



PREPARED: Wednesday, 07 June 2023

SANDY PARK STADIUM, EXETER

NOISE ASSESSMENT & MANAGEMENT PLAN

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AS12972/SP1	Site plan showing location of site and monitoring locations
AS12972/TH1-4	Time Histories – LT1
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Project Ref:	AS12972	Title:	Exeter Chiefs, Event Noise
Report Ref:	12972.230424.NIA.V1.1	Title:	Noise Assessment and Management Plan
Client Name:	Exeter Rugby Club Ltd		
Project Manager:	Mike McLoughlin		
Report Author:	Mike McLoughlin		
Clarke Saunders Acoustics Winchester SO22 5BE		This report has been prepared in response to the instructions of our client. It is not intended for and should not be relied upon by any other party or for any other purpose.	

1.0 INTRODUCTION

- 1.1 Clarke Saunders Acoustics (CSA) have been appointed by Exeter Rugby Club Ltd to provide acoustic support for music events to be held at Sandy Park Stadium, Exeter, EX2 7NN.
- 1.2 A variation to the existing licence for Sandy Park Stadium has been granted, and a variation in the extant planning permission is being sought to allow music events to be held at the stadium.
- 1.3 Exeter City Council (ECC) have requested that a noise assessment be conducted of potential music noise levels at surrounding noise sensitive receptors.
- 1.4 This report details the results of pre-event noise surveys carried out and the noise levels during weekend evenings, noise predictions of music noise levels from the event and assessment to the proposed criteria, and event noise management plan.

1.5 SITE AND EVENT DESCRIPTIONS

- 1.5.1 Sandy Park rugby stadium is located in an urban location, situated approximately 4.5 km east of the centre of Exeter and is shown in Figure ASI2972/SP1. The ambient sound climate at the site and surroundings is mainly determined by road traffic from the M5, A370 and local roads.
- 1.5.2 Noise sensitive receptors are located at varying distances from the stadium in each direction, as shown in Figure ASI2972/SP1.
- 1.5.3 The proposals are for the stadium to be utilised for the music events between May and August, outside of the rugby season.
- 1.5.4 The first year of events in 2023 are considered as a '*soft start*', with music events proposed to be held on four days throughout the year. Permission is currently being sought for these days.
- 1.5.5 Upon successful conclusion of the '*soft start*', it is the intention that the number of music events held at the stadium in future years would increase to up to eight calendar days a year, subject to suitable permissions and review of the impact of 2023 events. A single music event would be held on each day.
- 1.5.6 Gates for music events at the stadium during 2023 will open from circa 16:00h and the music events will conclude at 22:30h on Saturdays and 21:30h on Sundays.
- 1.5.7 The site will close at 23:30h on Saturdays and 22:30h on Sundays, to allow time for traffic movement, crowd dispersal & small equipment derigging of bands loading out.
- 1.5.8 Proposals are for the temporary south stand construction to be removed, replaced with a stage and array loudspeakers which will be located on hard standing immediately south of the pitch.

1.6 COMPETENCE

- 1.6.1 Noise surveys, predictions / assessment and management plan have been carried out by Mike McLoughlin, Senior Consultant at Clarke Saunders Acoustics, who is also the author

of this report. Mike has over 15 years' experience of noise consulting, holding a BSc (Hons) and MSc in acoustic studies.

1.6.2 The report adheres with the principles required by the Institute of Acoustics in its Code of Conduct, and the work is within the author's own area of knowledge and expertise. Where opinions have been expressed these represent true and complete professional opinions on the matters to which they refer.

1.6.3 CSA is a full member of the Association of Noise Consultants (ANC).

2.0 LICENCE, PLANNING, LOCAL AUTHORITY LIASION, AND CODE OF PRACTICE

2.1 PREMISES LICENCE

2.1.1 A variation to the existing licence for Sandy Park Stadium was granted on the 2nd February 2023, which included permission for live events to be held at the stadium subject to a number of conditions, including limiting events to:

- The area of the premises inside of the stadium.
- Saturdays (10:00 – 22:30) and Sundays (10:00 – 21:30).
- 2 Events per month (each Event lasting no longer than two days).
- No more than 2 consecutive weekends (to avoid 3 weekends in a row).
- The months May, June, July and August.
- A total of 15,500 people on the premises inclusive of the public, staff, crew and artists.

2.1.2 Any Events consisting of Licensable Activities shall be subject to an Event Management Plan '(EMP)' including a Noise Management Plan to include the following:

- Setting maximum decibel levels.
- The procedure for monitoring noise levels during the Event including liaison with the sound engineer for the Event.
- Testing prior to the Event.
- Record keeping.
- Dealing with noise complaints.
- Notification of residents.

2.1.3 The licence further states;

'At least 3 months prior to any Events taking place the licence holder must provide notification of the Event to the Licensing Authority (Exeter City Council), Environmental Health (Exeter City Council) and Devon and Cornwall Police. The notification must include the name of the Event, the duration of the Event (start, end date and time) and the number of people expected and must be in writing (email notification is acceptable) and must also include a copy the proposed EMP for the Event.'

Prior to any Event the final EMP must be approved by the Safety Advisory Group and the Responsible Authorities under the Licensing Act 2003 (including Environmental Health and Licensing Authority at Exeter City Council).

The final approved EMP must be kept on the premises during the course of the Event.

Prior to any event the Licence Holder shall appoint a suitably qualified and experience noise control consultant to liaise with all the Responsible Authorities under the Licensing Act 2003 (including Environmental Health and Licensing Authority at Exeter City Council) during the development of the EMP and with the licence holder, the promoter, the sound system supplier and the sound engineer on all matters relating to noise control prior and during the Event.

At least two months prior to an Event written notice shall be provided to local residents within at least a 1-mile radius of the premises, the residents association, placed on social media and the Licence Holders website which will include the date time and nature of the Event and details of a dedicated noise complaint line which will be manned and responded to throughout the Event.'

2.2 PLANNING APPLICATION

- 2.2.1 Exeter Rugby Club Ltd has submitted a planning application (23/0151/VOC) to redevelop the stadium to increase the capacity by providing three new grandstands and associated works. In addition, the application seeks to provide a variation of condition 7 of permission 12/1030/03 to allow music. Condition 7 of the extant permission limited the use of the stadium for playing rugby or other sporting activities and not to be used for public performance of musical events.

2.3 CODE OF PRACTICE ON ENVIRONMENTAL NOISE CONTROL AT CONCERTS

- 2.3.1 The 'Code of Practice on Environmental Noise Control at Concerts' (Noise Council 1995), provides guidance on the noise limits and operational procedures of the control of noise from concerts. The guidance states a number of guideline noise criteria for Music Noise Level (MNL) dependant on the number of events a year, as duplicated below.

CONCERT DAYS PER CALENDAR YEAR, PER VENUE	VENUE CATEGORY	GUIDELINE
1 - 3	Urban Stadia or Arenas	The MNL should not exceed 75 dB(A) over a 15-minute period
1 - 3	Other Urban and Rural Venues	The MNL should not exceed 65 dB(A) over a 15-minute period
4 - 12	All Venues	The MNL should not exceed the background noise level by more than 15 dB(A) over a 15-minute period

Table 3.1 – Code of Practice on Environmental Noise Control at Concerts Guidance

- 2.3.2 In the guidelines, the MNL is defined as the noise level measured one metre from the façade of any noise sensitive premises over a 15-minute period for events held between the hours of 09:00h and 23:00h.
- 2.3.3 The code of practice gives an indication of the potential impact of low frequency noise, with a level up to 70dB in either of the 63Hz or 125Hz octave frequency band being considered satisfactory; a level of 80 dB or more in either of those octave frequency bands causes significant disturbance.

2.3.4 The code also highlights that;

'Research shows that the music noise level in the audience by the mixer position at pop concerts is typically 100 dB(A), and that levels below 95 dB(A) will be unlikely to provide satisfactory entertainment for the audience.'

2.4 LOCAL AUTHORITY LIASION

2.4.1 CSA has consulted with the Environmental Health Department of Exeter City Council (ECC) (Alex Bulleid via phone / E-mail), to discuss the key considerations for the impact in relation to noise.

2.4.2 ECC have requested that noise monitoring at surrounding noise sensitive receptors be conducted prior to the events being conducted.

2.4.3 Discussions related to the number of events proposed to be held in 2023 and plans for subsequent years.

2.5 PROPOSED NOISE LIMITS

2.5.1 Discussions with the council (ECC) highlighted that the concert noise guidelines are based on events extending up to 23:00h, whereas the events at the stadium will conclude music at 22:30 on Saturdays and 21:30 on Sundays.

2.5.2 The guidance issued under section 182 of the Licensing Act 2003 (April 2018) states:

'...Any conditions appropriate to promote the prevention of public nuisance should be tailored to the type, nature and characteristics of the specific premises and its licensable activities. Licensing authorities should avoid inappropriate or disproportionate measures that could deter events that are valuable to the community, such as live music...'

2.5.3 It is, therefore, proposed that the MNL for the four days of music events at the stadium during 2023 will be set so as not to exceed 75 dB(A).

2.5.4 In addition, low frequency noise in the 63 Hz or 125 Hz octave frequency bands will be limited at surrounding noise sensitive receptors to below a level of L_{eq} 80 dB over a 15-minute period.

2.5.5 After the 2023 events are concluded, the noise impact of the events will be reviewed in consideration of any complaints received and the management of the events, with the view to apply for permission to conduct eight days of events in 2024 with the same noise criteria.

2.5.6 It is noted that music events at other stadiums within the UK operate with a limit of 75dB(A) for eight days of events in a year.

3.0 ENVIRONMENTAL SOUND SURVEY

3.1 A survey of the existing ambient and background sound levels was undertaken at the locations LT1, LT2, LT3 and LT4 shown in site plan ASI2972/SP1. This survey was carried out to determine representative background sound levels of the nearest noise sensitive receptors.

- 3.2 Automated sound level monitoring equipment was set to record measurements of consecutive 5-minute L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels. These monitors measured sound levels between the afternoon of Friday 24th March 2023 and the morning of Tuesday 28th March 2023. Data presented in this report has been time corrected to the actual time.
- 3.3 The noise meter at LT4 ceased monitoring on the early morning of Tuesday 28th March due to a power interruption. Nevertheless, data collected during the monitor's active period is deemed suitable for use.
- 3.4 During the monitoring period British summer time started and clocks changed at 01:00 on Sunday 26th March. The data shown in the time histories has not been adjusted for this time shift, and therefore all times shown are Greenwich Mean Time.
- 3.5 The sound level meters were located in free field positions at 1.5 m above ground level, with the exception of the meter at LT3, which was circa 2.5m above ground level.
- 3.6 The following equipment was used during the survey:
- 1 no. Svantek SV958 sound level meter (LT1)
 - 1 no. NTi XL2 sound level meter (LT3)
 - 2 no. Norsonic 118 sound level meter (LT2, LT4)
 - 1 no. Norsonic Rion sound level calibrator type 1251
- 3.7 The calibration of the sound level meters was verified before and after use, and no significant calibration drift was detected (<0.5 dB). All equipment has current certified traceable laboratory calibration which is available on request.
- 3.8 Measurements were made following procedures in BS 7445:1991 (ISO1996-2:1987) *Description and measurement of environmental noise Part 2-Acquisition of data pertinent to land use* and BS4142:2014 + A.1:2019 *Methods for rating and assessing industrial and commercial sound*.
- 3.9 The weather during the monitoring period was variable, with some periods of heavy rain and wind. The aim of the noise survey, however, is to determine noise levels at surrounding noise sensitive receptors during the weekend evening periods (Saturday / Sunday) when the proposed events are due to occur.
- 3.10 During Saturday evening the weather was dry with light winds until 20:00, when rain commenced and did not cease until the early hours. The rain will have caused road noise to be higher than with dry roads, which may have affected noise measurements. Noise data from this period has been included in the results for completeness.
- 3.11 The Sunday evening was dry with light winds and was deemed suitable for the purposes of the noise surveying.

3.12 SOUND SURVEY RESULTS

- 3.12.1 Figures ASI2972/TH1-TH4 show the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels as time histories at measurement position LT1, ASI2972/TH5-TH8 shows the same data at LT2, ASI2972/TH9-TH12 at LT3, and ASI2972/TH13-TH16 at LT4.

- 3.12.2 In determining background noise levels, the 'Code of Practice on Environmental Noise Control at Concerts' states that the level should be the arithmetic average of the hourly L_{A90} measured over the last four hours of the proposed music event or over the entire period of the proposed music event if scheduled to last for less than four hours.
- 3.12.3 The average sound levels measured during the survey during weekend evening periods are shown in the table below. The typical highest L_{AFmax} is also shown, defined as the 90th percentile of the L_{AFmax} dataset, and the L_{A90} , defined as the arithmetic average of the L_{A90} dataset.
- 3.12.4 Some data presented below is not used in the assessment, however, is included to provide information on the soundscape at the noise sensitive receptors.

LOCATION	PERIOD	NOISE LEVEL		
		$L_{Aeq,T}$	TYPICAL L_{Amax} (90 th PERCENTILE)	AVERAGE L_{A90}
LT1 (free-field)	Saturday Evening* (18:30-22:30)	55 dB	66 dB	51 dB
	Sunday Evening (17:30-21:30)	54 dB	67 dB	51 dB
LT2 (free-field)	Saturday Evening* (18:30-22:30)	57 dB	65 dB	53 dB
	Sunday Evening (17:30-21:30)	63 dB	72 dB	60 dB
LT3 (free-field)	Saturday Evening* (18:30-22:30)	53 dB	65 dB	49 dB
	Sunday Evening (17:30-21:30)	56 dB	68 dB	53 dB
LT4 (free-field)	Saturday Evening* (18:30-22:30)	58 dB	76 dB	56 dB
	Sunday Evening (17:30-21:30)	65 dB	76 dB	62 dB

Table 4.1 – Results of environmental sound survey

[dB ref. 20μPa]

* Measurements may be adversely affected by metrological conditions

4.0 NOISE ASSESSMENT

- 4.1 Noise predictions of the overall MNL and levels within the 63 Hz and 125 Hz octave bands have been made at the surrounding noise sensitive receptors.
- 4.2 The Code of Practice Guidance indicates that limiting the noise levels below $L_{Aeq, 15min}$ 95 dBA at the front of house (the mixer position within the audience) may lead to an unsatisfactory event.

- 4.3 Noise predictions have been made based on achieving these range of levels at the front of house position located 30m in front of the stage, with the frequency spectrum¹ detailed below.

NOISE LEVELS	63	125	250	500	1K	2K	4K	8K	dBA
Front of House Noise levels	105	95	92	92	91	87	81	78	95

Table 4.1 – Front of house noise levels – Sound pressure level

- 4.3.1 Noise predictions have been carried out for the proposed loudspeaker arrays by contour modelling using the calculation protocols defined within ISO 9613-1:1993 and ISO 9613-2:1996, as implemented within CadnaA noise prediction software.
- 4.3.2 The model has incorporated LIDAR ground terrain data, buildings, and assumed reflective building envelope.
- 4.3.3 Meteorological conditions have been integrated within the model with ambient temperature of 15°C, relative humidity 70%, and wind speed of 3 m/s. The ISO 9613-2:1996 calculation procedure is based on downwind directions favourable to propagation from sources of noise, or under a well-developed moderate ground-based temperature inversion which can commonly occur on clear calm nights.
- 4.3.4 Details of the sound system design has been provided by the production team and consist of the following for the stage left and right PA, with 8 x J8 and 2 x J12 speakers per hang.
- 6 x d&b Q7 front fill
 - 16 x d&b J-Subs
 - 16 x d&b J8
 - 4 x d&b J12
 - 2 x d&b J Flying Frame
 - 4 x d&b audiotechnik Q7 Loudspeakers
- 4.3.5 Two additional areas are proposed for stage left and right grandstand fills, with 8 x J8 hangs both Stage Left and Right.
- 16 x d&b J8
- 4.3.6 Loudspeaker directivity has been incorporated into the noise model by utilising Common Loudspeaker Format (CLF) data for the proposed speakers, or similar models where data is not available for the original speakers.
- 4.3.7 Low frequency music noise within the 63 Hz octave band have been modelled from the subwoofer speakers, with a roll off in level of the subwoofer speakers at and above the 125 Hz octave band. Array loudspeakers have been modelled with noise emissions from the 125 Hz octave band and above

¹ An Evaluation of UK And International Guidance for The Control of Noise at Outdoor Events, Wheeler et al, Proceedings of the Institute of Acoustics. Vol.42.Pt.3 2020

4.3.8 The predicted noise levels ($L_{Aeq,15min}$) at the nearest receptors based on the proposed loudspeakers are shown in Figure ASI2972/N1.

4.3.9 A summary of the predicted noise levels at key locations and noise sensitive receptors are detailed in the table below.

LOCATION	PREDICTED MUSIC NOISE LEVEL		
	$L_{Aeq,15min}$	$L_{eq,15min}$ 63 Hz	$L_{eq,15min}$ 125 Hz
Front of House (@30m)	95 dB	105 dB	95 dB
Sandy Park Farm	75 dB	73 dB	78 dB
Old Rydon Lane (West)	66 dB	67 dB	71 dB
Old Rydon Lane (East)	67 dB	75 dB	71 dB
Clyst Road	60 dB	72 dB	64 dB
Woodland Drive	66 dB	75 dB	67 dB
Western Permitted development (21/0496/FUL)	60 dB	67 dB	65 dB

Table 5.1 – Predicted Music Noise Levels

[dB ref. 20 μ Pa]

4.3.10 The predicted music noise levels are at or below the proposed noise criteria for the events. There is an inherent uncertainty in relation to noise predictions, however the noise model predictions demonstrate that the event is feasible in relation to controlling noise emissions from the event to within a suitable noise level whilst maintaining a suitable volume for audiences.

4.3.11 Controls will be put in place in the form of sound propagation tests and on-site monitoring during events to ensure that noise emissions are controlled.

4.3.12 It is noted that some meteorological conditions such as high wind or temperature inversions can significantly affect noise propagation. The model does, however, assume the worst case meteorological propagation conditions in all directions.

5.0 EVENT MANAGEMENT PLAN

5.1 The following measures are recommended in order to minimise impacts of event noise as far as practicable. These measures would form part of an Environment Management Plan (EMP), which should be agreed with the Local Planning Authority

5.2 PRE-EVENT INFORMATION

5.2.1 In accordance with the licence, at least two months before the event written notice shall be provided to local residents within at least a 1-mile radius of the premises, the residents' association, placed on social media and the Licence Holder's website which will include

the date, time and nature of the Event and details of a dedicated noise complaint line which will be staffed and responded to throughout the Event.

- 5.2.2 The licensee will provide details to the Environmental Health Department of the proposed times of any rehearsal or sound checks, sound propagation tests, event times, and set up and break down periods.

5.3 SOUND PROPAGATION TESTS

- 5.3.1 A sound propagation test will be carried out on the day of the event which would not commence before 10:00h. The propagation test will involve music being played through the event speaker system of the event artist(s) or a similar artist(s) within the same genre.
- 5.3.2 It is anticipated that these tests would be undertaken during the set up and artist sound checks, currently programmed to occur between the period 10:00hrs and 15:45hrs. Tests at high volumes for propagation test purposes are likely to require less than 30 minutes duration.
- 5.3.3 During the sound propagation test the MNL will be monitored simultaneously at a predetermined fixed monitoring location at the mixer location / Front of House and at the closest noise sensitive receptors.
- 5.3.4 These tests will determine the maximum level at the mixer location / Front of House which will meet the MNL at surrounding noise sensitive receptors, allowing subsequent adjustment of running noise levels during the event. The tests allow for consideration of atmospheric absorption and meteorological conditions.

5.4 EVENT NOISE MONITORING

- 5.4.1 The appointed lead noise consultant will have overall responsibility by the event organiser for monitoring noise levels and has the ability and authority to make decisions and implement changes in noise level during the event.
- 5.4.2 All other parties including production staff, artists, stage managers, and sound engineers are not to alter sound levels without express permission from the lead noise consultant.
- 5.4.3 A class 1 noise monitor will be located at the mixing desk / FoH location, which will monitor 1-minute and 15-minute overall L_{Aeq} noise levels, and L_{eq} levels in the 63 Hz and 125 Hz octave bands.
- 5.4.4 Noise levels at the mixing desk / FoH location will be monitored in reference to the results of the sound propagation test results to provide an indication that the noise limits at surrounding noise sensitive receptors can be achieved. Direct feedback will be provided to the production team / sound engineer(s) for any adjustments to event noise levels which are required.
- 5.4.5 Offsite noise measurements will be conducted during the event with a class 1 noise monitor at a sample of the nearest noise sensitive receptors, which will be agreed with the local authority.
- 5.4.6 Noise data of 1-minute and 15-minute overall L_{Aeq} noise levels, and L_{eq} levels in the 63 Hz and 125 Hz octave band will be collected.

- 5.4.7 Where any exceedance of the event MNL is measured, the noise consultant shall immediately contact the production team / FOH via two-way radio to reduce music noise levels and noise measurements will continue until levels are demonstrated to achieve the event noise limits.

5.5 EVENT SET UP, BREAK DOWN, AND CLEAN UP

- 5.5.1 The events are to be held over two consecutive weekends with the event site / stage being in situ during the whole period. The site set up is proposed to occur from Tuesday 13th to Friday 16th June 2023 between the hours of 10:00h – 20:00h.
- 5.5.2 The event site / stage will be dismantled between the hours of 10:00h – 20:00h from Monday 26th to Wednesday 28th June 2023.
- 5.5.3 During these times there may some periods of increased noise emissions from the Sandy Park site, although the levels associated with these works are unlikely to result in adverse impacts on surrounding noise sensitive receptors.
- 5.5.4 The music events will conclude at 22:30h on Saturdays and 21:30h on Sundays, with the whole site closing at 23:30h on Saturdays and 22:30h on Sundays. This time allows for traffic movement, crowd dispersal & small equipment derigging of bands loading out.
- 5.5.5 Noise from small equipment derigging is unlikely to result in elevated noise emissions from site, and would not be expected to result in adverse impacts on surrounding noise sensitive receptors.

5.6 TRANSPORT PLANNING

- 5.6.1 Due to the location of the site and the number of attendees there is the potential of noise impacts from people attending the events. The site operator is developing a site dispersal plan which would not be dissimilar to rugby games. However, measures are proposed to utilise a greater number of buses to transport people to and from the event.
- 5.6.2 For rugby games, the Digby Park and ride car park is utilised, however during the proposed events this car park will be closed to minimise the number of people walking through the Clyst Heath residential area. Full details are available within the site dispersal plan.

5.7 COMPLAINTS PROCEDURE

- 5.7.1 A clear and detailed complaints procedure shall be provided to local residents to enable them to report potential issues relating to noise, including details of a dedicated noise complaint line (01392 890990) which will be staffed during the event.
- 5.7.2 Noise complaints will be logged and investigated, with a record kept of complainant concerns, contact details, precise timings and any involvement with the Local Planning Authority. Complainants' consent for their details to be held on file must be secured for GDPR compliance.
- 5.7.3 Upon a complaint being received / recorded, the telephone staff shall immediately inform the noise consultants supporting the event and will email details to the noise consultant where appropriate. The noise consultant has the ability and authority to make decisions and implement changes in noise level during the event.

- 5.7.4 The noise consultant will contact the production team via two-way radio to notify them of the complaint and determine the requirement for investigation. The noise consultant will visit the complainant's property to take noise measurements.
- 5.7.5 Where music noise levels are measured to be above the event noise limits, the noise consultant shall immediately contact the production team / FOH via two-way radio to inform the need to reduce music noise levels.
- 5.7.6 Any practical action identified by the licensee should be documented and logged alongside the complaint with feedback to the complainant on any actions and timescales.
- 5.7.7 The licensee should investigate the cause of the complaint, making contact with the complainant and visiting their premises if required.
- 5.7.8 Any complaints received should be logged by the licensee using the complaints reporting form (Appendix B) or similar.
- 5.7.9 The complaints log shall be held at the licensee's office register and made available to the Local Planning Authority on request.

5.8 POST EVENT REPORTING

- 5.8.1 After the event has concluded, a post event report will be provided by the noise consultant to the local authority within 28 days after the event. This report will detail noise measurements made on site, as well as noise measurements made at surrounding noise sensitive receptors.
- 5.8.2 The report will detail any complaints received and actions taken, including noise measurements. Details of any complaints can be made available to the Local Planning Authority on request before the 28-day period.

6.0 CONCLUSIONS

- 6.1 Clarke Saunders Acoustics have been appointed by Exeter Rugby Club Ltd to provide acoustic support for music events to be held at Sandy Park Stadium, Exeter, EX2 7NN.
- 6.2 A variation to the existing licence for Sandy Park Stadium has been granted, and a variation in the extant planning permission is being sought to allow music events to be held at the stadium.
- 6.3 This report has detailed noise surveys conducted at surrounding noise sensitive receptors and provided a summary of the noise levels during weekend evenings.
- 6.4 The noise assessment has predicted that music noise levels from the event at surrounding noise sensitive receptors are likely to be at or below the proposed noise criteria for the events.
- 6.5 Based on the proposed operation of events, an Event Management Plan including noise limits is proposed to address and limit the potential noise impacts on surrounding noise sensitive receptors.
- 6.6 Exeter Rugby Club Ltd is committed to incorporating the management plan into the event operations.

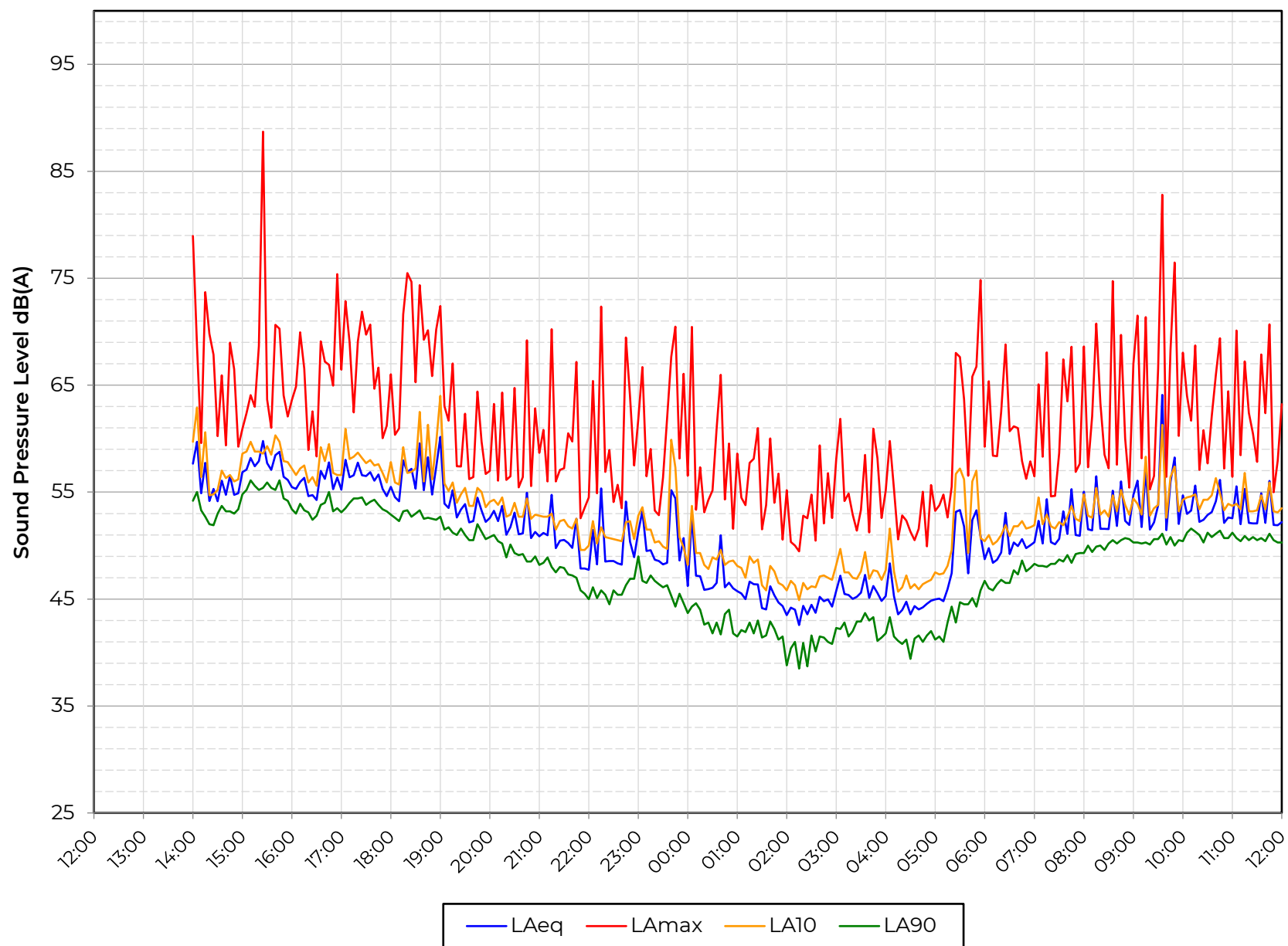


Mike Mccloughlin MIOA
CLARKE SAUNDERS ACOUSTICS



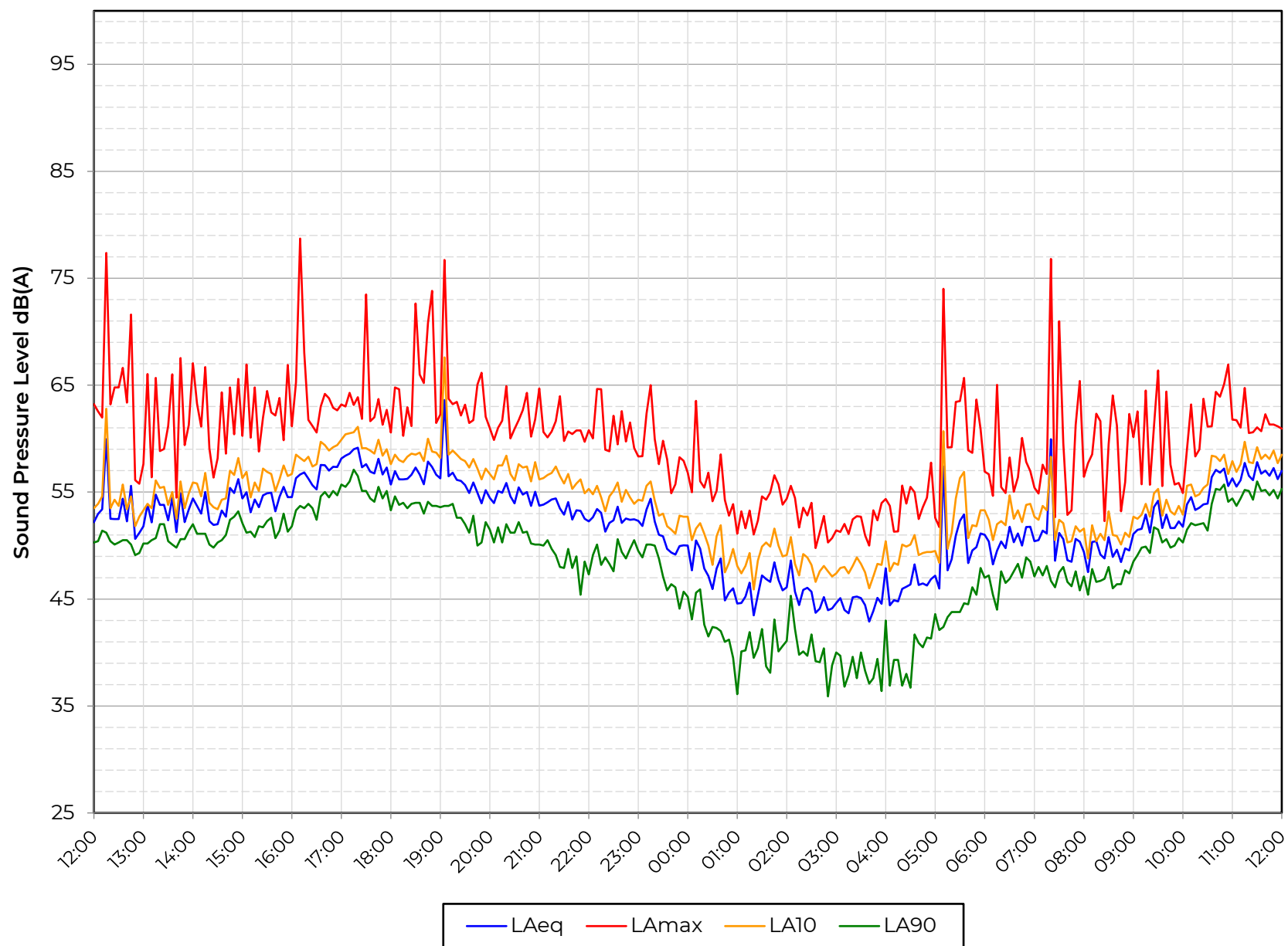
Exeter Chiefs - Event Noise

Position LTI



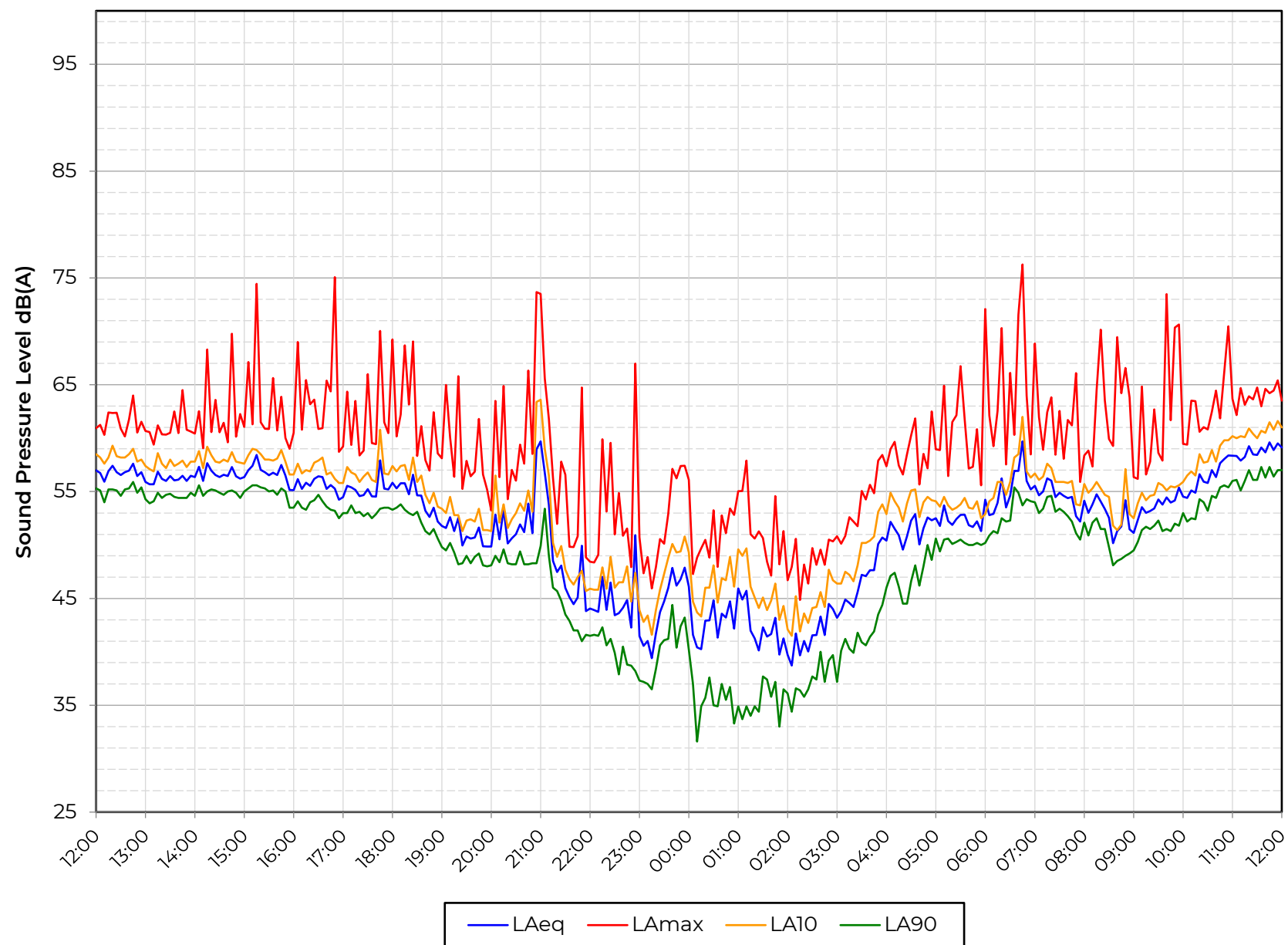
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Position LTI



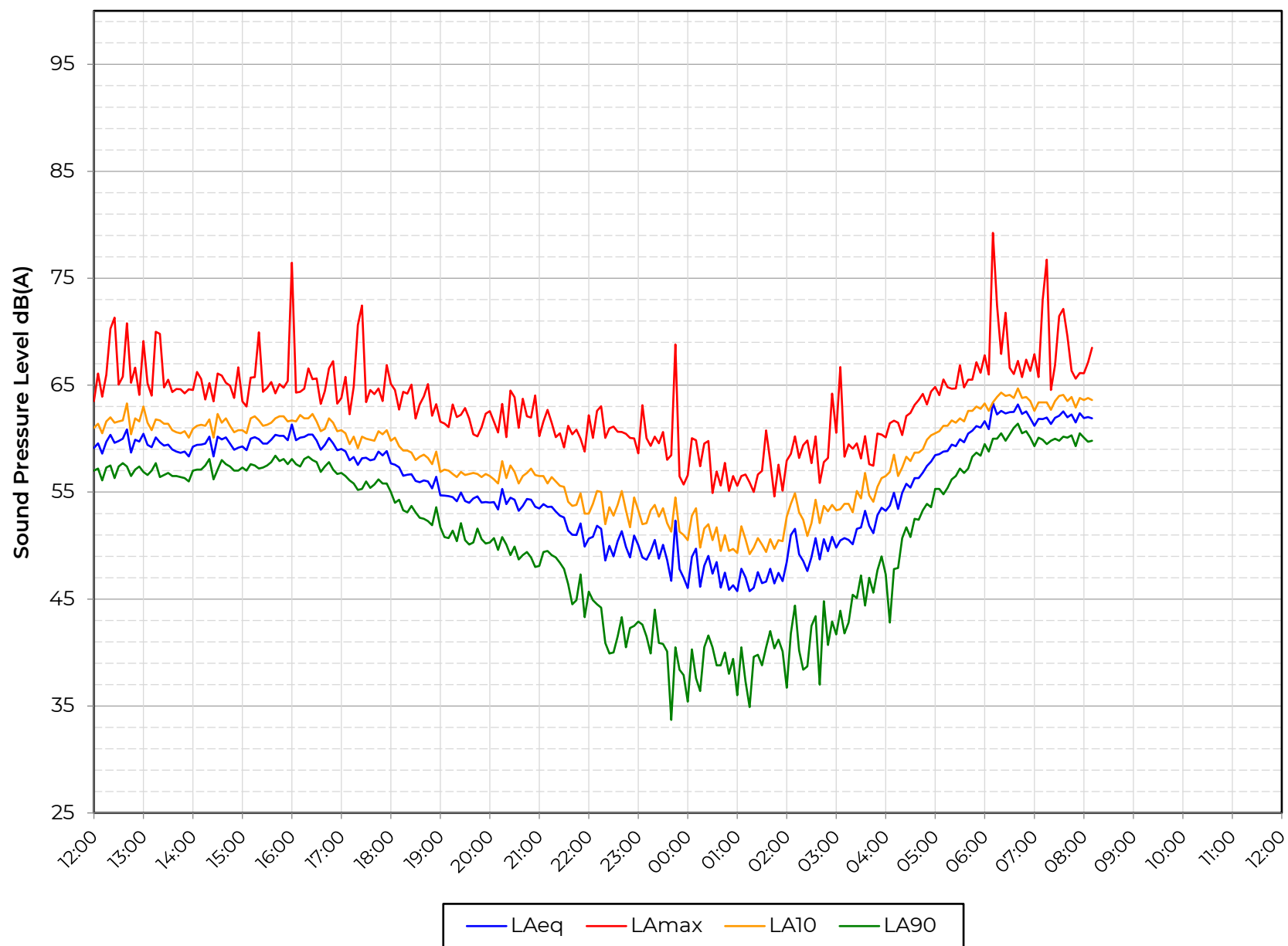
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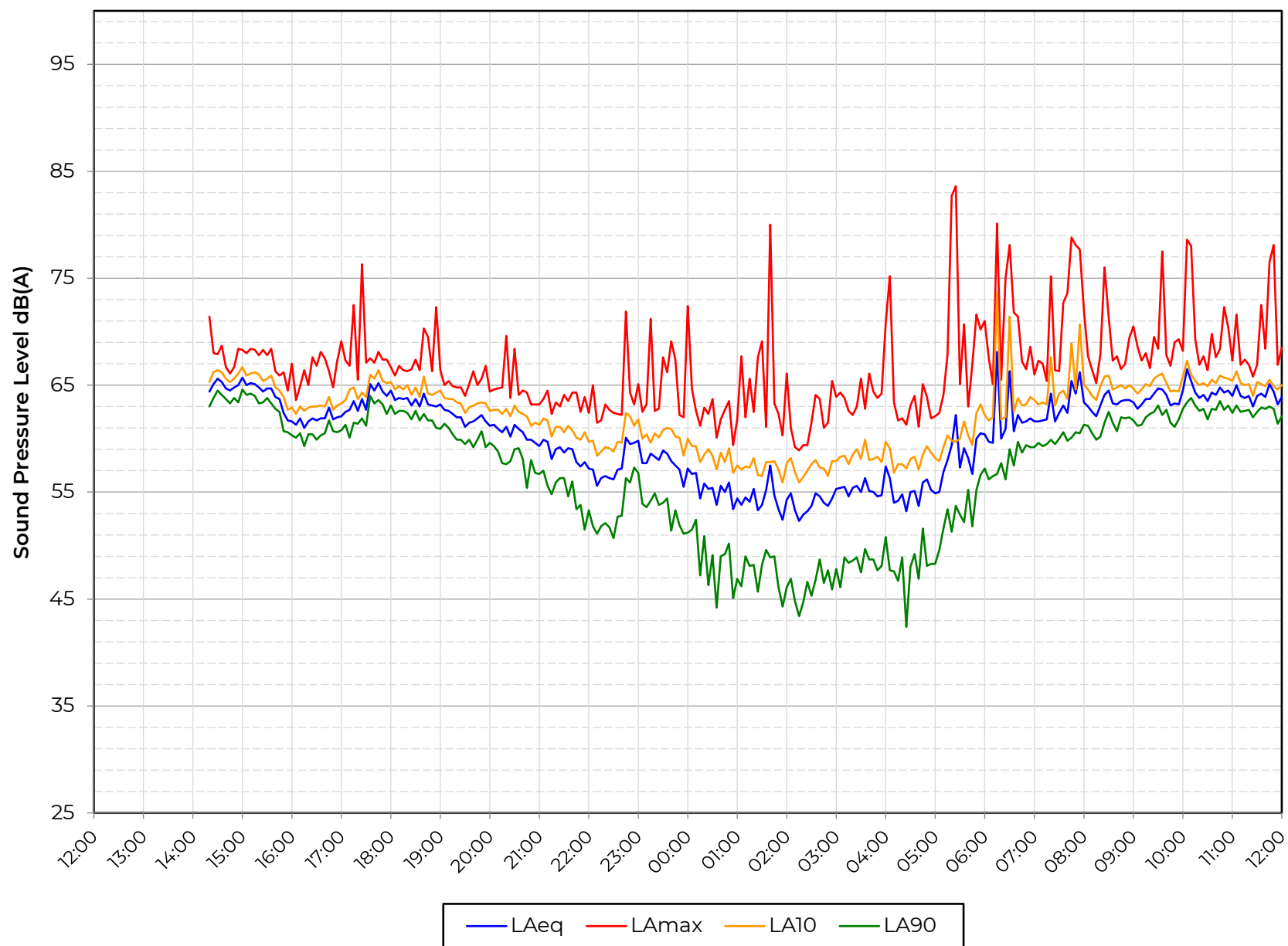
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Position LTI



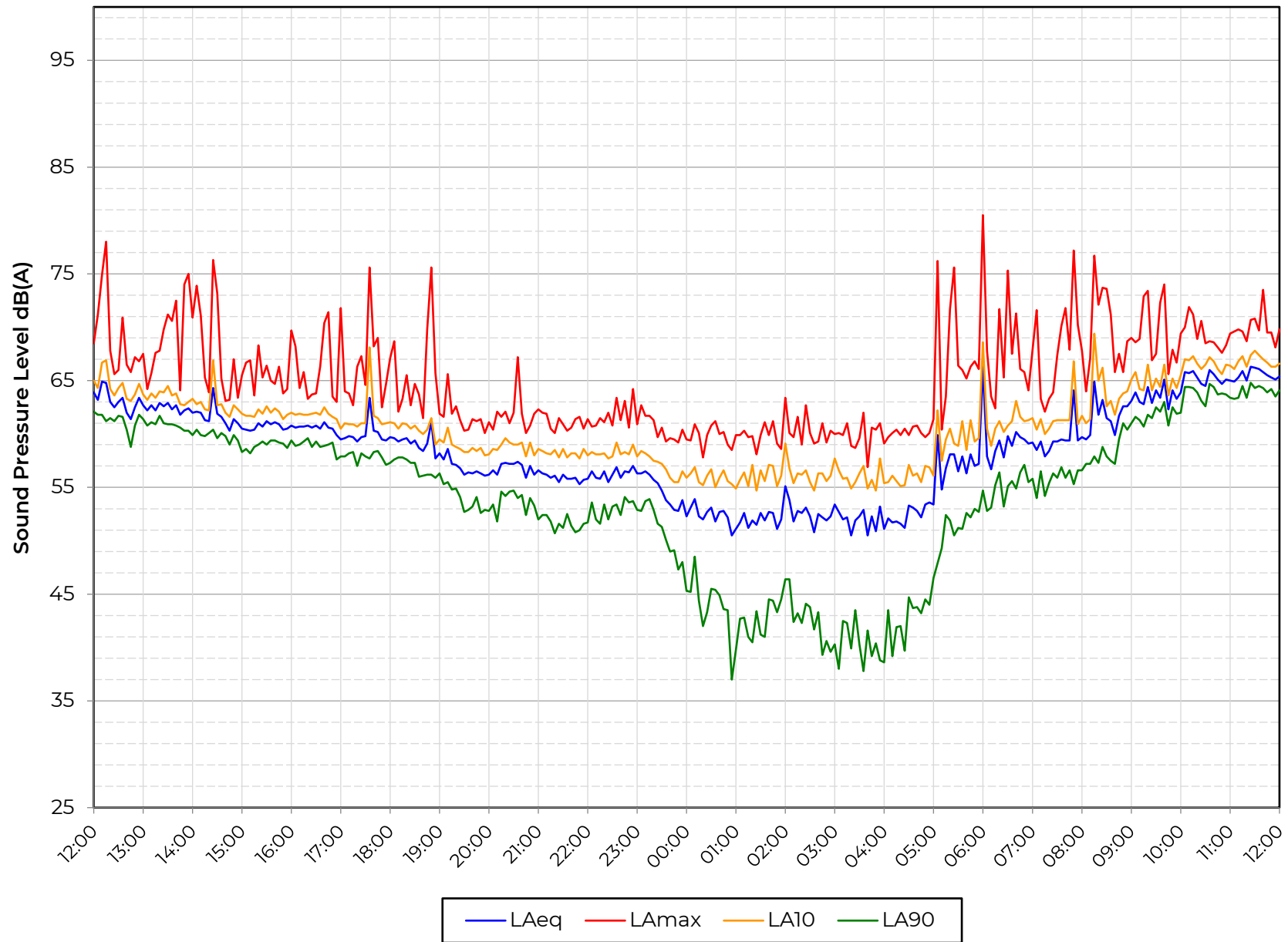
Exeter Chiefs - Event Noise

Position LT2



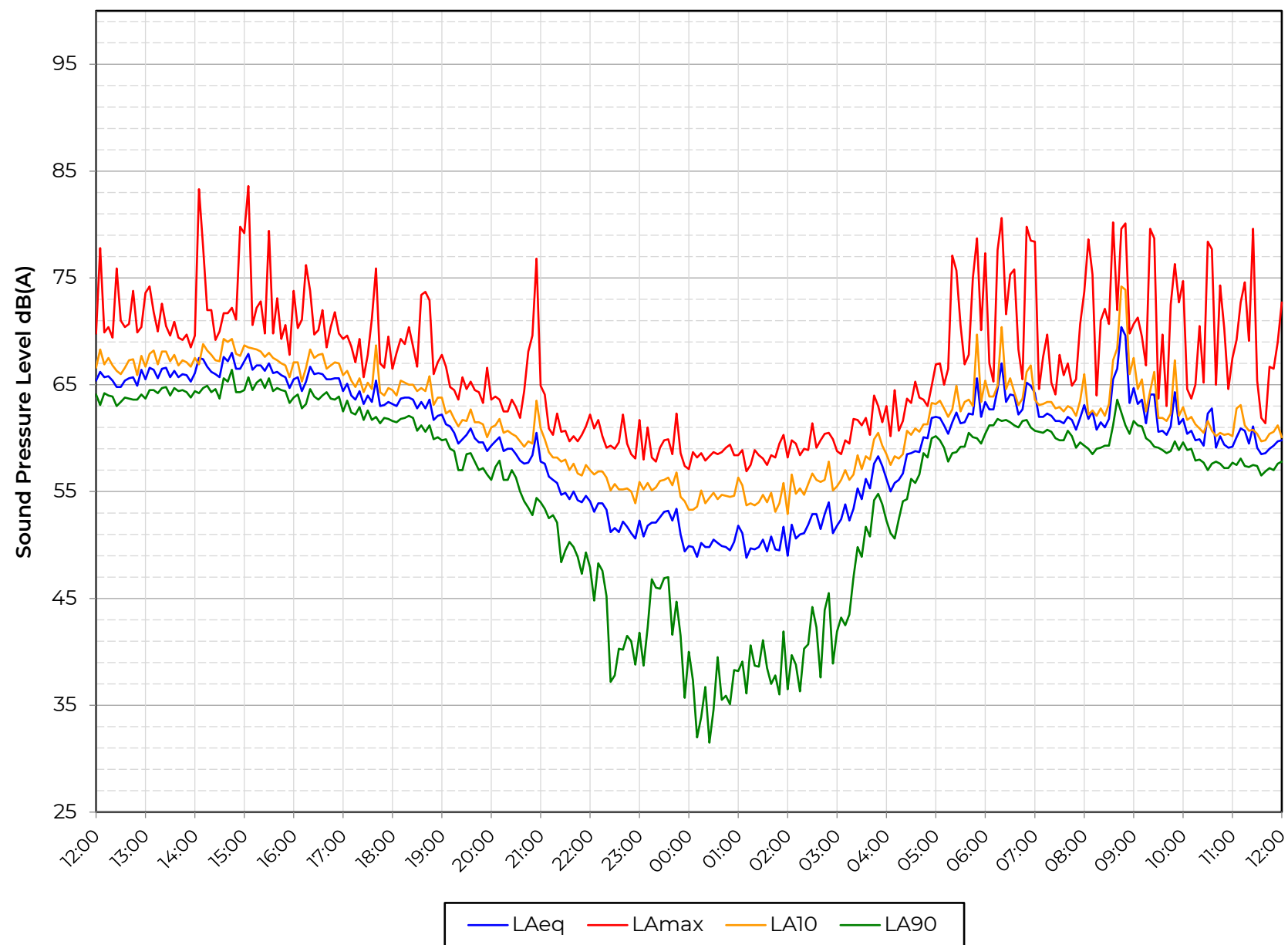
Exeter Chiefs - Event Noise

Position LT2



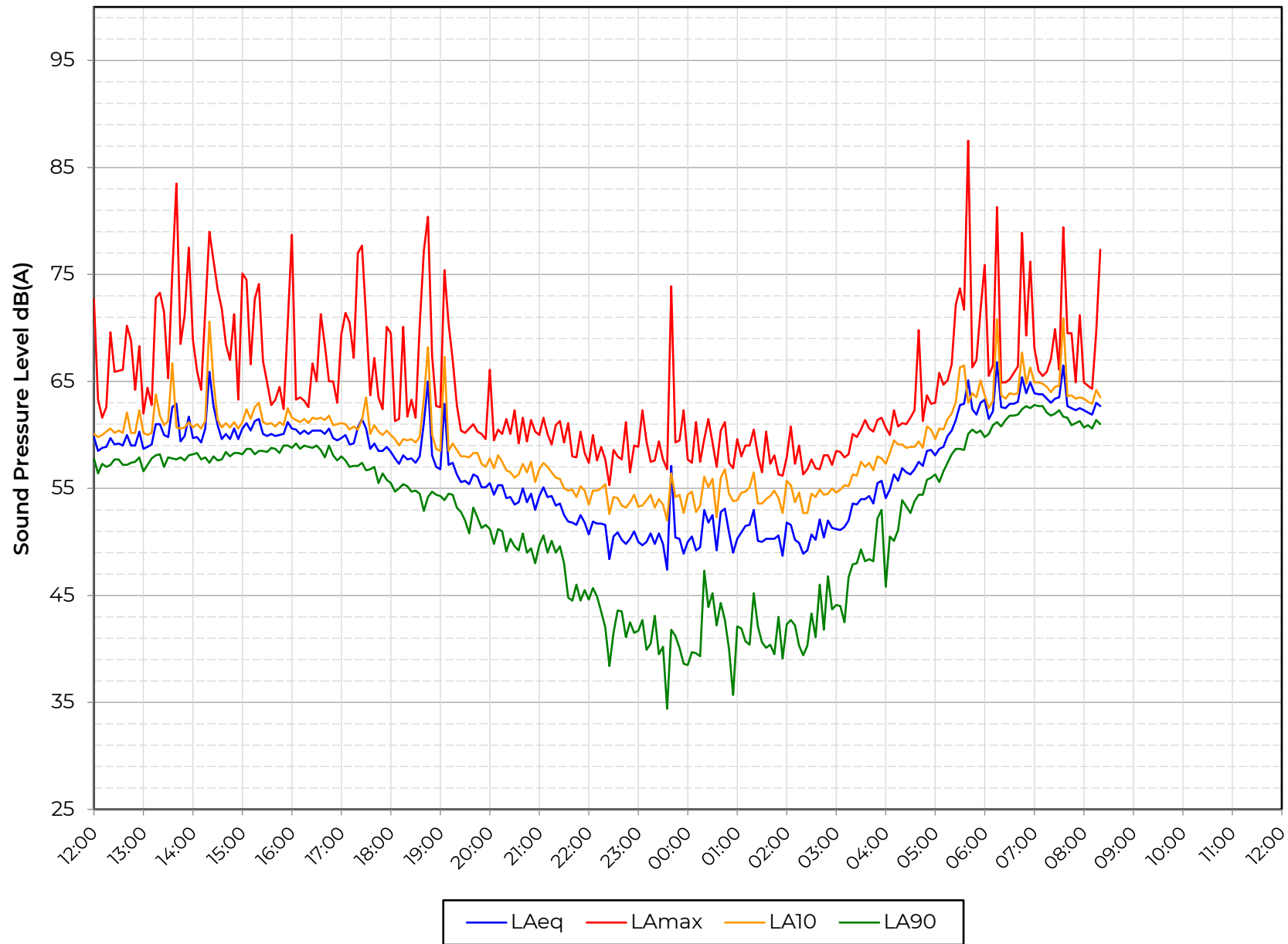
Exeter Chiefs - Event Noise

Position LT2



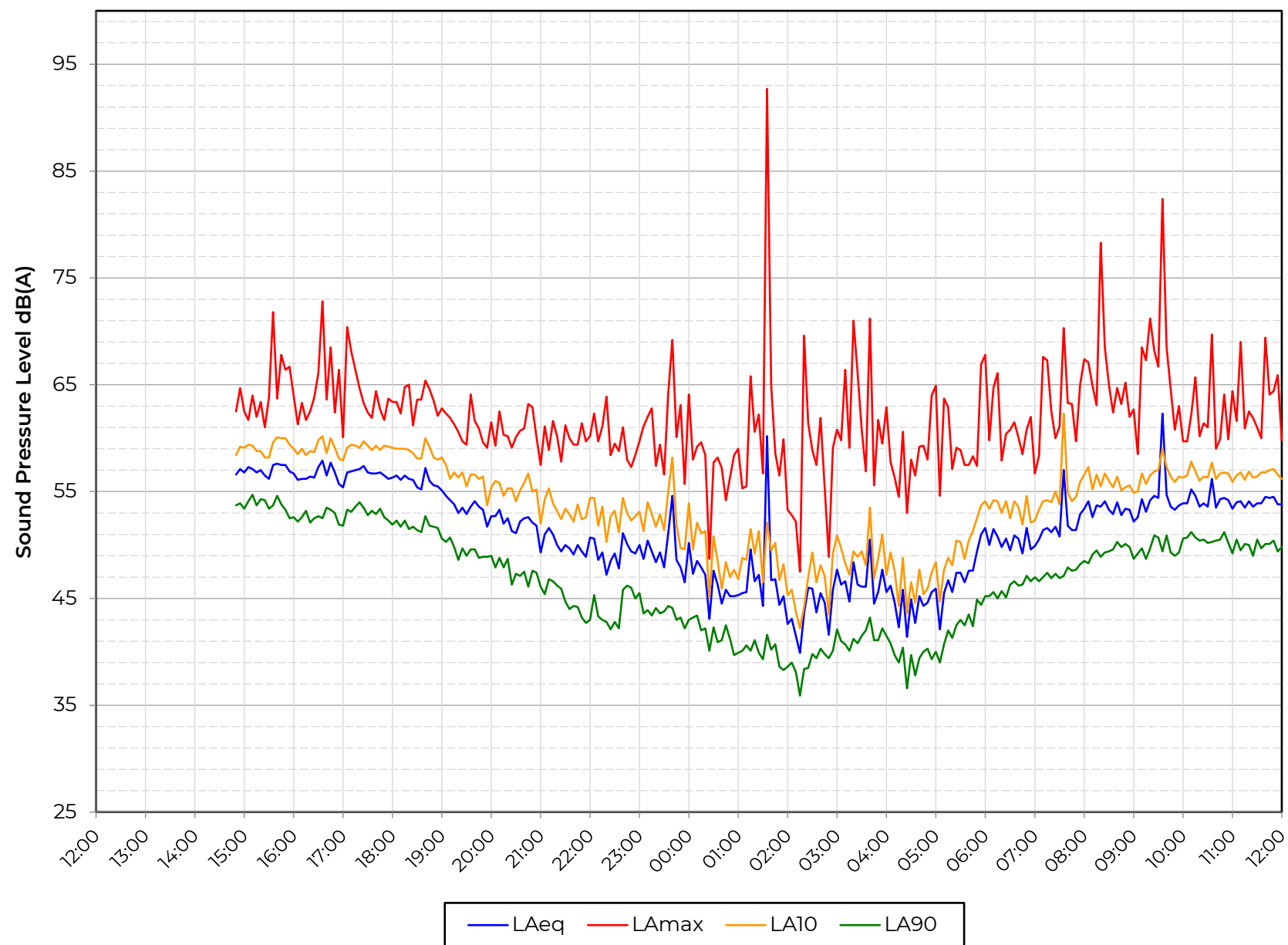
Exeter Chiefs - Event Noise

Position LT2



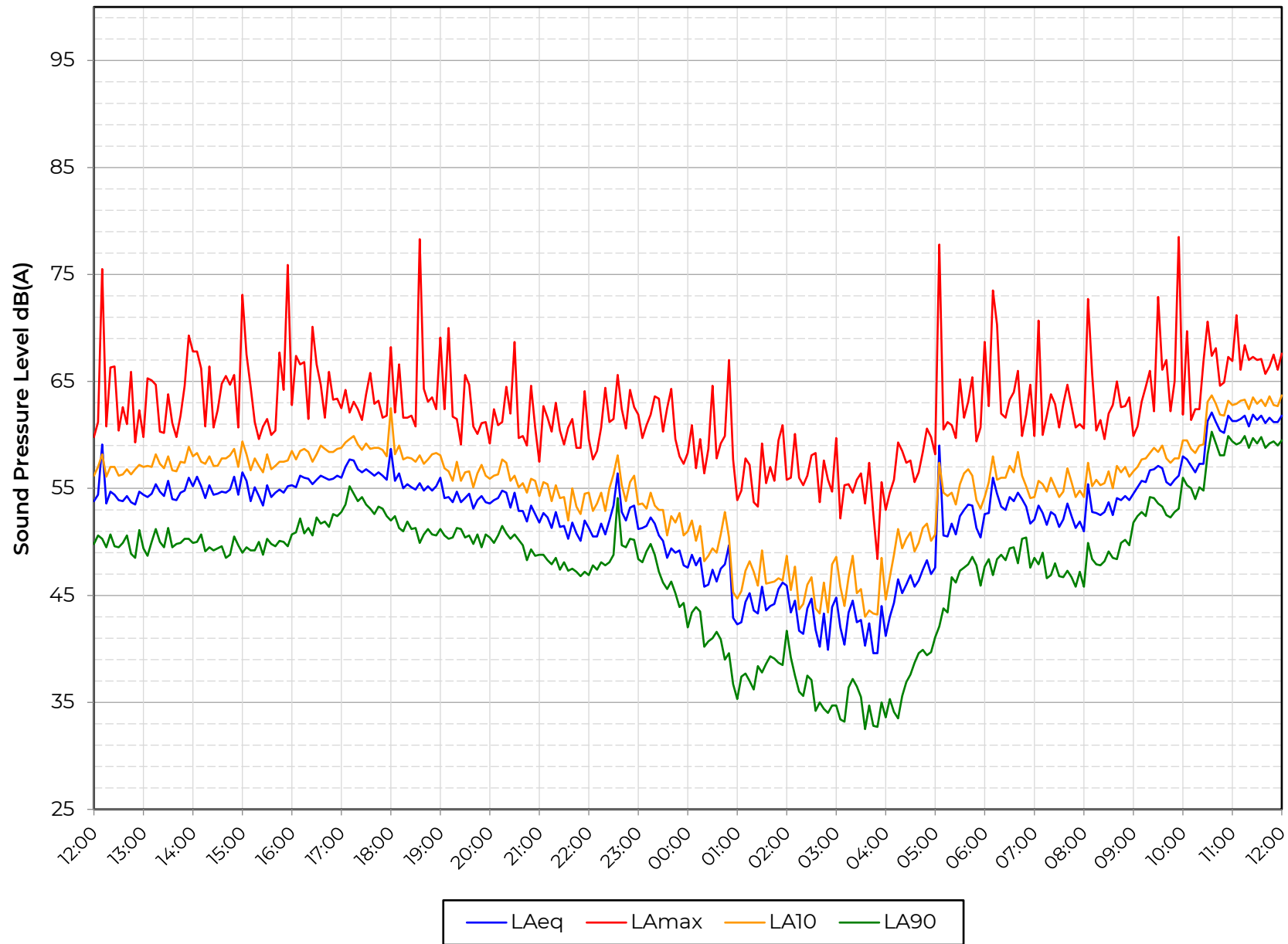
Exeter Chiefs - Event Noise

Position LT3



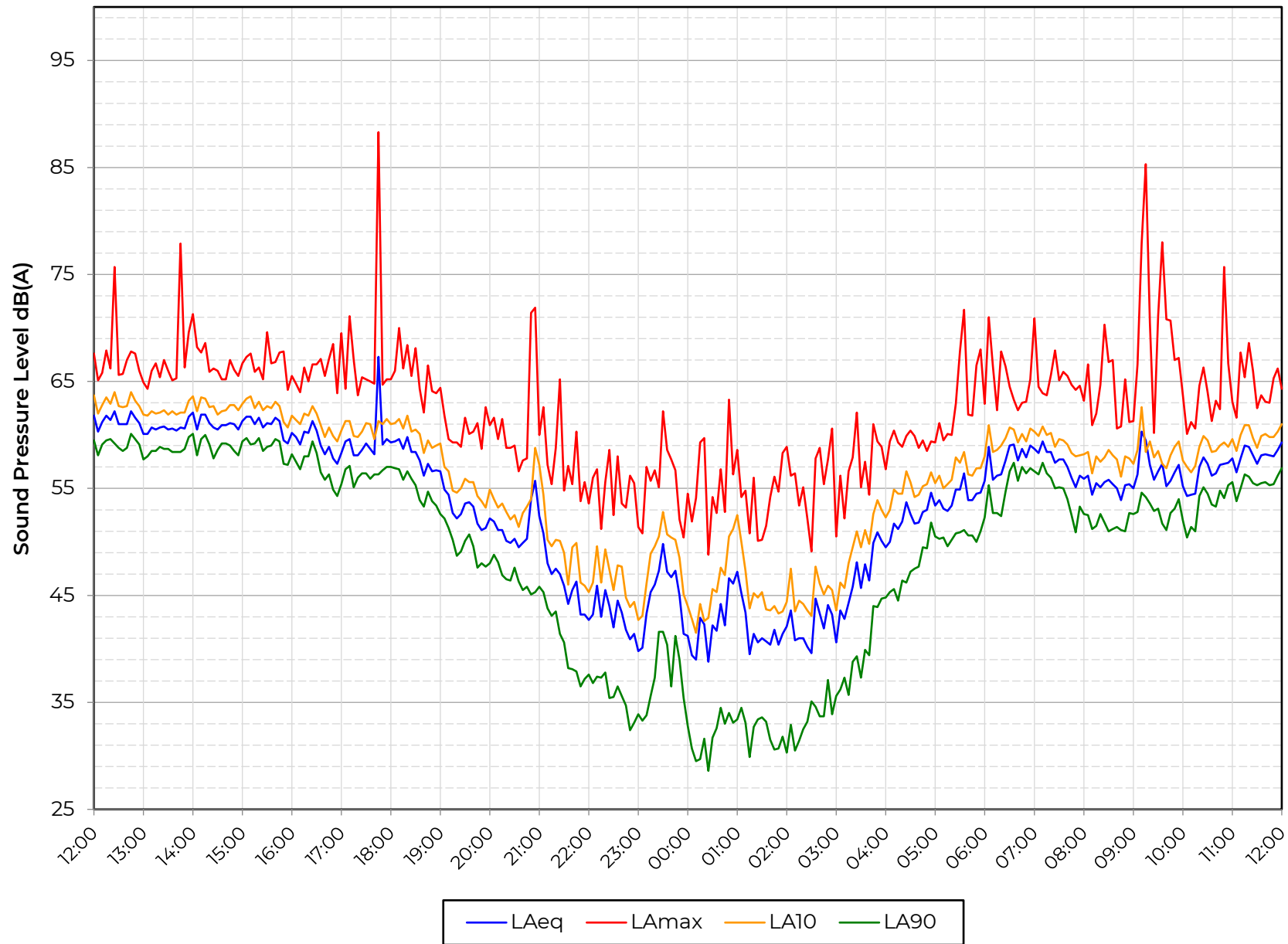
Exeter Chiefs - Event Noise

Position LT3



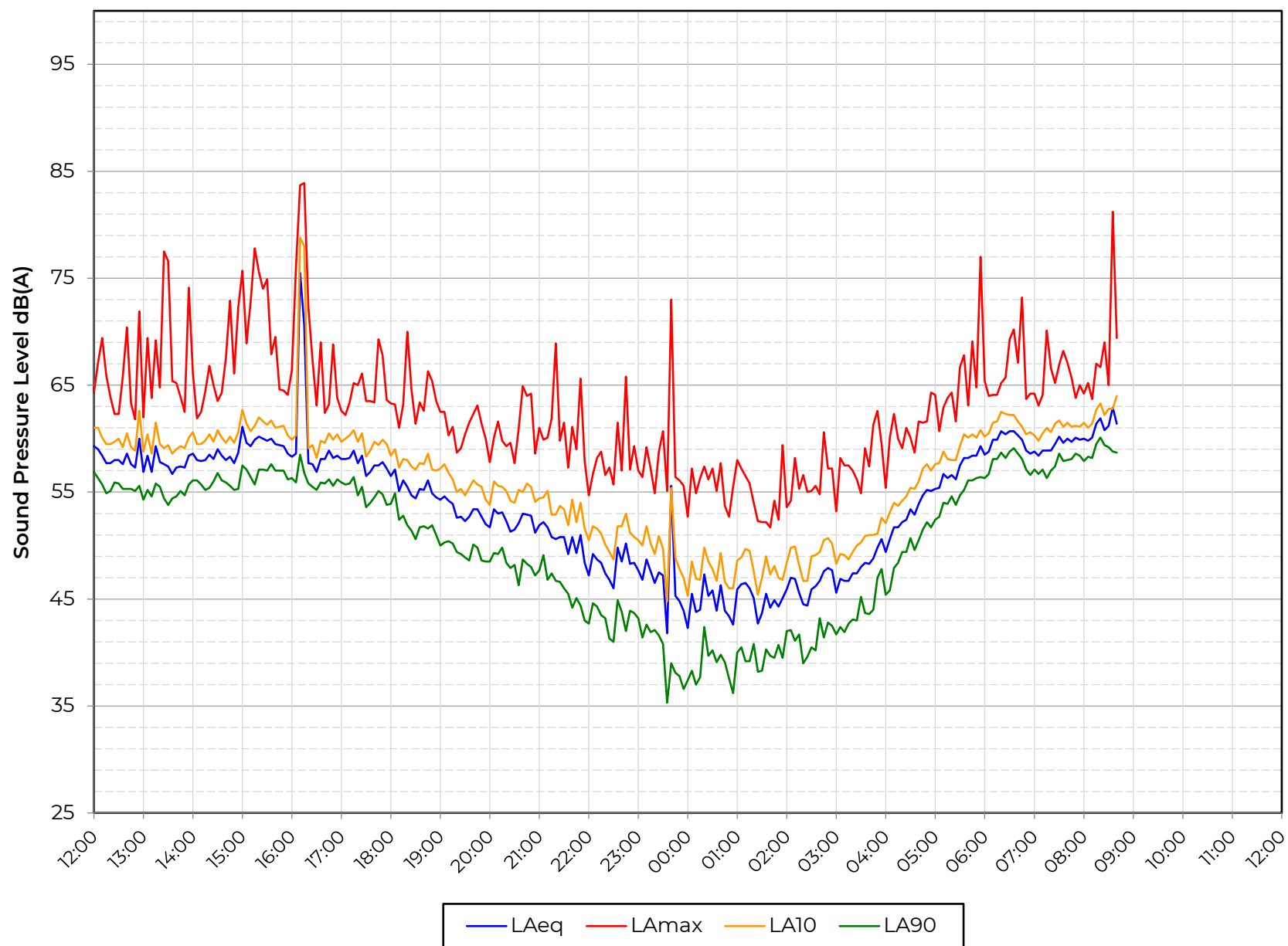
Exeter Chiefs - Event Noise

Position LT3



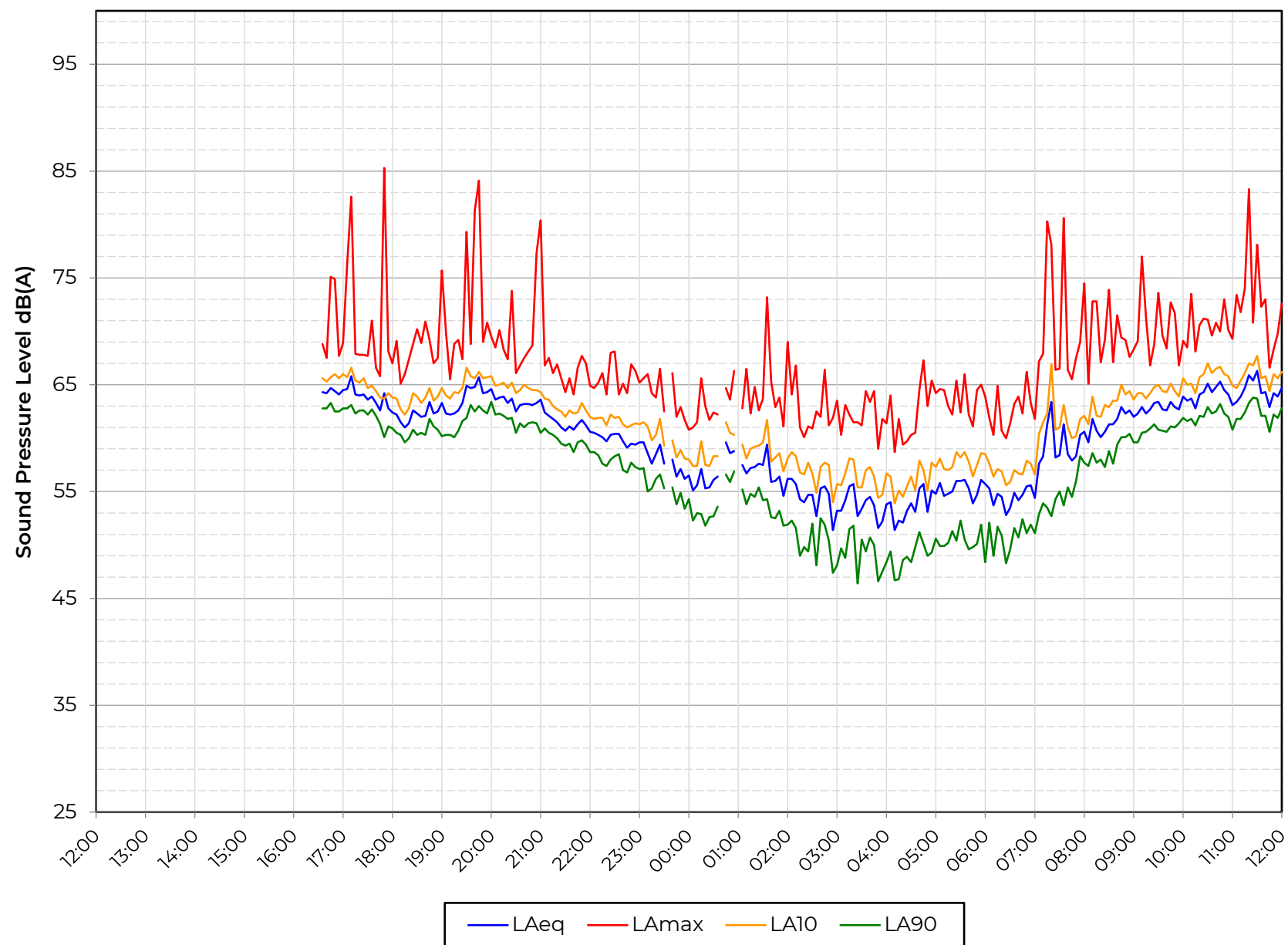
Exeter Chiefs - Event Noise

Position LT3



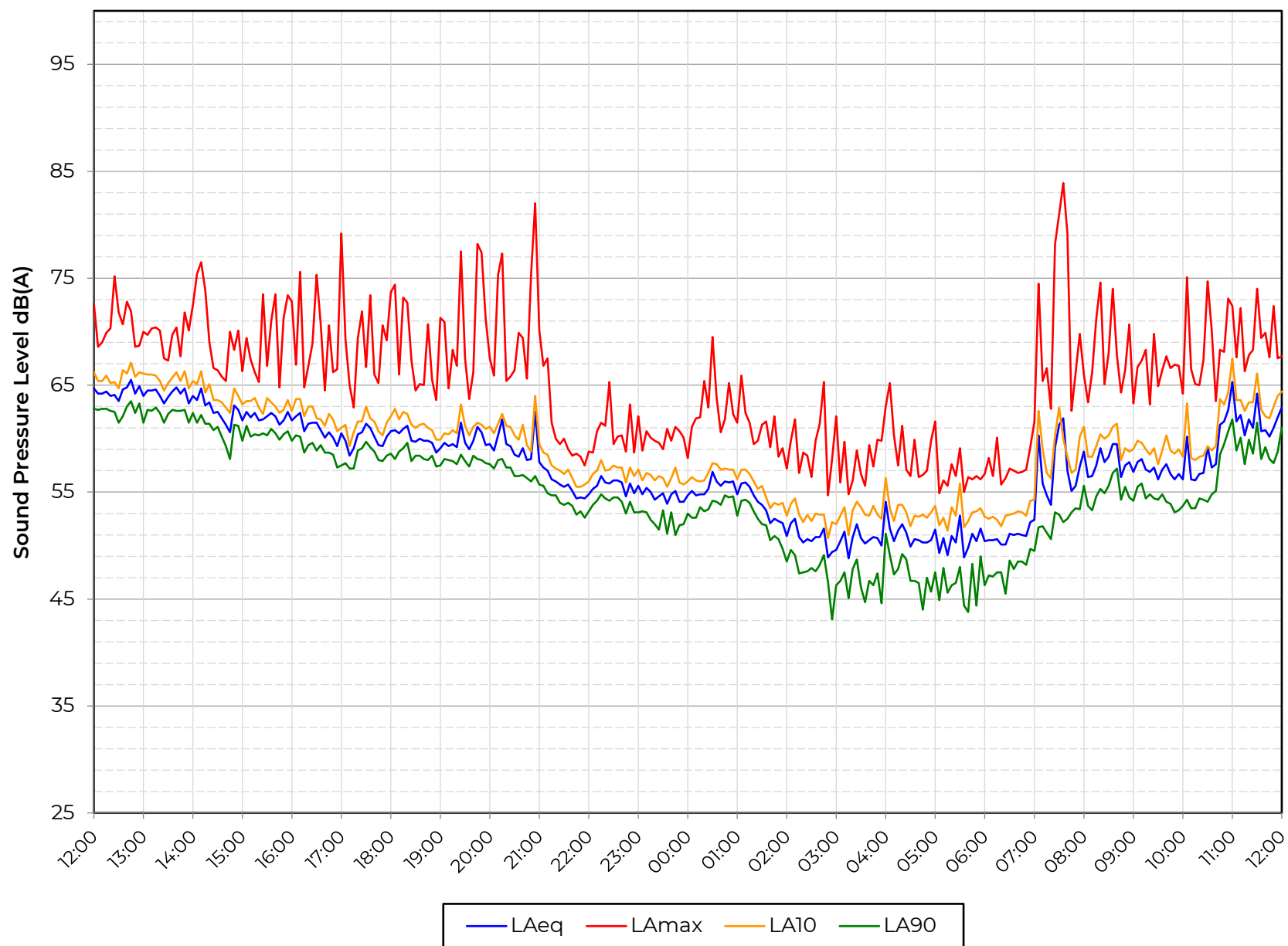
Exeter Chiefs - Event Noise

Position LT4



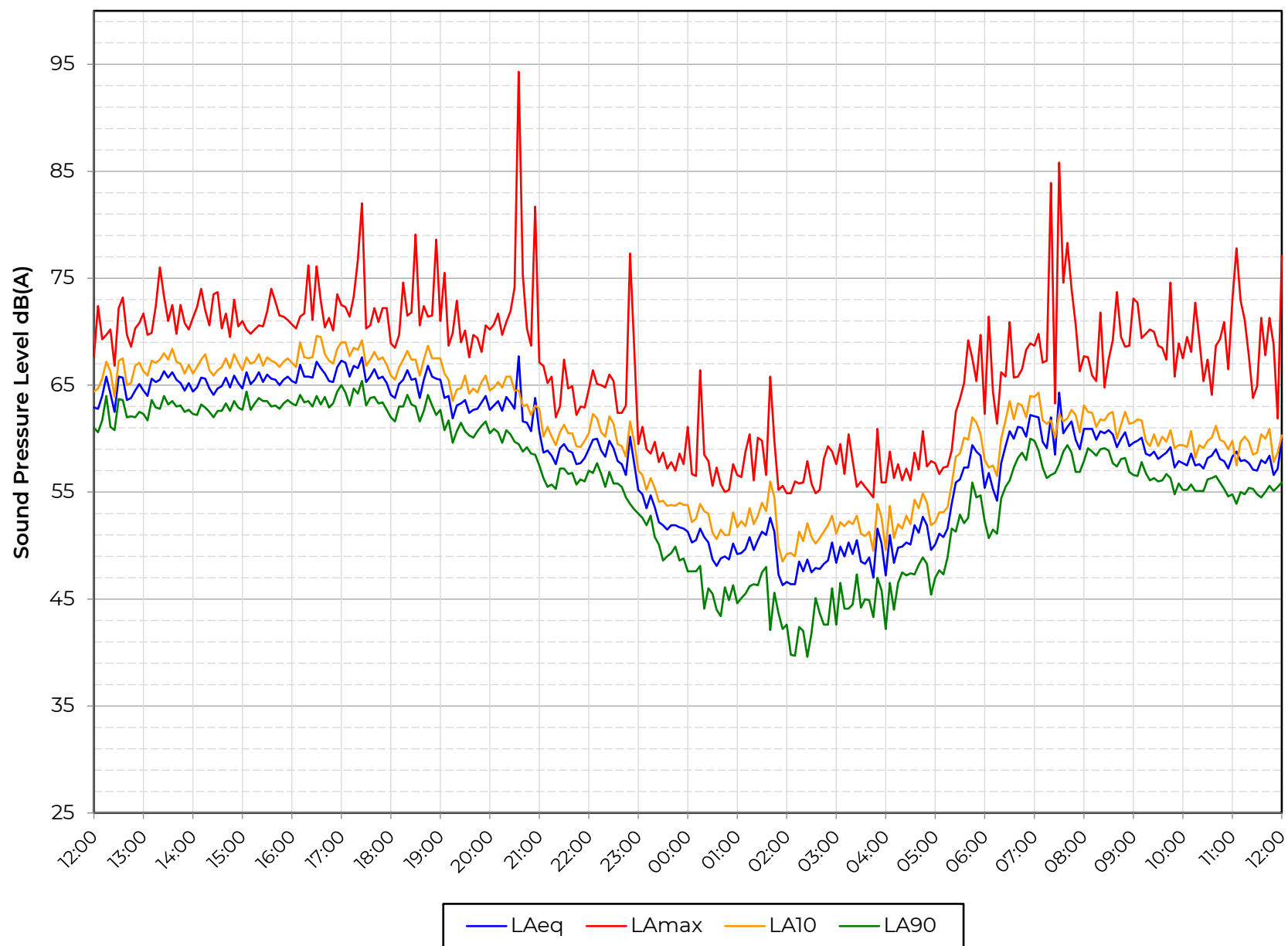
Exeter Chiefs - Event Noise

Position LT4



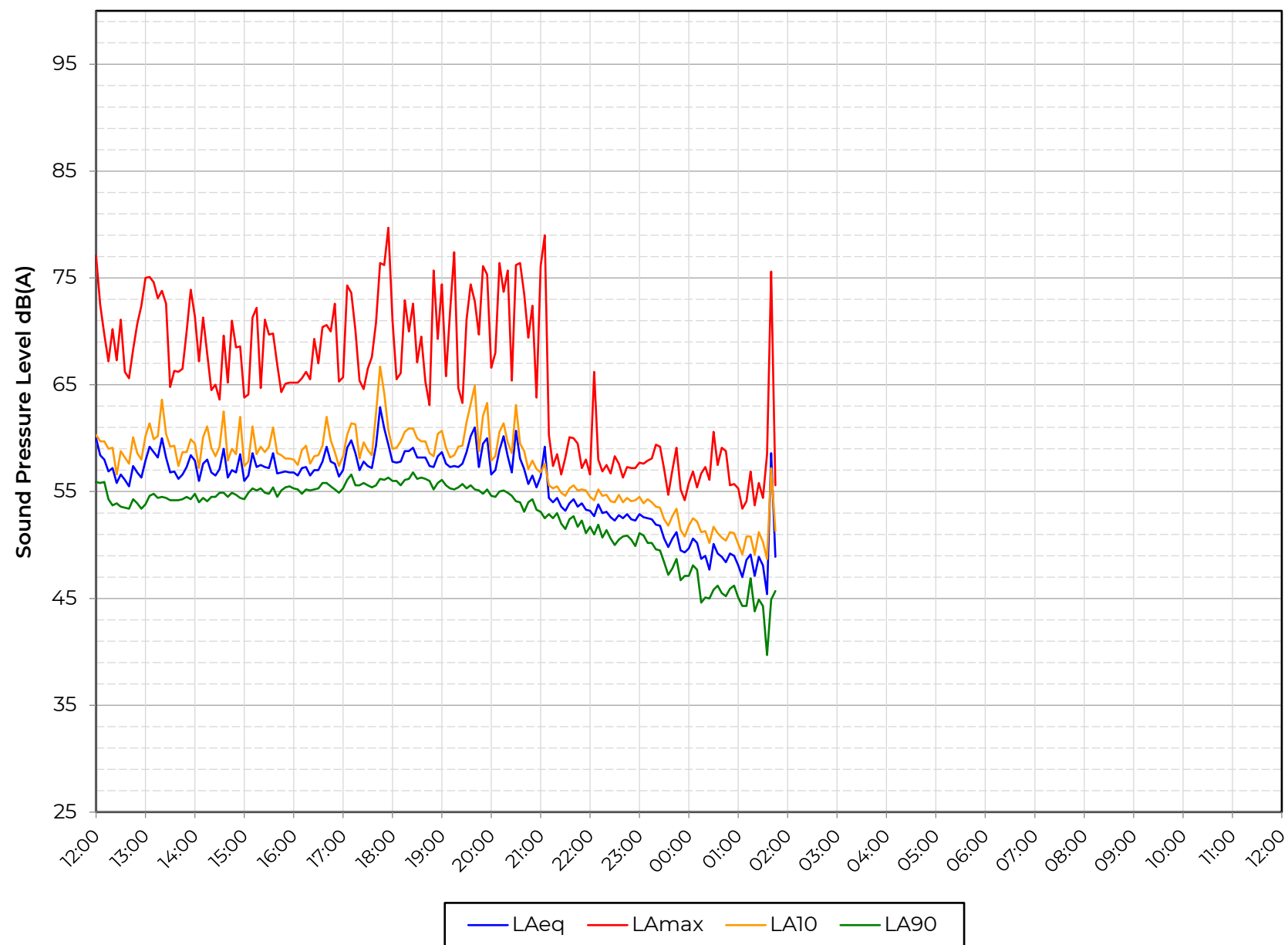
Exeter Chiefs - Event Noise

Position LT4



Exeter Chiefs - Event Noise

Position LT4





Clarke Saunders
Associates

Exeter Chiefs

Music Noise
Level
LAeq, 15min

Receptor Height:
1.5m AGL

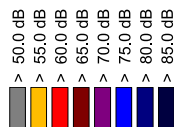
Facade Receptor Height:
1.5m & 4.5m AGL

Figure
AS12972/N1



Scale 1:2750 @ A3

Key (dBA)



1.1 Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound	Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.
Noise	Sound that is unwanted by or disturbing to the perceiver.
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}:	<p>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).</p> <p>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.</p> <p>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.</p>
L_{10} & L_{90}:	<p>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.</p> <p>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.</p>
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.
Music Noise Level (MNL)	<i>The L_{AEQ} of the music noise measured at a particular location.</i>
Noise Consultant	A person given responsibility by the organiser of the event for monitoring noise levels in accordance with the prevailing Conditions, and who has the ability

and authority to make decisions and implement changes in noise level during the event

Sound Engineer *Person employed to control the sound quality of the music for the audience.*

1.2 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
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1.3 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.

INTERPRETATION

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

1.4 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.

Appendix B

Noise Complaints Report Form	
Complaint Number	
Time and date of complaint	
Name and address of complainant	
Complainants contact details (Telephone / E-mail)	
Time and date of activity related to complaint	
Weather at time of complaint activity	
Wind conditions at time of complaint activity (speed / direction)	
Complainants description of noise issue	
Any other issues relating to the complaint	
Indicated cause of complaint	
Other relevant information	
Operations / activities on site at time of complaint activity	
Follow up	
Actions taken	
Investigation outcome (if required)	

Completed by:	
Reviewed / Authorised by:	

Ronan Keating with Supports From Blue & East 17		
Saturday 17th June 2023		
PRODUCTION SCHEDULE		
08:00	Dressing Room & Backstage Access	
08:00 - 09:00	Breakfast	
09:00	Ronan Tech Load In	
09:30 - 11:30	Ronan Set Up	
11:30 - 13:00	Lunch	
12:00 - 13:30	Ronan Sound Check	
13:45 - 14:45	Blue Sound Check	
15:00 - 15:45	East 17 Sound Check	
16:00 - 17:30	Dinner	
SHOW TIMES		
STAGE TIME	SET LENGTH (mins)	BAND NAME
16:00	-	Doors
17:30 - 18:30	60	East 17
18:30 - 19:15	45	Changeover
19:15 - 20:15	60	Blue
20:15 - 21:00	45	Changeover
21:00 - 22:30	90	Ronan Keating
22:30 - STRICT VENUE AUDIO CURFEW		
23:30 - Dressing Room Curfew		
V1 - 19th April 2023		

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Rick Astley with Supports From TBC & TBC		
Sunday 18th June 2023		
PRODUCTION SCHEDULE		
09:00	Dressing Room & Backstage Access	
09:00 - 10:00	Breakfast	
10:00	Rick's Tech Load In	
10:00 - 12:00	Rick's Set Up	
12:00 - 13:00	Lunch	
13:00 - 14:00	Rick's Sound Check	
14:00 - 14:45	Main Support Sound Check	
15:00 - 15:45	Support Sound Check	
16:00 - 17:30	Dinner	
SHOW TIMES		
STAGE TIME	SET LENGTH (mins)	BAND NAME
16:00	-	Doors
16:30 - 17:30	60	TBC
17:30 - 18:15	45	Changeover
18:15 - 19:15	60	TBC
19:15 - 20:00	45	Changeover
20:00 - 21:30	90	Rick Astley
21:30 - STRICT VENUE AUDIO CURFEW		
22:30 - Dressing Room Curfew		
V1 - 19th April 2023		

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<div>Will Young</div> <div>with Supports From</div> <div>Corinne Bailey Rae & Natalie Imbruglia</div>		
Saturday 24th June 2023		
PRODUCTION SCHEDULE		
08:00	Dressing Room & Backstage Access	
08:00 - 09:00	Breakfast	
09:00	Will's Tech Load In	
09:30 - 11:30	Will's Set Up	
11:30 - 13:00	Lunch	
12:00 - 13:30	Will's Sound Check	
13:45 - 14:45	Corinne Bailey Rae Sound Check	
15:00 - 15:45	Natalie Imbruglia Sound Check	
16:00 - 17:30	Dinner	
SHOW TIMES		
STAGE TIME	SET LENGTH (mins)	BAND NAME
16:00	-	Doors
17:30 - 18:30	60	Natalie Imbruglia
18:30 - 19:15	45	Changeover
19:15 - 20:15	60	Corinne Bailey Rae
20:15 - 21:00	45	Changeover
21:00 - 22:30	90	Will Young
22:30 - STRICT VENUE AUDIO CURFEW		
23:30 - Dressing Room Curfew		
V1 - 19th April 2023		

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<div>Soul Soul & Gabrielle</div> <div>with Support From</div> <div>The Real Thing</div>		
Sunday 25th June 2023		
PRODUCTION SCHEDULE		
09:00	Dressing Room & Backstage Access	
09:00 - 10:00	Breakfast	
10:00	Soul Soul Tech Load In	
10:00 - 12:00	Soul Soul Set Up	
12:00 - 13:00	Lunch	
13:00 - 14:00	Soul Soul Sound Check	
14:00 - 14:45	Gabrielle Sound Check	
15:00 - 15:45	The Real Thing Sound Check	
16:00 - 17:30	Dinner	
SHOW TIMES		
STAGE TIME	SET LENGTH (mins)	BAND NAME
16:00	-	Doors
16:30 - 17:30	60	The Real Thing
17:30 - 18:15	45	Changeover
18:15 - 19:15	60	Gabrielle
19:15 - 20:00	45	Changeover
20:00 - 21:30	90	Soul Soul
21:30 - STRICT VENUE AUDIO CURFEW		
22:30 - Dressing Room Curfew		
V1 - 19th April 2023		

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