Community Noise Report

South Harpenden

October – December 2019

London Luton Airport

Version 1.0

Introduction

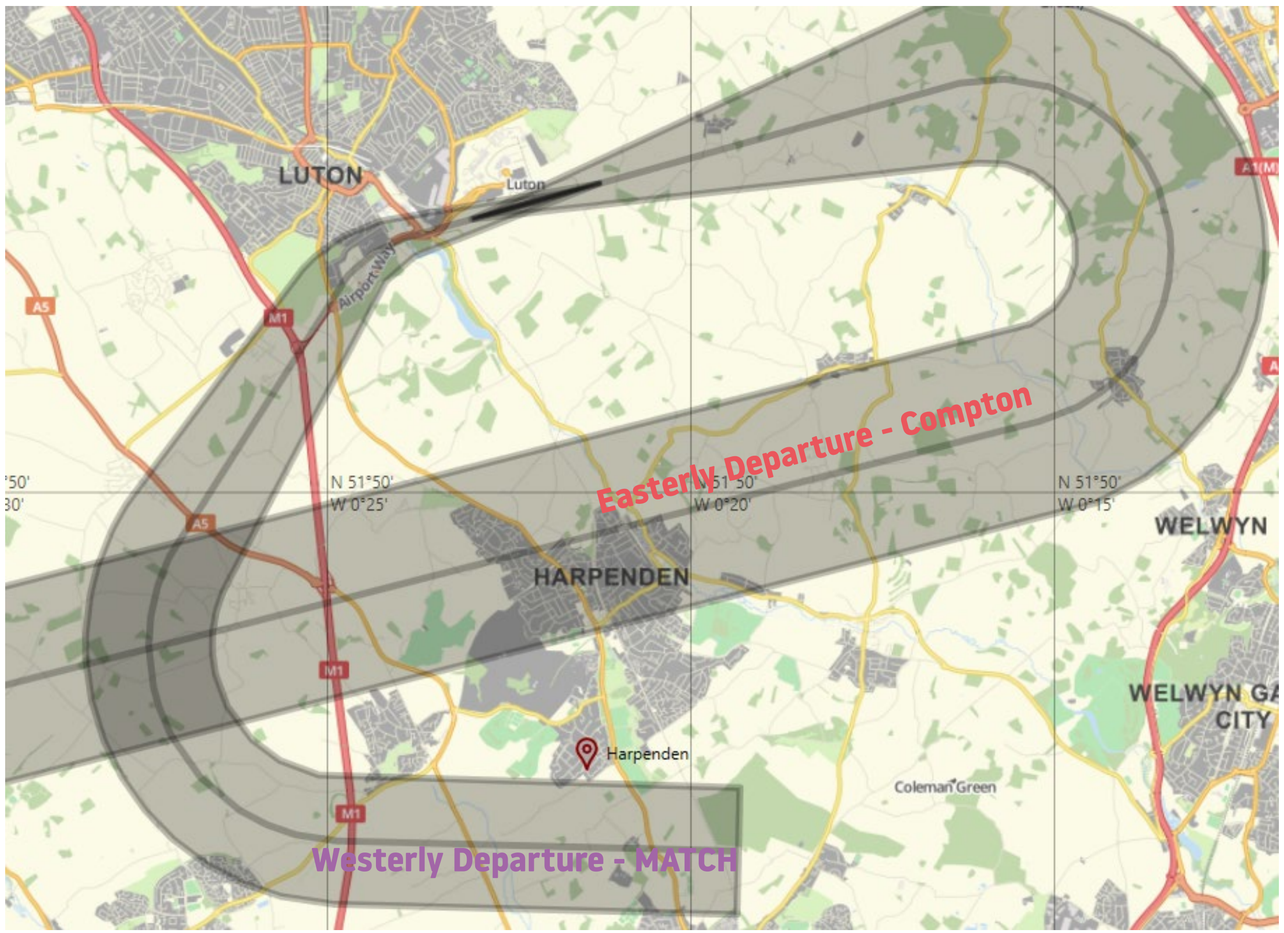
As part of the ongoing noise monitoring programme, London Luton Airport deployed a portable noise monitoring terminal in South Harpenden.

The purpose of the monitoring programme is to understand the typical noise levels created in the local community. For South Harpenden, it specifically related to the westerly Match departure. The easterly Compton departure (which is a closer route to North and Central Harpenden) is also being looked at for comparison in this report. The Noise Preferential Routes (NPRs) are shown on the map.

The noise monitor was located at a property on The Deerings at South Harpenden, close to the edge of the westerly Match departure corridor (1.2km from the centerline) and 3.6 km from the easterly Compton departure, at an altitude of approximately 404 feet above sea level. The red pinpoint on the map show the location of the noise monitor.

The noise monitor in South Harpenden was in place between 19th October and 22nd December 2019.

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.

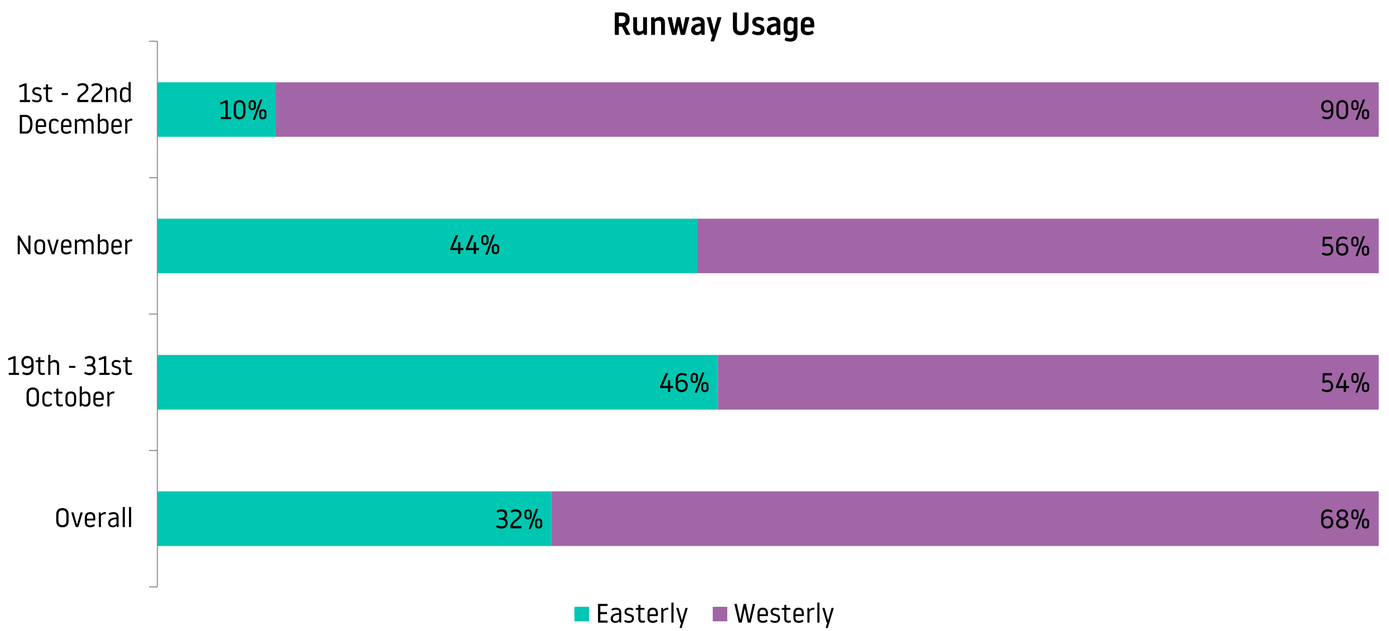


LLA Operations During the Monitoring

There are two directions of operation, depending on the wind direction as aircraft are required to take off and land into the wind for 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 weather.

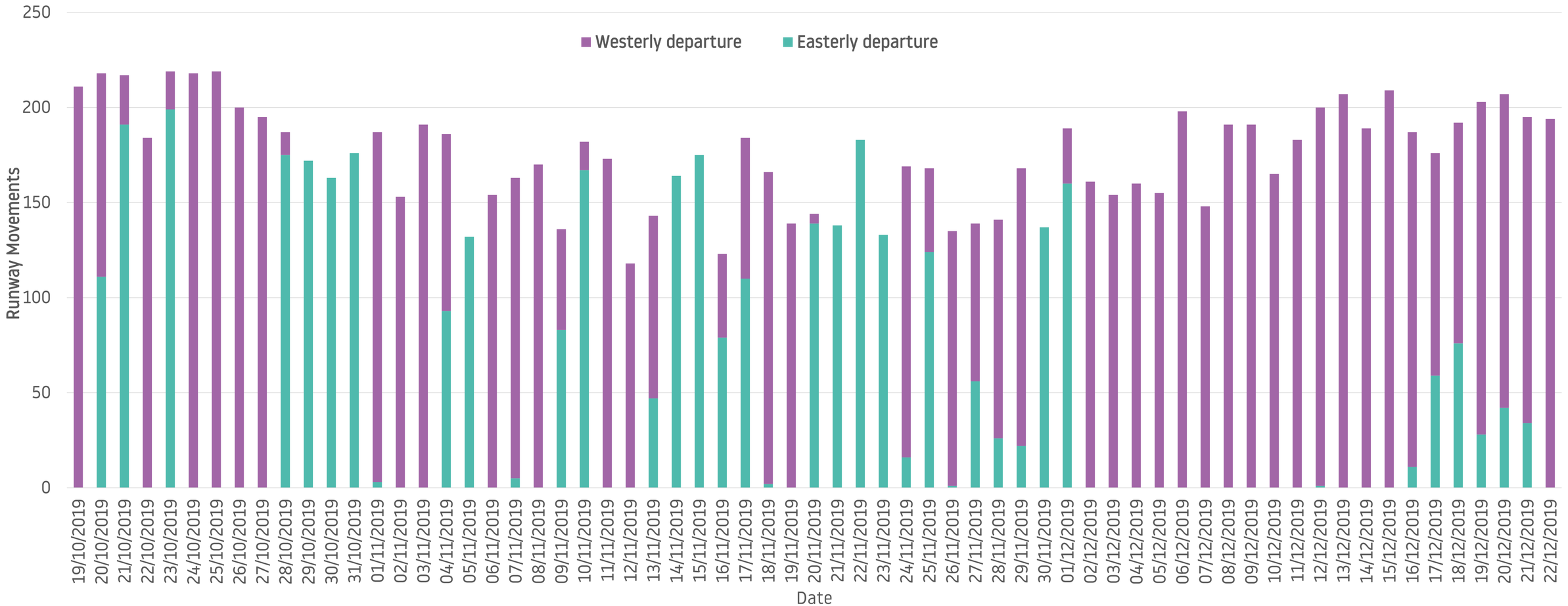
During the monitoring period, the direction of operation was 32% easterly and 68% westerly. The 5 year average for this time of year is 25% easterly vs 75% westerly.

There were 4,220 aircraft which departed on the westerly Match route and 1,082 aircraft which departed on easterly Compton route whilst the noise monitor was located in South Harpenden.



Daily Movements During Monitoring Period

The chart below shows the number of daily westerly and easterly departures at LLA. Due to the location of South Harpenden, some flights that departed on our westerly Match and easterly Compton routes would have flown near the monitor. Therefore, aircraft noise may be noticeable.



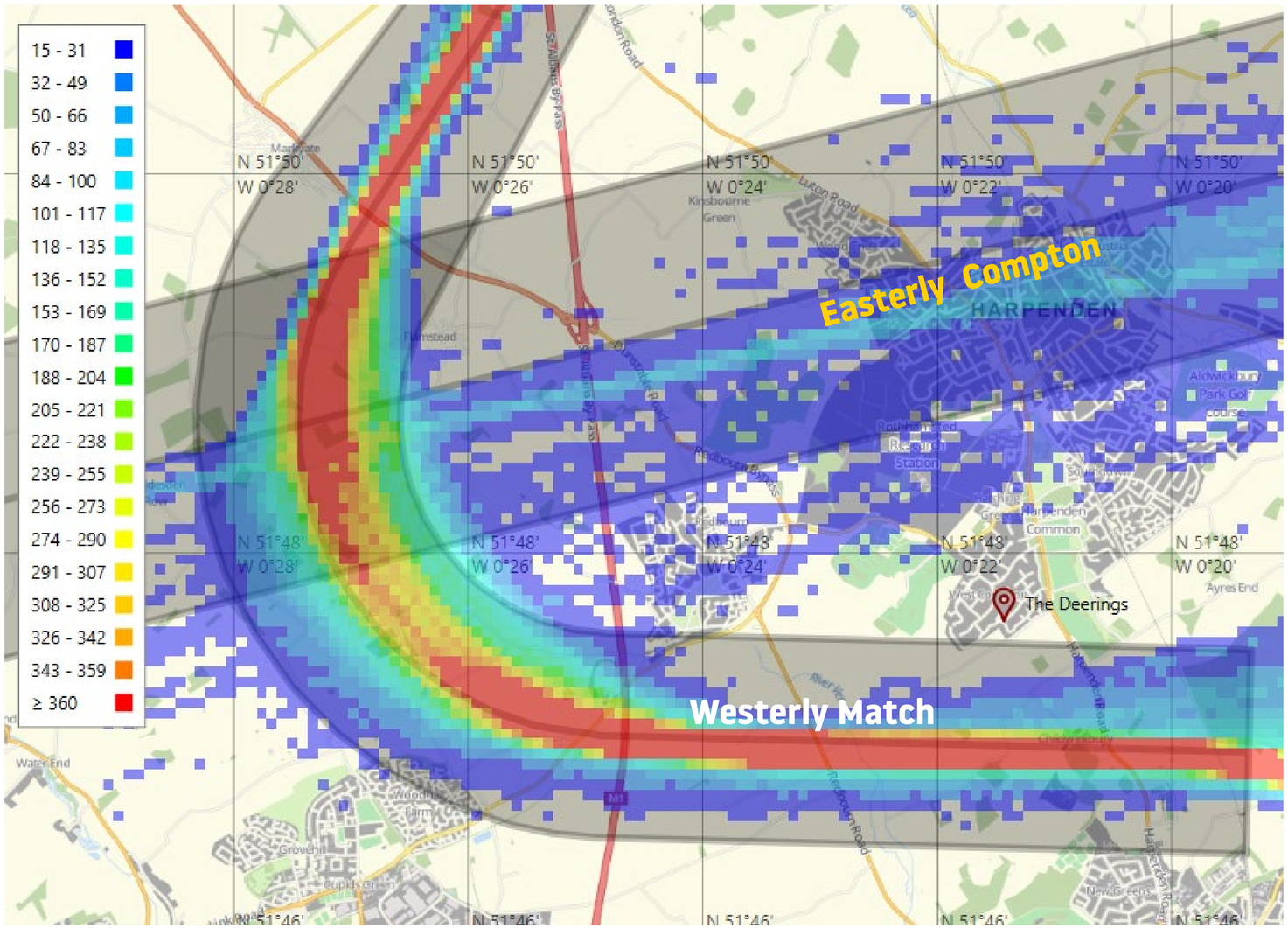
Operations During the Monitoring Period

The graph below represents the average number of departures during the monitoring period. Depending on the operating direction on the day, residents in South Harpenden may experience different flight patterns. During the peak periods, local residents of South Harpenden may notice more frequent aircraft movements. In general, the morning peak starts at 0700 and may last up to 3 hours. The afternoon peak is generally between 1400-1500 and 1700-1900. On a day of westerly operation which occur approximately 70% of the time yearly, residents may notice more aircraft flying close to South Harpenden. On a day of easterly operation, resident may notice less aircraft as only 35% of flight (2019's average) use the Compton departure route and it is further north from South Harpenden.

During the night period of 23:00 – 06:00 in the monitoring period, there was an average of 6 departures whereas in the previous year, there was an average of 8 departures.

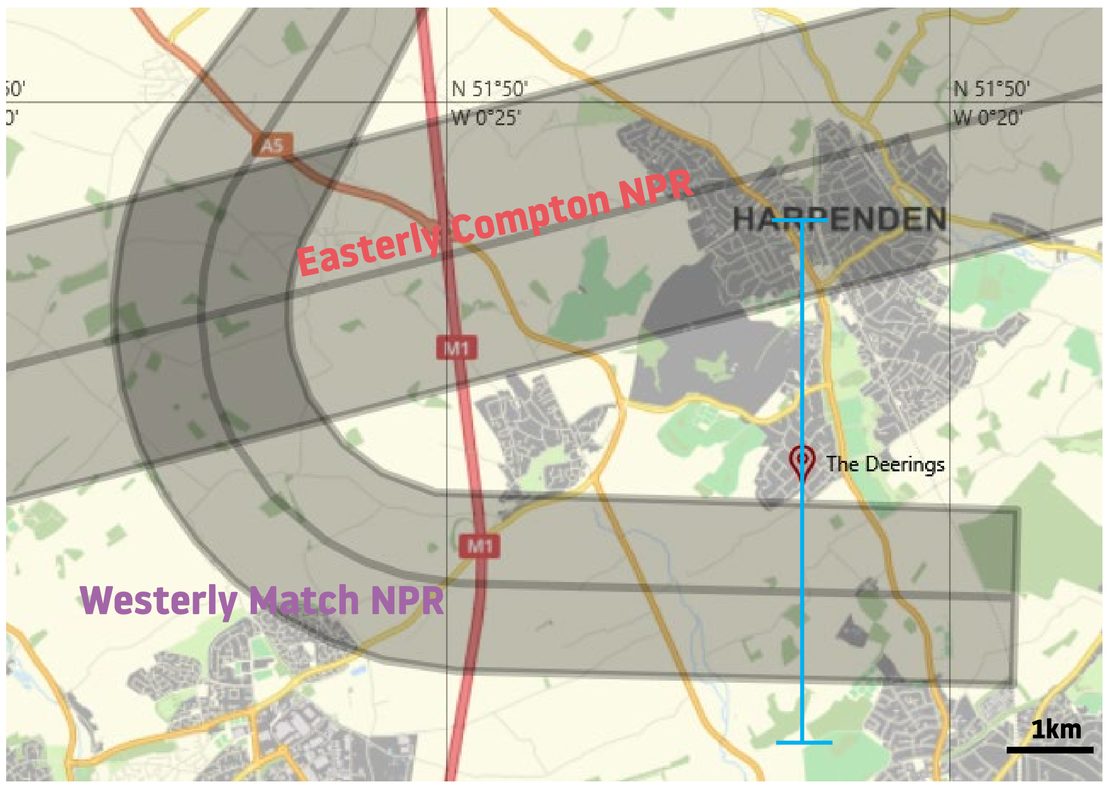
Aircraft Tracks During the Monitoring Period

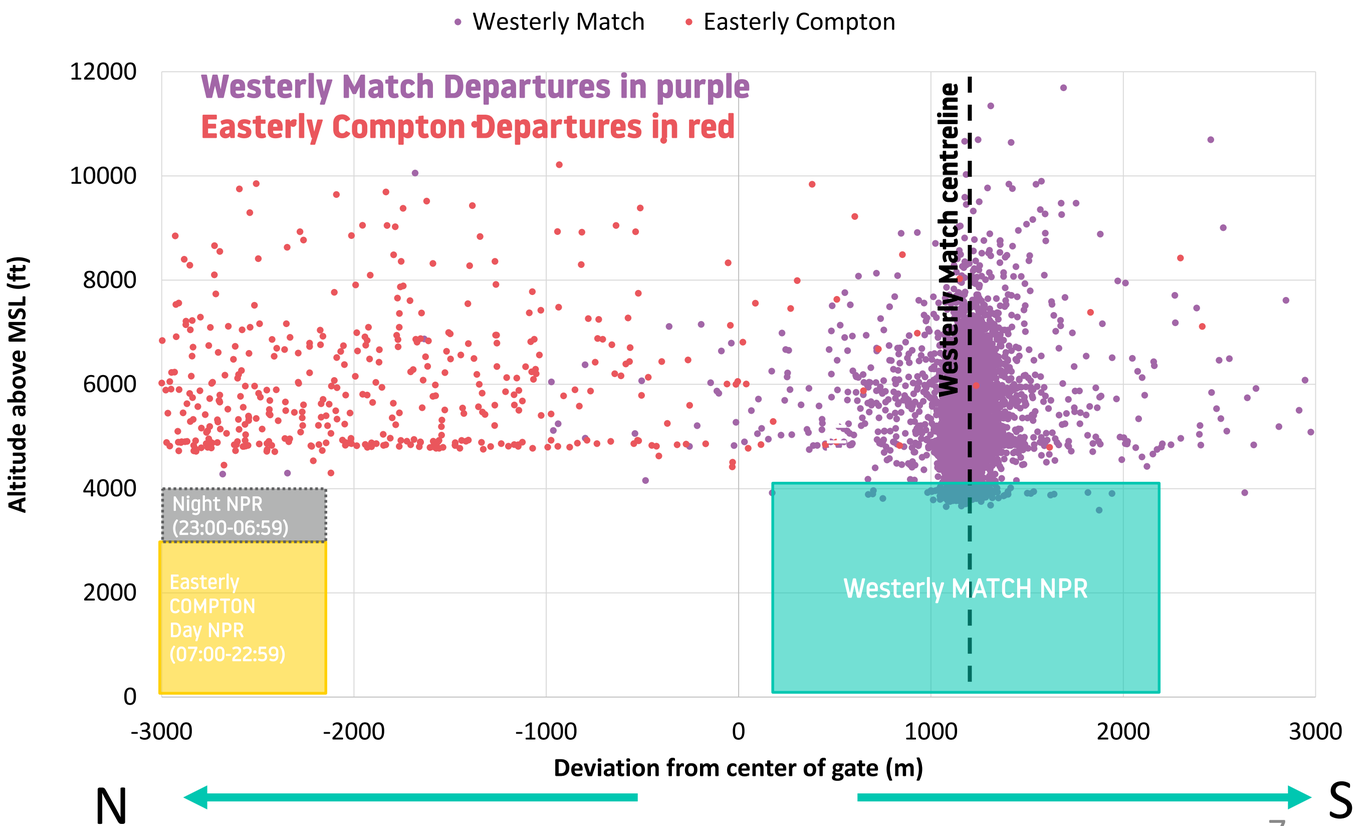
The heat maps below show the representative flight tracks that passed near the noise monitor terminals during the monitoring period. The red pinpoint indicates the location of the noise monitor in South Harpenden.



Altitude Analysis During Monitoring Period

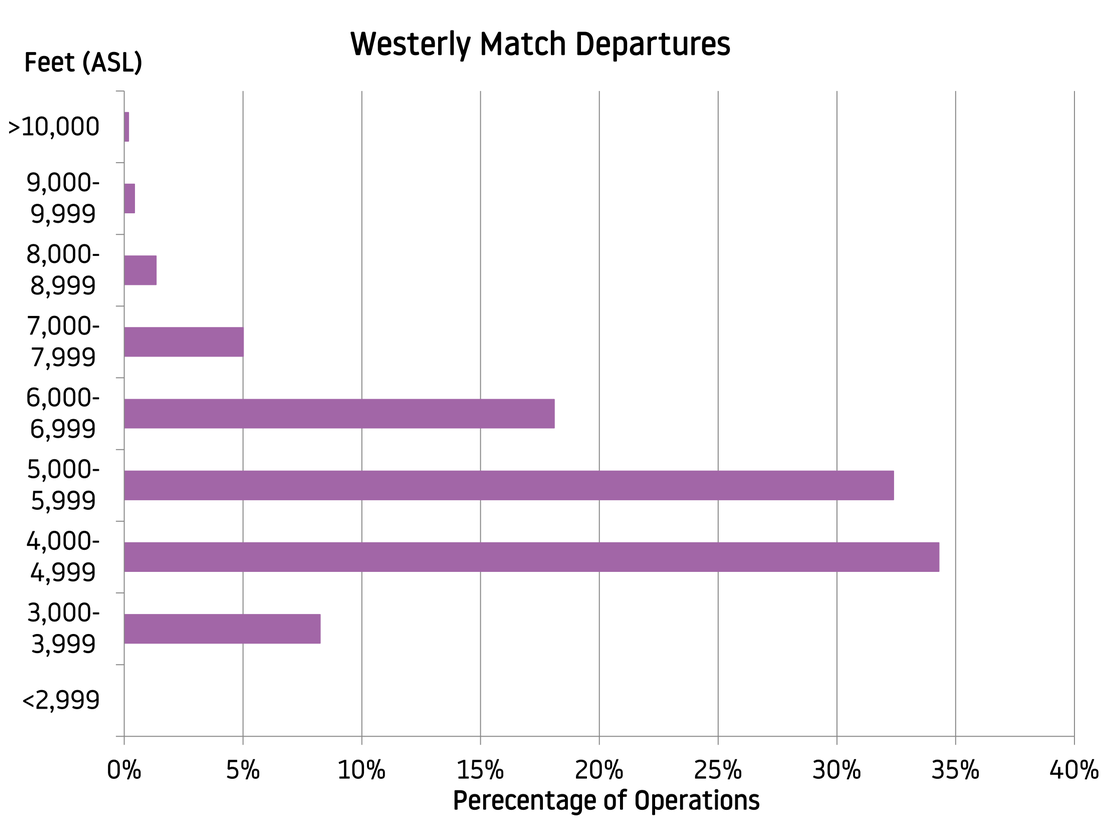
The altitude analysis for South Harpenden shows the vertical and lateral dispersion of aircraft 3km either side of the noise monitor. The map below shows the 6km gate which is drawn perpendicular to the NPRs from north to south and will gather information of every aircraft passing through the gate area. The scatter graph below shows the distance and altitude of aircraft from the noise monitor during the monitoring period. The westerly Match noise preferential route (NPR) and the easterly Compton NPR are labelled and displayed by the shaded area. Departing aircraft must remain within the NPR until reaching release altitude of 3,000ft during the day or 4,000ft at night (4,000ft at all times for Match route). Due to the close proximity of South Harpenden to the departure routes, local residents may see aircraft flying near South Harpenden at an altitude of above 4,000ft.

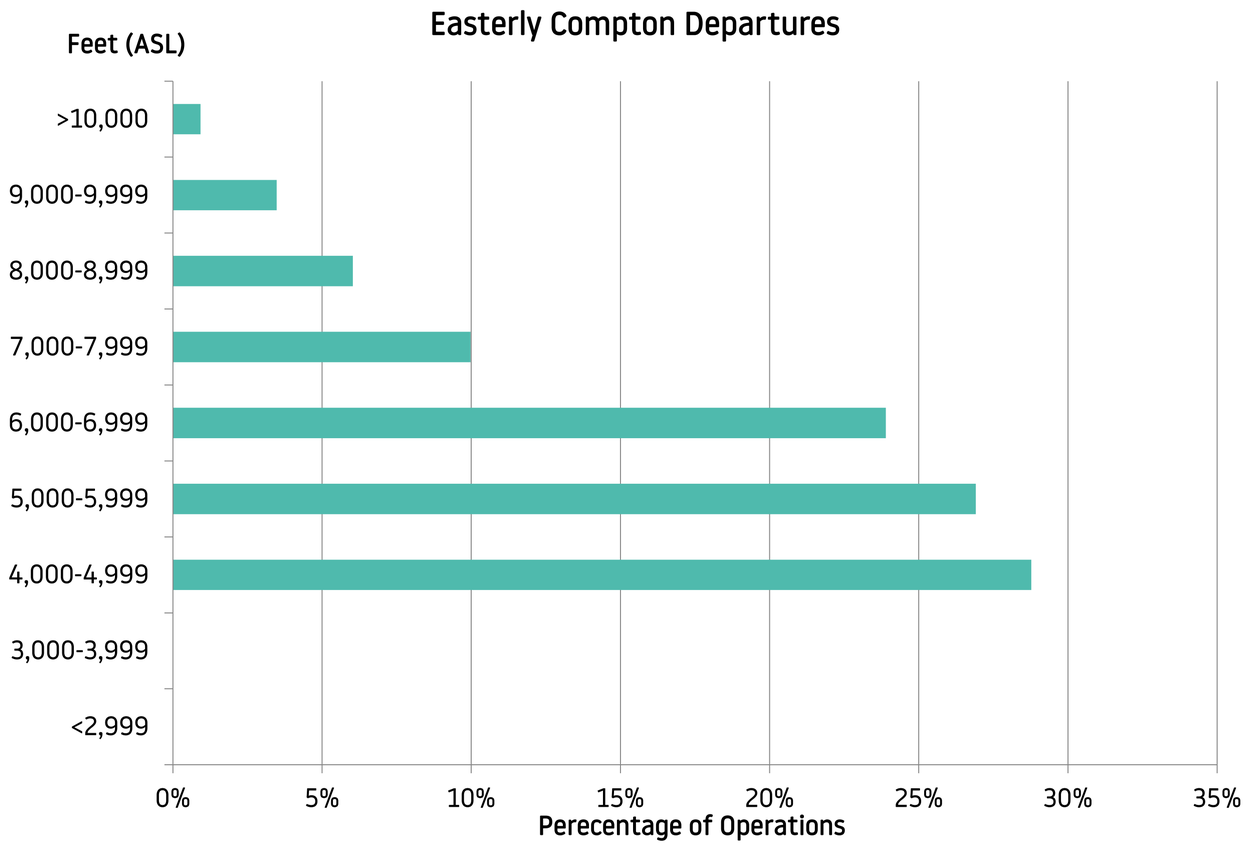




Altitude Analysis During Monitoring Period

The altitude analysis is split into two parts in this sub-section - westerly Match departures and easterly Compton departures. The bar charts show the altitude spread when aircraft reach the noise monitor in Harpenden. For westerly departures, the average altitude of aircraft in this area was 5,407 feet above sea level (ASL) (5,003 feet above ground level [AGL]). The purple bar chart shows the majority of the flights departed on westerly Match route were above 4,000 feet ASL. For easterly Compton departures, aircraft tend to be at higher altitude when they reach Harpenden. The average altitude of aircraft in this area was 6,112 feet ASL (5,708 feet AGL). That would have a less noise impact on South Harpenden.





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 Harpenden, the noise monitoring terminal collected readings from 2,247 westerly Match departing and 107 easterly Compton departing aircraft. During the period, there were total of 4,220 westerly Match departures and 1,082 easterly Compton 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). During the monitoring period, no recordings need to be excluded from the analysis for weather reason.

The purpose of the monitoring programme is to understand the typical noise levels created in the local community. For South Harpenden, it specifically related to westerly departures and easterly departures. For this reason, the data analysis is split into two parts – westerly departures and easterly departures.

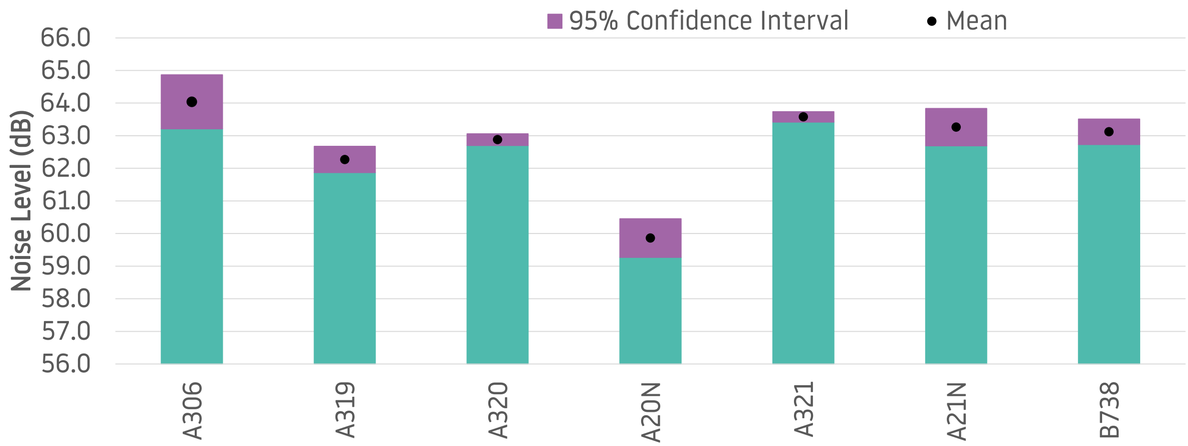
Westerly Departures - Noise Results During Monitoring Period

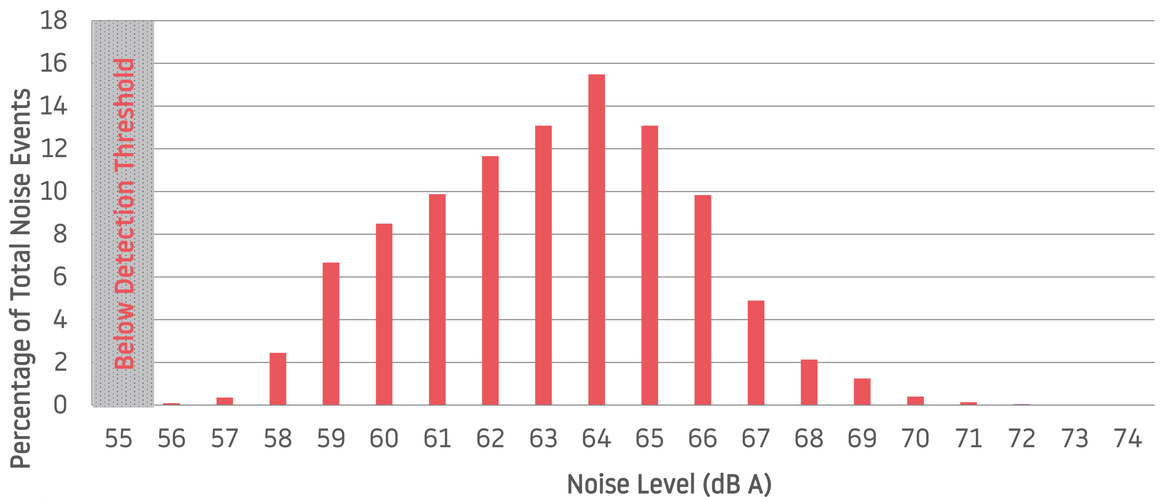
During the monitoring period, noise recording samples were gathered from the most popular aircraft types at London Luton Airport*. The summary of the results on westerly departing aircraft noise are shown on this page.

Aircraft Type	Number of movements	Average Noise (dB)
A306	55	64.0
A319	144	62.3
A320 CEO	756	62.9
A20N (A320 NEO)	26	59.9
A321 CEO	851	63.6
A21N (A321 NEO)	76	63.3
B738	213	63.1

The average westerly departure noise in South Harpenden is 63.1dB, based on a sample size of 2,247. The table shows the average noise for each aircraft type and the purple bar on the chart shows the uncertainty caused by the spread in readings and the sample size (95% confidence interval). From the results, Luton's most popular aircraft Airbus A320 CEO and A321 CEO have an average noise of 62.9dB and 63.6dB respectively in South Harpenden. The departure noise from A320 NEO and A321 NEO produced less noise than A320 and A321 CEOs. It is worth noting that some of the A320 NEO noise events were not collected by the noise monitor due to the ambient background noise level being higher, hence the fewer A320 CEO samples collected than the A321 CEO. The A306 was the noisiest aircraft type at South Harpenden on days of westerly operation during the monitoring period.

*The noise results shown in the analysis are only for those aircraft types that recorded more than 50 events per aircraft (A320 NEO included for comparison).





The noise monitor could not record every aircraft noise event if the aircraft noise level is below ambient background noise (≤55dB).

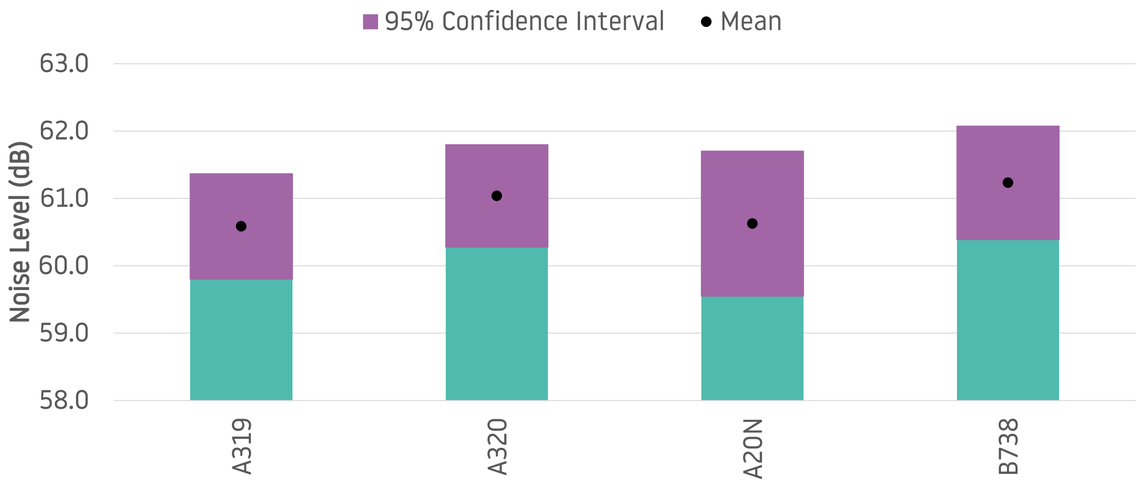
Easterly Departures - Noise Results During Monitoring Period

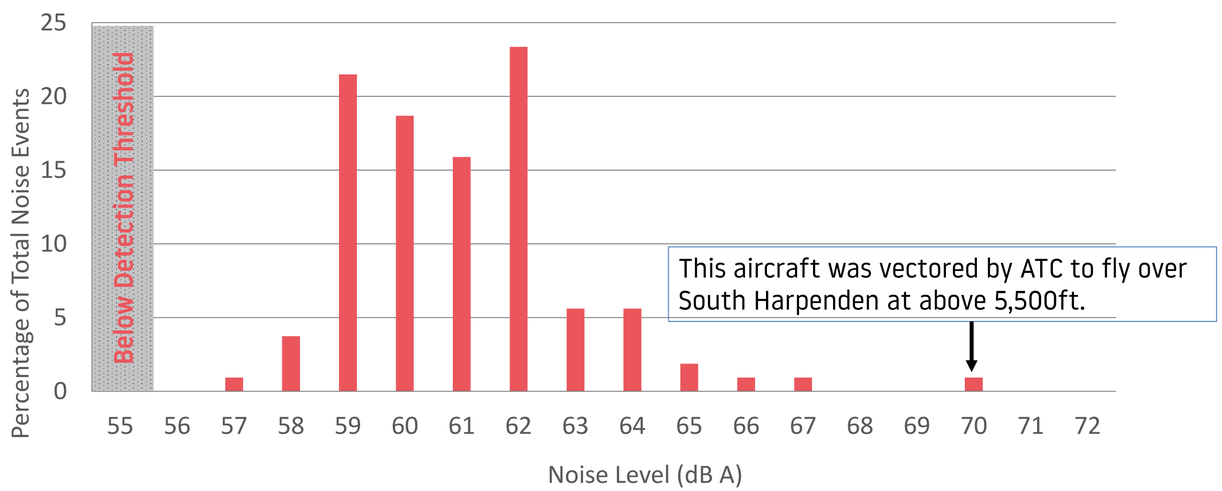
During the monitoring period, noise recording samples were gathered from the most popular aircraft types at London Luton Airport*. The summary of the results of easterly departing aircraft noise are shown on this page.

Aircraft Type	Number of movements	Average Noise (dB)
A319	26	60.6
A320 CEO	27	61.0
A20N (A320 NEO)	4	60.6
B738	28	61.2

The average easterly departure noise in South Harpenden is 60.9dB, based on a sample size of 107. It has a lower noise level than the westerly Match departure due to the further distance to the noise monitor from easterly departing aircraft. The table shows the average noise for each aircraft type and the purple bar on the chart shows the uncertainty caused by the spread in readings and the sample size (95% confidence interval). From the results, the noise level of each aircraft type on the list are very similar.

Only a small amount of easterly departure noise data was collected at this noise monitor in South Harpenden. The noise monitor could not record every aircraft noise event if the aircraft noise level is below ambient background noise. Therefore, the true average aircraft noise level for easterly operation may not be reflected at this location.





The noise monitor could not record every aircraft noise event if the aircraft noise level is below ambient background noise (≤55dB).

*The noise results shown in the analysis are only for those aircraft types that recorded more than 20 events per aircraft. (A320 NEO included for comparison)

Conclusion

- For South Harpenden, it specifically related to westerly Match departures. The easterly Compton departures was also included in this report for comparison. During the monitoring period, the airport was using westerly operations for 68% of the time, this is less than the five year average of this time period.

- The average altitude of westerly departing aircraft in South Harpenden is 5,407 feet above sea level (ASL), and as South Harpenden is already approximately 404 feet ASL, aircraft will typically be 5,003 feet above ground level (AGL) in this area.

- Almost all aircraft shown in the altitude analysis flew within or above the NPR corridor.

- The main aircraft type operating at London Luton Airport is the Airbus A320 CEO and A321 CEO which produced an average noise of 62.9dB and 63.6dB respectively in South Harpenden on a day of westerly operation. 4.5% of the noise events recorded in South Harpenden were created by the newer generation aircraft, A320 NEO and A321 NEO, registering average departing noise events of 59.9dB and 63.3dB respectively, quieter than the Airbus CEO departures. On the other hand, only a small amount of easterly noise data were collected in South Harpenden due to the further distance of the easterly Compton SID from South Harpenden. The noise monitor could not record every aircraft noise event if the aircraft noise level is below ambient background noise. Therefore, the true average aircraft noise level for easterly operation may not be reflected in South Harpenden.

- In Q4 2019, 57 aircraft (both westerly and easterly) were investigated as part of the Noise and Track violation scheme. 11 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 https://www.london-luton.co.uk/corporate/community/community-trust-fund

- We are looking at new ways to make our community noise reports easier for the local communities to understand as well as including the right information. If you have any suggestions about how we can make these reports better, please don't hesitate to let us know by emailing noise.enquiries@ltn.aero.

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 Harpenden.

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

Noise Preferential Route: 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.

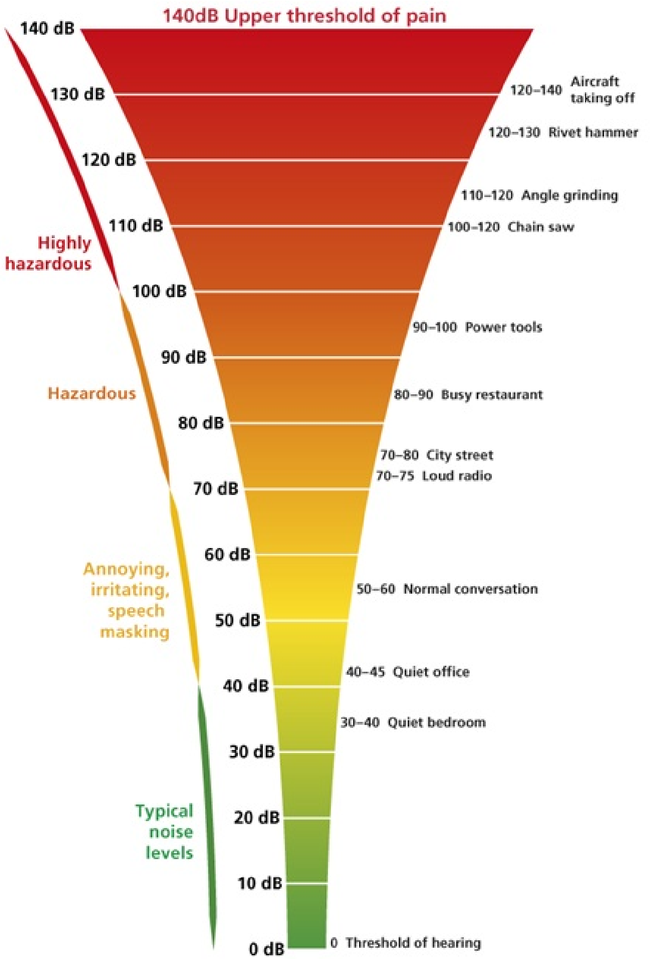
Gate Analysis: A gate which is drawn across an area and will gather information about every aircraft passing through the gate area.

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

Aircraft Types

Airbus A306 Freighter: Cargo aircraft with payload up to 54 tonnes
Main operator at LLA: DHL

Airbus A319: Short range single aisle jet with maximum 156 seats onboard
Main operator at LLA: easyJet

Airbus A320 CEO: Short to medium range single aisle jet, longer fuselage than A319, with around 180 seats.
Main operator at LLA: easyJet and Wizz Air

Airbus A320 NEO: Improved design of the A320 CEO, with more fuel efficient and quieter engines, known as NEO aircraft
Main operator at LLA: easyJet

Airbus A321 CEO: Stretched fuselage version of A320, providing more seats, up to 220.
Main operator at LLA: Wizz Air

Aircraft Types - Continued

Airbus A321 NEO: Improved design of the A321 CEO, with more fuel efficient and quieter engines, known as NEO aircraft.
Main operator at LLA: Wizz Air

Boeing B737: Medium range single aisle passenger jet with 189 seats
Main operator at LLA: Ryanair and TUI Airways

Boeing B757: Medium range single aisle passenger jet with up to 228 seats. The freighter version can provide payload up to 27 tonnes
Main operator at LLA: DHL (Freighter) and TUI Airways

Bombardier Global Express: Small long range private jet
Main operator at LLA: Private