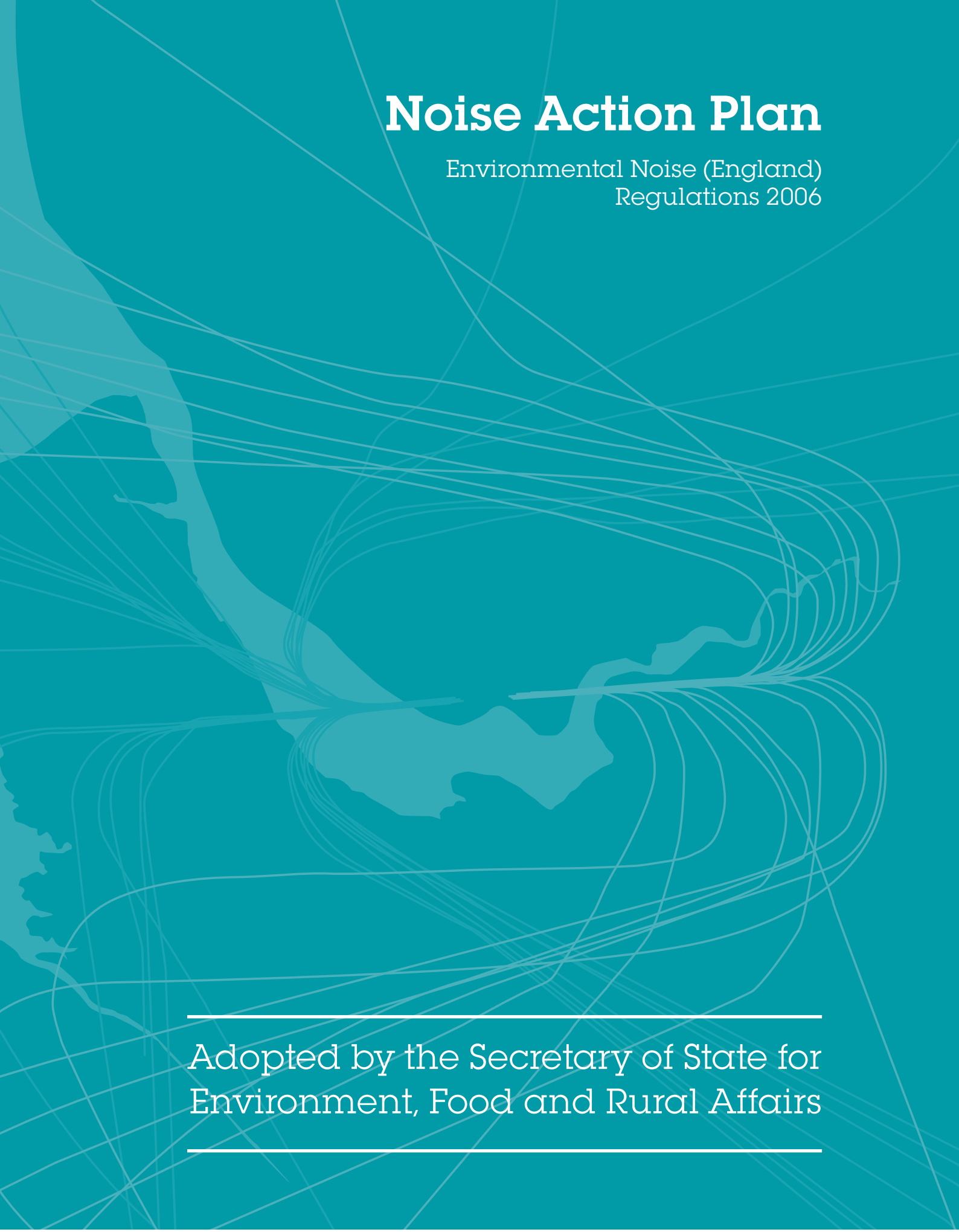
Noise Action Plan

Environmental Noise (England)
Regulations 2006



Adopted by the Secretary of State for Environment, Food and Rural Affairs

LiverpoolJohn LennonAirport

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1.0 Foreword

As a new member of the Liverpool John Lennon Airport (LJLA) team, I am proud that the Airport continues to play a dynamic role in the City Region handling over 4.8 million passengers in 2017.

LJLA has a choice of 60 destinations across Europe. As well as offering connectivity, the Airport contributes significantly to the region's economy by supporting 2500 jobs on site and many more across the region.

LJLA is striving to be the "Airport the Region Loves" and is seeking to be a good neighbour by ensuring any future development carefully balances local community concerns regarding noise and other potential environmental impacts with the social economic benefits a successful growing airport bring to the region. LJLA is committed to seeking sustainable growth by minimising and mitigating any environmental concerns wherever practicable to build an successful business.

When comparing the current Noise Action Plan data with the previous two the overall noise contours are smaller, for example taking the 55 dB Lden contours the areas are 17.0 km² in 2006, 17.6 km² in 2011 and 14.5 km², and for the 54 dB Lnight contours the areas are 4.5 km² in 2006, 4.3 km² in 2011 and 3.2 km² in 2016.

LJLA would welcome future constructive comments from any sources on how the Noise Action Plan could be improved in the future.

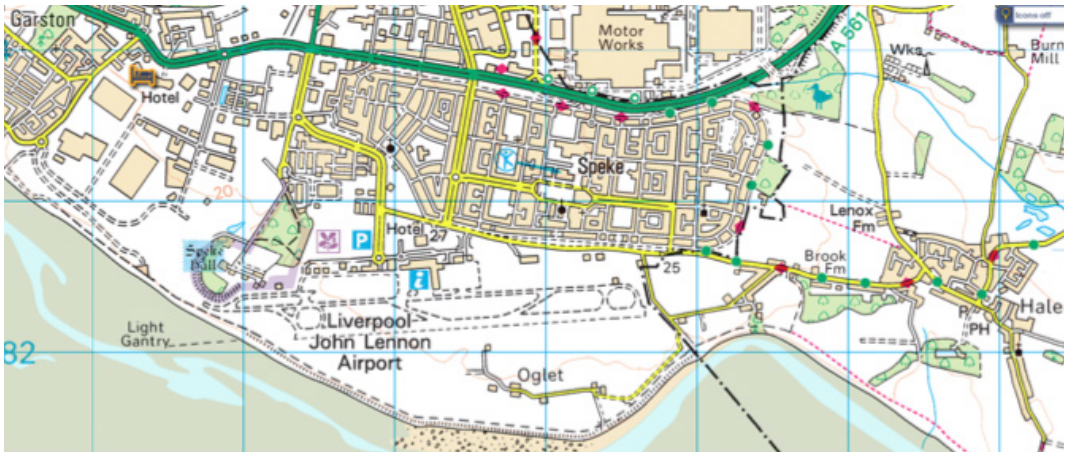
John Irving
Chief Executive Officer
Liverpool John Lennon Airport

2.0 Introduction

2.1 Airport Location

Liverpool John Lennon Airport is located 6 nautical miles to the south east of Liverpool City Centre on the northern banks of the Mersey Estuary. The airport's neighbours include the residential communities of Speke to the north and Hale Village to the east, within the Borough of Halton. To the North West, LJLA borders Liverpool International Business Park on the old northern airfield, and the grounds of Speke Hall which is a National Trust property with a significant number of visitors. Further to the north are the communities of Garston and Allerton. To the south, between the runway and the estuary, is agricultural land known as the Oglet. The new Control Tower and radar installation are situated within the Oglet and are accessed separately from Dungeon Lane, which passes close to the eastern end of the runway. To the west of the Airport and to the south of the Oglet are up to 5 kilometres of unpopulated tidal estuary.

Figure 1: The location of Liverpool John Lennon Airport



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2.2 Airport Operational Site

The operational site of LJLA extends to around 186 ha (460 acres). The runway and its associated taxiway is aligned east-west across the southern part of the site. All terminal, aprons, cargo buildings and airside facilities are situated on land to the north of the runway and south of Hale Road except the Control Tower and radar installation as noted above.

2.3 Runway 09/27

The current runway (09/27) is 2285m long and 46m wide. A full length parallel taxiway to the north of the runway serves all airside facilities. The main aircraft stands provide capacity for 28 aircraft and are situated towards the north western part of the site and a separate facility for General Aviation aircraft to the north eastern part of the site.

2.4 Aircraft Movement Numbers

CAA statistics show that in 2016 the year of the noise modelling LJLA had a total of 67,896 aircraft movements, of which 38,741 were air transport movements (commercial aircraft) and small number of military movements, and served approximately 4.827 million passengers.

Table 1: LJLA Number of Aircraft Movements 2007 – 2017

Year	Club	Commercial	Non-Commercial	Other	Total
2007	31,259	46,894	2,188	833	81,147
2008	28,322	44,693	3,605	1,110	77,730
2009	28,219	43,550	1,419	1,026	74,214
2010	27,006	44,084	1,338	946	73,374
2011	25,703	46,141	1,059	1,030	73,933
2012	27,100	36,191	1,065	1,240	65,596
2013	19,866	25,887	1,026	1,023	47,802
2014	25,478	30,102	1,430	1,402	58,412
2015	25,009	33,288	1,297	1,653	61,247
2016	26,444	38,471	1,324	1,657	67,896
2017	22,963	35,684	1,577	1,353	61,577

2.5 Airport Ownership

The Airport is part of The Peel Group which is a family owned business with principle investments encompassing land and property, transport and logistics, energy, retail and leisure. Established for over 40 years Peel has grown through the ethos of recycling capital and long term investmet. Peel has gained a reputation for visionary regeneration projects in the North of England. Peel first became involved with the Airport in 1997 and who have since made significant investments in the business. Passenger numbers have increased almost ten-fold since the mid-1990 s, with the Airport moving from 20th to the 12th busiest airport in the UK.

In March 2016, Liverpool City Council acquired a stake in the Airport in the form of shares with the investment used to further improve facilities for passengers and airlines and maximise the opportunity for the Airport and City Region to be a key gateway for the Northern Powerhouse.

3.0 Responsibilities, Policy and Procedural Context

3.1 The Environmental Noise (England) Regulations 2006

The regulations which transpose the European Environmental Noise Directive into the English legal framework are The Environmental Noise (England) Regulations 2006 (as amended). The regulations came into force on 5th October 2006 and apply to environmental noise to which humans are exposed. The regulations apply to noise from road, railway and aviation sources, as well as industrial noise. The regulations do not apply to occupational noise, noise from or between domestic premises, or noise from inside a means of transport or due to military activities in military areas.

3.2 Responsible Authority

The responsible authority for composing the Action Plan as defined in the Environmental Noise Regulations (England) 2006 (as amended) (ENR) is the Airport Operator. In the case of LJLA, Liverpool Airport Limited is the responsible authority.

3.3 Legal Requirements

Action Plans are a legal requirement under Directive 2002/49/EC relating to the Assessment and Management of Environmental Noise. The Directive is commonly referred to as the Environmental Noise Directive or END. The requirements of the END are transposed into the Environmental Noise (England) Regulations 2006 (as amended).

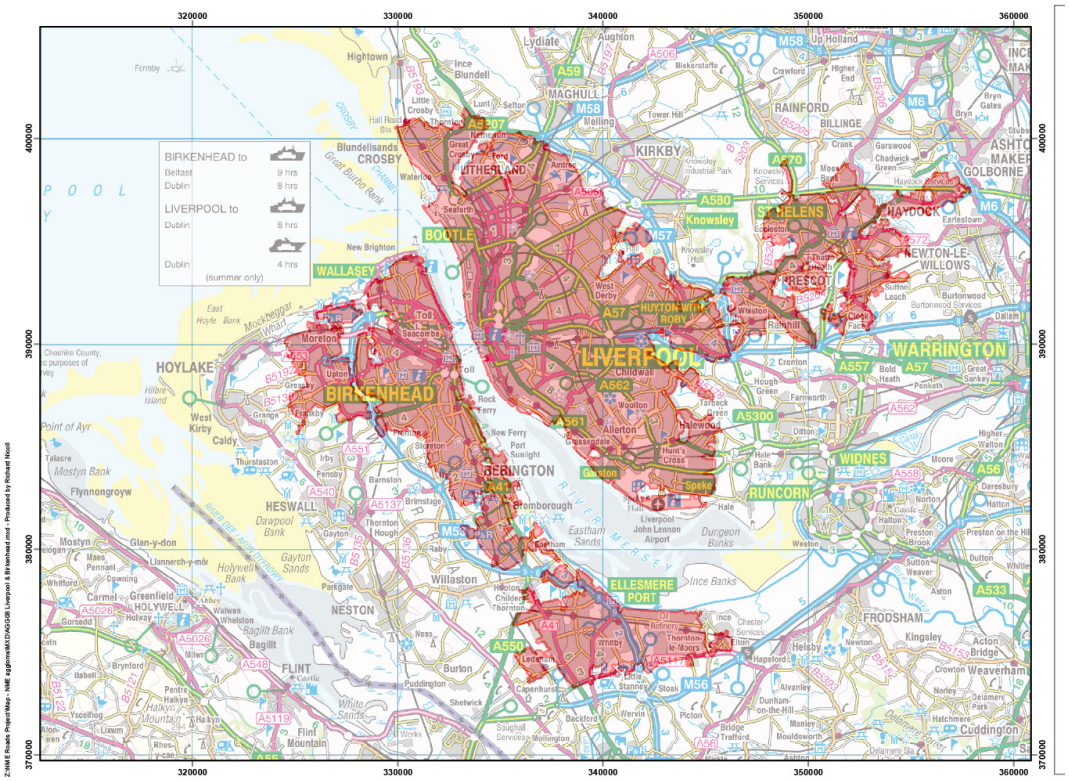
3.4 Requirements of END

The END requires Member States to produce strategic noise maps for the main sources of environmental noise. In practise, this means major roads, major railways, major airports and airports that effect large urban areas (known as agglomerations) with a population of more than 100,000 persons and a population density equal to or greater than 500 people per km2 in 2016 then every five years thereafter. LJLA will next remodel the noise contours in 2021.

3.5 The Agglomerations

The Agglomerations have been identified by Defra; the Agglomerations closest to LJLA are Liverpool and Birkenhead and are shown on the next page.

Figure 2: Liverpool & Birkenhead Agglomerations



3.6 The Noise Descriptors

Noise Action Plans must be drawn up by the Airport Operators that were required to produce strategic noise maps under the Regulations. Noise maps for areas surrounding an airfield are normally assessed in terms of the LAeq t=16h as the appropriate noise descriptor, calculated using the number of aircraft movements over an average summer day (airports generally have more aircraft movements in summer than winter). The END dictated that LJLA's Noise Maps include noise contours for the LAeqt=16h descriptor calculated from the number of aircraft movements on an average annual day rather than a summer day. The LAeqt=16h descriptor is replaced by Lden. The key difference is that the Lden descriptor has a weighting applied during the evening (19.00 – 23.00) of plus 5 dB (A) and during night-time (23.00 – 07.00) plus 10 dB (A) weighting is applied.

Appendix B has a full glossary of terms and definitions of the different noise descriptors.

3.7 The Competent Authority

Noise Action Plans has been produced using the results of the noise maps depicted representing the noise exposure in 2016. For the purposes of the Regulations, Airport Operators are the competent authorities in relation to Airport Action Plans. Therefore LJLA is responsible for undertaking this work and will review the Action Plan from time to time and revise if appropriate or necessary at least every 5 years in accordance with END. The next time the Noise Maps are scheduled to be refreshed is for 2021.

3.8 Quiet Areas

A requirement of the Airport Action Plans is the aim to protect quiet areas identified in agglomerations against any increase in noise. Defra have not identified any current quiet areas within the agglomeration that need to be considered.

LJLA will do all that is reasonably practical to safeguard any quiet areas identified in the future, from exposure to aircraft noise that does not compromise the safe and efficient operation of the aerodrome. Elsewhere there are other requirements that seek to protect other quiet areas such as National Parks and Areas of Outstanding National Beauty from over flights provided it does not add to the environmental burden on more densely populated areas. There are currently no National Parks or Areas of Outstanding National Beauty within LJLA controlled airspace or immediate sphere of influence.

3.9 Local Level – Quiet Operations Policy

At a local level LJLA operates a Quiet Operations Policy (QOP) which is discussed in detail in Chapter 9. The Section 106 Agreement with Liverpool City Council formed the original basis for the QOP after the extension to the passenger terminal was approved in February 2003. Policies for noise abatement in the Section 106 agreement include:

- Setting up a Noise Monitoring Sub Committee made up of representatives from Local Authorities, councillors and other local groups and individuals. The committee will oversee the Quiet Noise Policy.
- Provision of a Sound Insulation Grant Scheme for homes affected by airborne aircraft noise. The scheme boundary to be agreed with the City Council.
- A Noise Monitoring & Track Keeping System to be installed. This will record track performance and monitor aircraft noise.
- Ground noise provisions such as encouraging the minimum use of reverse thrust, minimise use of APU's and restrict and record all engine testing.
- Night Noise Provisions which includes a Quota Count Scheme and restrictions on QC8 and QC16 aircraft operations at night.

3.10 The International Level

At an international level, the International Civil Aviation Organisation (ICAO) sets progressively tighter certification standards, known as Chapters for noise emissions from civil aircraft to which member countries' fleets must conform.

3.11 The EU Level

The European Union (EU), through the European Civil Aviation Conference (ECAC) is increasingly assuming responsibility for the regulation of aircraft noise standards which member state incorporate into their respective national legislation.

Environmental Noise Directive (2002/49/EC) seeks to define a common approach across Europe to reducing and measuring noise from major sources, particularly road and rail networks, aircraft, outdoor equipment, industry and mobile machinery. This is partly transcribed into English legislation as the Environmental Noise (England) Regulation 2006.

EU Regulation No. 598/2014 replaced EC Directive 2002/30 and EU Directive 2006/93/EC and covers the establishment of rules and procedures relating to the introduction of noise-related operating restriction consistent with the ICAO Balanced Approach.

The UK is likely to follow broadly similar principles to those of the EU after Britain's withdrawal from the EU.

3.12 The UK Governments Role

The UK Government's role is one of setting and developing the policy framework for aviation and aircraft noise control for UK airports. The government's policy on aviation is currently being reviewed in "Beyond the Horizon – The Future of UK Aviation".

The current Aviation Policy Framework (2013) set out the government's policy to allow the aviation sector to continue to make a significant contribution to economic growth across the country. The 2013 framework is likely to be updated in 2019.

3.12.1 UK AIP

Full details of the range of aircraft operations related noise controls are set out in statutory notices and published in the UK Aeronautical Information Package (UK AIP) and elsewhere as appropriate. These controls include aspects such as noise abatement procedures and night flight limits and controls LJLA and Other UK Airports.

3.13 The LJLA Master Plan

The Airport Master Plan sets out plans for future development and growth until 2050, confirms a long term vision for the future of LJLA and describes further investment proposals for the Airport and its surrounding landholdings. It considers proposals for the Airport to 2030 in detail and provides a broad indication of potential development to 2050. It also sets out proposals for further growth and development of the Airport as a key transport and strategic economic asset. These proposals include expanding the range of destinations served, adding long haul services to key business and leisure destinations, and developing the Airport and its landholdings as a strategic economic asset by maximising its potential to create jobs and support ongoing regeneration across the Liverpool City Region.

More details can be found at:
https://www.liverpoolairport.com/about-ljla/liverpool-john-lennon-airport-master-plan-to-2050/

3.14 Airspace Change

3.14.1 LJLA Current Airspace

In July 2016, after following the CAP725 Airspace Change Process (ACP) that included a 12 week consultation period, LJLA introduced an alternative satellite based final approach procedure. The procedure was designed to match the ground based Instrument Landing System (ILS) approach from approximately 8 nm to touch down. The new procedure is used as a back up if the ILS is not available. The GNSS approach procedures are important because it ensured that a precision approach for appropriately equipped aircraft was always available, therefore, minimising the noise and additional emission associated with an efficient or missed approach.

The GNSS approach has been in place for approximately two years and is usually only used for training or as an alternative if the ILS was not available.

3.14.2 Proposed Airspace Change

The North England already has one of the busiest airspaces in the world with a number of airports in close proximity. The airspace that these airports use was designed for an age when aircraft and navigation was much less sophisticated.

The Government has embarked on their 'Future Airspace Strategy' (FAS), led by the CAA, to modernise the UK's airspace. The aim of the strategy is to make the airspace more efficient; improve punctuality; cut CO_2 emissions; reduce noise from less aircraft-holding at low levels; and to ensure there is capacity to meet future demand. The FAS will require all UK airports to modernise, as well as the network that sits above these airports which is known as en-route airspace. FAS is also part of a Europe-wide modernisation project, called the Single European Sky, to make the skies above Europe more efficient.

The introduction of Performance Based Navigation (PBN) is key to achieving the aims of the FAS. PBN improves the accuracy of where aircraft fly by moving away from 'conventional' navigation using ground-based beacons, to satellite navigation. However, enabling aircraft to follow an allocated route more precisely will potentially lead to routes becoming narrower and more concentrated than today, this concentration of aircraft may change the interaction with aircraft in some of our local communities.

It's not just LJLA that is required to modernise its airspace, all the UK main airports will be seeking to systemise airspace around their respective airports and NATS will be doing the same with the national airways.

UK airspace is an essential, but largely invisible, part of our national transport infrastructure that enables the safe movement of commercial aircraft along with an increasing number of other users (general aviation, gliders, micro-lights, balloons, model aircraft, drones etc.). The current system was designed and introduced in the 1950/60 and is based largely on ground based navigation beacons that are being phase out over the next few years. This means there will have to be an ACP to convert to new satellite based procedure and this gives an opportunity for LJLA and other UK Airports to explore what improvements can be made in the efficient use of the airspace with modern precision made navigation and at the same time seek to reduce overall noise exposure and emissions.

4.0 Current Operating Restrictions

4.1 Summary of Current Limitations

Current limitations on aircraft movements are those covered in the Section 106 Planning agreement with Liverpool City Council. Below is a summary of aircraft which are restricted at LJLA:

- Between 2300-2330, aircraft with quota count of QC/8 and QC/16 must not be scheduled to take-off or land;
- Between 2330-0600, aircraft with quota count of QC/8 and QC/16 must not take-off or be scheduled to land;
- Between 0600-0700, aircraft with quota count of QC/16 must not take-off or be scheduled to land.

4.2 Engine Testing

Aircraft engine testing is subject to the approval of the Airport Authority and shall only be permitted between the hours of 0700 and 2300. Outside these hours engine testing will not be permitted other than in exceptional operational circumstances.

5.0 The Noise Mapping Process

5.1 Instructions to Consultants

LJLA instructed Bickerdike Allen Partners (BAP) as independent aviation acoustic experts to undertake the Strategic Noise Mapping for LJLA as outlined in Statutory Instrument 2006 No. 2238 The Environmental Noise (England) Regulations 2006.

5.2 The Integrated Noise Model

The Aviation Environmental Design Tool (AEDT) is a computer model that evaluates potential aircraft noise impacts in the vicinity of airports. It is developed by the FAA and has replaced the Integrated Noise Model (INM). The Airport Authority believes that AEDT is the most appropriate model to use at LJLA. The first round of modelling undertaken for 2006 used INM version 6.2a whilst the latest modelling for 2011 used INM version 7.0d. The use of the different versions of INM and AEDT the way the method used to calculate the number of properties affected will account for a proportion of the variation between 2006, 2011 and 2016.

5.3 The Noise Map Descriptors

The noise maps have been produced for, LAeq,16h, Lday, Levening, Lnight and Lden. The contours are presented in 3 dB steps for:

- 54 dB to 72 dB for Lday.
- 54 dB to 62 dB for Levening.
- 54dB to 69 dB for LAeq,16h.
- 48 dB to 63 dB for Lnight.and 5 dB steps for:
- 55 dB to 75 dB for Lden.

5.4 The Mapping Results

The mapping results show, as expected those exposed to the most aircraft noise are the areas of Hale Village, the South East of Speke and an area of northern Runcorn. A large area covered by the contours is uninhabited such as Business Parks, farmland and a large expanse of the tidal Mersey Estuary.

6.0 Noise Level Contour Maps

6.1 EU Noise Indicators

The harmonisation of the noise indicators across Europe mean that a new noise indicator and respective time periods have been created for the Regulations and Noise Maps. Lden and Lnight are the two noise indicators selected by the European Commission for use in noise policy and the new regulations use both of these indicators.

6.2 The Lden

Aircraft noise mapping has been produced for an annual average day, and has to be produced in terms of a new noise indicator (the Lden) and for an annual average night (2300-0700). The new indicator takes account of all aircraft movements throughout an average 24 hour period, but adds 'penalties' to the noise arising in the evening (+ 5 dB) and the night (+10 dB). Evening is defined as 1900-2300.

6.2.1 The Lden Formula

The day-evening-night level Lden in decibels (dB) is defined by the following formula:

$$L_{den} = 10\lg\frac{1}{24}\left(12\times10^{\frac{L_{day}}{10}} + 4\times10^{\frac{L_{evening}+5}{10}} + 8\times10^{\frac{L_{night}+10}{10}}\right)$$

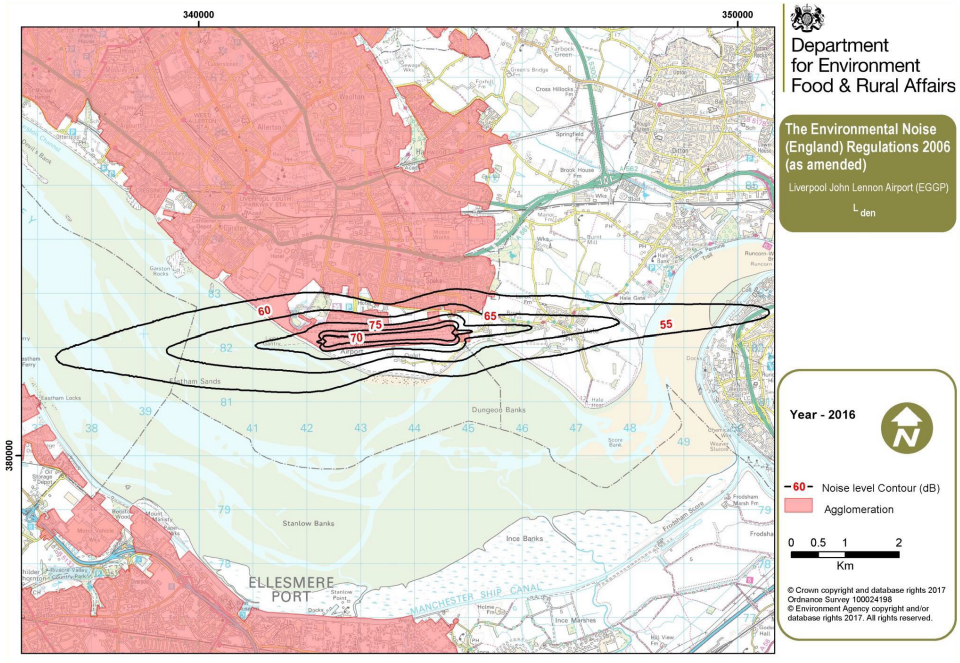
Example:

$$L_{den} = 60\ \text{dB} + 50\ \text{dB} + 40\ \text{dB} = 58\text{dB}$$

6.3 Publication of the Maps

The LJLA maps were published by Defra along with those from 18 other UK Airports. These were submitted by the respective airports and have been amalgamated by Defra with similar noise maps for road and rail noise to give an overall picture of the noise impact from transport sources. These can be reviewed on the Defra website (http://www.extrium.co.uk/noiseviewer.html).

Figure 3: Lden Noise Contours for Liverpool John Lennon Airport



Source: DEFRA Airport Noise Action Planning Data Pack 2017 Liverpool John Lennon Airport (EGGP) July 2017
All the DEFRA noise maps for LJLA can be seen in Appendix A.

7.0 Noise Impacts and Exposure

7.1 Population and Dwelling Exposure Statistics Tables

The estimated total number of people and dwellings exposed above various noise levels from the strategic mapping of noise from aircraft using this airport are shown in the tables 2 to 6 on the next pages.

7.2 Population and Dwelling Counts

The population and dwelling counts have been rounded as follows:
The number of dwellings has been rounded to the nearest 50, except when the number of dwellings is greater than zero but less than 50, in which case the total has been shown as "< 50". The associated population has been rounded to the nearest 100, except when the associated population is greater than zero but less than 100, in which case the total has been shown as "< 100".

The FAA INM Noise Model was used in 2006, 2011 and the AEDT Noise Model was used in 2016, which means there may be slightly different results. There are also variations in the way the number of dwellings and people have been calculated by Defra, which appears to have elevated the numbers (e.g. different census data).

Table 2: Estimated total number of people and dwellings above various noise levels, Lden

Noise Level (dB)	Number of Dwellings			Number of People			Area enclosed (km2)			Noise Sensitive Buildings*
	2006	2011	2016	2006	2011	2016	2006	2001	2016	
≥ 55	2,450	3,100	2,000	5,700	6,900	4,500	17	17.6	14.5	A.B.C
≥ 60	900	900	650	2,200	2,000	1,500	7.04	7	5.9	A.B
≥ 65	< 50	<100	<50	< 100	<100	<100	2.64	2.6	2.1	None
≥ 70	< 50	0	0	< 100	0	0	1.07	1	0.8	None
≥ 75	0	0	0	0	0	0	0.54	0.4	0.4	None

Table 3: Estimated total number of people and dwellings above various noise levels, Lday

Noise Level (dB)	Number of Dwellings			Number of People			Area enclosed (km2)			Noise Sensitive Buildings*
	2006	2011	2016	2006	2011	2016	2006	2001	2016	
≥ 54	1,750	2,200	1,800	4,200	5,100	4,000	13.87	15.5	11.9	A.B
≥ 57	1,100	1,300	950	2,700	2,900	2,200	8.25	9.1	7.0	A.B
≥ 60	350	400	150	800	900	300	4.75	5.2	3.9	B
≥ 63	<50	<100	<50	<100	<100	<100	2.6	2.9	2.1	None
≥ 66	<50	<100	<50	<100	<100	<100	1.49	1.5	1.2	None
≥ 69	0	0	0	0	0	0	0.93	0.9	0.7	None

Table 4: Estimated total number of people and dwellings above various noise levels, Levening

Noise Level (dB)	Number of Dwellings			Number of People			Area enclosed (km2)			Noise Sensitive Buildings*
	2006	2011	2016	2006	2011	2016	2006	2001	2016	
≥ 54	1,200	1,200	1,550	2,900	2,800	3,500	9.88	9.9	10.6	A.B
≥ 57	550	600	750	1,400	1,200	1,600	5.72	5.5	6.1	A.B
≥ 60	100	100	100	200	200	200	3.17	2.9	3.3	None
≥ 63	<50	<100	<50	<100	<100	<100	1.78	1.6	1.7	None
≥ 66	<50	0	<50	<100	0	<100	1.07	0.9	1.0	None
≥ 69	0	0	0	0	0	0	0.7	0.5	0.6	None

Table 5: Estimated total number of people and dwellings above various noise levels, LAeq, 16h

Noise Level (dB)	Number of Dwellings			Number of People			Area enclosed (km2)			Noise Sensitive Buildings*
	2006	2011	2016	2006	2011	2016	2006	2001	2016	
≥ 54	1,600	2,000	1,750	4,000	4,700	3,900	12.93	14.2	11.6	A.B
≥ 57	1,000	1,100	900	2,400	2,500	2,000	7.65	8.3	6.8	A.B
≥ 60	300	300	150	700	700	300	4.37	4.7	3.8	B
≥ 63	<50	<100	<50	<100	<100	<100	2.4	2.5	2.1	None
≥ 66	<50	<100	<50	<100	<100	<100	1.39	1.4	1.1	None
≥ 69	0	0	0	0	0	0	0.88	0.8	0.7	None

Table 6: Estimated total number of people and dwellings above various noise levels, Lnight

Noise Level (dB)	Number of Dwellings			Number of People			Area enclosed (km2)			Noise Sensitive Buildings*
	2006	2011	2016	2006	2011	2016	2006	2001	2016	
≥ 48	1,750	1,900	1,500	4,200	4,300	3,300	13.65	13.1	10.2	A.B
≥ 51	1,000	1,000	650	2,500	2,300	1,400	7.98	7.6	6.0	A.B
≥ 54	400	200	<50	1,000	500	<100	4.51	4.3	3.2	None
≥ 57	<50	<100	<50	<100	<100	<100	2.45	2.3	1.7	None
≥ 60	<50	<100	0	<100	<100	0	1.39	1.3	1.0	None
≥ 63	<50	0	0	<100	0	0	0.85	0.7	0.6	None
≥ 66	0	0	0	0	0	0	0.56	0.5	0.4	None

Table 7: * Noise Sensitive Buildings

Identifier	Building
A	National Trust Speke Hall, Speke, Liverpool
B	Hale Village Primary School, Hale Village, Halton
C	St Ambrose Primary School, Speke, Liverpool
D	Westfield Primary School, Runcorn, Halton
E	Victoria Road Primary School, Runcorn, Halton

If the values in the tables are compared, the number of dwellings and population predicted to be exposed to certain noise level has fallen for all but the Levening in 2016 compared to 2006 and 2011. The increase in Levening dwellings and population can be attributed to there being more flights during this period compared to 2006 and 2011.

7.3 Methodology for Calculation of Population and Dwelling Exposure Statistics

7.3.1 Population Statistics

In order to derive the statistics presented in the above tables, analysis has been undertaken to count the population and number of dwellings within the specified noise contours. This assessment was carried out utilising a strategic residential population location dataset. The following paragraphs summarise the method used in constructing this dataset.

7.3.2 Identification of Residential Dwellings

Residential dwellings and buildings containing residential dwellings were identified through the 2015 (OS) AddressBase Premium and Topography layer respectively. An average population per residential dwelling was calculated for each discrete dwelling utilising population data attained from the mid-year population estimates from the Office of National Statistics (ONS), June 2015.

7.3.3 Building Polygons

The total number of residential dwellings and the total associated population were calculated for each residential building polygon, taking into account building polygons with multiple dwellings. Examples of building polygons containing multiple dwellings located within a single polygon include tower blocks and apartments.

Data Source: DEFRA Airport Noise Action Planning Data Pack 2017 Liverpool John Lennon Airport (EGGP) July 2017

8.0 Current & Future Noise Mitigation Measures

8.1 ICAO

ICAO's current environmental activities are largely undertaken through the Committee on Aviation Environmental Protection (CAEP). CAEP drives the ICAO agenda formulating new policies and adopting new Standards on aircraft noise and aircraft engine emissions.

Future International recommendations and guidance on technical and operational aspects of noise reduction and mitigation, with the aircraft noise and emissions issues linked to airports and operations will be through CAEP. CAEP meets as a Steering Group annually to review and provide guidance on the progress of the activities of the working groups. So far, CAEP has held eight formal meetings: in 1986 (CAEP/1), 1991 (CAEP/2), 1995 (CAEP/3), 1998 (CAEP/4,) 2001 (CAEP/5), 2004 (CAEP/6), 2007 (CAEP/7), 2010 (CAEP/8), 2013 (CAPE/9) and 2016 (CAPE/10. Each formal CAEP meeting produces a report with specific recommendations for the consideration of the ICAO Council. ICAO acts on recommendations from CAEP in the light of any comments received from the Air Navigation Commission and, if there are economic aspects, from the Air Transport Committee.

The Full CAEP Assembly, which meets every 3 years, considers major policy issues in the environmental field that are brought to its attention by the Member States, hence there are 3 year phased progress on environmental aviation issues.

8.1.1 Chapter 3

The aviation industry has an unparalleled record of successful innovation over the past 40 years. Improvements in aircraft technology and design have resulted in a reduction of an aircraft's noise of greater than 20 dB. All commercial aircraft currently operating in the EU must comply with the ICAO Chapter 3 noise standard.

8.1.2 ICAO Chapter 4

From 2006, all newly designed or manufactured aircraft must comply with the tighter Chapter 4 standard, which represents a 10 dB reduction on measurements for Chapter 3 aircraft. As older noisier aircraft are phased out of use and replaced by modern, quieter aircraft, this will bring further noise improvements for each individual aircraft movement.

8.2 The Rules of the Air

8.2.1 Air Navigation Orders (ANO) and the Rules of the Air Regulations (RoA)

The Standardised European Rules of the Air (commonly referred to as SERA) took effect across Europe on 4 December 2014 and in the UK superseded most (but not all) of the UK Rules of the Air Regulations 2007.

SERA is based on the same International standards as the UK Rules of the Air so in most respects they are identical and the transition seamless.

The UK has retained a small number of domestic Rules of the Air and issued a number of General Permissions and General Exemptions. These can be found through the CAA's SERA web pages at www.caa.co.uk/sera.

All civil aircraft must fly within the guidelines of the Air Navigation Orders (ANO) and the Rules of the Air Regulations (RoA) which are the responsibility of the Civil Aviation Authority's Aviation Regulation Enforcement team. The RoA are diverse, complex and the vast majority are not related to noise impacts of aircraft. The section most relevant is that which relates to low flying aircraft. Rule 5 - in the RoA gives the indications of the expected minimum height restrictions placed upon aircraft operators:

- Aircraft are not permitted to fly over congested areas below a height of 1,000 feet above the highest fixed obstacle within a horizontal radius of 600 metres of the aircraft or below such height as would enable it, in event of a power unit failure, to make an emergency landing without causing danger to persons or property on the surface.
- Away from congested areas, aircraft are not permitted to fly closer than 500 feet to any person, vessel, vehicle or structure. The 500 feet rule does not apply to aircraft whilst landing or taking off in accordance with normal aviation practices.

8.2.2 Exemptions of Rules of the Air

A number of aviation activities can be exempted from the RoA and these include Police operations, flying displays and aerial surveys. LJLA regularly receive noise complaints about the operations of the Merseyside and Cheshire Polices Air Support Units, plus the ad-hoc aerial surveys.

8.2.3 Noise Reduction Measures at LJLA

As well as the Rules of the Air which give general guidance to aircraft pilots LJLA also have a number of noise reduction measures already in place.

8.3 The UK AIP Instructions

8.3.1 UK AIP Noise Abatement Procedures

The UK AIP is the prime official source of information on the UK's airspace and airports. The AIP is made up of three parts: General, En-Route and Aerodromes. LJLA has its own AIP with detailed charts and data. Part of the textual data is Noise Abatement Procedures. These Noise Abatement Procedures are shown below in italic text. Some slight changes have been made to the text to help ease of reading.

8.3.2 UK AIP Text

8.3.2.1 Least Disturbance

Every operator of aircraft using the aerodrome shall ensure at all times that aircraft are operated in a manner calculated to cause the least disturbance practicable in LPL Controlled Airspace.

8.3.2.2 Inbound Aircraft

Inbound aircraft, other than light aircraft flying under VFR or Special VFR, shall maintain a height of at least 2000 ft. above aerodrome level until cleared to descend for landing. Aircraft approaching without assistance from ILS or radar shall follow a descent path which will not result in its being at any time lower than the approach path which would be followed by aircraft using the ILS glidepath, and it is recommended that aircraft join final approach at not less than 3 nm.

8.3.2.3 Runway 27 Departures

After take-off all aircraft of more than 5700 kgs (12,500 lbs) MTWA shall climb straight ahead at maximum rate to 1000 ft aal before turning.

8.3.2.4 Runway 09 Departures

(i) Between 2300 and 0700 (winter) 2200 and 0600 (summer), Runway 09 will only be available for take-off when overriding operational considerations necessitate its use, eg performance requirements.
(ii) After take-off the initial turn onto outbound heading shall be commenced as soon as practicable, but not below 500 ft aal and not before passing the end of the runway.

8.3.2.5 All Departures

After completion of the initial turn onto outbound heading, all turbo-jet powered aircraft shall reduce power for noise abatement purposes so as to maintain a rate of climb of at least 500 ft per minute at power settings which will ensure progressively decreasing noise levels at points on the ground under the flight path.

8.3.2.6 Definition of the Summer Period

Summer for the purpose of this report is the period of British Summer Time whist winter is the period between the end of British Summer Time in one year and the start of British Summer Time in the next.

8.3.2.7 Continuous Descent Approach

Turbo-fan and turbo-prop aircraft are expected to apply continuous descent, low power; low drag approach techniques where practical to do so. Subject to ATC instructions, inbound aircraft are to maintain as high an altitude as practical and adopt a low power, low drag, continuous descent approach profile. ATC will provide estimated track distance to touchdown to allow pilots to descend at a rate they judge best suited to achieve continuous descent without using more power or drag than necessary. The object will be to join the glidepath at the appropriate height for the distance without level flight.

8.3.2.8 Approach Speed

To facilitate these techniques aircraft should be flown no faster than 250 kt from the Speed Limiting Points and below FL100 and 250-210 kt during the intermediate approach phase. Thereafter speed should be managed so as to achieve a continuous descent using as little power or drag as possible. ATC may impose speed control if required for separation purposes.

8.3.2.9 Reverse Thrust

To minimise disturbance in areas adjacent to the aerodrome, Flights Crew shall avoid the use of reverse thrust after landing unless necessary for the safe operation of the aircraft, especially between 23:00 and 06:00 (local time).

8.4 Quota Count

8.4.1 Quota Count

As part of its Section 106 Planning Agreement with Liverpool City Council LJLA also manages a Night Quota Count System (QCS). Each type of aircraft is given a separate 'Quota Count' value for landing and take-off, based upon the noise levels measured at the time when that aircraft type was first certified. There are seven QC categories and these double with each increase of 3 decibels. Aircraft are assigned Quota Counts (QC) for arrival and departure as shown in Table 7. Quota Counts for Aircraft that regularly arrive and depart at LJLA are shown in Table 9.

Table 8: Quota Count given to aircraft according to its certified noise level (EPNdB)

Certified Noise Level (EPNdB)	Quota Count
> 101.9	16
99 – 101.9	8
96 – 98.9	4
93 – 95.9	2
90 – 92.9	1
87 – 89.9	0.5
84 – 86.9	0.25
<84	0

Table 9: Quota Counts for Aircraft that regularly arrive and depart at LJLA

Operator	Aircraft Type	Arrival QC	Departure QC
easyJet	Airbus A319	0.25	0.5
easyJet	Airbus A320	0.25	0.5
Ryanair	Boeing 737-800	0.5	0.5
Blue Air	Boeing 737-700	0.5	0.5
Flybe	Bombardier Dash 8	0.5	0
Wizz Air	Airbus A320	0.25	0.5

8.4.1.1 Recording of Quota Count

LJLA monitors and records all quota count points accrued by aircraft movements in the quota period. The annual limit of quota points is 18,000 per annum. The Night Quota Period is from 2330 hours to 0600 hours and is based on the historical Quota Count system developed for the designated London airports. The LJLA Night Quota period is different from the END night period which is 23:00 to 07:00.

8.4.1.2 Military Aircraft

Military aircraft which regularly visit LJLA are exempt from the Quota Count Scheme.

8.4.2 Aircraft movement restrictions

A further element of the Quota Count Scheme is the restriction on movements of aircraft with QCS of QC/8 and QC/16. The restrictions are as follows:

- Between 2300-2330, aircraft with quota count of QC/8 and QC/16 must not be scheduled to take-off or land;
- Between 2330-0600, aircraft with quota count of QC/8 and QC/16 must not take-off or be scheduled to land;
- Between 0600-0700, aircraft with quota count of QC/16 must not take-off or be scheduled to land.

8.5 Engine Testing

Aircraft engine testing is subject to the approval of the Airport Authority and shall only be permitted between the hours of 0700 and 2300 (local). Outside these hours, engine testing will not be permitted other than in exceptional operational circumstances. Engine test for main apron aircraft above 50% must be undertaken at "Yankee" to maximise the distance from the communities of Speke and Hale Heath.

8.6 Preferred runway

LJLA has one runway that can be used in two directions, i.e. the aircraft can approach from the east and depart towards the west (Runway 27) or diametrically opposed (Runway 09). The orientation of runway use is selected by Air Traffic Control (ATC) primarily based on wind speed and direction at the Airport to ensure safe, stable operations of aircraft as they approach or depart. When possible the preferred runway (Runway 27) is used for departing aircraft to minimise noise impact. When aircraft depart towards the west on Runway 27, there is advantage for natural noise mitigation as there are no properties within the first 5.8 kilometres of the aircraft flight, because of the large expanse of the Mersey tidal estuary.

Figure 4: Runway Utilisation for Arrivals & Departures on runways 09/27 from 1999 to 2012 and for Jan 2012 to Dec 2017

The local communities, especially on the Wirral peninsula notice a difference in the altitude and frequency of aircraft movements when the runway operation switches from the preferred 27 to 09, which, on occasions triggers noise complaints.

8.7 Noise Monitoring Sub Committee

LJLA has a Noise Monitoring Sub Committee with membership of professional officers, elected members, Airport representatives and community groups, the main role of the committee is to:

- be a technical sub-committee of the LJLA Consultative Committee to advise on noise matters.
- meet when required (but at least quarterly).
- to consider issues related to the Airport's noise impact on the local environs and communities.

The members of the sub-committee are there to encourage improvements and question, as well as being a vehicle for two way communication. The group does not have executive powers.

8.8 Noise Monitoring & Track Keeping System

The Noise Monitoring and Track Keeping System (NM&TKS) enables LJLA to report accurately the altitude, position, aircraft type and noise generated by each aircraft movement. The NM&TKS collects information from three main sources:

- Noise data from the Noise Monitoring Terminals (NMT) at Hale, Eastham and the Mobile NMT. The noise data is correlated with aircraft track data to identify specific aircraft noise events.
- Secondary Surveillance Radar (SSR) from NATS at Manchester Airport provides information about the position, altitude and speed of aircraft near LJLA. This enables the Airport Company to identify specific aircraft movements, their altitude at a specific time and correlate a noise event at one of the NMTs.
- The Airport's Operation Database (Chroma Fusion) provides information about the aircraft using LJLA such as the aircraft type, airline, origin or destination which can be correlated with the track data to make the information easier to interpret.

LJLA are seeking to update the NM&TKS with new analytical software and new noise monitoring hardware terminals during Summer 2018.

Table 10: Average Annual Noise Monitoring Results (SEL) for Aircraft using LJLA during 2016

Aircraft Type	Airline	NMT 1 – Hale		NMT2 – Eastham	
		ARR	DEP	ARR	DEP
Airbus 319	easyJet	89.6	81	83.9	79.2
Airbus 320	easyJet	88.5	82.6	84.4	79
	Wizz Air	88.5	87.1	82.9	77.4
Boeing 738-800	Ryanair	89.9	87.1	85	77.5
Bombardier Dash 8	Flybe	84	76.8	81	71.9

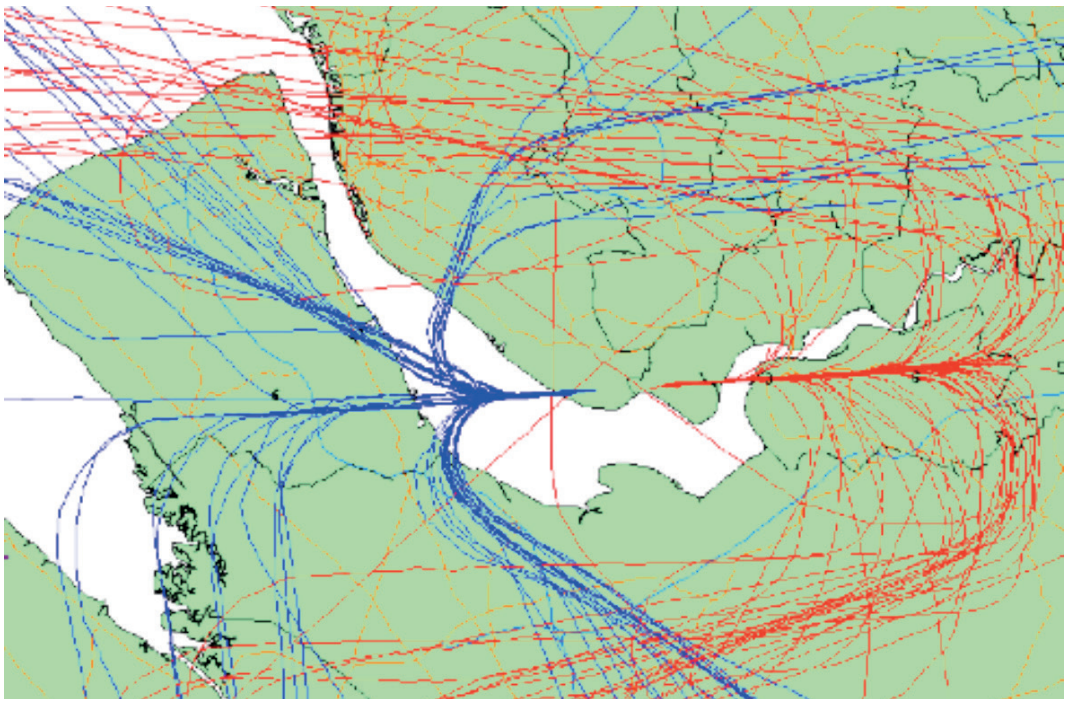
8.9 Preferred Noise Routes

8.9.1 Standard Instrument Departure routes (SIDs)

LJLA recognises that a balance of social and environmental benefits is gained by concentrating aircraft along the least possible number of routes. The practice of concentrating departures along a limited number of routes is consistent with airspace management best practice. The overriding need is to ensure the safe separation of aircraft which is assisted by concentrating air traffic along a limited number of routes. Departing aircraft from LJLA, with the general exception of General Aviation (GA) aircraft fly the Noise Preferred Routes (NPR) which are a swathe up to 1.5 km either side of the nominal centre line of the Standard Instrument Departure routes (SIDs) up to an altitude of 3000 feet.

These will be reviewed as part of the Airspace Change proposals as discussed in Section 3.14 of the LJLA Noise Action Plan.

Figure 5: Actual LJLA Departure and Arrival Routes (runway 27 operations)



8.9.2 Manchester Terminal Movement Area

The airspace above and around LJLA Controlled Airspace is part of the Manchester Terminal Movement Area (MTMA) and is operated under the control of NATS at their Prestwick Centre. Manchester Airport is east of LJLA and Hawarden Airport (near Chester) is located south west of LJLA. The proximity, combined with the differing alignment of the runways at each airport, creates a complex interface between the traffic patterns of the three airports. All aircraft activity at LJLA has to be safely integrated with traffic for Manchester and Hawarden Airports to avoid conflicts in demand for access to the same airspace. Therefore, a full review of MTMA and the LJLA airspace is currently underway in conjunction with airport airspace users, including the airlines. As discussed in Section 3.14 the aim of the proposed change is to increase overall regional resilience and capacity whilst seeking to minimise noise and emissions from arriving and departing aircraft. The process will follow the CAP1616 and will be subject to public consultation. The review will include maximising the use of Continuous Descent Approach (CDA) and continuous climb procedures, where practical to minimise the need for level aircraft flight around LJLA. This has the added benefits of maximising the efficiency of aircraft; e.g. by reducing fuel burn and by maximising the vertical distance between aircraft and the ground thereby minimising noise impact.

8.9.3 Precision Navigation (P-RNAV) technology

The use of Precision Navigation (P-RNAV) technology for departing and arriving aircraft will be an important consideration in the future development of optimum noise abatement and routing for the community as a whole. RNAV represents the start of a potential move towards navigation and landing aids being on the aircraft rather than on the ground.

In July 2016 LJLA introduced Global Navigation Satellite System (GNSS) based Area Navigation (RNAV) Instrument Approach Procedures (IAP) for both runways 09 and 27. LJLA implemented the GNSS approaches to provide contingency if the existing navigation equipment needs to be taken out of service for maintenance or due to an outage – for example caused by a lightning strike or component fault.

New procedures were introduced for both Runway 09 and Runway 27, replicating the respective existing ILS designs. Aircraft follow similar tracks from the national airways network to align with the approach path and the approaches are flown at the same altitudes and speeds as for the ILS. In essence, the only difference is the equipment being used to guide the aircraft's final approach to the runway.

8.10 Sound Insulation Grant Scheme (SIGS)

LJLA operates a SIGS for eligible properties determined on noise exposure criteria:

- Within a day-time 63 dB LAeq, t=16hrs hours noise exposure contour from airborne aircraft noise, or
- Within a night-time 59 dB LAeq, t=8hrs noise exposure contour from airborne noise reducing to 55 dB in the future subject to further growth and development.

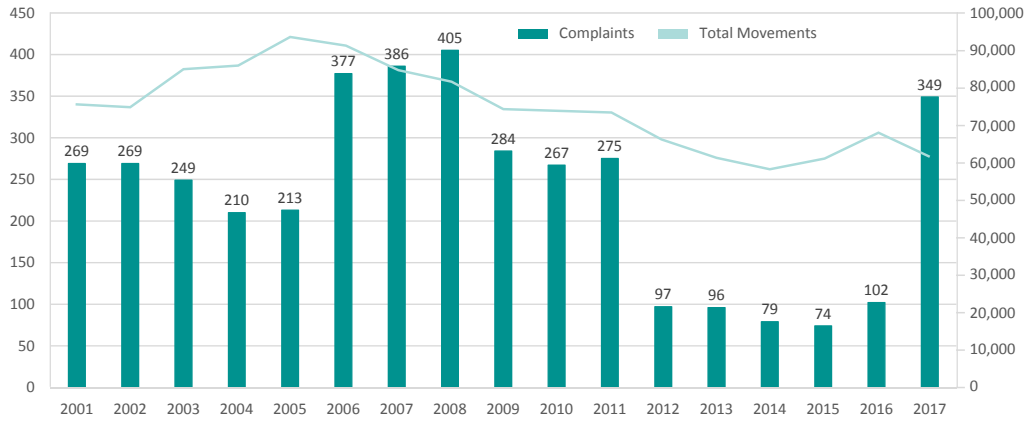
The SIGS grant is an 80% contribution with the airport company expense capped at £3000 per property for glazing and ventilation, £400 for loft insulation and £135 for blinds.

8.11 Complaints recording and investigation

8.11.1 Noise Complaint Responsibility

LJLA takes all complaints about environmental noise seriously. The Environment Team is responsible for responding to enquires and complaints received from the local community, regulatory authorities, interest groups or other organisations. An enquiry or complaint can be made by telephone, letter, facsimile, email or the complaint form on the website.

Figure 6: The Number of Noise Complaints Received by LJLA & Total Aircraft Movements between 2001 and 2017.



8.11.2 Investigation of Noise Complaints

Every noise complaint received by LJLA is investigated using a range of information sources, but primarily the Noise Monitoring and Track Keeping System. All the noise complaints received by LJLA are collated and reported by the Environmental Team to the Noise Monitoring Sub Committee and Airport Executive Team on a quarterly basis.

8.12 Potential Future Mitigation Measures

8.12.1 Maintain and Improve

LJLA in conjunction with other competent authorities will continue to maintain and seek to improve its noise abatement procedures where practical and safe to do so. The tables in the next section "Actions Liverpool John Lennon Airport will take" set out the future mitigation measures.

8.12.2 Impacts of Noise

There are many different experiences and impacts of noise, and each individuals experience and interpretation will be different. Noise can disturb human activity by causing distraction. These include general detection/distraction, speech interference, and disruption of work/mental activity and sleep disturbance. Any of these can lead to annoyance and possibly more overt reactions, including complaints.

8.12.3 Benefits of Air Transport

Noise, is an inevitable consequence of a mature and vibrant society. People enjoy and benefit from transport (air, rail and road) and this benefit manifests itself in terms of business, leisure, employment, relationships and the movement of goods and services. When managing the environmental noise that arises from aircraft, trains and road vehicles a balance needs to be struck.

Table 11: Actions Liverpool John Lennon Airport are proposing to undertake

Action	Type of Impact	Performance Indicator
Continue to be part of Sustainable Aviation Partners and seek to develop Best Practise to minimise noise impact and investigate implementation options at LJLA.	Arrivals Departures	Individual aircraft noise reduction at LJLA and other airports in the UK.
Continue to recognise that a balance of social and environmental benefits is gained by concentrating aircraft along the least possible number of routes (SIDS).	Arrivals Departures	Review national guidance with ATCS every 2 years and co-operate with other local airports and NATS as part of a larger regional review in the future to further enhance performance.
Maintain a quota count system and record all quota count points accrued by aircraft movement in the quota period.	Arrivals Departures	The annual limit of quota points 18,000 per annum. The Airport Company will report its quota usage in an annual report to the NMSC.
Work with Operations Planners to ensure were practical the noisiest aircraft are not scheduled to arrive or depart in the night quota period.	Arrivals Departures	Using Chroma Fusion reports a monthly search will be carried out find any aircraft which contravened these restrictions and investigate the reason why.
Explore the option over the next 4 years for a volunteer restriction on the number of QC4 scheduled pax aircraft movements.	Arrivals Departures	Introduction of a volunteer code for a restriction on QC4 aircraft movements.
Continue to ensure that Runway 27 is the preferred runway of choice.	Arrivals Departures	Monitor runway use and report annually to the NMSC.
Install and new NM&TKS with historical data.	Arrivals Departures Over Flights	Install by Winter and commissioned by Jan 2019.
Ensure that the Noise Monitoring and Track Keeping System (NM&TKS) is maintained and calibrated for credibility.	Arrivals Departures Over Flights	The Airport will ensure regular checks are maintained to ensure the data provided is as accurate as possible. Annual calibration of the system will also be carried out by the manufacturer.
The part of the Liverpool agglomeration touched by the noise contours is an area of Speke. These areas lie parallel to the runway and as such are rarely directly over flown. A proportion of the disturbance that is caused to these areas will be from ground noise such as reverse thrust on landing.	Arrivals Ground Noise	To minimise disturbance in areas adjacent to the aerodrome, LJLA will encourage pilots to avoid the use of reverse thrust after landing, consistent with safe operation of the aircraft, especially between 23:00 and 06:00 (local time).
Continue to ensure every operator of aircraft using the aerodrome operates in a manner which causes the least disturbance practicable in areas surrounding the aerodrome.	Arrivals Departures Ground Noise	Review the UK AIP every year to ensure it has relevance to any development at the airport and report to the NMSC. Report this to the Airlines through the Flight Safety Committee quarterly.
In the future if any households fall within the airports 69db LAeq noise contour, LJLA will, in line with Government policy, offer a relocation assistance scheme.	Arrivals Departures Ground Noise	No Households currently lie in the 69db Leq,t=16hours noise contour; the airport will continue to review its noise mapping every 2 years.
With our partners in Sustainable Aviation LJLA will continue to lobby for and seek to support continual improvements in technology and operations towards the ACARE goal of 50% reduction in perceived external noise by 2020 based on new aircraft of 2020 relative to equivalent new aircraft in 2000.	Arrivals Departures Ground Noise	Support the ACARE goals through Sustainable Aviation.
Monitor all aircraft engine testing which shall only be permitted between the hours of 0700 and 2300 (local).	Ground Noise	Records will be kept of the engine tests and the times of these tests will be monitored.Outside these hours engine testing will not be permitted other than in exceptional operational circumstances. The number and power of the test will be reported to the NMSC.
Continue to engage with the Noise Monitoring Sub Committee (NMSC).	Community Responsibility	The NMSC will meet 4 times per year and will have leading role to influence the development of the Noise Action Plan. The Airport will ensure that at every meeting a Noise Log of all complaints received prior to the meeting is presented for scrutiny and consideration by the membership.
Monitor as far as practical any complaints regarding aircraft outside of the Airport's immediate boundary to ensure they operate within the Rules of the Air Regulations.	Community Responsibly	Working with the ATSP and using the NM&TKS ensure aircraft are over the heights specified in the Rules of the Air Regulations when not arriving or departing the airport. Any infringements will be investigated and report to the CAA as the regulator.

Table 11: Actions Liverpool John Lennon Airport are proposing to undertake. Continued.

Action	Type of Impact	Performance Indicator
Continue to operate a SIGS which will include night time eligibility.	Community Responsibility	Noise contours will be reviewed every two years by the Airport. Any new properties that qualify for SIGS will be informed by writing.
Continue to offer an answer phone number; email address & web form for complaints and enquiries services for aircraft noise and other environmental enquires.	Community Responsibility	Number of complaints received will be recorded and presented to the NMSC. Complainants will receive an appropriate response attempting to answer the enquiry with factual objective information.
Work with our partners at the Airport to minimise impacts on the noise environment.	Community Responsibility	Regular discussion and promotions with the Airlines to encourage best practise through the Flight Safety Committee which meets quarterly.
LJLA will do all that is reasonably practical to safeguard any quiet areas identified from exposure to aircraft noise due to the operations of LJLA if this does not compromise the safe and efficient operation of the aerodrome.	Community Responsibility	Regulation through END, and directions and guidance provided by Defra and DfT.
Benchmark the SIGs against airports with a similar sized operations and geographical situation.	Community Responsibility	Report to the Airport Management Team and NMSC with a comparison against similar airports
Continue to log all complaints relating to aircraft operations and publish the statistics annually.	Community Responsibility	All complaints will be logged and presented into the NMSC and published statistically in the Annual Noise Report on the LJLA website.
Seek to respond to 100% of all complaints and enquiries within 14 working days.	Community Responsibility	As part of the Report we will show the percentage of complaints responded to with in the 14 days.
Seek to gain Noise Minimisation benefits from the proposed Airspace change as part of the future Airspace Strategy.	Community Responsibility	Reduction in the overall noise exposure.
Continue to engage with the Local Planning Authorities to ensure awareness of aircraft operations is considered in the development of sensitive land use.	Land Use Planning	Maintain the interactions with the Local Planning Authorities and have a seminar for Local Authority Planners and Environmental Professionals to enhance noise and safeguarding understanding.

8.13 Long term strategy

8.13.1 Master Plan

The Airport's Master Plan was published in March 2018 and is available online. The Master Plan depicts the potential future development of LJLA (https://www.liverpoolairport.com/about-ljla/liverpool-john-lennon-airport-master-plan-to-2050). The Master Plan sets out a "Road Map" to assist the delivery of the Airports Vision and highlights key investments required by 2030 to maximise the Airports contribution to the region's economy including:

- enhancing international connectivity
- supporting infrastructure investment
- developing the Airport as a growth hub
- sustainability and the environment

8.13.2 Sustainable Aviation

LJLA in partnership with other members of the aviation industry will approach future noise mitigation on four paths to achieve and overall impact:

- aircraft frame and engine technology improvements
- operational improvements (e.g. CCO & CDA)
- land use planning, undertaken with LPA's
- noise communication and community engagement

Table 12: Financial Costs of the LJLA Noise Service

Type	Description	Approximate Cost
Staff Costs	Environment Team	£40,000
SIGS	Development & Contributions	£35,000
Equipment	NM&TKS Hardware & Software Maintenance/ Calibration	£14,000
Equipment	NM&TKS Hardware upgrade (Sept 2018)	£80,000
NMSC	Secretariat Cost	£6,000
Noise Mapping & Modelling	External Independent Professional Assistance	£12,000

9.0 Measurements of the Action Plan Progress

9.1 Outcome of the Noise Action Plan

It is very difficult to estimate how the actions will affect people's perception of aircraft noise and thus any concerns they may have over the next 5 years. The estimated total number of people identified by the mapping as living within the Lden 55dB or greater in 2016 is 4,500. This is a reduction on the 2011 figure of 6,900. It is hoped the Action Plan will help reduce annoyance by aircraft noise from LJLA.

The main influence on the noise contour size is the aircraft type and variant. The airport will seek to encourage the airlines to deploy their quietest aircraft to LJLA routes. These fleet improvements will happen, but at the moment LJLA is not in a market position to instruct when the quieter aircraft variants will be phased in at LJLA. The NAP is envisaged to have a positive influence on the noise environment of the 4,500 people within the Lden 55dB and that by 2020 even allowing for modest growth.

9.2 Objective Measure of the Action Plan

The Airport Operator as the Competent Authority believes the Action Plan delivers a balanced positive set of measures which are realistic and achievable. The objective measure of the Action Plans success will be the area covered by the future noise contours and the number of people encompassed within them proportionate to the airport's activity and benefits to the region.

9.3 Summary

The action plan was developed with the aid of the Airport Consultative Committee and the NMSC members.

All opinions and views, both positive and negative, were used to develop the Noise Action Plan along with current national and local policy, plus social and economic benefits in order to come to a balanced Noise Action Plan. The Noise Action Plan was adopted by the Secretary of State in February 2018. LJLA will continue to welcome your views and opinions at any time on how the Noise Action Plan could be improved.

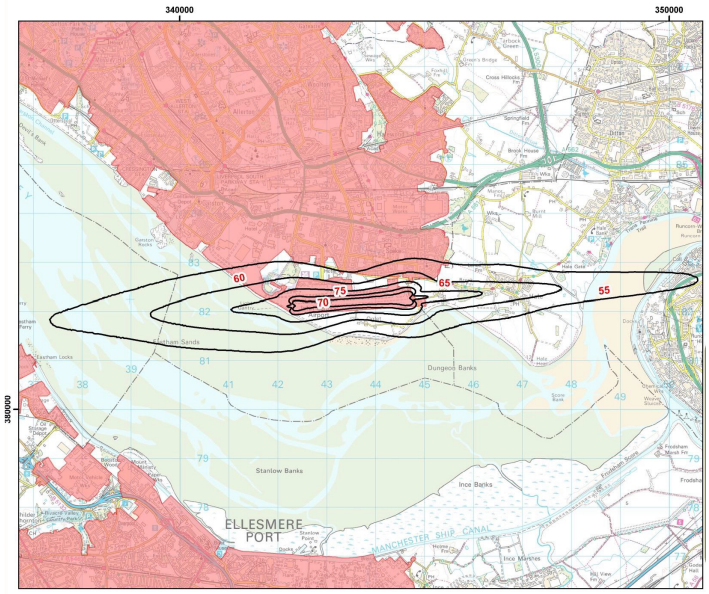
10.0 Conclusions

LJLA has prepared this Noise Action Plan as required under the Environmental Noise (England) Regulations 2006 (SI 2006/2238). This Noise Action Plan is produced based on the results of noise mapping for the Airport based on 2016 aircraft movements as required by DEFRA. The main purpose of the Noise Action Plan is to establish the noise impact of the airport, and to consider whether the current noise control measures are sufficient to adequately protect the local community, particularly those worst affected. An assessment of LJLA's noise impact has been carried out based on:

- Relevant guidance and legislation
- The current noise impact of operations at LJLA shown by the results of the END Strategic Noise Maps
- The significant noise control measures already in place at the Airport.

The assessment has found that the environmental noise impact of existing operations at the airport, based on both the noise contours, subject to the implementation of the measures described in the Noise Management Section of this summary are acceptable.

Appendix A: All Defra Noise Maps



Department for Environment Food & Rural Affairs

The Environmental Noise (England) Regulations 2006 (as amended)

Liverpool John Lennon Airport (EGGP)

L_{den}

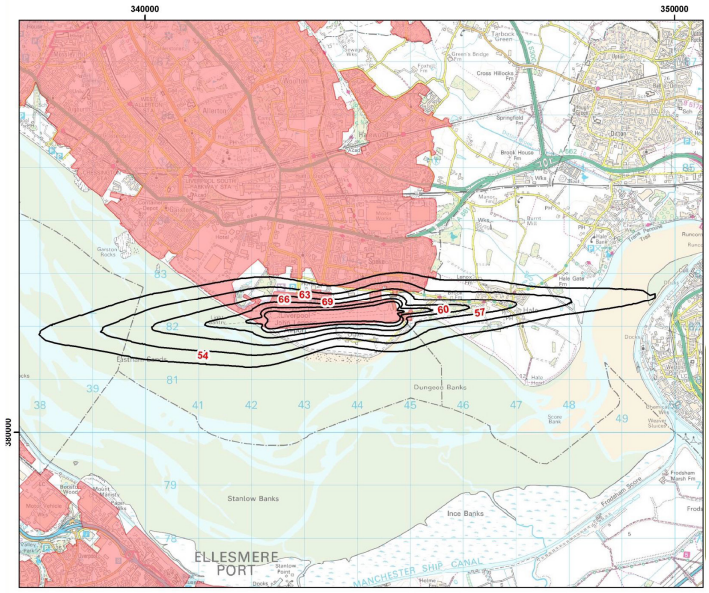
Year - 2016

60 Noise level Contour (dB)

Agglomeration

0 0.5 1 2

Km



Department for Environment Food & Rural Affairs

The Environmental Noise (England) Regulations 2006 (as amended)

Liverpool John Lennon Airport (EGGP)

L_{day}

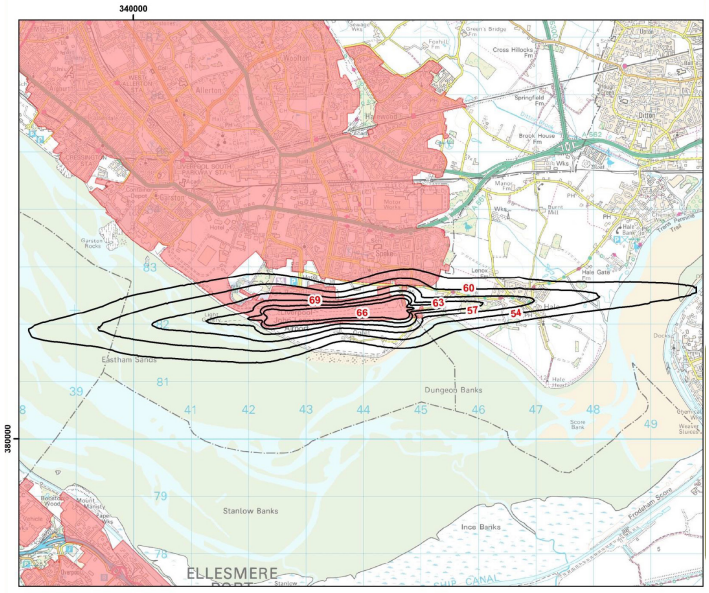
Year - 2016

60 Noise level Contour (dB)

Agglomeration

0 0.5 1 2

Km



Department for Environment Food & Rural Affairs

The Environmental Noise (England) Regulations 2006 (as amended)

Liverpool John Lennon Airport (EGGP)

$L_{evening}$

Year - 2016

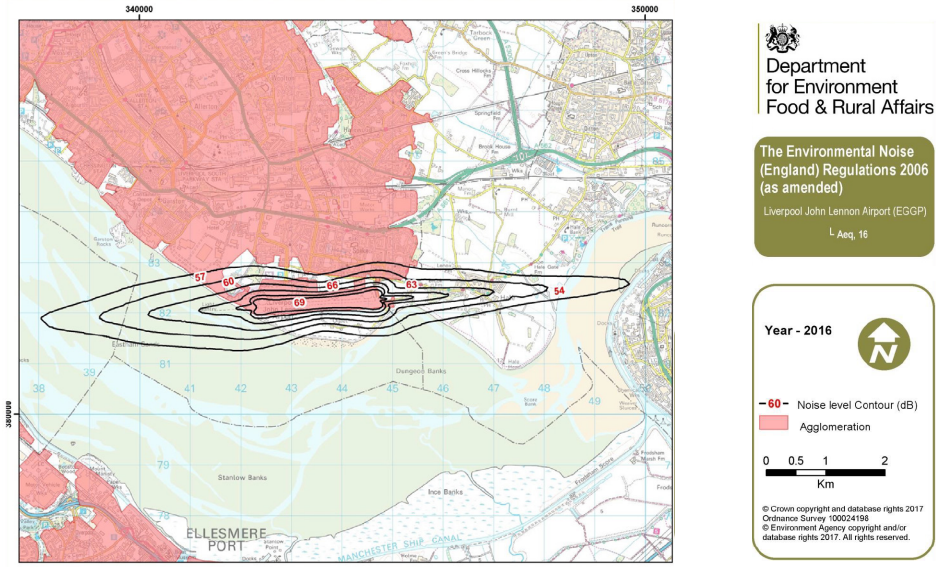
60 Noise level Contour (dB)

Agglomeration

0 0.5 1 2

Km

Appendix A: All Defra Noise Maps



Department for Environment Food & Rural Affairs

The Environmental Noise (England) Regulations 2006 (as amended)

Liverpool John Lennon Airport (EGGP)

$L_{Aeq, 16}$

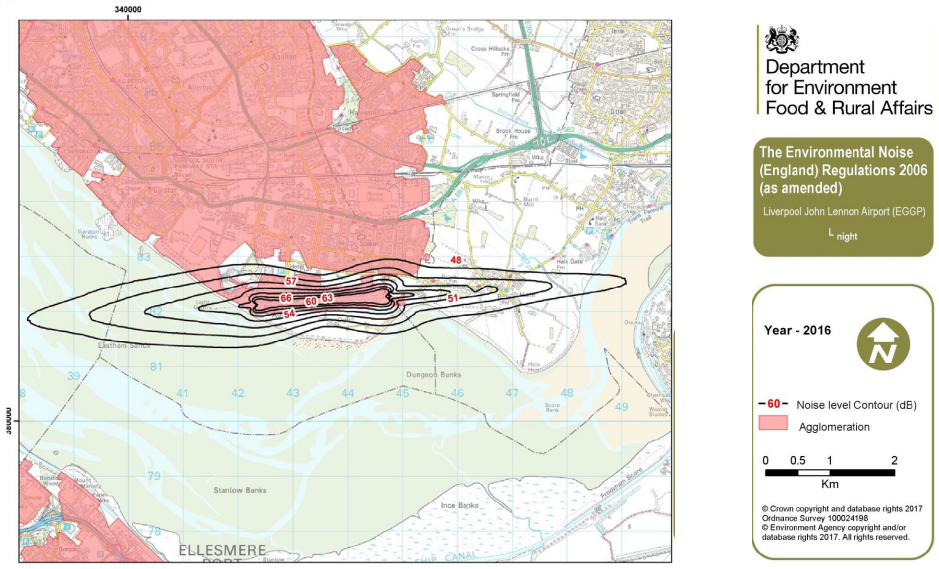
Year - 2016

60 Noise level Contour (dB)

Agglomeration

0 0.5 1 2

Km



Department for Environment Food & Rural Affairs

The Environmental Noise (England) Regulations 2006 (as amended)

Liverpool John Lennon Airport (EGGP)

L_{night}

Year - 2016

60 Noise level Contour (dB)

Agglomeration

0 0.5 1 2

Km

Appendix B: Glossary of Terms

Chroma Fusion
Used by the Airport to manage and display aircraft and airport related information

Annex 16
ICAO Environmental Protection Documentation (has details of noise certification and limits)

APU
Auxiliary Power Unit – a small engine unit located within an aircraft to provide power when aircrafts main engines are not operating i.e. when it is parked on stand

ATC
Air Traffic Control

B&K
Brüel & Kjær – company supplying and maintaining the Noise Monitoring & Track Keeping System

CAA
Civil Aviation Authority – the Government body that regulates civil aviation in the UK

CDA
Continuous Descent Approach – Approach using a smooth continual descent instead of a stepped approach

dB
Decibel (dB) - a logarithmic unit of measurement that expresses the magnitude of a physical quantity relative to a specified or implied reference level. Its logarithmic nature allows very large or very small ratios to be represented by a convenient number. Being a ratio, it is a dimensionless unit

dB(A)
A weighted Decibel which is designed to represent the human ear's response to sound

DEFRA
Department of Environment, Food and Rural Affairs

DfT
Department for Transport

END
Directive 2002/49/EC referred to as the Environmental Noise Directive

Engine Tests
Where aircraft engines are tested whilst the aircraft is parked on the ground

ENR
Environmental Noise (England) Regulation 2006 transposes Directive 2002/49/EC on the statute books

FAA
Federal Aviation Authority - the USA's equivalent of the UK Civil Aviation Authority

FAS
Future Airspace Strategy

FASI-N
Future Airspace Strategy Implementation (North) (formerly Prestwick Lower Airspace Systemisation)

FIDs
Flight Information Display – shows arrival and departure times for aircraft flights

GA
General Aviation - Commercial movements including Air-Taxis, positioning and local movements and all non-commercial movements including private aircraft operations and aero-club instructional flights

GIS
Geographical Information System – software that displays maps and geographical data

ICAO
International Civil Aviation Organisation

ILS
Instrument Landing System – an electronic system used by aircraft to navigate to and land precisely on the runway

LJLA
Liverpool John Lennon Airport (Liverpool Airport Limited Company Registration Number 2116704)

LAeq
Equivalent continuous sound level. The steady dB (A) level which would produce the same A-weighted sound energy over the stated period of time as specified time-varying sound

Lday
The average noise for a 12 hour period, 07:00 to 19:00

Lden
The average noise for a 24 hour period, but adds 'penalties' to the noise arising in the evening (+ 5 dB) and the night (+10 dB). Daytime is 07:00 to 19:00, evening is 19:00 to 23:00 and night is 23:00 to 07:00 hours

Levening
The average noise for a 4 hour period, 19:00 to 23:00

Lnight
The average noise for an 8 hour period, 23:00 to 07:00

MTMA
Manchester Terminal Movement Area

MTOW
Maximum Take Off Weight - Maximum weight at which the pilot of an aircraft is allowed to attempt to take off, due to structural or other limits

nm
Nautical Miles - 1 Nautical mile = 1.15 miles or 1,852 metres

NM & TKS
Noise Monitoring & Track Keeping System – Computer system which incorporates aircraft track keeping and noise monitoring data

NMSC
Noise Monitoring Sub-Committee - a technical sub-committee of the Airport Consultative Committee, comprising community and local council representatives

NMT
Noise Monitoring Terminal. Noise station consisting of a highly sensitive microphone, noise analyser and PC to store and send the data

PLAS
Prestwick Lower Airspace Systemisation

PNRs
Preferred Noise Routes for aircraft – where aircraft flight routes are directed over areas of lower population density, to minimise overall noise impact

QC
Quota Count - a noise ranking system

QCS
Quota Count Scheme - the scheme which adopts the noise ranking system

Reverse Thrust
The use of aircraft engines to slow aircraft when landing on a runway

Runway 09
Used for westerly aircraft arrivals and easterly departures (typically used by 25% of aircraft movements). Arriving over the Wirral Peninsula and departing towards Hale Village

Runway 27
Used for easterly aircraft arrivals and westerly departures (typically used by 75% of aircraft movements). Arriving over Hale Village and departing towards the Wirral Peninsula

Section 106 Agreement
Legally binding Planning agreement which Liverpool John Lennon Airport entered into with Liverpool City Council in November 2000

SEL
Single Event Sound Exposure Level - in dB (A) accounting for maximum noise level and duration

SID
Standard Instrument Departure Route for aircraft – a defined departure route for aircraft departing and airport

SSR
Secondary Surveillance Radar - provides detailed information on aircraft movements

UK AIP
UK Aeronautical Information Publication – a technical manual containing information about all UK airports flight procedures (CAA published document)

VFR
Visual Flight Rules - Flight rules were the pilot is expected to "see and avoid" obstacles and other aircraft as opposed to Instrument Flight Rules were instruments are used to aid navigation and separation

Liverpool John Lennon Airport
Liverpool, L24 1YD

www.liverpoolairport.com

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