

THFC CONCERTS 2022

LADY GAGA

TOTTENHAM HOTSPUR STADIUM

POST CONCERT REPORT
P053786-0820-0-EN-PCR-GAGA
R00

16TH AUGUST 2022

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VANGUARDIA
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VANGUARDIA LIMITED

HEAD OFFICE

21 Station Road West, Oxted
Surrey RH8 9EE

Tel +44 (0) 1883 718690

office@vanguardia.co.uk
vanguardia.co.uk

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1. INTRODUCTION

- 1.1. Vanguardia Ltd. was appointed by Tottenham Hotspur Football & Athletic Company Limited to assist in the monitoring and management of noise levels from the Lady Gaga concert held at the Tottenham Hotspur Stadium on the following dates:
- Friday 29th July 2022
 - Saturday 30th July 2022
- 1.2. The purpose of this document is to describe the results of the noise management scheme that was put in place to manage music noise levels at residential properties. Information relating to noise from the event is presented in Section 2. A summary of the results of the noise management and monitoring scheme are set out in Section 3.
- 1.3. A noise management plan (ref. P053786-0820-020-0002-00) was issued prior to the event. This document sets out the noise control procedures that were adopted throughout the event.
- 1.4. A glossary of technical acoustic terms used is included in Appendix A of this report.

2. EVENT INFORMATION

2.1. Key information relating to the event is summarised in Table 1 below.

Table 1 Lady Gaga, THFC - Event information

Event dates	29 th -30 th July 2022
Sound system	d&b Audiotechnik GSL / J Series (plus in house system)
Sound checks	From 15:00
Event start & finish times	20:00 – 22:30
Noise Limits	Music Noise Level (MNL) shall not exceed 75 dB L _{Aeq, 15 min} measured at 1 metre from the façade of any noise sensitive premises.

2.2. The objective of the noise management scheme was to ensure that the offsite music noise level limit of 75 dB L_{Aeq, 15 min} was not breached.

2.3. Weather conditions throughout the event were suitable for taking environmental noise measurements. A summary of weather history during the event is presented in Appendix B of this report.

2.4. Acoustic measurements were taken by Vanguardia Ltd. before and during the event with the instrumentation presented in Table 2. All equipment used has a traceable laboratory calibration history and was field calibrated at 1 kHz before and after the event with no significant drift noted.

Table 2 Acoustic measurement instrumentation used during Lady Gaga, THFC

Sound level meter (SLM) model	Measurement position	Serial number	Calibrator type and serial number
Larson Davis LxT Sound Expert	Offsite	3317 3812 7083	CAL200, 11097 CAL200, 16906
NTi XL2 Sound Analyzer	Front of House mix position	10066 10997	

2.5. During the event, music noise levels were monitored with regular sound pressure level measurements taken from the following two offsite locations, also indicated in Figure 1:

- **NSR1:** Junction of Lancaster Close and Park Lane (opposite Concord House (East)).
- **NSR2:** 27, Worcester Avenue (in front of residential façade, on the pavement).

Figure 1 Offsite noise monitoring positions at Lady Gaga, THFC



3. NOISE MANAGEMENT RESULTS

SOUND PROPAGATION TESTING

- 3.1. Sound propagation testing was undertaken prior to the event to establish an indicative FOH sound level with regards to offsite noise level limits. The music used during sound propagation testing was of a similar genre and frequency content to that being played during the event. The results of sound propagation testing are presented in Table 3 below.

Table 3 Sound propagation test data from Lady Gaga, THFC

Time	Location	FOH Level (dB LAeq, 15 min)	Offsite measurement (dB LAeq, 15 min)	Offsite measurement (dB LCeq, 15 min)
14:15	NSR1 Lancaster Close/Park Lane	97	64	82
14:30	NSR1 Lancaster Close/Park Lane	97	63	83
14:50 (10 min)	NSR2 Worcester Road	98	62	78

MUSIC NOISE LEVEL MEASUREMENTS

- 3.2. Sound pressure level data, measured by Vanguardia Ltd. on and offsite during the event, are presented in Table 4 below.

Table 4 Noise data from Lady Gaga, THFC

Date	Time	Location	FOH Level (dB LAeq, 15 min)	Offsite measurement (dB LAeq, 15 min)	Offsite measurement (dB LCeq, 15 min)
Friday 29 th July 2022	20:45	NSR1 Lancaster Close/Park Lane	101	65	81
	21:15*	NSR2 Worcester Road	100	65	82
	22:00	NSR1 Lancaster Close/Park Lane	101	65	81
Saturday 30 th July 2022	20:30	NSR1 Lancaster Close/Park Lane	102	65	79
	20:45	NSR1 Lancaster Close/Park Lane	101	64	80
	21:15	NSR2 Worcester Road	100	61	76

NOTE* - INCLUDES NOISE FROM PERSONS BEING EJECTED FROM THE STADIUM

- 3.3. It was established early into the event that even with a substantial entertainment level within the stadium, there was considerable headroom in regard to the MNL limit at the closest residential properties. The measured results show that the off-site MNL's were comfortably below the licence limit, as the typical difference between FOH levels and off-site MNL's was approximately -35 dB.

NOISE COMPLAINTS

- 3.4. At the time of writing Vanguardia Ltd. have not been made aware of any complaints resulting from this concert.

4. SUMMARY

- 4.1. Vanguardia Ltd. have undertaken noise management of the Lady Gaga concert at the Tottenham Hotspur Stadium on the 29th and 30th of July 2022 following the noise management scheme outlined in Section 2 of this report.
- 4.2. It can be seen from Table 4 that the music noise level did not come close to breaching the noise limit, and that at the time of writing, no complaints have been received as a result of the music noise generated by this event.
- 4.3. Vanguardia have produced a separate report in reference to the sound quality, audibility and clarity for the recent concerts at Tottenham Hotspur Stadium.

APPENDIX A - ACOUSTIC GLOSSARY

A-WEIGHTING

The human ear is not equally sensitive to all frequencies of sound. It is relatively much less sensitive to very low frequencies such as 'mains hum', and to very high frequencies such as the call of a bat, than to the 'mid-frequencies' important for human voice communication. In order to make sound level meters, which would otherwise be indiscriminate in registering sound pressures, respond in a way which reflects human perception of sound, they usually are fitted with a set of filters to progressively filter out the high and low frequency energy. The filters are made to an internationally standardised specification and the filtered noise level is said to be 'A-weighted'. Sometimes A-weighted decibel levels are denoted 'dBA', but the correct, internationally standardised format for reporting requires the 'A' to be appended to the noise descriptor e.g. $L_{Aeq,T}$, L_{Amax} , etc.

AMBIENT NOISE

This is the totally encompassing sound at the measurement position over a specified time interval and usually comprises sound from many different sources both near and far.

ATTENUATION

A general term used to indicate the reduction of noise, or the amount (in decibels) by which it is reduced.

AVERAGING

In the absence of a dominant steady source, the sound level at a point, indoors or outdoors, varies continuously. For example, the variation may be over a few dB about an average value in a quiet room, or over 10 dB or more in a noisy outdoor environment. In order to define a level to represent the relative level of noise in the space it is necessary to define that average value. The most common averaging methods are energy averaging (L_{Aeq}) and statistical averaging (L_{AN} where N is a percentage between 1 and 100). The $L_{A10,T}$, the noise level exceeded for 10% of the measurement time interval T, is commonly used in the UK for the assessment of road traffic noise.

BACKGROUND NOISE LEVEL, $L_{A90,T}$

Background noise level is a term used to describe that level to which the noise falls during quiet spells, when there is lull in passing traffic for example. It is quantified by the $L_{A90,T}$ which is the noise level that is exceeded for 90% of the measurement time interval, T.

DECIBELS

Noise conventionally is measured in decibels (dB). The decibel is a logarithmic unit and decibel levels do not add and subtract arithmetically. An increase or decrease of 3 dB in the level of a steady noise is about the smallest that is noticeable. It represents a doubling or halving of noise energy. An increase or decrease of 10 dB represents a ten-fold change in noise energy, and is perceived as a doubling or halving of loudness. The threshold of hearing for a typical young, healthy adult is 0 dB A-weighted sound pressure level. A noise level of 140 dBA can cause physical pain. Most people listen to their televisions at about 60 to 65 dBA. Alongside a busy main road the ambient noise level may be in the 70 to 80 dBA range; on a quiet day in the country it might be as low as 30 dB, in town 40 to 50 dBA.

DECIBEL ADDITION

If two similar noise sources operate together their combined noise level at an observer's position some distance away is 3 dB higher than the noise level generated by just one of them. If two further machines are switched on the noise level generated by all four at the observer's position is 3 dB higher than the level generated by the two. If the number of machines is again doubled, to eight, the noise level increases by another 3 dB, and so on.

EQUIVALENT CONTINUOUS A-WEIGHTED SOUND PRESSURE LEVEL, $L_{Aeq, T}$

The 'equivalent continuous A-weighted sound pressure level' is an average of the fluctuating sound energy in a space. It is the value of the A-weighted sound pressure level of a continuous, steady sound that, over the specified time period, T seconds, has the same root mean square sound pressure as the varying sound. It can be likened to the mean petrol consumption of a car over a specific journey during which the instantaneous consumption peaked during periods of acceleration and fell during periods of coasting or braking.

FAÇADE SOUND LEVELS

Road and railway traffic noise levels often are specified in terms of the sound level at a position 1 m in front of the most exposed façade of potentially noise sensitive premises. Such levels

are assumed to be 3 dBA higher than sound levels measured at an equivalent position away from the noise reflected off the building façade and any other surfaces (excluding the ground).

MUSIC NOISE LEVELS (MNL)

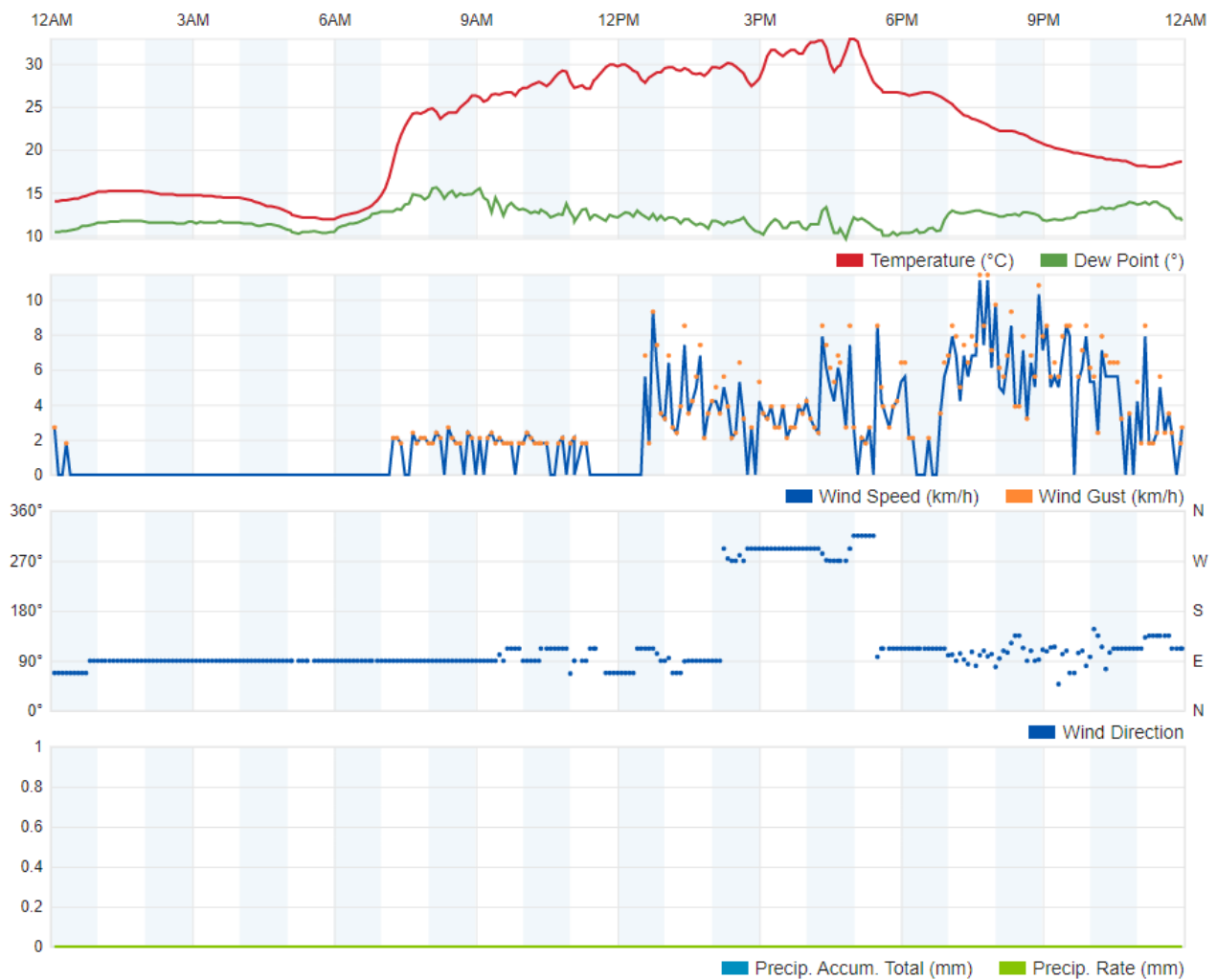
The L_{Aeq} of the music noise measured at a particular location without interference from extraneous ambient noise.

APPENDIX B – WEATHER HISTORY DATA

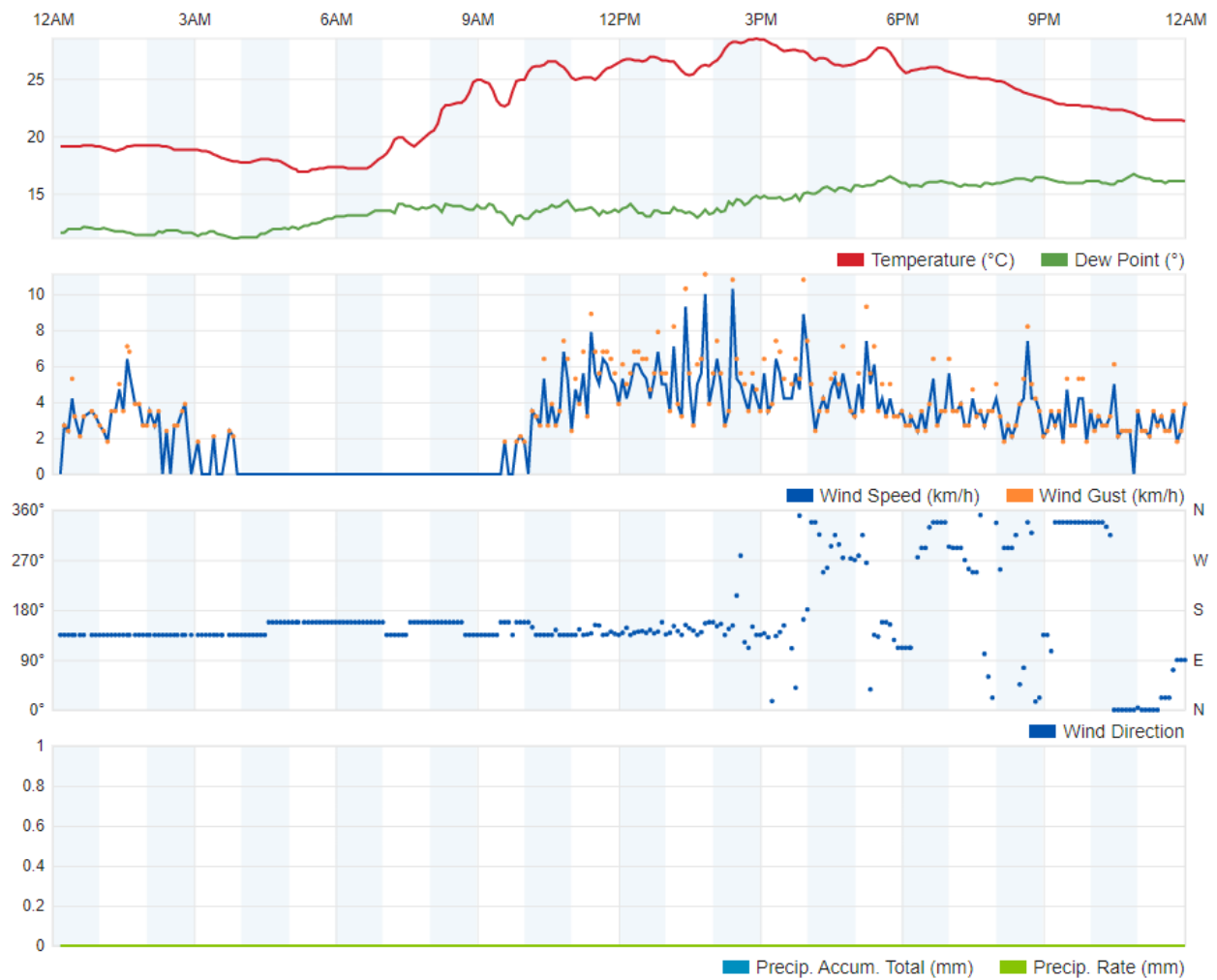
Weather data for event days is taken from *www.wunderground.com* [Accessed 16th August 2022].

Weather station ID: *ILONDO371*

July 29, 2022



July 30, 2022



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VANGUARDIA LIMITED

LONDON OFFICE

The Ministry
79-81 Borough Road
London SE1 1DN

HEAD OFFICE

21 Station Road West, Oxted
Surrey RH8 9EE

NORTH WEST OFFICE

Eastgate, 2nd Floor
2 Castle Street, Castlefield
Manchester M3 4LZ

Tel +44 (0) 1883 718690

office@vanguardia.co.uk
vanguardia.co.uk