Community Noise Report

Pitstone

May – July 2023

London Luton Airport

Introduction

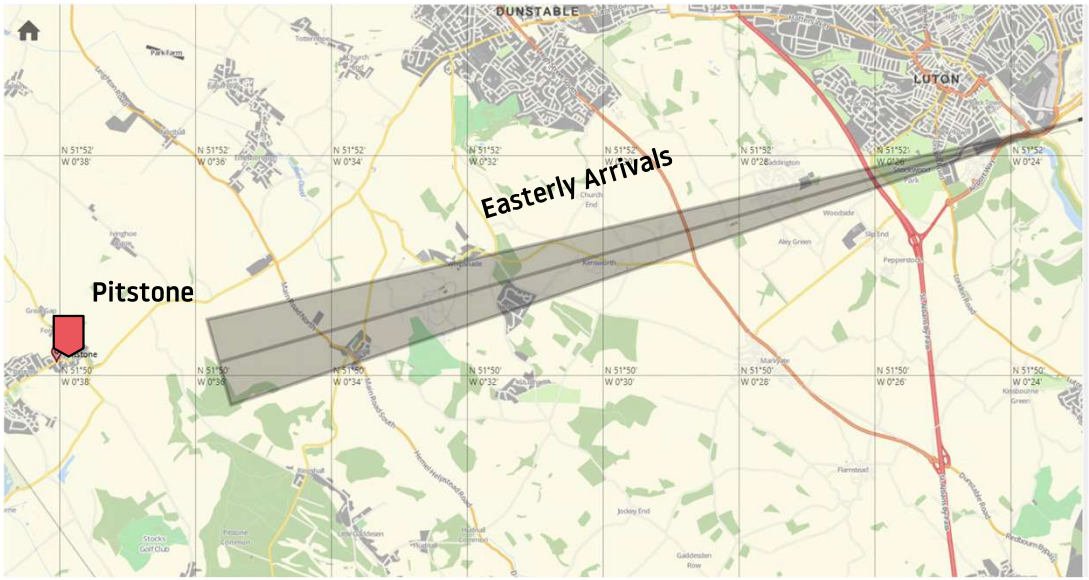
As part of the ongoing noise monitoring programme, London Luton Airport deployed a portable noise monitoring terminal in Pitstone.

The purpose of the monitoring programme is to understand the typical noise levels created in the local community. For Pitstone, it specifically related to the easterly arrivals. The arrival flightpaths are shown on the map. One map shows a zoomed-out version with Luton airport to the end of the arrival route and a closer map to show the location more clearly.

The noise monitor was located at a property on Marsworth Road in Pitstone, approx. 2.7km West of the easterly arrival centerline at an altitude of 360 feet above sea level. The red pinpoint on the map shows the noise monitor location.

The noise monitor in Pitstone was in place between 15th May and 14th July 2023.

Aircraft noise and tracks recorded were extracted from LLA's noise and track-keeping system. This document evaluates the lateral and vertical positioning of aircraft near the monitor as well as the noise recorded at ground level.

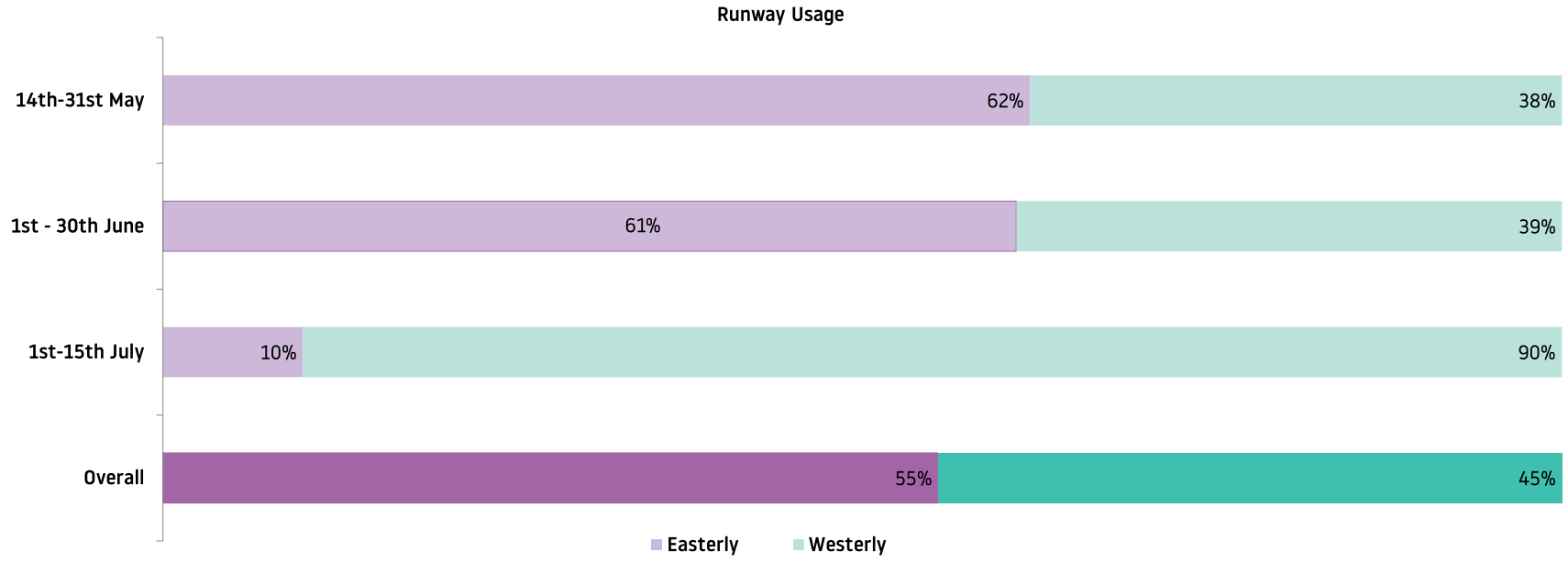


LLA operations during the monitoring period

There are two operating directions at LLA. The operating direction depends on the wind direction as aircraft are required to take off and land into the wind for aircraft performance and safety reasons. These are known as easterly operations and westerly operations and can change the aircraft tracks nearby specific areas. The split in operating direction varies from year to year and month to month. The amount of time that the runway operates in one direction depends on the wind direction.

During the period of monitoring, the direction of operation was 55% Easterly and 45% Westerly. The 5-year average for this time of year is 33% easterly vs 67% westerly.

There were 6,692 aircraft arriving on the easterly route and 5,381 on the westerly route in the monitoring period.



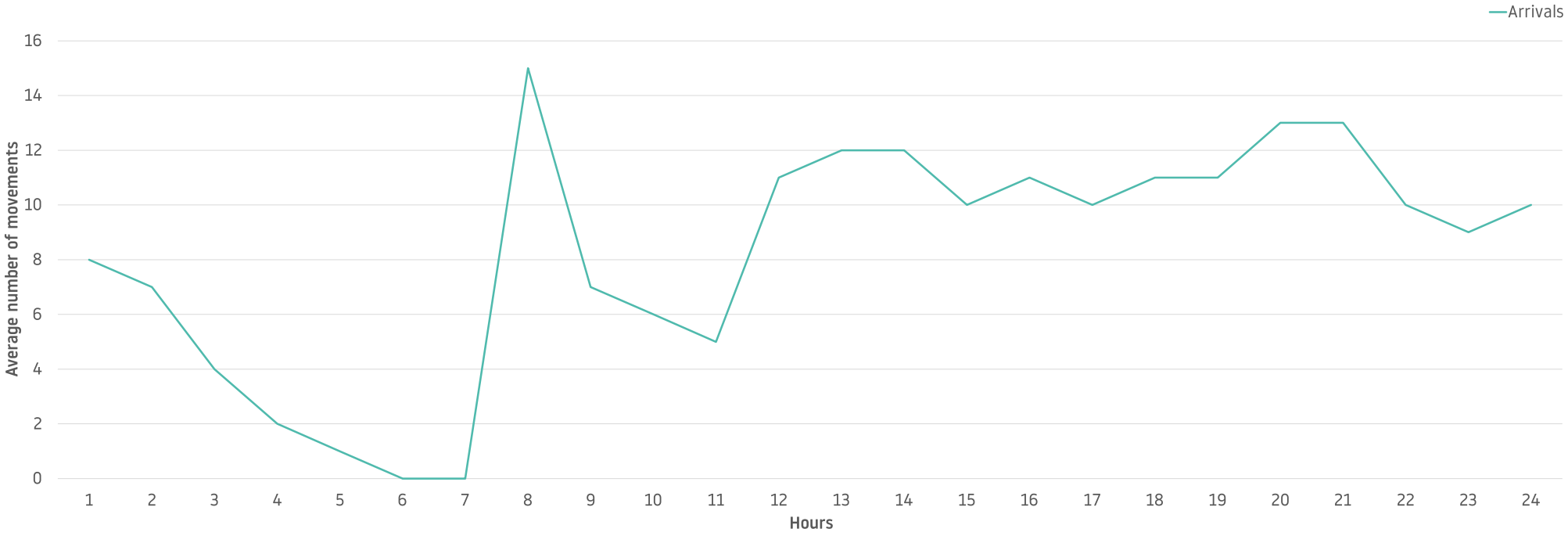
Daily Movements During Monitoring Period

The chart below shows the number of daily westerly arrivals and easterly arrivals that passed over the noise monitor. Due to the location, some flights that arrived at our easterly runway would have flown above or near the noise monitor terminal.

Operations During the Monitoring Period

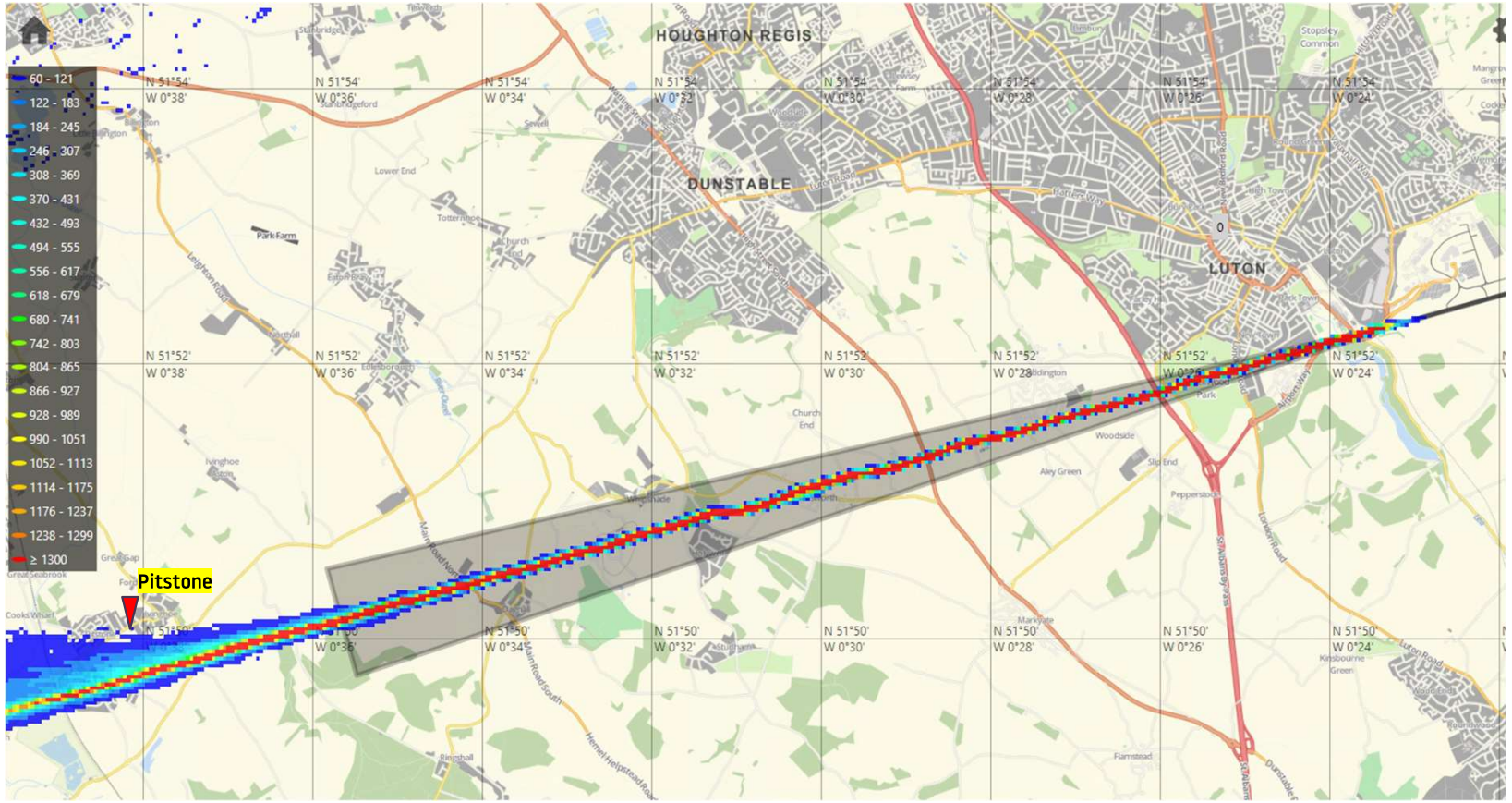
The graph below represents the average aircraft movement by hours during the monitoring period. Depending on the operating direction on the day, residents in Pitstone may experience different flight patterns. Residents at this NMT location may notice the morning peak begins at 07:00 on easterly arrival operations depending on direction of runway chosen.

During the night period of 23:00 – 06:59 in the monitoring period, there were average of 19 departures. Peak times for arrivals were 07:00 – 08:00 and 19:00 – 20:00.



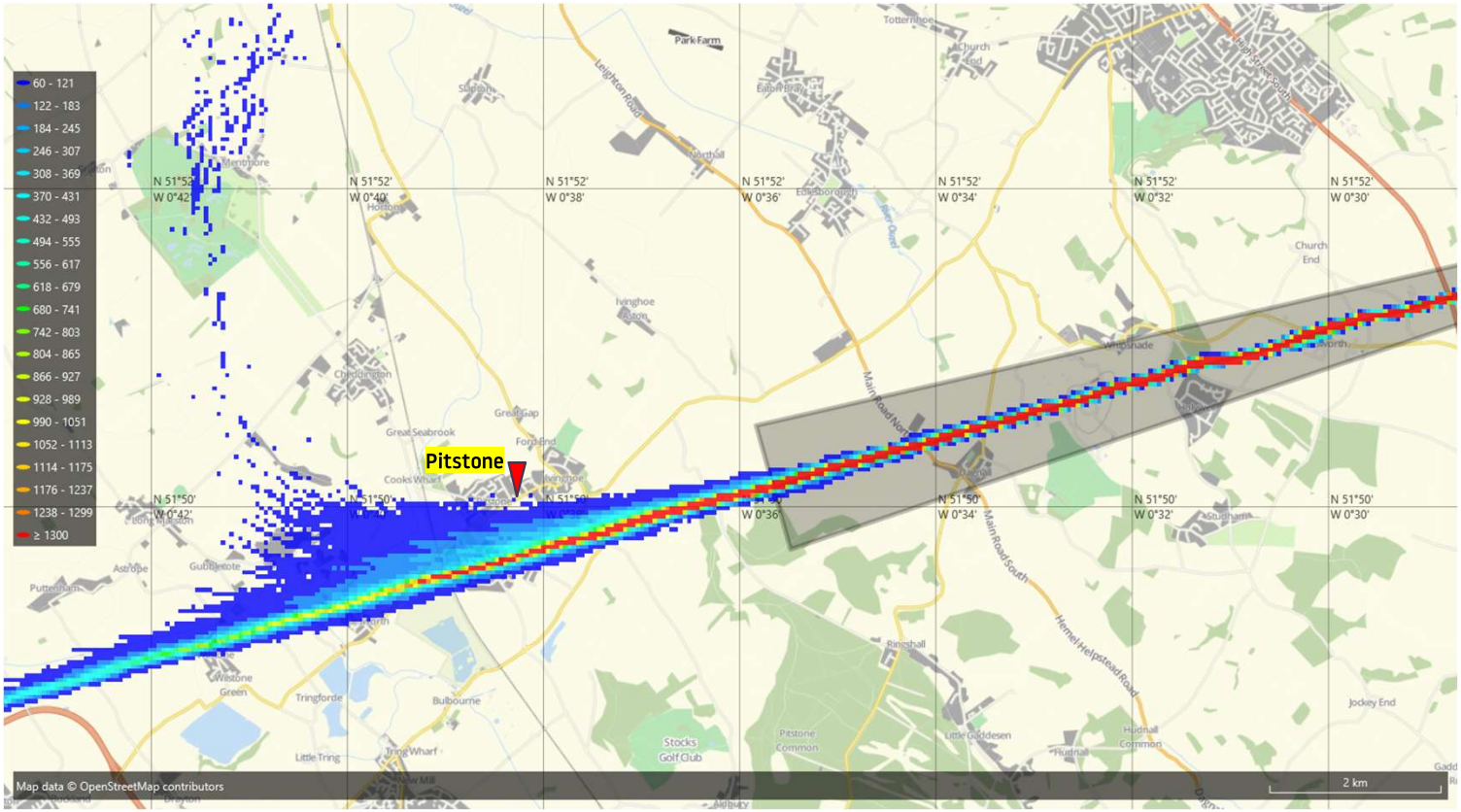
Aircraft Tracks

The heat map below show the representative flight tracks that passed near the noise monitor terminals during the monitoring period. The red pinpoint indicates the location of the noise monitor in Pitstone. At this location, it is mainly affected by easterly arrivals.



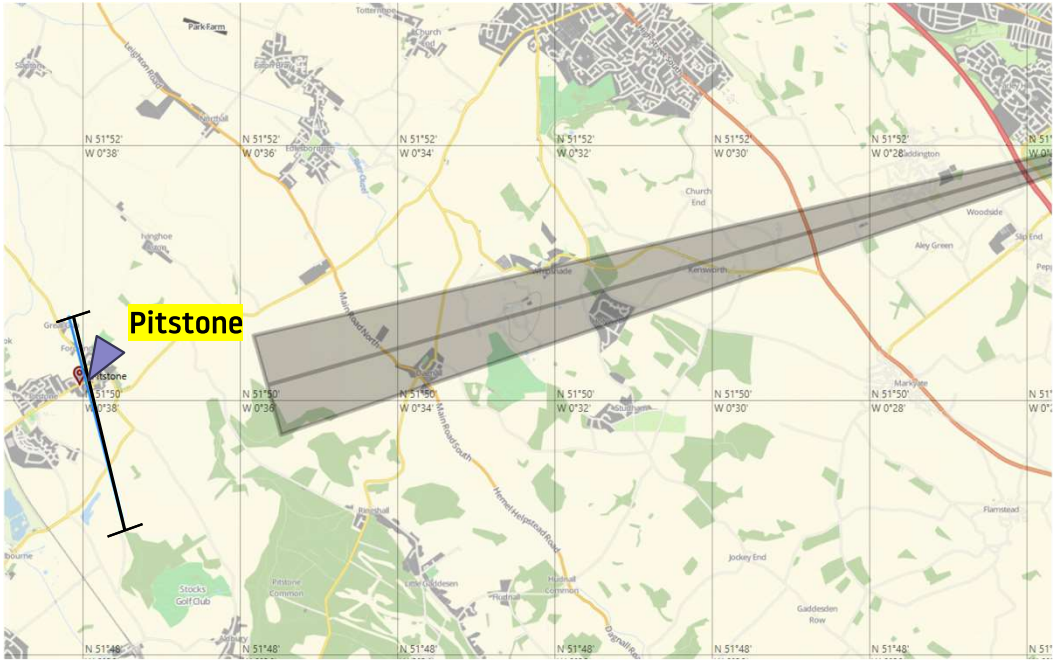
Aircraft Tracks

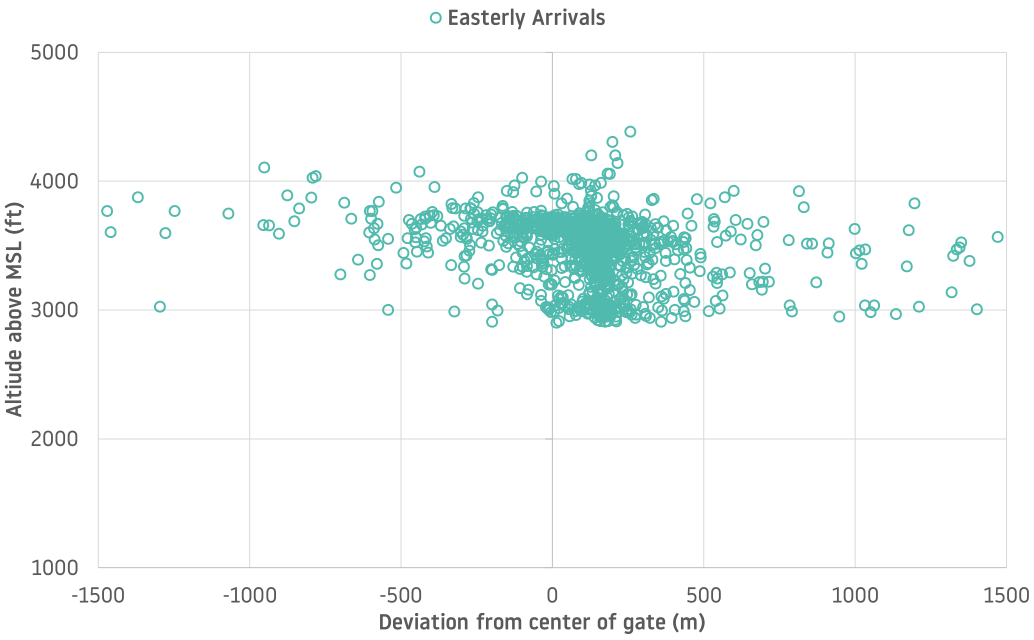
The heat map below shows a closer image of the the representative flight tracks that passed near the noise monitor terminals during the monitoring period. The red pinpoint indicates the location of the noise monitor in Pitstone. At this location, it is mainly affected by easterly arrivals.



Altitude Gate Analysis

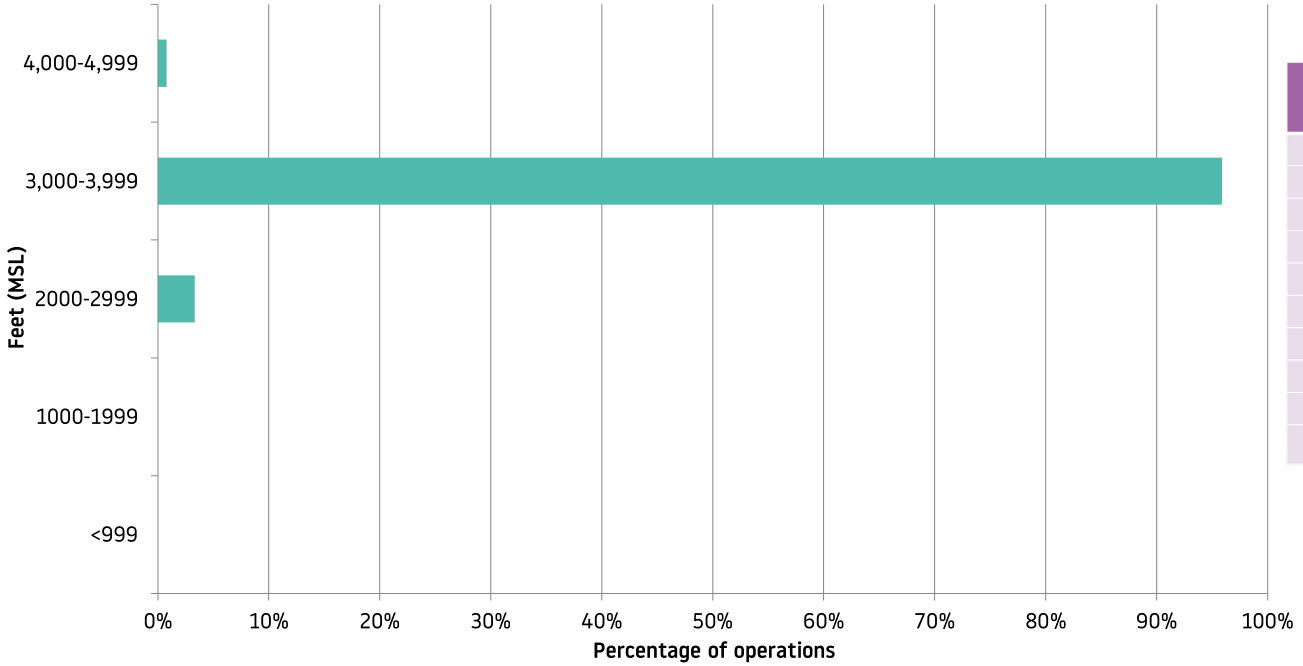
The altitude analysis for Pitstone shows the vertical and lateral dispersion of aircraft 1.5km either side of the arrival centreline. The map below shows the 3km gate which is drawn from northwest to southeast and it gathered information of every aircraft passing through the gate area. The scatter graph below shows the distance and altitude of aircraft from the noise monitor during the monitoring period. The easterly day and night noise preferential route (NPR) is labelled and displayed by the shaded area. Arrival aircraft must remain within the NPR until reaching the release altitude of 3,000ft during the daytime period and 4,000ft at night-time period. If an aircraft leaves the corridor before reaching the specified altitudes, we will conduct an investigation as to why this happened. This could result in a fine being given to the operator.





Altitude Gate Analysis – Easterly Arrivals

For easterly arrivals, the bar chart below shows the percentage rate and altitude of aircraft departing for aircraft that are departing on easterly operations. The average altitude of aircraft in this area was 3,514 ft AMSL (3,157 ft AGL) when they reached near the noise monitor in the proximity of Pitstone. The table on the right shows the number of aircraft movements by aircraft type and their average altitude.



Aircraft Type	Number of movements	Average Altitude (AMSL in ft)
A20N	834	3,577
A21N	1032	3,516
A306	48	3,409
A319	951	3,572
A320	1746	3,562
A321	624	3,538
B738	942	3,603
C56X	192	3,506
GLEX	207	3,346
All	6,576	3,514

*only aircraft movements above 120 were included in the table with A306 included for comparison.

How Do We Analyse the Noise Data

Following the noise monitoring period, we collate the data taken from our Noise and Track Keeping system and analyse the noise reading samples.

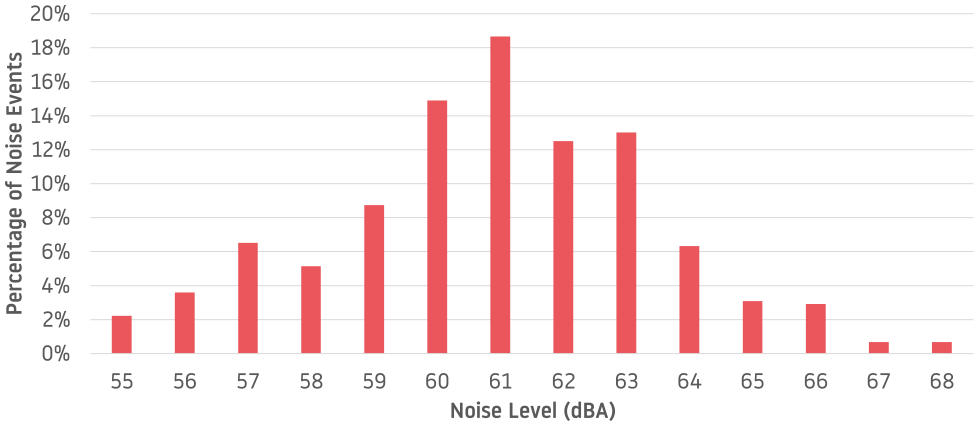
During the monitoring period in Pitstone, the noise monitoring terminal collected readings from 6,522 easterly arrivals. During the period, there were 8,077 easterly arrivals. It is noteworthy that the noise monitor may not be able to record every aircraft noise event if the aircraft noise level is below ambient background noise. Therefore, there may be a difference between the number of actual air transport movements and number of aircraft noise events collected during the monitoring period.

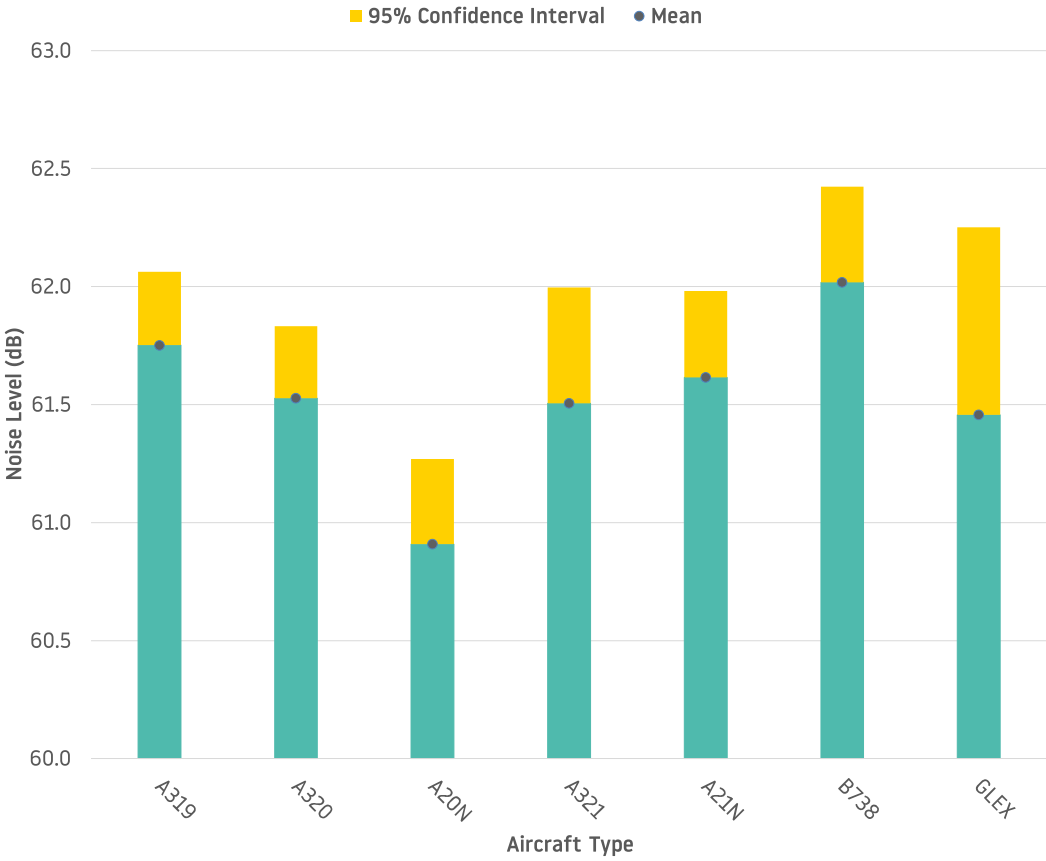
The weather also plays a big part in the data recorded and in periods of extreme weather i.e (very strong winds) the equipment can record noise incorrectly, so we exclude samples from the analysis during these weather conditions. When analysing the samples, the first thing we do is to ensure that there is no unusual noise event present which might not be caused by aircraft (i.e. vehicles, pets or wildlife). Some recordings were excluded from the analysis for the above reasons.

Noise Results – Easterly Arrivals

During the monitoring period, the noise recording samples were gathered from the most popular aircraft types at London Luton Airport*. The summary of the noise results is shown in this section. The tables show the average noise by aircraft type and the bar chart shows the uncertainty caused by the spread in readings and the sample size (95% confidence interval).

Aircraft Type*	Number of movements	Average Noise (dB)
A319	826	61.8
A320 CEO	1,085	61.5
A320 NEO (A20N)	655	60.9
A321 CEO	465	61.5
A321 NEO (A21N)	756	61.6
B737-800 NG (B738)	533	62.0
All Aircraft Types	4,320	61.5





*The noise results shown in the analysis are only for those aircraft types that recorded more than 5 events per aircraft.

Noise Results - Summary

- In Pitstone, residents may experience louder aircraft noise when the airport is operating in the easterly direction as the arrival aircraft following the NPR route is above Pitstone compared to the NPR route on a westerly arrival route.
- On easterly arrival operation, the average arrival noise measured was 61.5dB, based on a sample size of 4,320.
- From the results, Luton's most popular aircraft type by operators, Airbus A320 CEO, had an average easterly arrival noise of 61.5dB.
- The arrival noise from the newer generation aircraft, A320 NEO, produced less noise than A320 CEOs, at an easterly average of 0.6dB quieter at arrival in Pitstone.
- From the noise data collected, there were only 655 A320 NEO departure noise events captured out of the 726 flights (90%) from the 3km gate analysis whereas 1,085 noise events out of 1,216 A320 CEO flights (89%) were captured. As mentioned earlier, noise monitors may not be able to record every aircraft noise event if the aircraft noise level is below ambient background noise. This may have skewed the average noise result.
- During the monitoring period, 45% of the movements were newer generation aircraft which are more fuel efficient and quieter.
- The Boeing B738 was the noisiest aircraft type at Pitstone for arrivals. This aircraft type registered at average of 62.0dB easterly.

Conclusion

- A mobile noise monitor was installed at a residential property in Pitstone for nine weeks.
- For Pitstone, it specifically related to easterly arrivals. During the monitoring period, the airport operated in the direction of easterly and westerly for 55% and 45% of the time, respectively. Generally, over the year, LLA operate in the westerly direction for 69% of the time due to the prevailing wind.
- The average altitude of easterly arrival aircraft in Pitstone is 3,514 feet above mean sea level (AMSL), as Pitstone is already approximately 387 feet AMSL, aircraft will typically be at 3,157 feet above ground level (AGL) in this area.
- The main aircraft type operating at London Luton Airport is the Airbus A320 CEO which produced an average noise of 61.5dB easterly.
- The A320 NEO registered at an easterly average of 0.6dB quieter at departure in Pitstone.
- During the monitoring period, 45% of the noise events recorded in Pitstone were created by the newer generation aircraft, A320 NEO, A321 NEO, B737-800 NG.
- Some of the noise events by quieter aircraft were not captured by the noise monitor as some of the aircraft noise level is below ambient background noise. This may have skewed the average noise result.
- During the monitoring period, 48 departure aircraft (easterly operations) were investigated as part of the Noise and Track violation scheme. 5 aircraft were fined, all fine generated by this scheme go directly into the community trust fund, more information on the community trust fund can be found on https://www.london-luton.co.uk/corporate/community/community-trust-fund.
- LLA publish other monitoring reports and newsletter on a regular basis. These reports can be viewed and downloaded from the Noise webpage on the LLA website - https://www.london-luton.co.uk/corporate/community/noise.

Glossary of Terms

Easterly Operations: Easterly operations refers to the time when the wind is blowing from the east and aircraft land on the easterly runway and would fly above Pitstone.

Standard Instrument Departure (SID): Published route that an aircraft must follow on departure.

Noise Preferential Route (NPR): All aircraft except propeller aircraft leaving London Luton Airport should follow flight paths known as Noise Preferential Routes (NPRs) up to an altitude of 3,000 feet or 4,000 feet depending on the route. They lead from the runway to the main UK air traffic routes and form the first part of the Standard Instrument Departure routes (SIDs).

Aircraft Movement: A single aircraft departing or arriving at the airport.

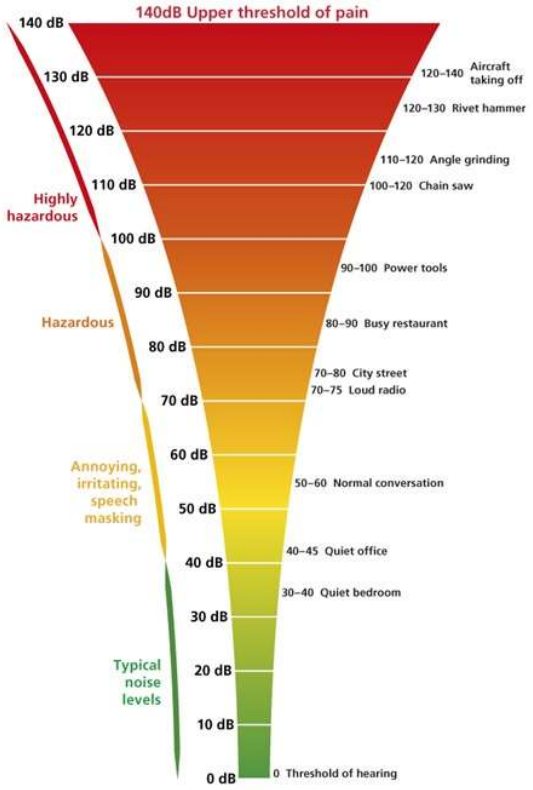
Altitude Gate Analysis: A gate which is drawn across an area and will gather flight date about every aircraft passing through the gate area.

Noise Event: A single event is the period from when an aircraft approaches the monitor until when the aircraft is leaving the area.

Decibel (dB): The unit used to measure noise (typically 50-60dB is equivalent to a normal conversation level).

LasMax: A unit of measure and is the maximum noise level from a single aircraft passing over the noise monitor.

95% Confidence Interval: A range of values that you can be 95% certain contains the population mean.



Source: iosh.co.uk