Community Noise Report South Luton January – May 2022





Introduction

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

The purpose of the monitoring programme is to understand the typical noise levels created in the local community. For South Luton, it specifically related to the westerly departures and easterly arrivals. The Standard Instrument Departures (SIDs) or Noise Preferential Routes (NPRs) and the final approach flightpath are shown on the map.

The noise monitor was located at a residential property on Cutenhoe Road, directly underneath the easterly arrival centreline and approximately 200m northwest of the westerly departure centreline, at an altitude of 525 feet above sea level. The red pinpoint on the map shows the noise monitor location.

The noise monitor in South Luton was in place between 20th January and 17th May 2022.

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 monitoring period, the direction of operation was 43% easterly and 57% westerly. The 5 year average for this time of year is 37% easterly vs 63% westerly.

There were 9,532 aircraft departed on the westerly routes and 7,139 aircraft landed on the easterly runway whilst the noise monitor was located in South Luton. In terms of total air transport movements, LLA was operating at 77% of pre-pandemic level.



Runway Usage

		97%
		95%
	74%	26%
9%		41%
		73%
<mark>6</mark>		57%

erly 🛛 🖉 Westerly



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Daily Movements During Monitoring Period

The chart below shows the number of daily westerly departures and easterly arrivals that passed over the noise monitor. Due to the location, all flights that departed from our westerly runway and landed on our easterly runway would have flown above the noise monitor terminal.



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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 South Luton may experience different flight patterns. During the peak periods, local residents of South Luton may notice more frequent aircraft movements. In general, the morning peak starts at 6am on the days of westerly operation which occur approximately 70% of the time annually. Residents at this NMT location may notice the morning peak begins an hour later at 7am on the days of easterly operation and these aircraft would be lower at altitude and more noticeable as the dwellings at this location are directly underneath the easterly final approach flightpath.

During the night period of 23:00 – 06:00 in the monitoring period, there were average of 18 arrivals and four departures. The night arrival rate was at 82% of 2019 pre-Covid pandemic level whereas the night departure rate was the same.



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 South Luton. At this location, it is affected by easterly arrivals and westerly departures.





Altitude Gate Analysis

The altitude analysis for South Luton shows the vertical and lateral dispersion of aircraft 1.5km either side of the noise monitor. The map below shows the 3km gate which is drawn perpendicular to the NPR 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 westerly NPR is labelled and displayed by the shaded area. Departing aircraft must remain within the NPR until reaching the release altitude of 3,000ft during the day time period and 4,000ft at night time period (4,000ft at all times when departing on the MATCH SID). Due to the close proximity of South Luton to the departure and arrival routes, local residents may see aircraft flying above South Luton at low altitude. A number of departing aircraft that flew outside the NPR laterally were investigated. Most were vectored by air traffic control due to weather and some were fined as part of the noise and track violation scheme.





Altitude Gate Analysis – Easterly Arrivals

The altitude analysis is split into two parts in this South Luton report – Departures and Arrivals. The bar charts in this section show the concentration of the aircraft when aircraft reach the noise monitor in South Luton. For arrivals, aircraft tend to be at much lower altitude due to the close proximity to the runway at South Luton. The average altitude of aircraft in this area was 931 feet AMSL (406 feet AGL).



Aircraft Type	Number of movements detected	Average Al (AMSL in
A306	49	929
A319	729	932
A320 CE0	1,479	928
A320 NEO (A20N)	529	935
A321 CEO	526	913
A321 NEO (A21N)	472	934
B737-800 NG (B738)	795	926
B737 Max 8 (B38M)	40	916
Global Express (GLEX)	229	936
Cessna 560X (C56X)	148	951
Gulfstream G560 (GLF6)	127	949
All	6,305	931

itude ft)



Altitude Gate Analysis – Westerly Departures

For departures, the average altitude of aircraft was 2,117 feet AMSL (1,592 feet AGL) when they reach above the noise monitor above Cutenhoe Road in South Luton. The purple bar chart shows majority of the departing flights were above 1,500 feet AMSL. The lighter weight aircraft, Cessna 560X, Gulfstream G650 and Global Express, achieved higher altitude.



Aircraft Type	Number of movements	Average Alti (AMSL in 1
A306	109	2,583
A319	949	1,961
A320 CE0	2,332	2,023
A320 NEO (A20N)	770	2,058
A321 CEO	658	2,023
A321 NEO (A21N)	645	1,931
B737-800 NG (B738)	1,082	1,981
B737 Max 8 (B38M)	62	1,778
Global Express (GLEX)	413	2,270
Cessna 560X (C56X)	264	2,531
Gulfstream G560 (GLF6)	168	2,252
All	9,417	2,117

50%







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 South Luton, the noise monitoring terminal collected readings from 6,559 easterly arriving aircraft and 6,560 westerly departing aircraft. During the period, there were 7,139 easterly arrivals and 9,532 westerly departures.

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 or wildlife). A total of 360 recordings were excluded from the analysis for the above reasons.



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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
A306	50	88.7
A319	766	83.5
A320 CE0	1,542	82.4
A320 NEO (A20N)	551	81.7
A321 CEO	567	82.1
A321 NEO (A21N)	490	83.0
B737-800 NG (B738)	818	84.8
B737 Max 8 (B38M)	48	83.1
Global Express (GLEX)	229	76.9
C56X	146	82.1
GLF6	137	76.9



100 events per aircraft (A306 and B737 Max 8 included for comparison).

Noise Results – Westerly Departures

Aircraft Type*	Number of movements	Average Noise (d
A306	58	80.6
A319	711	79.7
A320 CE0	1,613	79.0
A320 NEO (A20N)	572	75.9
A321 CEO	475	80.8
A321 NEO (A21N)	473	80.0
B737-800 NG (B738)	749	83.2
B737 Max 8 (B38M)	49	78.5
Global Express (GLEX)	289	77.9
C56X	180	69.5
GLF6	127	75.0



100 events per aircraft (A306 and B737 Max 8 included for comparison).

Noise Results - Summary

- noise would be more noticeable at this location.
- average departure noise measured was 78.1dB, based on a sample size of 6,560.
- (departure).
- more fuel efficient and quieter.
- 83.0dB.

• On Cutenhoe Road in South Luton, residents may experience louder aircraft noise when the airport is operating in the easterly direction as the arrival aircraft follow the final approach flightpath in a straight line towards the runway at low altitude. The altitude of the arrival aircraft is much lower than the westerly departing aircraft. The arrival flightpath is directly above Cutenhoe Road so therefore the aircraft

The average easterly arrival noise on Cutenhoe Road in South Luton was 81.9dB, based on a sample size of 6,559. On westerly operation, the

From the results, Luton's most popular aircraft type by operators, Airbus A320 CEO, had an average noise of 82.4dB (arrival) and 79.0dB

The departure noise from the newer generation aircraft, A320 NEO, produced less noise than A320 CEOs, at an average of 3.1dB quieter. Similar to the Boeing 737 series, the new B737 Max 8 was 4.7dB quieter than its predecessor B737-800NG, despite that they flew slightly at lower altitude. However, the Max's sample is small. In the sample, 17% of the movements were newer generation aircraft which are

The A321 NEO aircraft, however, registered slightly higher arrival noise level than the A321 CEO. The average noise was 0.9dB higher at

The freight aircraft A306 was the noisiest aircraft type at South Luton. This aircraft type is generally deployed in the daytime period.

Conclusion

- A mobile noise monitor was installed at a residential property on Cutenhoe Road for four months period.
- wind.
- the noise from landing aircraft would be louder than departing aircraft.
- westerly departure respectively.
- a difference of 4.7dB. However, the sample size is still small until the operators replace its fleet and deploy them into LLA.
- https://www.london-luton.co.uk/corporate/community/community-trust-fund.
- https://www.london-luton.co.uk/corporate/community/noise.

For South Luton, it specifically related to westerly departures and easterly arrivals. During the monitoring period, the airport operated in the direction of easterly and westerly for 43% and 57% of the time respectively. Generally, over the year, LLA operate in the westerly direction for 70% of the time due to the prevailing

The average altitude of westerly departing aircraft in South Luton is 2,117 feet above mean sea level (AMSL), and as South Luton is already approximately 525 feet AMSL, aircraft will typically be at 1,592 feet above ground level (AGL) in this area. For easterly arriving aircraft, the altitude would be lower than the departures at this location on Cutenhoe Road as landing aircraft need to follow a swallower angle of descent than the climb gradient for departure. Therefore,

The main aircraft type operating at London Luton Airport is the Airbus A320 CEO which produced an average noise of 82.4dB and 79.0dB for easterly arrival and

17% of the noise events recorded in South Luton were created by the newer generation aircraft, A320 NEO, A321 NEO and B737 Max 8. The A320 NEO registered average departing noise of 75.9dB, 3.1dB lower than A320 CEOs. More noticeably, the B737 Max 8 was significantly quieter than its predecessor B737-800NG with

During the monitoring period, 67 departure aircraft (both westerly and easterly) were investigated as part of the Noise and Track violation scheme. 16 aircraft were fined, all fines generated by this scheme go directly into the community trust fund, more information on the community trust fund can be found on

• LLA published other monitoring reports on a regular basis. These reports can be viewed and downloaded from the Noise webpage on the LLA website -

Glossary of Terms

Westerly Operations: As aircraft take off and land into the wind, westerly operations refers to the time when the wind is blowing from the west and aircraft follow the departure route in the direction of South Luton.

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 South Luton.

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