Report VA5067.240115.NIA1.1

89 High Street, Billericay

Noise Impact Assessment

15 January 2024

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Contents

Attachments

Report Version	Author	Approved	Changes	Date
NIA	Ben Alexander	Jamie Duncan	-	21/12/2023
NIA1.1	Ben Alexander	Jamie Duncan	Planning consultant comments adopted	15/01/2024

1. Introduction

It is proposed to partially convert and extend the existing building at 89 High Street, Billericay for residential use and add two new semi-detached houses at the rear of the existing site.

Venta Acoustics has been commissioned by Klara 89 Ltd to undertake an assessment of the current environmental noise impact on the site and provide recommendations of acoustic mitigation, where required, in support of an application for full planning permission.

An environmental noise survey has been undertaken to determine the noise levels incident on the site. These levels are then used to undertake an assessment of the likely impact in accordance with the National Planning Policy Framework with reference to relevant standards, guidance and the planning requirements of Basildon Borough Council.

Outline mitigation measures are considered and an appraisal of the requirements of external building fabric elements is provided.

2. Guidance and Legislation

2.1 Local Authority Pre-Application Response Feedback

The planning case officer for the application has provided the following feedback as part of the pre-application consultation:

> *There was concern that residents proposed in the parts of the building closest to restaurant garden at 91 High Street could could* [sic] *be adversely affected by noise, and that a noise impact assessment would therefore be needed.*

2.2 The National Planning Policy Framework (2023)

The revised *National Planning Policy Framework* (NPPF), published in December 2023, sets out the Government's planning polices for England, superseding all previous planning policy statements and guidance.

In respect of noise, the NPPF states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing developments from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution.

Hence, Paragraph 191 states that *planning policies and decisions should also 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:*

a) *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*
b) *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*

In regards to the term adverse impact, reference is made to the Noise Policy for England:

2.3 Noise Policy Statement for England (2010)

The Noise Policy Statement for England (NPSE) sets out the long term vision of Government noise policy: 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.

This vision is supported by the following aims:

- *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 terms "significant adverse" and "adverse" are related to the following concepts:

- No Observed Effect Level (NOEL) - the level below which no effect on health and quality of life can be detected.
- Lowest Observed Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected.
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

The guidance acknowledges that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations, but will be different for different noise sources, receptors and times.

In order to enable assessment of impacts in line with these requirements, reference should be made to other currently available guidance.

2.4 WHO Guidelines for Community Noise (1999)

The guidance in this document details suitable noise levels for various activities within residential and commercial buildings.

The relevant sections of this document are shown in Table 2.1.

Criterion	Environment	Design range $L_{Aeq,T}$ dB
Maintain speech intelligibility and avoid moderate annoyance, daytime and evening	Living Room	35 dB
Prevent sleep disturbance, night time	Bedrooms	30 dB

Table 2.1 – Excerpt from WHO **[dB ref. 20µPa]**

This guidance also states:

> *For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times a night (Vallet & Vernet 1991).*

For outdoor living areas, it is stated that:

> *To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB LAeq on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB LAeq. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development.*

For sleep disturbance, i.e. in bedrooms at night, the NOEL can, therefore, be taken as anything below 30dB(A), whilst the onset of the LOAEL occurs at 30dB(A) and above. The SOAEL cannot be inferred from this information.

During daytime periods, for avoidance of annoyance, the NOEL relates to anything up to 50dB(A) (typically applied to external areas, such as gardens), whilst the onset of the LOAEL occurs at 50dB(A) and above.

2.5 BS8233:2014

BS8233 *Guidance on sound insulation and noise reduction for buildings* provides guidance as to desirable internal ambient noise levels for different areas within residential buildings.

The relevant section of the standard is shown below in Table 2.2.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq, 16 hour}$	-
Dining	Dining Room	40 dB $L_{Aeq, 16 hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16 hour}$	30 dB $L_{Aeq, 8 hour}$

Table 2.2 – Excerpt from BS8233:2014 - Indoor ambient noise levels for dwellings **[dB ref. 20µPa]**

Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

For external areas the standard states the following:

> *For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.*

However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

3. Site Description

As illustrated on attached site plan VA5067/SP1, 89 High Street is a part 2-storey, part single storey end-of-terrace building located on the corner of Rose Lane and the High Street, Billericay.

The building is part of the High Street parade and, as is typical for high streets, the immediate area is mixed use with shops, cafes and professional services located at ground floor, often with flats above. 89 High Street was formerly tenanted by a high street bank, with associated offices above.

The building adjoins other commercial properties to the north, with Rose Lane to the south. There is a restaurant on the opposite side of Rose Lane, which includes external seating at the rear.

The High Street lies to the immediate east, with other commercial properties and flats on the opposite side of the road. Apart from the neighbouring restaurant, there is little in the way of night-time economy in the area, with the nearest public house well over 100m further up the high street.

The curtilage of the site currently includes a small private carpark to the rear and there is a much larger, 24-hour public carpark beyond this.

The principal noise sources expected to affect the site are road traffic from the High Street and external patron noise associated with the seating area at the rear of the neighbouring restaurant.

3.1 Proposals

The proposals for the site include the conversion of most space at ground to second floor level of the existing building into residential flats, including room-in-roof conversion of the pitched roof overlooking the High Street.

The existing single storey flat roof area at the rear will be vertically extended to provide living space at first floor level, with additional room-in-roof space within the mezzanine / second floor roof pitch. In total, seven flats will be provided.

Commercial space will be retained at the front of the ground floor and at basement level of the converted building.

In addition to this, two separate part two-storey, part-three-storey semi-detached townhouses will be constructed at the rear of the site on the site of the existing small carpark.

4. Survey Procedure & Equipment

In order to establish the existing background noise levels at the site, a noise survey was carried out between Thursday 14th and Monday 18th December 2023 at the external first floor locations shown in site plan VA5067/SP1 as Position 1 and Position 2.

These locations were chosen to be representative of road traffic noise and patron noise from the adjacent restaurant external seating area noise levels at the most affected areas of the front and rear façades of the development, respectively.

Continuous 5-minute samples of the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels were undertaken at each of the measurement locations.

The weather during the survey period was generally dry with light winds. The background noise data is not considered to have been compromised by these conditions.

Measurements were made generally in accordance with ISO 1996 2:2017 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels*.

The following equipment was used in the course of the survey:

Manufacturer	Model Type	Serial No	Calibration	
			Certificate No.	Date
NTi Class 1 Integrating SLM	XL2	A2A-11461-E0	TCRT22/1490	3/8/22
NTi Class 1 Integrating SLM	XL2	A2A-15892-E0	150497-1	28/3/23
Larson Davis calibrator	CAL200	19816	1506037-1	28/7/23

Table 4.1 – Equipment used for the survey

The calibration of the sound level meter was verified before and after use with no significant calibration drift observed.

4.2 Results

The measured sound levels are shown as time-history plots on the attached charts VA5067/TH1-4 for position 1 and VA5067/TH5-8 for position 2.

The site is primarily affected by road traffic noise from the High Street. During warmer weather, it is expected that patron noise from the external seating area of the neighbouring restaurant will determine noise levels at the side and rear of the development.

The average noise levels for the Daytime and Night-time periods, as measured at the automated monitoring position were:

Monitoring Period	$L_{Aeq,T}$	
	Position 1	Position 2
07:00 – 23:00 hours	68 dB*	53 dB
23:00 – 07:00 hours	65 dB*	48 dB

Table 4.2 – Average ambient noise levels at measurement locations [dB ref. 20µPa]

* The external monitor data for Position 1 has not been corrected for façade influence. The microphone was less than 0.5m from the façade and a reduction of 3dB would be applicable to obtain free field levels.

The typical night-time L_{Amax} events at Position 1, generated by vehicle pass-bys on the High Street, were recorded to be in the order of 82 dB $L_{Amax,fast.}$ Free field levels would be approximately 3 dB lower.

5. Internal Noise Assessment

5.1 External Building Fabric Review

A review of the T2S Architecture Ltd planning-stage drawings for the proposed scheme has been undertaken with the intent of achieving the internal noise levels from average and maximum noise levels stated in BS8233 and the WHO Guidelines.

5.1.1 Assumed Restaurant Patron Noise Levels

Given the time of year during which monitoring was undertaken, the measured external noise levels at Position 2 are not thought to adequately represent the potential contribution from external patron seating associated with the neighbouring restaurant during warmer summer months.

As such the following review will take due account of library noise source data for the human voice, as detailed in ANSI 3.5:1997 - *Methods for calculation of the speech intelligibility index*, when considering patron noise.

Source element	63	125	250	500	1k	2k	4k	8k	dB(A)
Raised Voice, Lp @1m	50*	56*	62	66	62	57	51	43	67

Table 5.1 – Source levels detailed in ANSI 3.5:1997

*Assumed value

As the opening times of the restaurant are limited to 11:30 – 23:00 hours on Saturdays (other days of the week the restaurant shuts by 21:30 or 22:00 hours), night-time L_{Fmax} levels from loud patron voices are not considered.

On site observations indicate space for 11 bistro tables and overall seating numbers of up to approximately 40 patrons.

To adequately take account of the potential noise impact from the external seating area, noise impact will be considered over a busy 1-hour period when the external seating area is at capacity, with 50% patrons talking in raised voices at any given time.

On this basis, patron levels at the most affected first -floor windows overlooking the external seating area could be up to $L_{Aeq,1hour}$ 61 dB.

Windows at ground floor, or without a view of the seating area would be at least 5 dB lower due to screening offered by the brick wall at the boundary and general built form of the site.

5.1.2 Sound Reduction Performances of Building Elements

It has been assumed that all the non-glazed elements, i.e. walls and roof systems, will be capable of providing the following minimum sound insulation performance, when tested in accordance with BS EN ISO 10140-2:2021 *Acoustics - Laboratory measurement of sound insulation of building elements – Part 2: Measurement of airborne sound insulation*.

Building Element	Single figure weighted sound reduction index, dB
Roof	R_w 45
Masonry	R_w 51

Table 5.2 – Assumed sound reductions performances of non-glazed elements

5.1.3 Sound Reduction Performance of Windowsets and Vents

The monitoring data along with the architectural drawings have been used to calculate the required sound insulation performance for the windowsets (glazing and frame combination) and open ventilators for the building. These are summarised in Table 5.3 below.

Glazing Reference	Required Glazing SRI, dB	Ventilator Performance, dB
Type A	R_w 32	$D_{n,e,w}$ 35
Type B	R_w 30	$D_{n,e,w}$ 30
Type C	Any glazing and ventilator combination. Suitable internal levels achieved with glazing partially open.	

Table 5.3 – Required minimum sound reduction indices for glazing and ventilators

It is important that the performance shown in Table 5.3 are achieved by the entire windowset including frames, ventilators, seals, etc.

Glass performance alone would not be likely to show compliance with the specification as the other elements typically provide the weakest noise transmission path.

If trickle vents are used to provide secure ventilation, the performance shown in Table 5.3 will be required. The ventilator performances provided would need to be achieved with the vents open. Should this performance not be achievable, a mechanical ventilation solution may be required.

The figures stated are for a single vent per room.

If multiple vents are required, then the performance requirement shown in Table 5.3 will increase by a value equal to +10log(*N*), with N being the total number of vents serving the room. It should be noted that there is no reason why windows could not be opened as a matter of personal preference or for purge ventilation.

For Type A and Type B façade areas, i.e., where occupants should have the option to keep windows closed to maintain target internal noise levels, passive ventilators alone may not provide sufficient air flow to mitigate summer overheating. The likelihood of summer overheating occurring in these dwellings should be evaluated by a suitably qualified thermal engineer.

For Type C façade areas, windows can be left opened to offset overheating (where this occurs) and suitable internal noise levels still achieved.

5.1.4 Glazing Locations

Table 5.4, which should be read in conjunction with the attached glazing location plan, VA5067/GP1, shows on which façades and levels of the building the glazing with the sound reduction performances shown in Table 5.3 should be installed.

Facade	Floor	Glazing Reference
East and South (front)	1F – with a view of the High Street	Type A
South	1F – with a view to external seating	Type B
All others (including roof lights)	All	Type C

Table 5.4 – Glazing locations

5.2 Internal Noise Assessment

Noise levels at the façades overlooking the High Street are such that these windows would need to remain closed in order to meet the WHO 1999 and BS8233:2014 design targets. These windows and ventilators would need to be specified to meet the Type A acoustic performances detailed in Table 5.3.

Noise levels at first floor windows opposite the external restaurant seating area would often be low enough that suitable internal noise levels could be achieved with windows partially open, although at times, external patron noise levels from restaurant may be high enough that occupants prefer to keep these windows closed. As such, these windows and ventilators should be selected to meet the Type B specifications.

All windows with an acoustic specification should remain openable at occupant preference or to allow for purge ventilation.

Noise levels at all other windows, including those on all façades of the proposed semi-detached town houses at the rear, are low enough that windows could be left partially open and suitable internal noise levels (relaxed by 5dB as per BS8233:2014 Note 7 shown in Table 2.2) still achieved. As such, any glazing and ventilator combination would be sufficient at these building façades.

The secure ventilation scheme for the dwellings should ensure that the appropriate air changes can be achieved, in line with Part F of the building regulations.

With the above recommendations implemented, the noise levels within the proposed dwellings would be expected to be in line with recommendations given in the WHO 1999 and BS8233:2014 guidance. Internal noise levels can therefore be considered to be between the NOEL the LOAEL levels.

On this basis, it is offered that the potential for road traffic noise and patron noise impact from the neighbouring external restaurant seating area have been adequately addressed, as per the planning requirements of Basildon Borough Council.

5.3 Areas of External Amenity

Flats 1.01, 1.02 and 1.04 are all to be provided with external terrace areas overlooking Rose Lane and/or the rear of the site.

Except perhaps for busy summer periods for the neighbouring restaurant where patrons are seated externally for long periods of the day, noise levels on terraces would comply with the World Health Organisation guideline value for external amenity of $L_{Aeq,16hour}$ 55dB.

It is assumed that the proposed town houses would have gardens with circa 1.8m high closed boarded timber fencing at the perimeter. Noise levels in these gardens are expected to be comfortably below $L_{Aeq,16hour}$ 55dB for seated receptors.

No mitigation measures are deemed necessary in relation to external noise levels.

The outdoor noise levels across the site can therefore be considered to fall between the LOAEL and SOAEL levels, generally being below the level that is expected to cause significant annoyance.

6. Conclusion

A baseline noise survey has been undertaken by Venta Acoustics to establish the prevailing noise climate in the locality of 89 High Street, Billericay in support of a full planning application for the proposed development of new residential dwellings.

The measured levels, along with published noise data for patron noise levels, have been assessed against the National Planning Policy Framework and currently available standards and guidance documents including World Health Organisation *Guidelines for Community Noise* (1999) and BS8233:2014 *Guidance on sound Insulation and noise*.

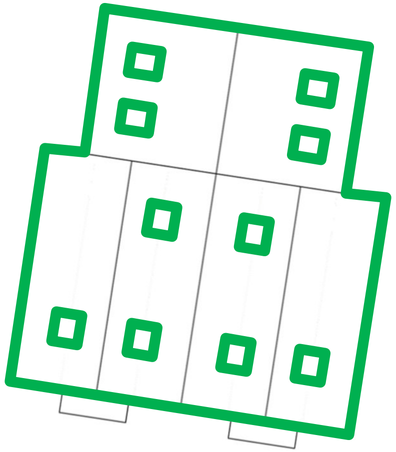
Appropriate external and internal noise criteria have been considered to minimise adverse impacts on health and quality of life as a result of the new development. Appropriate mitigation measures have been outlined which should be developed during detailed design, including proprietary thermal double-glazing and trickle vents.

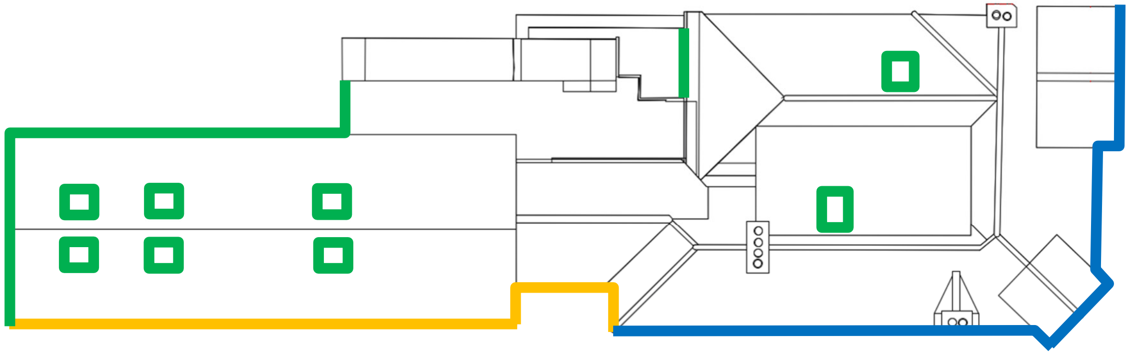
Where these mitigation measures are adopted, internal noise impact is anticipated to lie between the NOEL and LOAEL and external noise impact between the LOAEL and SOAEL.

On this basis it is offered that the planning concerns of Basildon Borough Council have been adequately addressed and site is acceptable for the proposed residential use.

Ben Alexander MIOA

VA5067/SP1 Site Plan showing measurement locations + proposed site layout





Facade		Floor	Glazing Reference
East and South (front)	(blue)	1F – with a view of the High Street	Type A
South	(yellow)	1F – with a view to external seating	Type B
All others (including roof lights)	(green)	All	Type C

89 High Street, Billericay

Environmental Noise Time History: 1

Position 1 - Front

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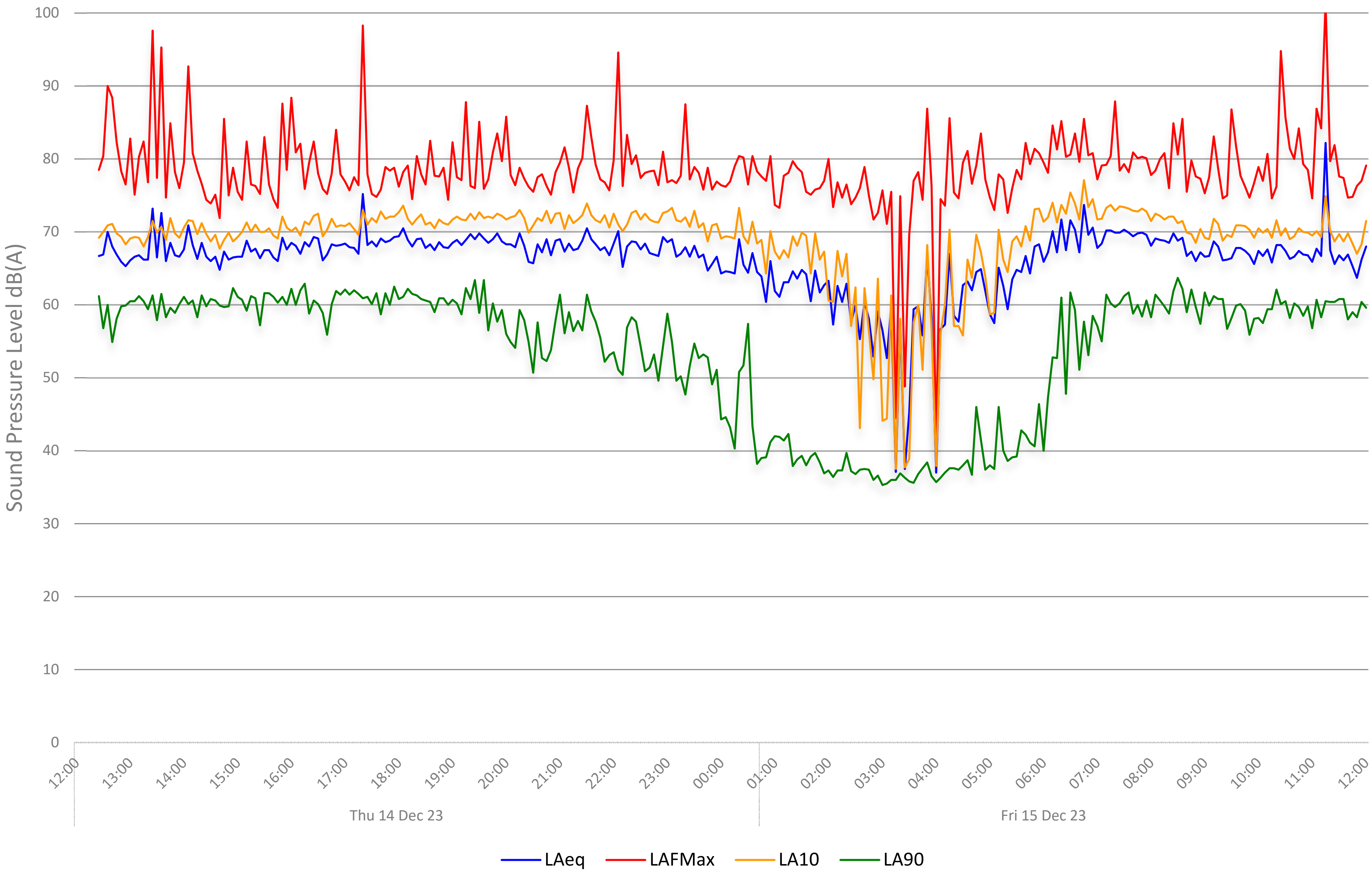
Figure VA5067/TH1



89 High Street, Billericay

Environmental Noise Time History: 2

Position 1 - Front

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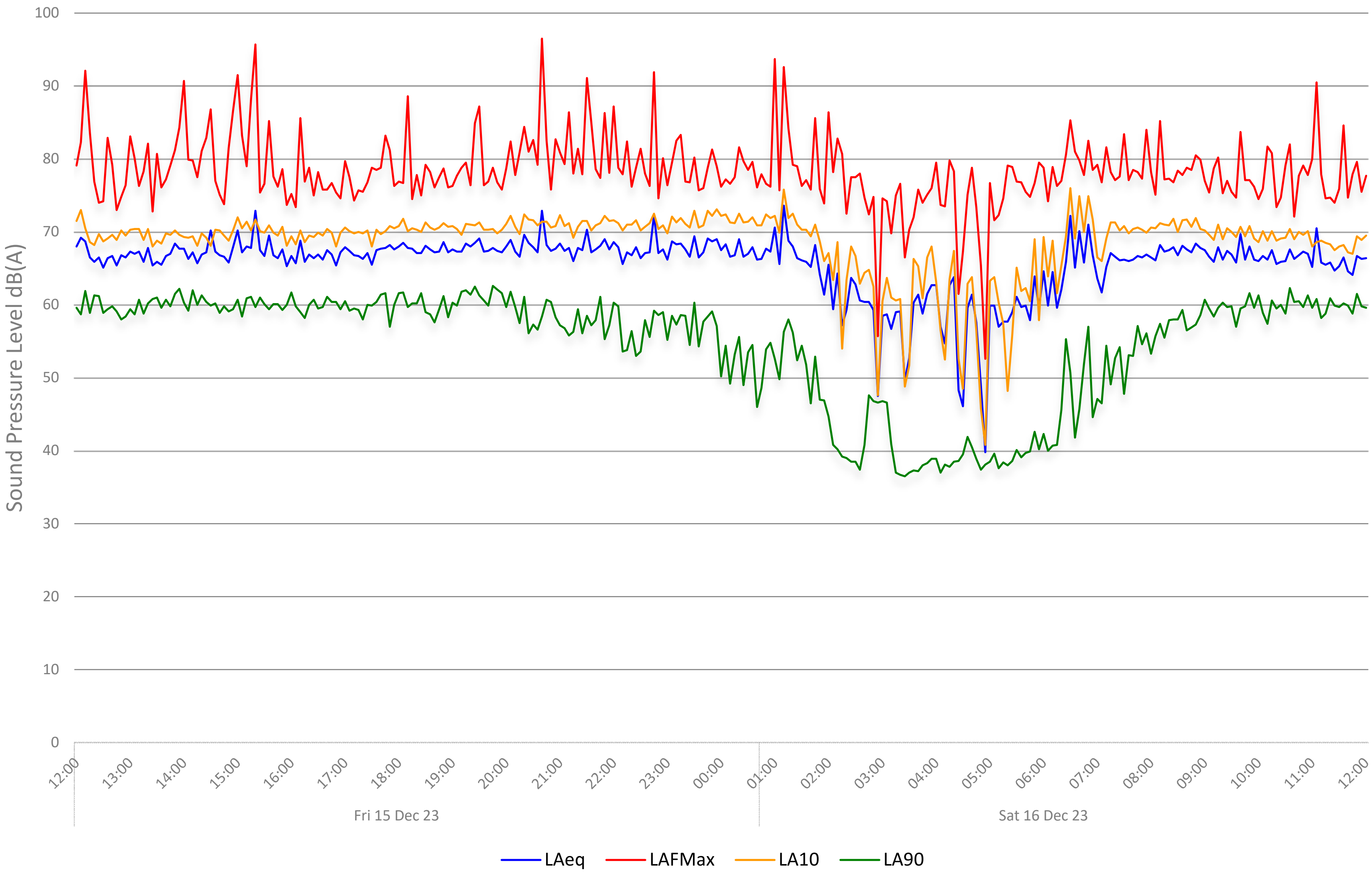
Figure VA5067/TH2



89 High Street, Billericay

Environmental Noise Time History: 3

Position 1 - Front

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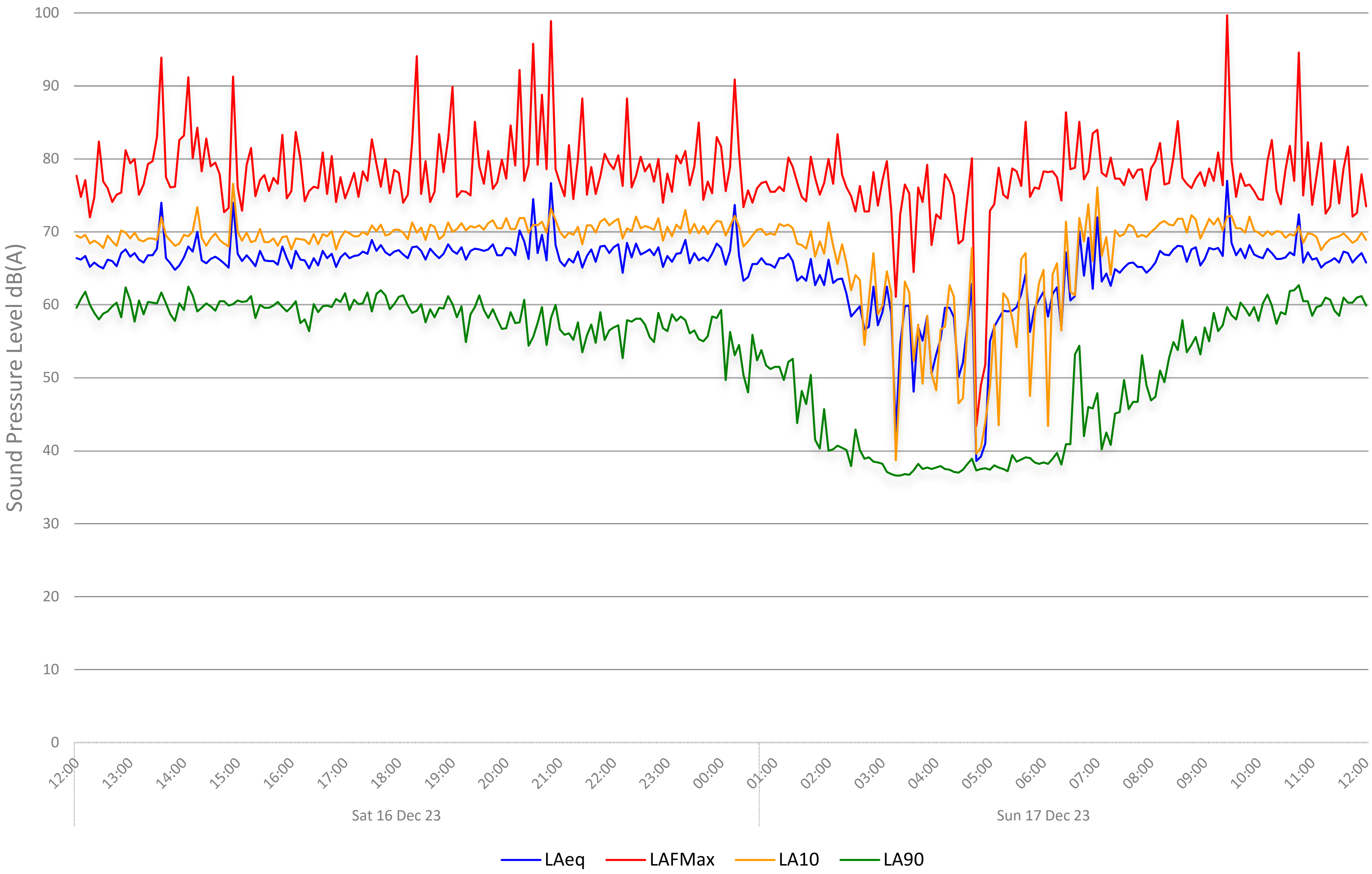
Figure VA5067/TH3



89 High Street, Billericay

Environmental Noise Time History: 4

Position 1 - Front

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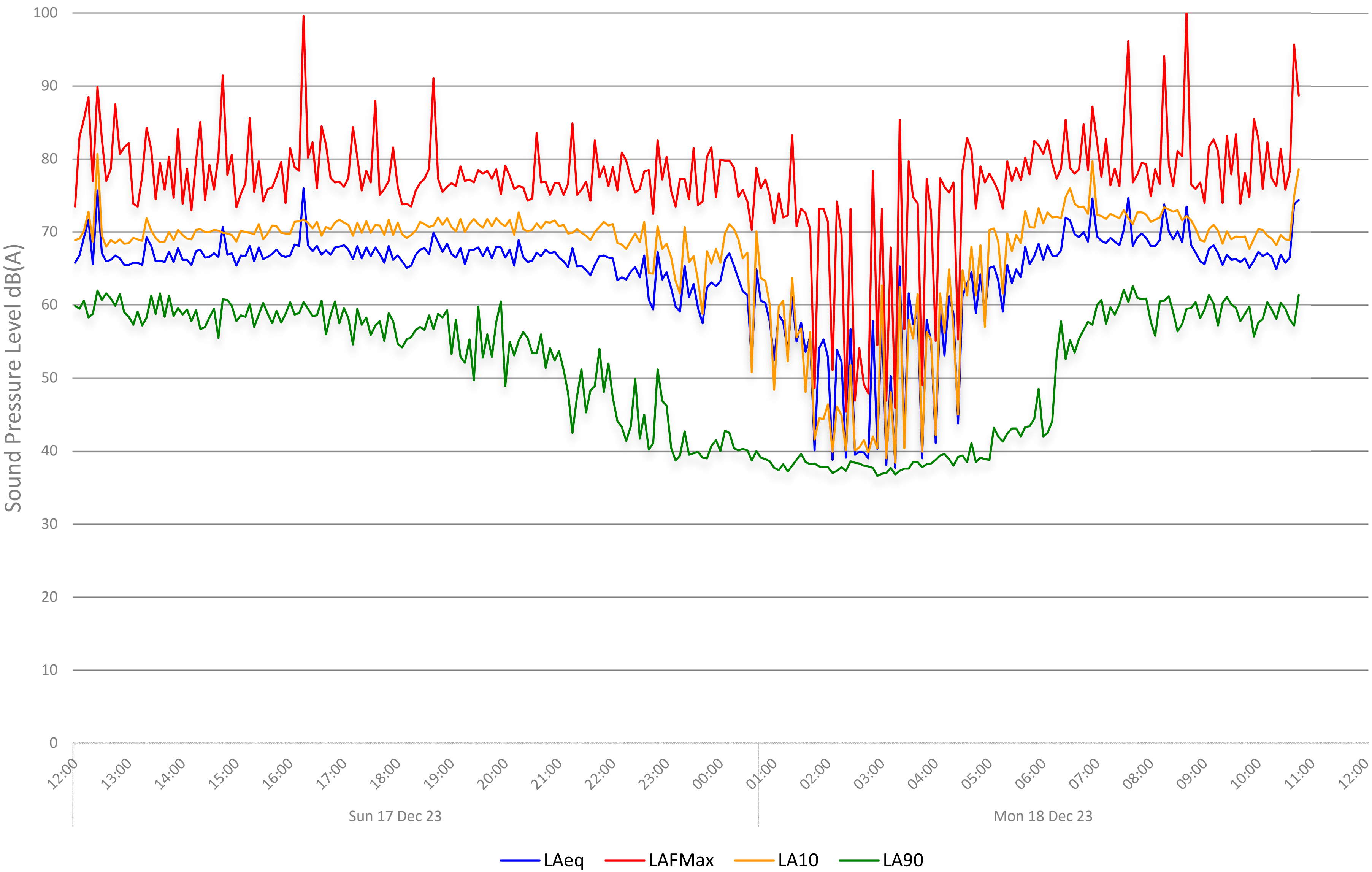
Figure VA5067/TH4



89 High Street, Billericay

Environmental Noise Time History: 9

Position 2 - Rear

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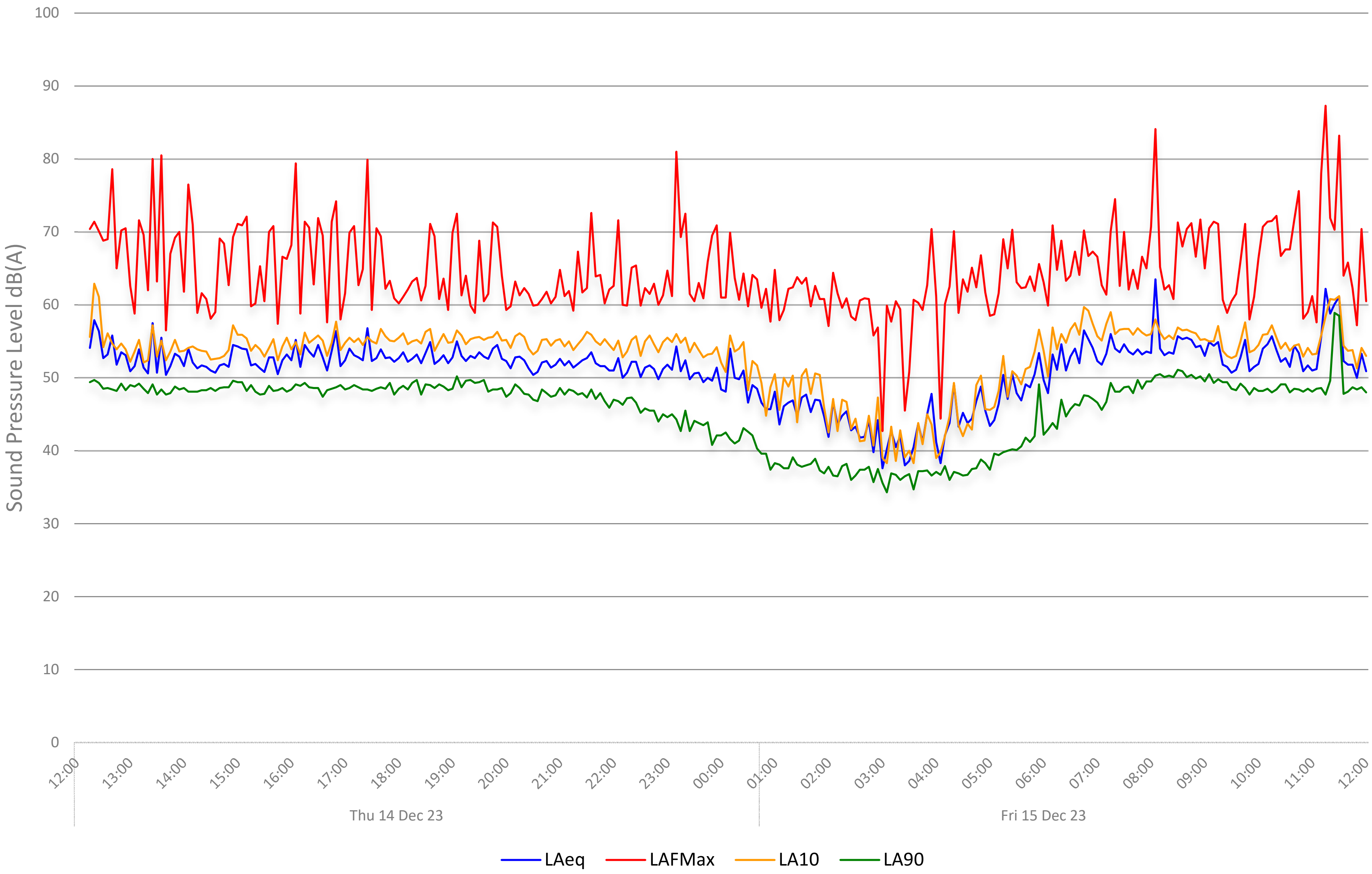
Figure VA5067/TH9



89 High Street, Billericay

Environmental Noise Time History: 10

Position 2 - Rear

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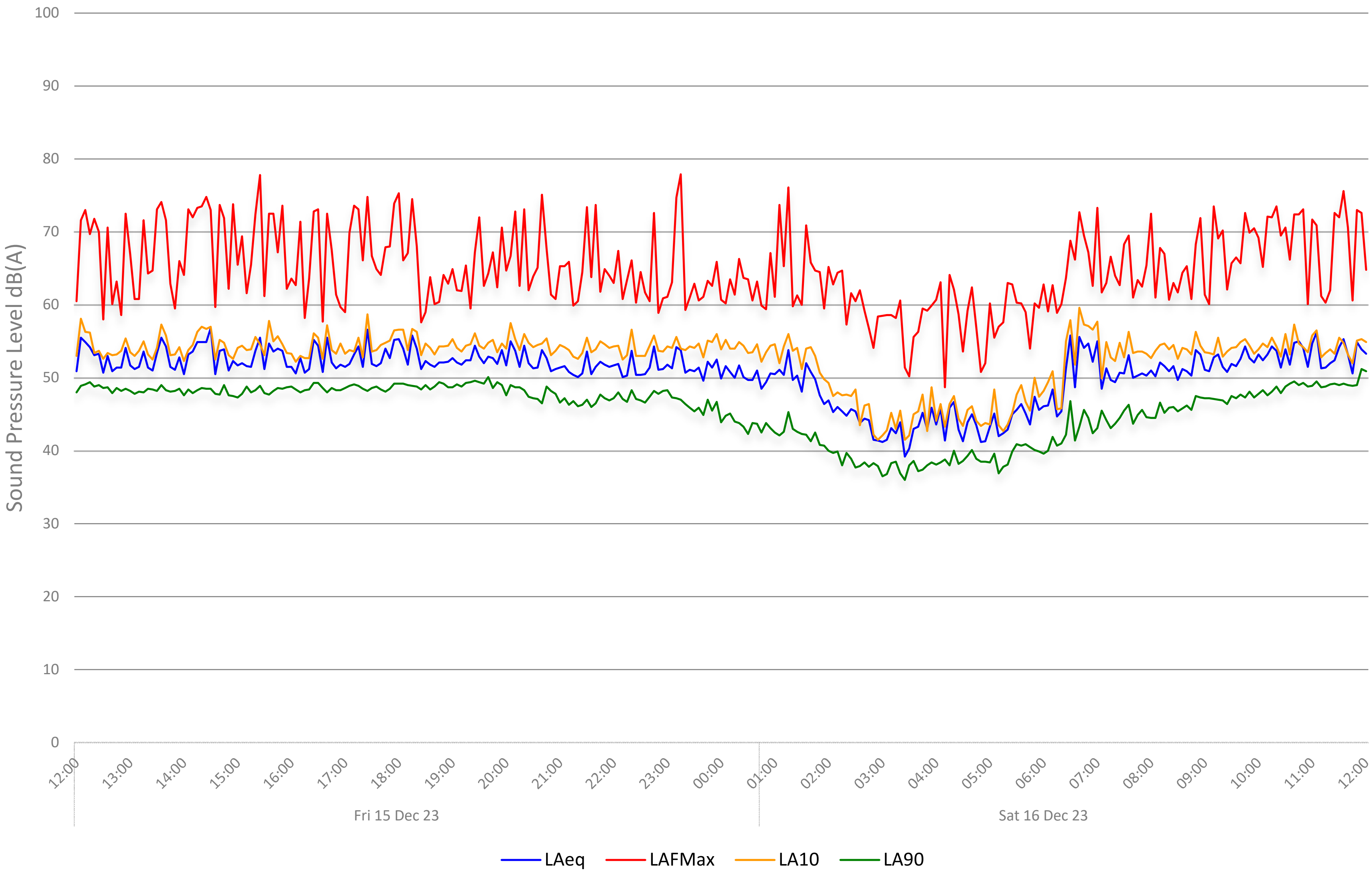
Figure VA5067/TH10



89 High Street, Billericay

Environmental Noise Time History: 11

Position 2 - Rear

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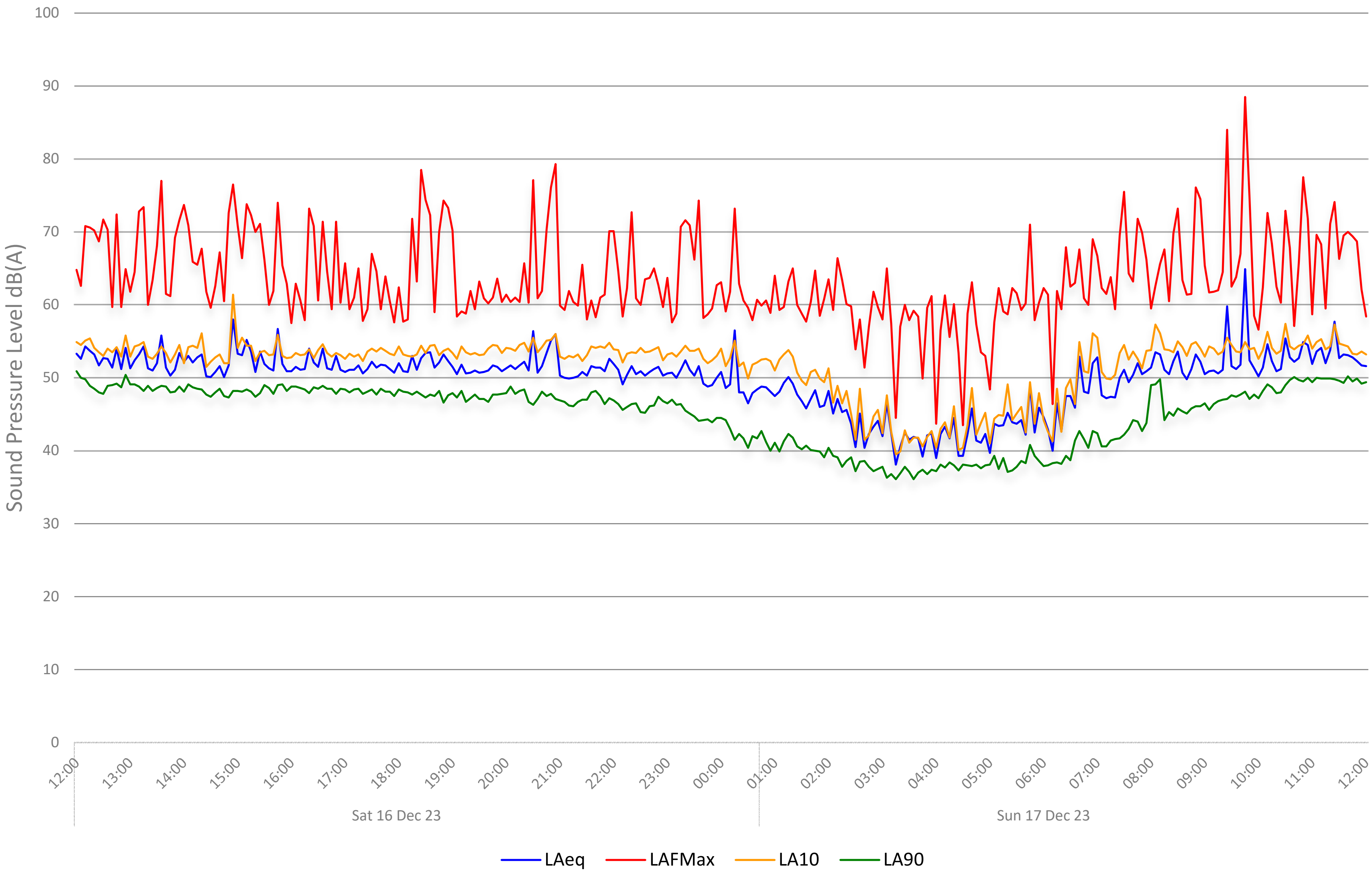
Figure VA5067/TH11



89 High Street, Billericay

Environmental Noise Time History: 12

Position 2 - Rear

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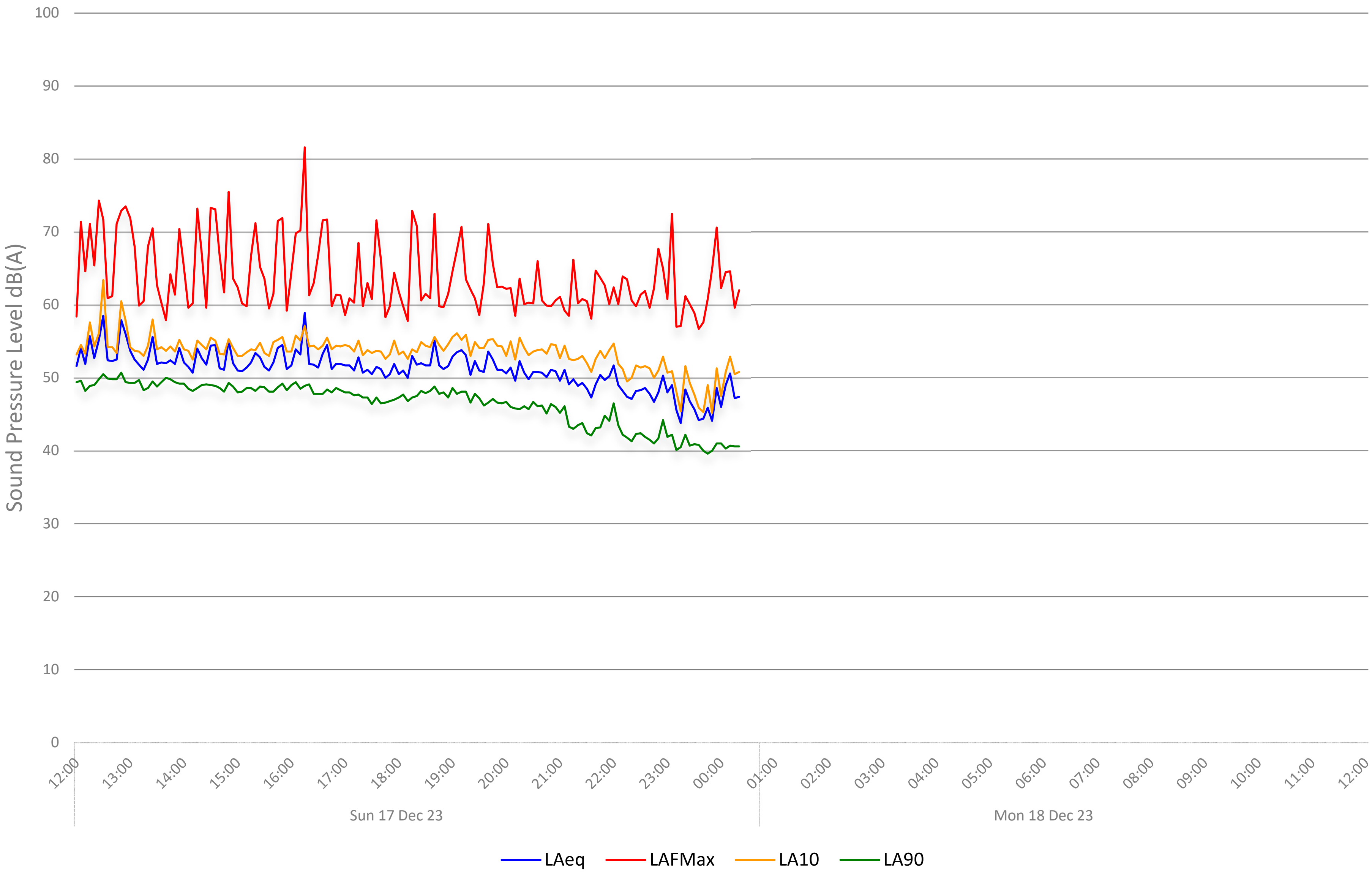
Figure VA5067/TH12



APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A.
L_{eq} :	A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90} :	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
L_{max} :	The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.
R	*Sound Reduction Index.* Effectively the *Level Difference* of a building element when measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-2:2010 and corrected for its size and the reverberant characteristics of the receive room.
$D_{n,e}$	Normalised sound insulation of small building elements of fixed dimensions, such as vents, measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-2:2010.
R_w D_w $D_{nT,w}$ $D_{n,e,w}$ $D_{n,f,w}$	Value of parameter, determined as above, but weighted in accordance with the procedures laid down in BS EN ISO 717-1 to provide a single-figure value.

1.1 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000

APPENDIX A

1.2 Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

1.3 Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in sound level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a tall barrier exists between a sound source and a listener, with the barrier close to the listener, the listener will perceive the sound as being louder if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the sound would seem quieter than if he were standing. This is explained by the fact that the "effective screen height" is changing with the three cases above. In general, the greater the effective screen height, the greater the perceived reduction in sound level.

Similarly, the attenuation provided by a barrier will be greater where it is aligned close to either the source or the listener than where the barrier is midway between the two.