}$ (dB)	
	Day Time Hours (07h00-23h00)	Night Time Hours (23h00-07h00)
MP1 – North side of property	52	37

T3 Measured representative background noise levels.

3.2.6 Attended noise measurements were taken at measurement position MP2 immediately outside the car lift doors during a full test cycle operations for both car lift lowering to the basement, and for the car lift raising from the basement to ground level; the total duration for both was approximately 3 minutes.

3.2.7 During both lowering and raising operations of the car lift, no noise was audible at the measurement position immediately outside the doors for the entire car lift cycle, apart from that due to gentle impacts when the doors finished opening, and finished closing, when there was a 'bang'. The single event (SEL) noise levels of these events were measured to be 54dB(A) and 61dB(A) respectively.

4 Plant Noise Criteria

4.1 Local Authority Guidance

4.1.1 The Decision Notice issued from Camden London Borough Council regarding developments to 73-75 Avenue Road, London states the following conditions as applicable to the installation of the proposed car elevator:

Condition 12 - *Prior to commencement on the relevant part of the development full details of the car lift (including relevant acoustic information) to demonstrate compliance with condition 13 shall be submitted to and approved in writing by the local planning authority. The car lift shall be installed and maintained in accordance with any such approved details.*

Reason: To safeguard the amenities of the adjoining premises and the area generally in accordance with the requirements of policies A1 and A4 of the London Borough of Camden Local Plan 2017.

Condition 13 - Noise levels at a point 1 metre external to sensitive facades shall be at least 10dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive facade shall be at least 15dB(A) below the LA90, expressed in dB(A).

Reason: To safeguard the amenities of the adjoining premises and the area generally in accordance with the requirements of policies A1 and A4 of the London Borough of Camden Local Plan 2017.

4.1.2 Appendix 3 of the Camden Local Plan 2017 referenced by the conditions provides the following guidance on assessments of industrial and commercial noise sources:

"…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)."

4.1.3 Based on the above, plant noise limits have been derived from the measured L_{A90} background noise levels with reference to BS 4142:2014+A1:2019. A brief summary of this standard is provided in the following section, describing how adverse impacts due to noise from industrial and commercial noise may be assessed.

4.2 BS 4142:2014+A1:2019

4.2.1 When considering noise emission from plant, it is normal to follow guidance in BS 4142:2014+A1:2019[1], section 1.1 of this standard states the following:

"This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

a) sound from industrial and manufacturing processes;

[1] British Standard 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound.

b) sound from fixed installations which comprise mechanical and electrical plant and equipment

c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and

d) sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site."

4.2.2 The methodology in the standard compares the measured or calculated rating level of the noise from the source and compares it to the representative existing measured L_{A90} background noise level for the period concerned.

4.2.3 The higher the excess of rating level over background noise level, the greater the likelihood of an adverse noise impact. BS 4142:2014+A1:2019 gives the following guidance:

"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."

4.2.4 In addition to the above, section 11(1) of BS 4142 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."

4.2.5 As stated above, where background sound levels and rating levels are low, absolute levels can be more relevant than a margin compared to the existing level.

4.2.6 For this reason, it is proposed that a rating level of 30 dB be taken as a lower limit for design criterion (background levels below 30 dB and rating levels below 35 dB are considered 'very low' in BS4142:1997).

4.2.7 Where the existing background level is 35 dB or lower, the design aim will be to reduce the rating level including any character correction as much as practicable down to or below a rating level of 30 dB.

4.2.8 To put the recommended limit of 30dB(A) in context, allowing for a typical loss of 12dB(A) from a partially open window would result in noise levels below 20dB(A) inside any residences exposed to this level of external plant noise.

4.2.9 Internal noise levels below 20dB(A) are more than 10dB(A) below the guideline level of $L_{Aeq,8h}$ 30dB suggested in BS8233:2014[2], as being appropriate or bedrooms to provide suitable conditions for sleeping.

4.3 Plant Noise Limits

4.3.1 Based on the above, the noise limits in table T4 are to apply here:

Location	**Plant Noise Emission Limits, $L_{Ar,Tr}$ (dB)** *(for plant with no distinguishing feature)* **Proposed Operating Hours (24/7)**
1m from 1st story window at 77 Avenue Road	30

T4 Plant noise emission limits at the nearest residential receivers.

4.3.2 The noise limits are to apply at 1 m from the nearby residential windows. Any plant with a tonal component would be subject to a further 5dB penalty, as noted by planning condition 13.

5 Plant Noise Assessment

5.1 Noise levels have been calculated at a single assessment position labelled as AP1 on the attached site plant 18/0635/R5/SP1, and described below:

- AP1 – 1 m from the first-floor window at the front of 77 Avenue Road.

5.2 This assessment has taken into account distance losses, and façade reflections, impulsiveness penalty, screening, and the quantity of noise events where each is appropriate. The calculations sheets are summarised in the table below.

[2] British Standard 8233:2014 - Guidance and sound insulation and noise reduction for buildings

	Noise level / correction value
SEL doors open	54.2 dB(A)
SEL doors close	60.5 dB(A)
Sum for doors open & close (car lift up, or car lift down)	61.4 dB(A)
SEL to L_{Aeq} time correction (15-minute assessment period)	– 29.5 dB(A)
Distance correction (10 metres)	– 20 dB(A)
Screening (line of sight)	– 5 dB(A)
Façade correction	+3 dB(A)
Noise level for one event (car lift up, or car lift down)	10 dB(A) $L_{eq,15min}$
Number of events (10 no. – maximum possible in 15-minute assessment period)	+10 dB(A)
Noise level for 10 no. car lift events	20 dB(A) $L_{eq,15min}$
Distinct impulse penalty	+ 5 dB(A)
Rating noise level for 10 no. car lift events	25 dB(A) $L_{Ar,Tr,15min}$
Noise limit	30 dB(A)

T5 Car lift noise calculations

5.3 Our assessment has shown that no mitigation is required to meet the plant noise emission limits at all times, even allowing for repetitive use of the car lift with the platform lowered and raised five times each within the 15-minute assessment period.

6 Conclusions

6.1 Planning permission has been granted for the installation of a vehicle elevator at 73-75 Avenue Road, London. The conditions attached to the planning consent reference noise emissions from the proposed car lift.

6.2 A noise survey has been undertaken at the site to quantify the existing noise climate and set noise limits in line with requirement of the planning conditions. A subsequent assessment of car lift noise emission has been undertaken, confirming compliance with the noise limit.

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.

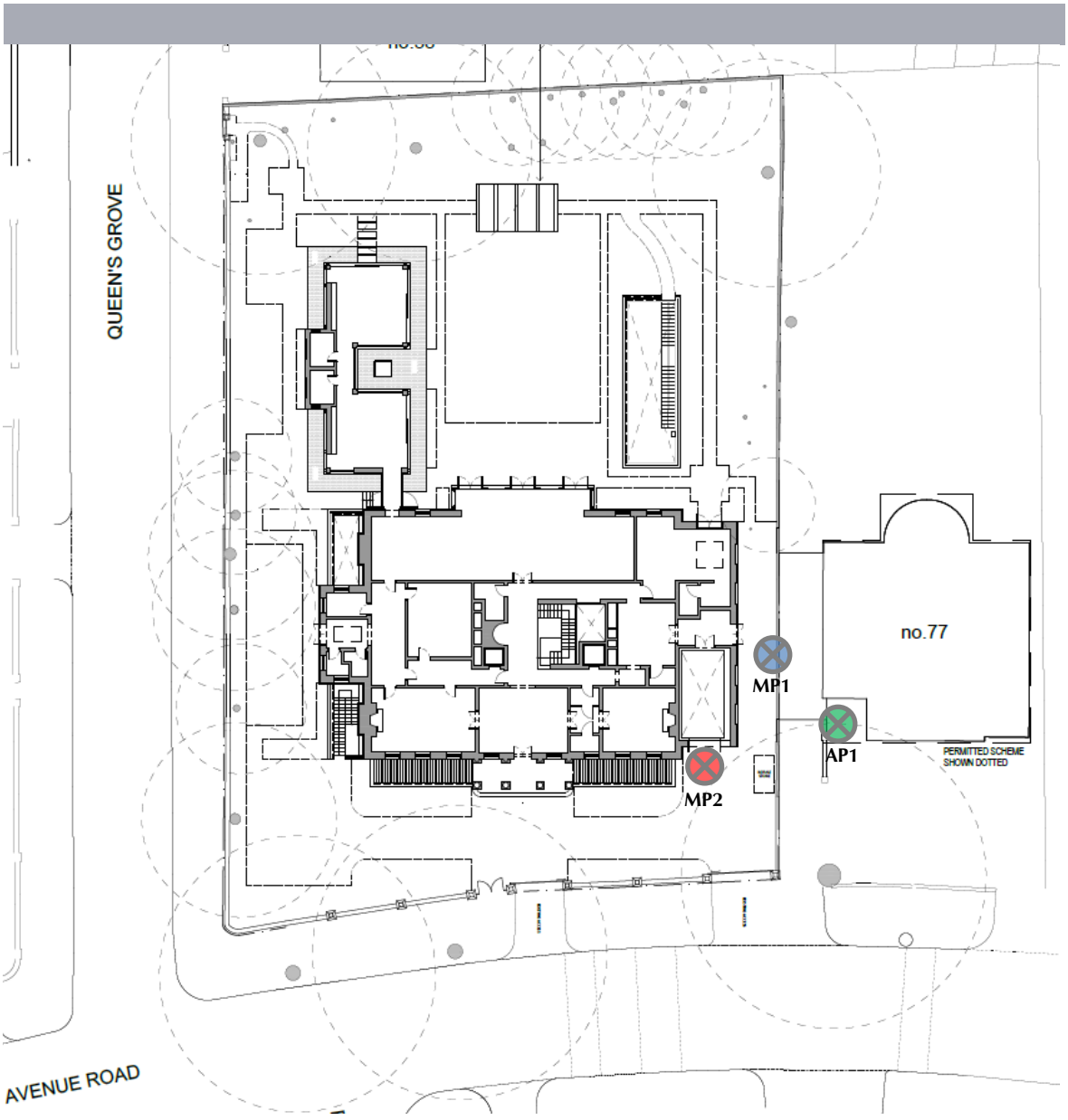
L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_n.

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

Figure 18/0635/R5/SP1



Title: Site plan detailing measurement and assessment positions regarding 73-75 Avenue Road and 77 Avenue Road

Project: 73-75 Avenue Road

Date: 10 August 2022 Scale: Not to scale

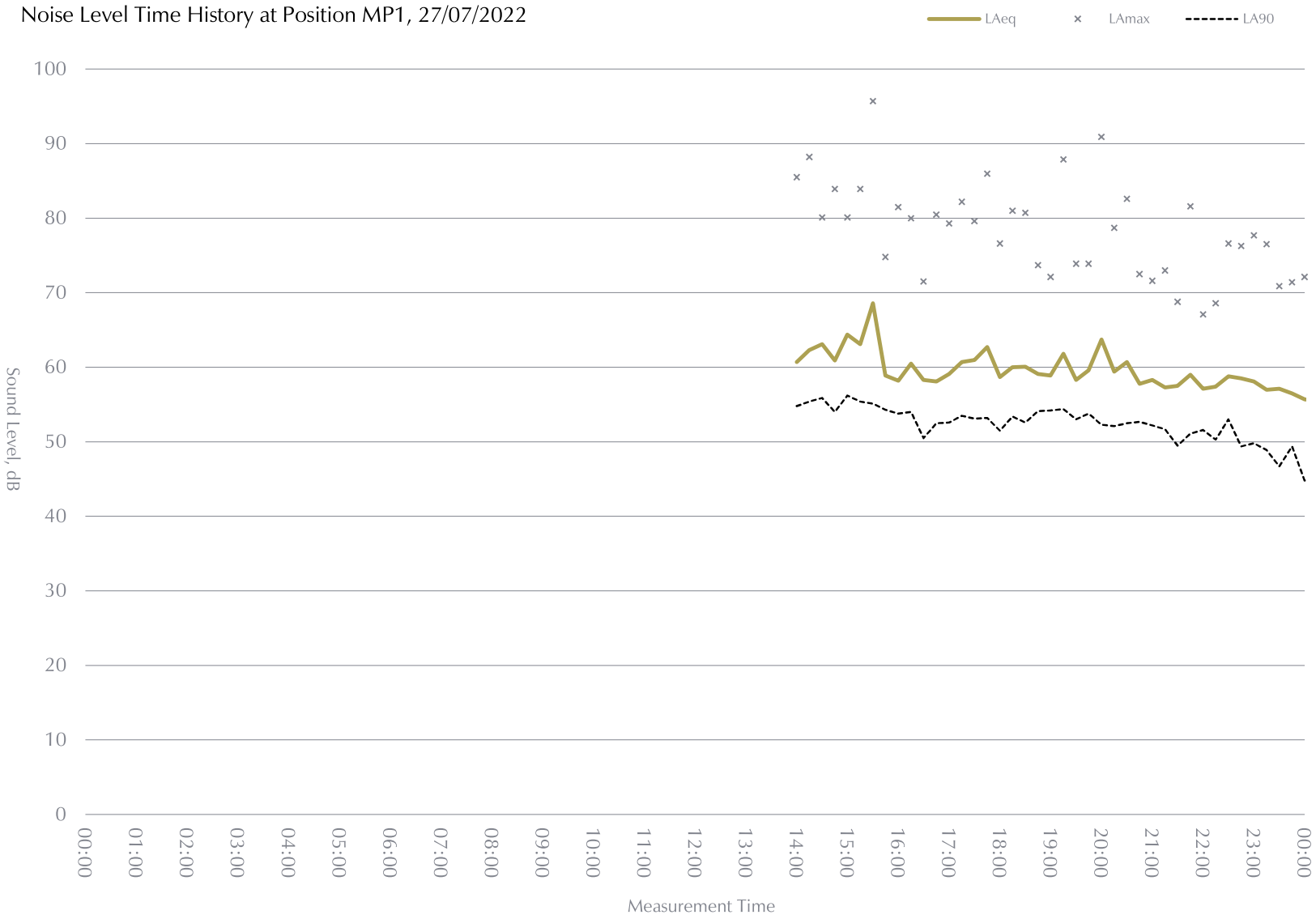


Figure 18/0635/R5/TH01

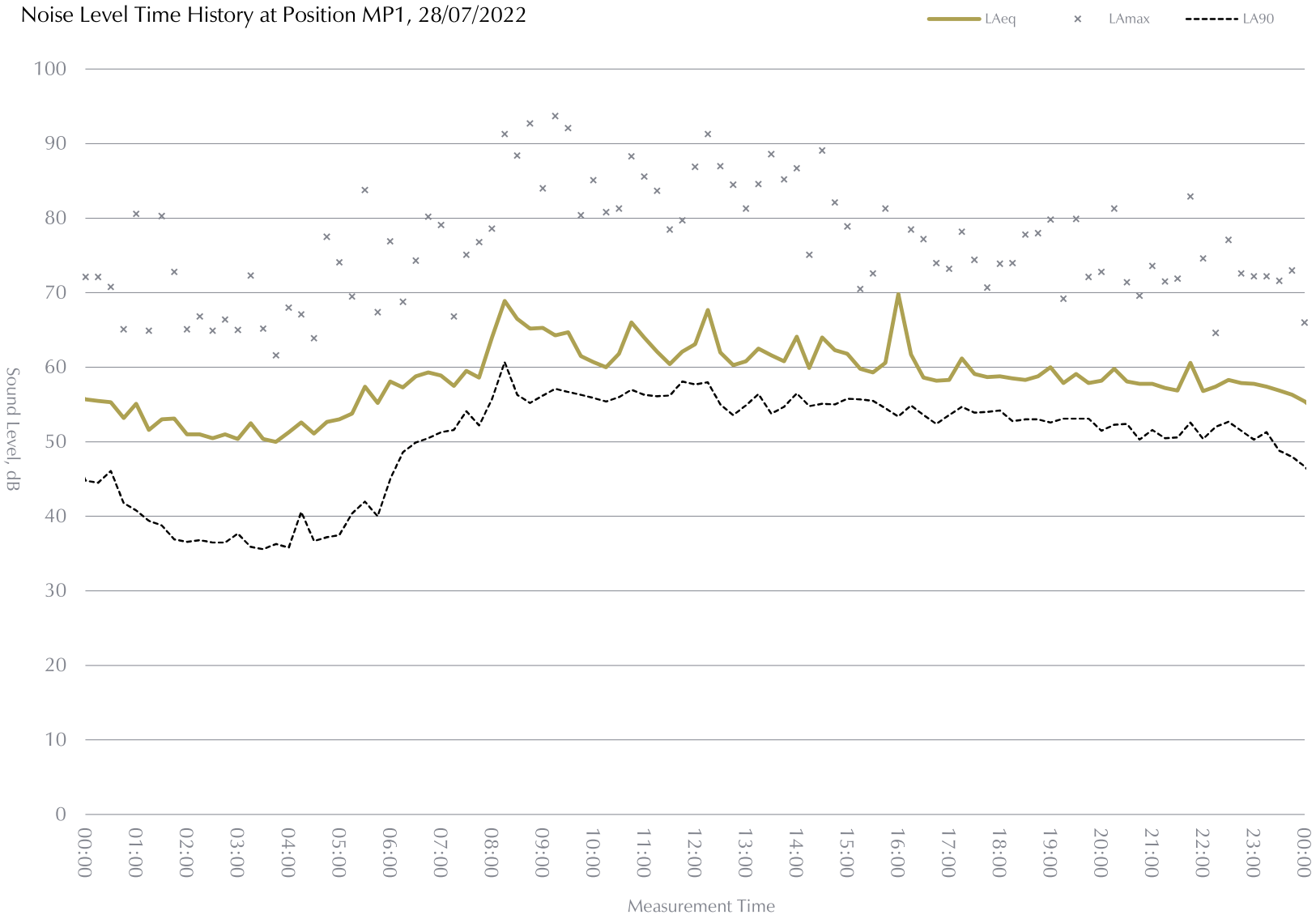


Figure 18/0635/R5/TH02

Noise Level Time History at Position MP1, 29/07/2022

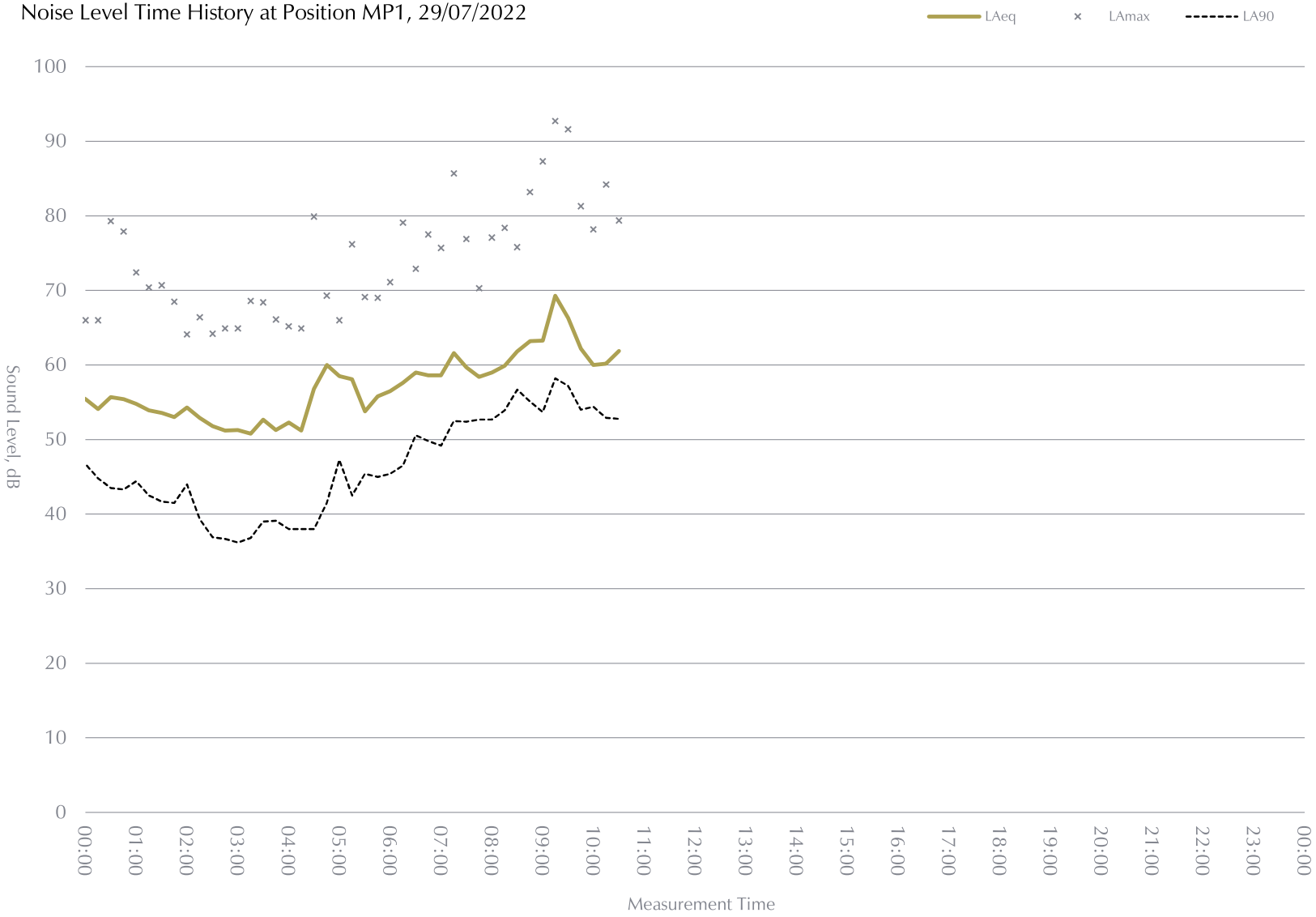


Figure 18/0635/R5/TH03

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