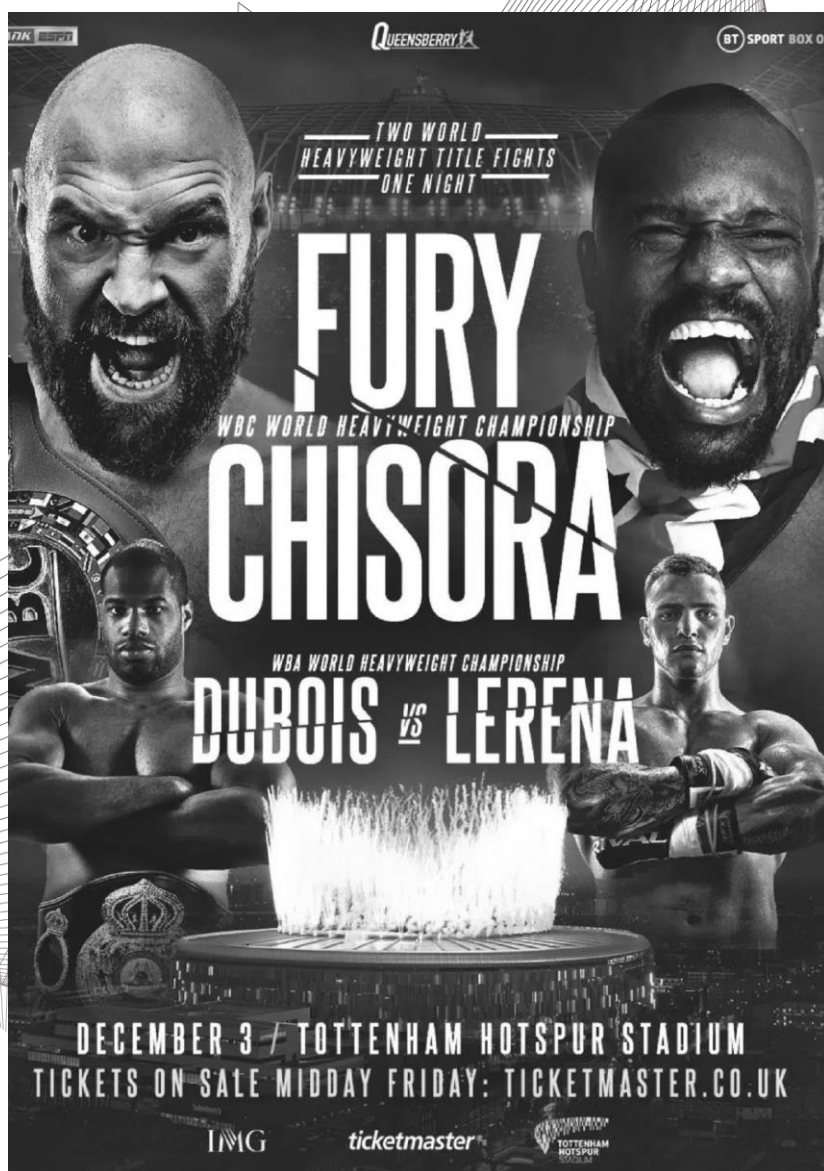


FURY VS CHISORA: BOXING (03/12/22)

TOTTENHAM HOTSPUR STADIUM

POST EVENT REPORT
0055225-0820-0-EN-PER-0001
R00

7TH MARCH 2023



VANGUARDIA
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DOCUMENT CONTROL

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REVISION	NOTES	DATE ISSUED
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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 Limited* was appointed by *Tottenham Hotspur Football & Athletic Company Limited* to assist in the monitoring and management of noise levels from the "Fury vs Chisora" Boxing Event, held at the Tottenham Hotspur Stadium on the following date:

— Saturday 3rd December 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. Whilst a Noise Management Plan (NMP) was not issued prior to the event, *Vanguardia* were requested to respond to a *Safety Advisory Group* (SAG) schedule on behalf of the Client, which *Vanguardia* actioned following a SAG meeting held on the 4th November '23 and as a proxy to issuing an NMP. The purpose of *Vanguardia's* response following issue of the SAG schedule, was to agree the noise management procedures which would be put in place on the day of the event. This document also 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 Fury vs Chisora Boxing Event, THFC - Event information

Event date	3 rd December 2022
Sound system	4x Martin Audio Blackline ring-hoisted corner arrays (plus in house custom JBL system)
Propagation tests	Between 10:00 to 12.00 hrs on the 02/12/2023 (for a maximum of 15-mins duration)
Event start & finish times	Doors open (first undercard): 17.00 hrs, PA system hard stop/OB termination: 22.30 hrs
Noise Limits	Music Noise Level (MNL) shall not exceed 75 dB $L_{Aeq, 15 \text{ min}}$ 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 $L_{Aeq, 15 \text{ min}}$ was not breached between the event operating hours of; 17.00 to 22.30 hrs (PA system hard stop).

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 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.

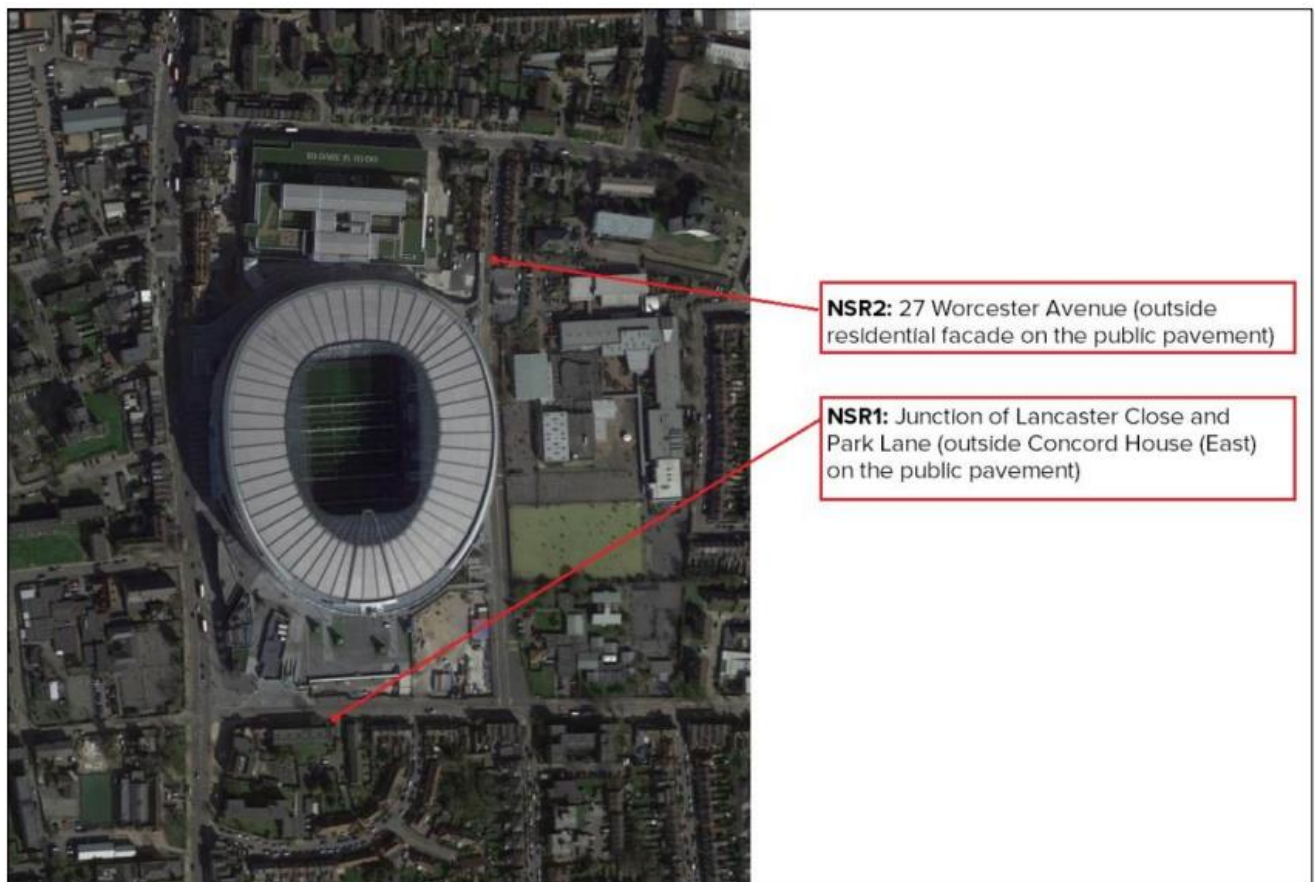
Table 2 Acoustic measurement instrumentation used during Lady Gaga, THFC

Sound level meter (SLM) model	Measurement position	Serial number	Calibrator type and serial number
Larson Davis LxT Sound Expert	Off-site	3316	CAL200, 11097
NTi-Audio XL2 Sound Analyzer	Front-of-House mix position	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 below:

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

Figure 1 Offsite noise monitoring positions for the “Fury vs Chisora” Boxing event, Tottenham Hotspur Stadium



3. NOISE MANAGEMENT RESULTS

SOUND PROPAGATION TESTING

- 3.1. Sound propagation testing was undertaken prior to the event (Friday 2nd December 2022 at around 12.00 hrs) to compare, real-time indicative Front-of-House (FOH) sound levels with corresponding 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.
- 3.2. The results of sound propagation testing indicated that at the planned FOH sound levels intended to be operated by the sound engineer (approximately 97 to 99 dB $L_{Aeq,15-mins}$), the corresponding off-site sound levels would be around; ≤ 63 dB $A_{eq,15-mins}$ (observed at NSR2, initially) which provided sufficient comfort that it would be highly unlikely for anticipated show sound levels to be capable of breaching the stipulated off-site noise limit.

MUSIC NOISE LEVEL MEASUREMENTS

- 3.3. Sound pressure level data, measured by *Vanguardia* offsite during the worse-case periods of the entire event, which occurred during the ringwalks just prior to the main bout (for both Tyson Fury and Derek Chisora), are presented in Table 3 below.

Table 3 Noise data from "Fury vs Chisora" Boxing event, Tottenham Hotspur Stadium

Date	Time	Location	Off-site measurement		Notes
			dB $L_{Aeq,15-mins}$	dB $L_{Ceq,15-mins}$	
Saturday 3 rd December 2022	21:06	NSR2: 27 Worcester Road	63.7	77.1	Audience rendition of "Sweet Caroline" followed by Derek Chisora ringwalk
	21:26	NSR1: Lancaster Close/Park Lane	59.0	65.7	Tyson Fury ringwalk followed by Master of Ceremonies main bout intro

- 3.4. It was established early into the event that even with a modest entertainment sound level within the stadium, there was significant 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.

BREACHES OF LICENSE CONDITIONS

- 3.5. No breaches of the Licence Conditions ever occurred during any of the measured off-site MNL measurements on the day of the Event (03/12/2023).

4. NOISE COMPLAINTS

- 4.1. At the time of writing Vanguardia have not been made aware of any complaints resulting from this event.

5. SUMMARY

- 5.1. *Vanguardia Limited* have undertaken noise management of the "Fury vs Chisora" Boxing Event held at the Tottenham Hotspur Stadium on; Saturday 3rd of December 2022 following the noise management procedures outlined in Section 2 of this report.
- 5.2. 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.

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.

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.

MUSIC NOISE LEVELS (MNL)

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

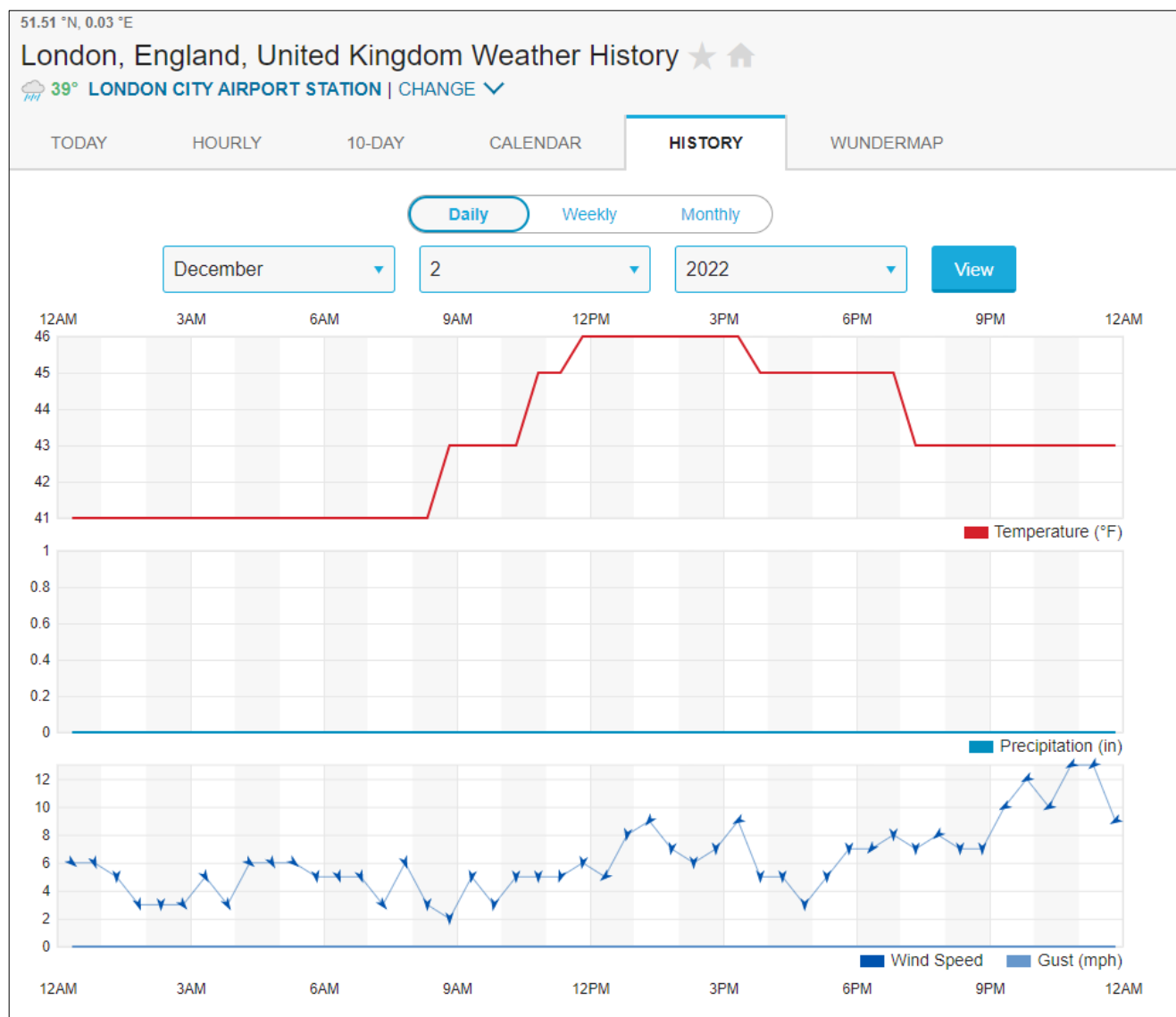
APPENDIX B – WEATHER HISTORY DATA

Historical weather conditions from the geographically-closest meteorological station acquired from the "LONDON CITY AIRPORT STATION", weather data from the propagation day and event day sourced from:

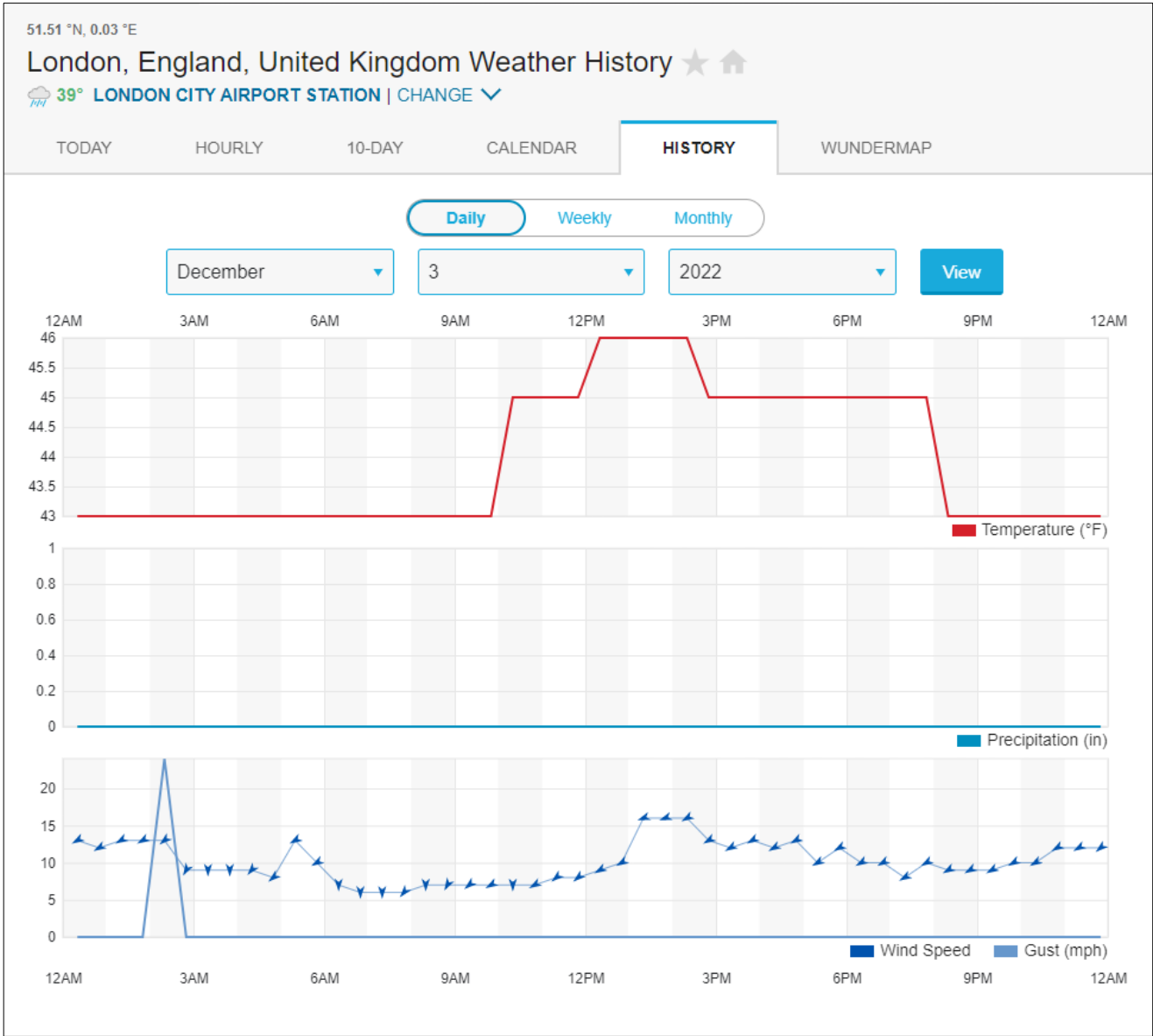
- www.wunderground.com [Propagation Test: 2nd December '22 and Event: 3rd December '22].

Weather station: "London City Airport" (ID: ILONDO371)

WEATHER CONDITIONS ON: FRIDAY 2nd DECEMBER '22
(PROPAGATION TEST)



WEATHER CONDITIONS ON: SATURDAY 3rd DECEMBER '22
(MAIN EVENT)



Registered in England 05666276



VANGUARDIA LIMITED

LONDON OFFICE

The Ministry
79-81 Borough Road
London SE1 1DN

HEAD OFFICE

21 Station Road West, Oxted
Surrey RH8 9EE

Tel +44 (0) 1883 718690

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