



London Luton Airport Operations Limited  
Environmental Statement  
Technical Appendix H  
Noise and Vibration  
London's Local Airport  
Planning Application

November 2012



# **Bickerdike Allen Partners**

**LONDON LUTON AIRPORT**

**NOISE IMPACT ASSESSMENT OF PROPOSED CURIUM DEVELOPMENT**

**A9501/R01**

**NOVEMBER 2012**

Report to:  
London Luton Airport Operations Limited  
Navigation House  
Airport Way  
Luton  
Bedfordshire  
LU2 9LY

# Bickerdike Allen Partners

<b>CONTENTS</b>	<b>Page Nos.</b>
<b>1. INTRODUCTION .....</b>	<b>6</b>
The Brief .....	6
Noise Impact Assessment Methodology.....	7
 <b>2. CURRENT CONDITIONS (2011).....</b>	 <b>21</b>
Airborne Aircraft Activity .....	21
Ground Noise Activity .....	28
Road Access Activity .....	29
 <b>3. CONSTRUCTION NOISE.... ..</b>	 <b>31</b>
 <b>4. FUTURE NOISE (2028) .....</b>	 <b>36</b>
Airborne Aircraft Activity .....	36
Ground Aircraft Activity .....	43
Road Access Activity .....	45
 <b>4. COMBINED IMPACTS .....</b>	 <b>47</b>
 <b>6. CURRENT NOISE CONTROL AND MITIGATION .....</b>	 <b>48</b>
Planning Conditions .....	48
Night Flying Policy .....	50
Noise Action Plan.....	51
 <b>7. FUTURE NOISE CONTROL AND MITIGATION .....</b>	 <b>52</b>
 <b>8. RESIDUAL IMPACTS.....</b>	 <b>54</b>
 <b>9. SUMMARY AND CONCLUSIONS .....</b>	 <b>54</b>

# Bickerdike Allen Partners

## LIST OF TABLES

Table 1: Tentative Ground Noise Impact Criteria .....	17
Table 2: Complaints Analysis/Ground Noise.....	18
Table 3: Ground Noise Elementary Assessments: Separation from Ground Noise Sources .	18
Table 4: Absolute Road Traffic Noise Criteria .....	19
Table 5: Subjective importance of changes in road traffic noise level .....	20
Table 6: London Luton Airport Daytime Noise Contour Areas .....	22
Table 7: London Luton Airport Night-time Noise Contour Areas.....	23
Table 8: London Luton Airport Daytime Airborne Airport Noise <sup>(1)</sup> at Local Areas .....	24
Table 9: London Luton Airport Night-time Airborne Airport Noise <sup>(1)</sup> at Local Areas.....	25
Table 10: 2011 Airborne Aircraft Noise (Dwellings/Population Exposed) .....	26
Table 11: Estimates* of Current Ground Noise/North Apron Area.....	29
Table 12: Typical Current (2011) Daytime Road Traffic Noise Levels near Local Roads (Predicted at 10m from nearside kerb).....	30
Table 13: Construction Noise Elementary Assessments: Separation of Residential Buildings from Construction Sources .....	32
Table 14: Typical Construction Plant Noise .....	34
Table 15: Construction Noise Assessment: Daily Noise Levels.....	35
Table 16: 2028 Baseline: Without Development: Airborne Aircraft Noise.....	38
Table 17: 2028 With Development: Airborne Aircraft Noise.....	39
Table 18: London Luton Airport Daytime Airborne Airport Noise at Local Areas: Change in Noise Level due to Development (Without Fleet Modernisation) .....	40
Table 19: London Luton Airport Night-time Airborne Airport Noise at Local Areas: Change in Noise Level due to Development (Without Fleet Modernisation) .....	41
Table 20: Estimates* of Future Ground Noise/North Apron Area .....	44
Table 21: Typical Future (2028) Daytime Road Traffic Noise Levels near Local Roads (Predicted at 10m from nearside kerb).....	46
Table 22: Airborne Aircraft Noise: Dwelling Exposures (Now and Future) .....	52

# Bickerdike Allen Partners

## LIST OF FIGURES

Figure N-01	Aircraft Noise Annoyance/ATWP Categories
Figure N-02	Adopted Arrival and Departure Routes
Figure N-03	Daytime Airborne Aircraft Noise Contours: Summer 2011
Figure N-04	Night-time Airborne Aircraft Noise Contours: Summer 2011
Figure N-05	Daytime Airborne Aircraft Noise Contour Comparison: Summer 1984/1999/2011
Figure N-06	Night-time Airborne Aircraft Noise Contour Comparison: Summer 1984/1999/2011
Figure N-07	Noise Assessment Locations
Figure N-08	Daytime Airborne Aircraft Noise Contours: Summer 2028 : Without Development : No Fleet Modernisation
Figure N-09	Night-time Airborne Aircraft Noise Contours: Summer 2028: Without Development: No Fleet Modernisation
Figure N-10	Daytime Airborne Aircraft Noise Contours: Summer 2028: With Development: No Fleet Modernisation
Figure N-11	Night-time Airborne Aircraft Noise Contours: Summer 2028: With Development: No Fleet Modernisation
Figure N-12	Effect of Fleet Modernisation on Daytime Airborne Aircraft Noise Contours
Figure N-13	Comparison between 2011 and 2028 With and Without Development Daytime Airborne Aircraft Noise Contours – No Fleet Modernisation
Figure N-14	Comparison between 2011 and 2028 With and Without Development Night-time Airborne Aircraft Noise Contours – No Fleet Modernisation
Figure N-15	Comparison between 2011 and 2028 With and Without Development Daytime Airborne Aircraft Noise Contours – Part Fleet Modernisation
Figure N-16	Comparison between 2011 and 2028 With and Without Development Night-time Airborne Aircraft Noise Contours – Part Fleet Modernisation

# Bickerdike Allen Partners

## LIST OF APPENDICES

### Appendix N

N(1)	Glossary of Acoustic Terms
N(2)	Recent UK Practice on Aircraft Noise Assessment
N(3)	Detailed Noise Input Data, Methodology and Airport Noise Contours
N(4)	Aircraft Noise Footprints
N(5)	Background Noise Measurements
N(6)	Ground Noise Elementary Assessments
N(7)	Complaints Statistics
N(8)	Construction Noise: Elementary Assessments
N(9)	Extracts from U.K. A.I.P.
N(10)	Night Flying Policy
N(11)	London Luton Airport Noise Action Plan 2010 - 2015

# Bickerdike Allen Partners

## LONDON LUTON AIRPORT

### NOISE AND VIBRATION: PROPOSED DEVELOPMENT

#### 1. INTRODUCTION

##### The Brief

- 1.1 This report has been prepared by Bickerdike Allen Partners and considers the noise impact of the proposed development at this long established aerodrome. The proposals are described in Chapter 3 of this ES.
- 1.2 This development is predicted to lead gradually to annual aircraft movements of up to 156,840 by 2028; current (2011) annual movements are 99,299. Without the proposed development the forecast annual aircraft movements by 2028 are 127,186. The future aircraft movements, as now, will be mostly carried out by narrow bodied, single aisle, twin engined aircraft such as the Airbus A319 and Boeing 737-800.
- 1.3 With respect to noise emission, the proposed development may increase noise in certain areas due to the increased aircraft movements mentioned above. The development retains the current runway unaltered. No new departure or arrival routes arise from this development. Separately to this application NATS are proceeding with an airspace management programme, which may cause some changes but these would need to be assessed prior to implementation.
- 1.4 This report addresses the following noise emissions from the airport:
  - Airborne aircraft noise  
That is the noise of aircraft as they depart from and arrive onto the runway at Luton. Due to local wind conditions, aircraft commonly (70% of the year) land from the east over Stevenage, and depart to the west over the southern edge of Luton. Consideration has also been given to noise induced vibration from aircraft activities.
  - Ground noise  
That is the noise as the aircraft taxi and manoeuvre after landing or prior to departure on the Airport's aprons and taxiways.
  - Road access noise  
That is noise generated by cars, vans, buses and lorries serving the Airport on the public highway.
  - Construction noise  
That is the noise occurring during the construction of the extra infrastructure, the taxiway and apron modifications, and the new taxiway, Foxtrot.
- 1.5 This Chapter continues initially with a discussion of the methodology used to assess the impact of airborne aircraft noise, before the methodology used to assess ground

noise, road access noise, and construction noise is briefly described. Where appropriate, detailed matters are contained within technical Appendix N. That Appendix contains a glossary of acoustic terms, Appendix N(1), and in Appendix N(2) a discussion on the recent practice for UK aircraft noise assessment up to March 2012 taking into account the Planning and Noise Guidance Note, PPG24. With the publication on 27<sup>th</sup> March 2012 of the National Planning Policy Framework (NPPF), PPG24 was replaced by non-numerical criteria.

- 1.6 Having described the methodology, current baseline conditions (2011) are described prior to reporting the forecast future conditions with and without the development completed for 2028. Noise management is then described. The overall conclusions of this noise impact assessment are summarised at the end of this chapter.

## **Noise Impact Assessment Methodology**

### **Airborne Aircraft Noise Assessment**

- 1.7 The previous Government published in 1998 the White Paper, *A New Deal for Transport: Better for Everyone* which announced the preparation of a UK Aerodromes policy looking 30 years ahead. That Government then carried out a very thorough study of the future of air transport in the period 1998-2003, and that included delineation of national policy with regard to airborne aircraft noise. The Government's study led to publication in December 2003 of the White paper entitled *The Future of Air Transport*, Department of Transport, "ATWP". That advised on the need to make best use of existing runways in the South East. This policy has been reaffirmed in the *Future of Transport* White paper in July 2004, *The Future of Air Transport 2006* progress report and in the Government's response (24<sup>th</sup> February 2010) to the House of Commons Transport Committee's First Report Session 2009-2010.
- 1.8 The current coalition Government produced its draft sustainable framework for U.K. aviation ("dAPF") in July 2012. Consultation on this document continued to 31<sup>st</sup> October 2012. When adopted, the Aviation Policy Framework in conjunction with relevant policies will replace parts of the ATWP. The ATWP remains, except with regard to additional runways at major airports, the current national policy until replaced. The Secretary of State for Transport has recently set up an independent review of the UK aviation hub activity which is required to report finally in 2015 to the next Government who may or may not accept the recommendations of the review to be chaired by Sir Howard Davies. A new regime for night flights at Heathrow, Gatwick and Stansted will be announced, for the period after October 2014 after a DfT two-stage public consultation in the period Autumn 2012 to Summer 2013.
- 1.9 In Chapter 3 of the ATWP DfT advised on environmental impacts, and that included a section on noise, paragraphs 3.10-3.27. Paragraph 3.14 confirms the use of the equivalent continuous sound level dB  $L_{Aeq,T}$  and 57 dB  $L_{Aeq}$  as the level of daytime noise marking the approximate onset of significant community annoyance.



# Bickerdike Allen Partners

- 1.10 The ATWP describes the DfT's policies for the appraisal and management of environmental impacts from aerodromes, including noise. The basic aim stated was to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise. With respect to aircraft noise measurement and mapping, the ATWP advised that, based on research the Government has used 57 dB(A)  $L_{eq}$  as the level of daytime noise marking the approximate onset of significant community annoyance (box on page 34 of the ATWP).
- 1.11 The ATWP explains the Government's approach to noise mitigation and compensation. It states at paragraph 3.15:
- "Our approach to noise impacts is first, to seek to control the scale of impacts; second, to mitigate remaining impacts; and third, to compensate for those impacts which cannot be mitigated ..."*
- 1.12 The ATWP also contains advice on the actions the Government expects Aerodrome operators (Aerodromes with more than 50,000 movements per year) to take, as stated in Paragraph 3.21:
- "Accordingly, with immediate effect, we expect the relevant Aerodrome operators to:*
- Offer householders subject to high levels of noise (69 dBA  $L_{eq}$  or more) assistance with the cost of relocating; and*
- Offer acoustic insulation (applied to residential properties) to other noise-sensitive buildings, such as schools and hospitals, exposed to medium to high levels of noise (63 dBA  $L_{eq}$  or more)."*
- 1.13 Paragraph 3.24:
- "To address the impacts of future Aerodrome growth we expect the relevant Aerodrome operators to:*
- Offer to purchase those properties suffering from both a high level of noise (69 dBA  $L_{eq}$  or more) and a large increase in noise (3 dBA  $L_{eq}$  or more); and*
- Offer acoustic insulation to any residential property which suffers from both a medium to high level of noise (63 dBA  $L_{eq}$  or more) and a large increase in noise (3 dBA  $L_{eq}$  or more)."*
- 1.14 This national planning policy approach indicates that to assess an airport application as considered here, it is necessary to determine the amenity effects when the aircraft noise exceeds 57 dB  $L_{Aeq,16h}$ , 63 dB  $L_{Aeq,16h}$  and 69 dB  $L_{Aeq,16h}$ . The Government experts, ERCD, provided evidence in November 2007 in support of a 3<sup>rd</sup> runway at Heathrow Airport in their report 0705 in which they discussed aircraft noise exposure in paragraph 2.1.1.

# Bickerdike Allen Partners

*“2.1.1 Since 1990, the established index for relating the amount of aircraft noise exposure to community annoyance has been the Equivalent Continuous Sound Level index, or  $L_{eq}$ . In the UK this index is applied to an average summer day (taking into account traffic between mid-June and mid-September) over 16 hours, between 0700 and 2300 local time. The background to the use of this index is explained in DORA Report 9023 (Ref 4). The magnitude and extent of the aircraft noise around an Aerodrome is depicted on maps by plotting contours of constant aircraft noise exposure ( $L_{eq}$ ) values. It is conventional practice to plot contours between 57 and 72 dBA  $L_{eq}$  in 3 dB steps. It has become general usage to describe 57, 63 and 69 dB  $L_{eq}$  as denoting low, medium and high community annoyance respectively, whilst noting that 57 dBA  $L_{eq}$  is also taken to describe the onset of significant community annoyance. More recently 54 dBA  $L_{eq}$  contours have also been plotted as a sensitivity test of underlying forecasts and noise performance assumptions. Populations and numbers of households within the noise contours are then estimated using 2001 Census data as updated by CACI Ltd in 2006”.*

- 1.15 This national policy approach has been applied generally in the U.K.
- 1.16 Unlike day-time assessment, which is based entirely on  $L_{Aeq,T}$  dB contours, night-time aircraft noise is evaluated in different ways, using different units, such as single event level (SEL) as well as the  $L_{Aeq,8h}$  index (for the period 23.00 to 07.00 hours), see Appendices N(2) and N(4).
- 1.17 The SEL unit is used in USA and by the UK Government. The latter has assessed sleep disturbance related to the exposure of individuals to 90 dB(A) SEL and above. For locations within the 90 dB(A) SEL footprint, a very slight risk of sleep disturbance will be present.
- 1.18 The use of night contours in UK for airport noise has been common, with the Government using a 6.5 hour  $L_{Aeq,T}$  contour for night noise control at Heathrow, Gatwick and Stansted. Luton has used the more conventional 8 hour  $L_{Aeq,T}$  for night noise monitoring and control for over a decade. With regard to criteria for 8 hour night noise contours, the European Environment Agency has recently reported that “from the broad overview of the limit values in a large number of countries, and from scientific evidence, as well as from some more political organisations, there seems to be a consensus that  $L_{den}$  around 50 dB (or the equivalent level on other units) would represent a good noise quality, and  $L_{night} < 55$  dB should be respected to protect the population from serious health effects.” (EEA Report 11/2010). It has to be appreciated that no UK study has been made to calibrate  $L_{den}$  or  $L_{night}$  for use in UK, and studies in Europe indicate vast differences between airports in local community response for the same  $L_{den}$  level.

## Bickerdike Allen Partners

- 1.19 The previous Secretary of State for Transport advised on 12<sup>th</sup> July 2012 that the Government believes that aviation needs to grow sustainably, delivering the benefits essential to our economic wellbeing whilst respecting the environment and protecting quality of life. The current Secretary of State for Transport advised on 7 September 2012 that our aviation networks and infrastructure have an important role to play in returning the country to sustainable economic growth.
- 1.20 Although the recently published dAPF does not carry much weight in planning prior to its adoption, it is briefly reviewed here as it indicates the coalition's views prior to public consultation. The dAPF, whilst side stepping the main issue of contention (airport/runway capacity), did consider the benefits of aviation and managing aviation's environmental impacts. The greatest volume of text was given in Chapter 4 and related to noise and other local environmental impacts.
- 1.21 Within Chapter 4, the policy objective on noise is discussed. The high-level policy objective on aircraft noise set out in the existing policy delineated in the ATWP is discussed, and as it is found consistent with the current Government's policy on noise set out in the Noise Policy Statement for England, the Government proposed to retain it:
- "That is to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise."*
- 1.22 The dAPF discussed how to describe the noise impact and advises that the government is minded to retain the 57 dB  $L_{Aeq,16h}$  contour as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance.
- 1.23 The dAPF also considers facilitating improved noise monitoring at Heathrow, Gatwick and Stansted either by producing noise contours down to 54 dB  $L_{Aeq,16h}$  or producing contours at 55  $L_{den}$  as for END mapping. The Government raises these two options for consultation but does not indicate which option it favours.
- 1.24 The dAPF also considers the noise compensation schemes delineated in the ATWP and indicates it continues to expect airports to operate such compensation, i.e. using the 63 dB  $L_{Aeq,16h}$  and 69 dB  $L_{Aeq,16h}$  eligibility criteria, see paragraph 1.13 above.
- 1.25 The dAPF, in essence, does not indicate any intention on the part of Government to alter the advice on noise matters given in the ATWP.
- 1.26 Figure 1 shows the ATWP categories and the percentage of people that would be expected to respond to a questionnaire concerning annoyance due to aircraft noise as being highly annoyed as a function of the aircraft noise level. The latter information is taken from CAP 725, published in April 2007, the Government's noise scientist's advice on noise assessment with regard to airspace changes. This illustrates that the onset of significant community annoyance, 57 dB  $L_{Aeq,16h}$ , is related

to a small percentage of people expressing high annoyance around 10%. Clearly a much greater percentage of people do not express that view. That is why general usage describes 57 dB  $L_{Aeq,16h}$  as denoting low community annoyance.

- 1.27 The other key national policy arose from the planning policy guidance given in PPG 24, issued in September 1994, see Appendix N(2). That guidance was replaced in March 2012 by the National Planning Policy Framework (NPPF) and the Noise Policy Statement for England (NPSE). Both give non-numerical criteria, unlike PPG24.

## **National Planning Policy Framework (NPPF)**

- 1.28 On 27<sup>th</sup> March 2012, the coalition Government published the NPPF which set out the Government's planning policies for England and how these are expected to be applied. As mentioned earlier this replaced the heavily used Planning and Noise Guidance Note PPG 24.

- 1.29 With respect to noise policy, that is delineated in paragraph 109, where it is stated that the planning system should contribute to and enhance the natural and local environment by:

*“preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability...”*

- 1.30 The aim of planning policies and decisions with respect to noise is also addressed in paragraph 123, viz

- *“avoid noise from giving rise to significant adverse impacts<sup>1</sup> on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts<sup>1</sup> on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established<sup>2</sup>; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”*

- 1.31 The NPPF contains no reference to specific noise exposure levels.

---

<sup>1</sup> See Explanatory Note to Noise Policy Statement for England (Defra)

<sup>2</sup> Subject to the provisions of the Environmental Protection Act 1990 and other relevant law.

## Noise Policy Statement for England (NPSE)

1.32 On 15<sup>th</sup> March 2010 Defra published its *Noise Policy Statement for England* (NPSE). This seeks to make explicit the underlying principles and aims regarding noise management and control that are to be found in existing policy documents, legislation and guidance. In particular it stresses the need to integrate noise management policy with the Government's sustainable development strategy. It introduces a new concept SOAEL – Significant Observed Adverse Effect Level, but clarifies that no numerical values have yet been determined by Defra, and advises that the lack of values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available. Defra has commissioned a research contract to investigate and advise on numerical values for SOAEL.

1.33 The NPSE delineates the Noise Policy Aims as;

*Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.*

1.34 In light of the non-numerical advice from DCLG and Defra, this development has been assessed using the current numerical policies given in the ATWP, recently repeated in the dAPF, and the principles delineated in the NPPF and NPSE.

## Regional Policies and Plans

1. 35 Regional planning policy is made up of the East of England Plan, which includes the regional spatial strategy (RSS) and Milton Keynes and South Midlands sub-regional strategy. The RSS currently remains extant. However, section 109 of the Localism Act 2011 provides the basis for the Secretary of State to revoke the RSS in whole or in part.

## Local Plans

1.36 The Luton Local Plan 2011-2031 is planned to be examined by an independent Inspector towards the end of 2013, with adoption of the Plan in 2014.

1.37 The previous Luton Local Plan 2001-2011 has now expired except for certain saved policies. One of those saved policies is Policy LLA1, which sets out the policy with regard to development at London Luton Airport.

# Bickerdike Allen Partners

## Policy LLA1

### Development at London Luton Airport

*The Borough Council will grant planning permission at London Luton Airport (identified as such on the Proposals Map) provided that it:*

- (i) is airport related; and*
- (ii) is not in conflict with national or regional government aviation policies; and*
- (iii) is in accordance with the most recent airport development brief agreed jointly by Luton Borough Council and London Luton Airport Operations Limited; and*
- (iv) results in an aircraft noise impact that is below the 1999 level; and*
- (v) incorporates sustainable transportation measures that will be likely to make an appropriate contribution to the achievement of the targets for the modal shift of passengers, visitors and staff travelling to the airport as set out in the most recent Surface Access Strategy; and*
- (vi) provides car parking facilities that comply with the most recent Surface Access Strategy with regard to;*
  - (a) the number and size of spaces; and*
  - (b) the location and management of the car parks.*

- 1.38 Policy LLA1, as drafted, does not clearly delineate the 1999 descriptor that is either predicted 1999 levels or actual 1999 levels. This however was referred to in the previous Luton Local Plan 2001-2011, specifically in paragraph 9.73. This advised that at the Local Plan Inquiry in 2004, the Inspector recommended a policy was adopted that would enable expansion, subject to noise impact that is below 1999 levels. In this context, the Inspector made reference to noise controls within the 1998 planning consent for the terminal building extension that related to predicted contours produced in the associated (1997) Environmental Statement. The regime under which the airport currently operates refers to noise contours for 1999 from this 1997 Environmental Statement. Aircraft noise had previously been monitored annually against 1984 levels. The 2001-2011 Local Plan stated that applications for further development will be assessed against this 1999 benchmark.
- 1.39 The most recent airport development brief was adopted by the Council as supplementary planning guidance. It considered Air and Ground Noise in Chapter 9.
- 1.40 The current policy ATWP addressed the need for acoustic insulation for other noise sensitive buildings other than the domestic residential buildings considered in the policy reviewed above. In particular it expects operators to offer such insulation to schools exposed to medium to high levels of noise (63 dB L<sub>Aeq</sub> or more). With respect to new schools, guidance is given in Building Bulletin 93 – Acoustic Design of Schools (BB93), see Appendix N(2).

# Bickerdike Allen Partners

- 1.41 For an initial assessment on the impact of aircraft noise on schools the same parameter has been used as for dwellings, dB  $L_{Aeq,16h}$  following the ATWP approach. For an assessment consistent with BB93 a revised parameter is appropriate,  $L_{Aeq,30min}$ , and to reflect this for Luton operations an increase in the predicted level of 3 dB is suggested.

## Vibration

- 1.42 High levels of aircraft noise can produce vibrations within buildings that can cause windows and objects on shelves to rattle. This arises due to the low frequency components of aircraft noise, particularly in the case of helicopters. Government guidance is that vibration from aircraft is unlikely to be a consideration except in the immediate vicinity of an aerodrome. At Luton, dwellings are generally located well away from aircraft activities and, therefore, the potential for noise-induced vibration is slight. For fixed-wing aircraft, noise induced vibration effects typically arise only when an aircraft produces a noise level, outside a dwelling, of more than 90 dB  $L_{Amax}$ . Current or proposed operations are not expected to give rise to noise levels of this magnitude outside any dwelling.
- 1.43 While complaints received by the Airport have not identified vibration as a major source of disturbance, some reports have been received. No more than three complainants per year have reported vibration events in recent years.

## Airborne Aircraft Noise Prediction

- 1.44 For this assessment, BAP have used the latest version of the Federal Aviation Administration Integrated Noise Model, (INM) to produce both current (2011) and forecast (2028) contours. This model allows the input data given in detail in Appendix N(3) to be incorporated into a noise model of operations at Luton. INM is the most widely used worldwide prediction model, and is in line with the latest ECAC prediction standard. The INM programme has been used at Luton Airport for many years.
- 1.45 The outputs are noise contours that take into account arrivals and departures. The calculations are made for the various time periods, in line with normal practice and with the requirements of the Luton Airport Development Brief.
- 1.46 The INM model used at Luton has taken into account local terrain details. Previous published contours have not taken terrain into account. They also take into account the recent validation of the general INM methodology to Luton operations, see Appendix N(3). The contours presented here for 2011 and 2028 are made using the latest methodology, that differs slightly from that used for contours issued previously, including the contours in the 2011 AMR.

## Airborne Aircraft Noise Contours

- 1.47 The following noise contours have been produced and are reproduced in Appendix N(3).

# Bickerdike Allen Partners

## As used by Central Government and in Luton Airport Annual Monitoring Reports

Daytime Average Mode Summer Period Contours, dB  $L_{Aeq,16h}$  [07:00-23:00] and Night-Time Average Mode Summer Period Contours, dB  $L_{Aeq,8h}$  [23:00-07:00] for:

- 1999 Luton Noise Budget;
- 2011 Current: 9.5 mppa<sup>(1)</sup>;
- 2028 without Development Baseline: 12.4 mppa without fleet modernisation.
- 2028 with Development: 18 mppa without fleet modernisation;
- 2028 with Development: 18 mppa with part fleet modernisation.

<sup>(1)</sup> million passengers per annum

## As used for Noise Action Plans in U.K

London Luton Airport Strategic Noise Maps:

- 24 Hour Day Average Mode Annual Period Contours dB  $L_{den}$ .
- Night Average Mode Annual Period Contours dB  $L_{night}$  [23:00-07:00].

For both 2011 Baseline and 2028 with Development 18 mppa with and without fleet modernisation.

## **Airborne Aircraft Noise Footprints**

1.48 For night-time noise evaluation 80 and 90 dB(A) SEL footprints have been produced, as recommended in CAP 725, and are given in Appendix N(4).

- Figure N(4)-01 SEL footprints for Airbus A300, A319 and A320, Boeing 737-800 for arrival from east.
- Figure N(4)-02 SEL footprints for Airbus A300, A319 and A320, Boeing 737-800 for departure to west on RWY 26 CLN/DVR/DET route.
- Figure N(4)-03 SEL footprints for Airbus A320 for arrival from west and departure on RWY 08 Compton route.
- Figure N(4)-04 SEL footprints for Airbus A320 for arrival from west and departure on RWY 08 CLN/DVR/DET route.
- Figure N(4)-05 SEL footprints for Airbus A320 for arrival from east and departure on RWY 26 Olney route.
- Figure N(4)-06 SEL footprints for Airbus A320 and Airbus A320 NEO for arrival from east, departure to west on RWY 26 CLN/DVR/DET.
- Figure N(4)-07 SEL footprints for Airbus A300-B4 and Airbus A300-600 aircraft for arrival from east, departure to west on RWY 26 CLN/DVR/DET route.



## Ground Noise Assessment

### Ground noise

- 1.49 Noise generated other than by aircraft in flight or taking off or landing is termed ground noise. The main sources of aerodrome ground noise are:
- Taxiing and manoeuvring aircraft
  - Operation of aircraft auxiliary power units (APUs)
  - Mobile ground equipment such as ground power units (GPUs)
  - Testing (ground running) of aircraft engines
- 1.50 Noise from ground operations has the potential to have an impact on residential areas close to the aerodrome boundary. At Luton residential properties to the north of the Airport are generally distant from the aprons and taxiways with considerable local screening due to industrial buildings and the large hangars. There are isolated properties to the south and east.
- 1.51 Aerodrome ground noise is heard in the context of other local ambient noise sources. The most common contributor to the noise climate in the residential areas closest to the Airport is road traffic and airborne aircraft noise. It was reported in the Development Brief that ground noise from the Airport at Eaton Green Road was dominated by road traffic noise, not solely related to the Airport, and the impact of the ground operations at the Airport themselves was not significant. LBC raised concern recently over ground noise for the Wigmore area of Luton in their response to the draft Noise Action Plan.

### Ground Noise Assessment Criteria

- 1.52 Unlike the assessment of airborne noise, there is no definitive agreement on the method of assessment of ground noise. Various methods have been adopted in the past, and these have led to the assessment of ground noise in terms of the equivalent continuous sound level, dB  $L_{Aeq,T}$ .
- 1.53 In this study, as generally the populated areas are distant from sources of ground noise, an assessment using a number of locations as opposed to full noise mapping has been undertaken. The nearest residential area is located to the north of the Airport, north of Eaton Green Road. The main Taxiway A that passes through the West Apron area is 350m distant, and in between the housing and this busy ground noise source area are located large hangars and other industrial buildings which form a noise barrier. The closest apron to the housing is the Cargo Apron which has currently less screening due to existing buildings.
- 1.54 The assessment has used the dB  $L_{Aeq,16h}$  metric for the daytime period 07:00-23:00 hours and dB  $L_{Aeq,8h}$  for the night-time period 23:00-07:00. This allows the level of ground noise assessed at various nearby locations to be compared

# Bickerdike Allen Partners

to the existing ambient environmental noise, see Appendix N(5) and the World Health Organisation (WHO) general environmental criteria given in Table 1 below.

**Table 1: Tentative Ground Noise Impact Criteria**

Source	Sound Level, dB L <sub>Aeq,T</sub>	Form of Criterion
WHO	55	Daytime (prevents any significant/serious community annoyance)
WHO	45	Night-time Noise

- 1.55 In the absence of agreed national criteria for ground noise, and based on UK best practice and professional experience, the significance criteria below have been used in this assessment:

## Magnitude of Ground Noise

### Daytime:

- $\geq 55$  dB L<sub>Aeq,16h</sub> - Onset of Significant impact
- $< 55$  dB L<sub>Aeq,16h</sub> - No Significant impact

### Night-time:

- $\geq 45$  dB L<sub>Aeq,8h</sub> - Onset of Significant impact
- $< 45$  dB L<sub>Aeq,8h</sub> - No Significant impact

## Changes in Ground Noise

- 0 to 2 dB - No impact
- 3 to 5 dB - Marginal impact
- 6 to 9 dB - Significant impact

## **Ground Noise Prediction Method**

- 1.56 The prediction of ground noise has been undertaken using a spreadsheet model in conjunction with reference noise level data and event duration information determined from BAP's field noise measurements taken at various Aerodromes, see Appendix N(6). Predictions have been based on the forecast movements in the assessment years. Some prediction has been made of current conditions. Study of the Aerodrome complaint statistics for the last eighteen years indicates low community reactions over ground noise, and how much of it is due to engine ground runs, see Table 2. This would be expected as the aircraft on the taxiways and aprons are distant from local amenities, see Table 3 below.
- 1.57 The recent short-term baseline noise measurements, Appendix N(5), included identification of the contribution of ground noise to overall ambient levels.

# Bickerdike Allen Partners

**Table 2: Complaints Analysis/Ground Noise**

Year	Annual Numbers of Complaints	
	All Ground Noise	Engine Ground Runs Only
1994	11	-
1995	64	-
1996	20	-
1997	22	-
1998	3	-
1999	3	-
2000	23	-
2001	22	-
2002	22	15
2003	18	6
2004	14	12
2005	27	18
2006	69	44
2007	44	3
2008	35	14
2009	14	5
2010	11	8
2011	5	3

**Table 3: Ground Noise Elementary Assessments: Separation from Ground Noise Sources**

Assessment Locations	Separation <sup>(1)</sup> (m) of Receptor from			
	Taxiway Extensions	New Apron	Pier B	Foxtrot Taxiway
Somerles Farm	650-750	750-850	>1000	>1000
Dane Street Farm	400-550	>1000	>1000	>1000
Eaton Green Road/Barnston Close	>1000	300	700	950
Eaton Green Road/Chertsey Close	>1000	300	800	900
Eaton Green Road/Wigmore Valley Park Centre	>1000	700	900	950

<sup>(1)</sup> Separation: distance from centre of source element to receiver.

## Road Access Noise Assessment

- 1.58 The proposed scheme may affect the environment by virtue of noise from road traffic derived from increased activities at the aerodrome as well as a general intensification of Airport service and maintenance vehicle traffic. The scheme involves new road construction near the final access road into the Central Terminal Area from the Holiday Inn hotel roundabout. The environmental impact assessment of future road traffic noise has been made in conjunction with the Transport Assessment.

## Road Traffic Noise Assessment Criteria

- 1.59 Unlike for the airborne noise assessment, the criteria used in the analysis here takes into account the approach adopted in the UK using information in (the recently withdrawn) PPG 24, as well as the UK Department of Transport document Design Manual for Roads and Bridges, Volume 11 (DMRB).
- 1.60 This study uses noise measured in terms of dB  $L_{Aeq,16h}$  to assess the road traffic noise. The Noise Insulation Regulations 1975 (as amended in 1988) identify the threshold for eligibility for soundproofing. That is expressed as a façade level of 68 dB  $L_{A10,18h}$ . A correction of -3 dB(A) is applied to convert the façade level to a free-field level, and a further correction of -2 dB(A) approximately converts from the  $L_{A10,18h}$  to the  $L_{Aeq,16h}$  metric. The resulting criteria for sound proofing is 63 dB  $L_{Aeq,16h}$ , which is the same level used in the ATWP advice for airport noise.
- 1.61 Based on the above, the absolute criteria given in Table 4 have been adopted for use in this assessment.

**Table 4: Absolute Road Traffic Noise Criteria**

Absolute Noise Level at Façade, dB $L_{Aeq,16h}$	Significance Criteria
> 66 dB $L_{Aeq,16h}$	Substantial
59 - 66 dB $L_{Aeq,16h}$	Moderate
< 59 dB $L_{Aeq,16h}$	Minor

- 1.62 The impact of changes in road traffic noise level on people relates to the magnitude of the change and, to some extent, when it occurs. As with the other types of noise, the amount of annoyance and perception of change depends on the individual. A scale of significance is given below for road traffic noise, derived from an interpretation of the change criteria from the DMRB. Significance depends on whether the change occurs suddenly or gradually. Table 5 is based on the former, representing a 'worst case' although in practice, any change will be gradual for houses near local access roads.

**Table 5: Subjective importance of changes in road traffic noise level**

Increase in Noise level, $L_{A10,18h}$	Change in % People Bothered, Very Much or Quite a lot by noise	Interpreted significance
0	0%	No change
0.1 – 0.9 dB	< 20%	Negligible
1 – 2.9 dB	20% - 30%	Minor
3 – 4.9 dB	30% - 35%	Moderate
5+ dB	>35%	Major

- 1.63 In summary, the significance criteria used in this assessment of road traffic noise are based on those described in Table 4 and Table 5, namely:

Magnitude of Road Traffic Noise

- > 66 dB  $L_{Aeq,16h}$  - Onset of Substantial impact
- 59 - 66 dB  $L_{Aeq,16h}$  - Moderate impact
- < 59 dB  $L_{Aeq,16h}$  - Minor impact

Changes in Road Traffic Noise\*

- < 1 dB - No impact
- 1 - 3 dB - Marginal impact
- 3 - 5 dB - Significant impact

\* Where the change is sudden. If the change is slow then the significance criteria are as used for changes in Airborne Aircraft, see Appendix N(1).

**Road Traffic Noise Prediction Method**

- 1.64 The prediction of road traffic noise has been undertaken utilising the calculation method given in the UK Department of Transport Calculation of Road Traffic Noise publication (CRTN). Short term noise measurements have been made of the current road traffic noise on Eaton Green Road, see Appendix N(5).

**Construction Noise Assessment**

- 1.65 Predictions have been undertaken based on procedures set out in BS5228 to give an indication of the likely levels of construction noise which might affect nearby properties. The impact has been assessed using standard methods. Appendix N(5) contains results of recent short term measurements of background noise.
- 1.66 In determining the following criteria comparison has been made with the existing ambient environmental noise, and with the examples of significance criteria given in BS 5228.

# Bickerdike Allen Partners

## Construction noise (daytime)

- 65 dB  $L_{Aeq,16h}$  - threshold of significance when ambient levels less than 65 dB  $L_{Aeq}$ .
- 70 dB  $L_{Aeq,16h}$  - not to be exceeded for rural, suburban and urban areas away from main traffic and industrial noise.
- 75 dB  $L_{Aeq,16h}$  - not to be exceeded in noisy urban areas.
- 75 dB  $L_{Aeq,16h}$  - noise insulation trigger level.

## Combined Noise Impacts

- 1.67 Some locations may be affected by a combination of noise from various sources. Using the separate impact assessments, the combined impact at locations where several sources are significant has been considered.

## 2. CURRENT CONDITIONS (2011)

### Airborne Aircraft Activity

- 2.1 Appendix N(3) records the details of both current and future flying operations at the aerodrome; these details have been used in the noise modelling. It also reports the contour methodology validation study.
- 2.2 Figure N-02 illustrates the arrival and departure routes at Luton.
- 2.3 Figure N-03 presents the daytime noise contours for summer 2011; Figure N-04 presents the night-time noise contours. Appendix N(7) gives current complaint statistics.
- 2.4 Figure N-05 compares the current daytime contours at 57 dB  $L_{Aeq,16h}$  with those at the two planning limit years 1984 “the old limit” and 1999 “the new limit”. Also shown are the contours for actual activity in 1999. The contour comparison is approximate as the prediction methodology is not identical in each case.
- 2.5 Figure N-06 presents similar comparisons for night-time noise using the 48 dB  $L_{Aeq,8h}$  parameter. Appendix N(4) presents SEL footprints for current aircraft operating at night, separately for landings and departures.
- 2.6 Table 6 and Table 7 summarise the past, current and future areas of the daytime and night-time contours respectively.
- 2.7 Table 8 and Table 9 illustrate the airborne aircraft noise levels for twenty-four local areas during daytime and night-time respectively. Figure N-07 indicates the locations used for this assessment.
- 2.8 The daytime noise impacted areas delineated by the 2011 contours 57 dB  $L_{Aeq,16h}$  and above range from the rural area near St Paul’s Walden to the east to areas near the

# Bickerdike Allen Partners

M1 in Slip End. The contours include parts of Breachwood Green and South Luton. These areas have been exposed to such noise for many years. There are approximately 6,726 people resident in the areas covered by the 57 dB  $L_{Aeq,16h}$  contour.

- 2.9 The area of the 2011 daytime contour is well within the area set by the original Luton Budget (1984) contour and the current Budget (1999) relevant to LBC planning policy LLA1, see Table 6.
- 2.10 The area of the noise impacted areas is greater at night than during the day, see Figures N-03 and N-04, and stretches from Stevenage to the south of Markyate. This area has been exposed to such noise for many years. The area of the 2011 night-time contour is well within the area set by the original Luton Budget (1984) contour and the current Budget (1999) relevant to LBC planning policy LLA1. There are approximately 16,347 people within the contour area.

**Table 6: London Luton Airport Daytime Noise Contour Areas**

Scenario <sup>(1)</sup>	Area Exposed to 57 dB $L_{Aeq,16h}$ and Above, km <sup>2</sup>
ACTUAL 1984 (CAA, 1.8 mppa)	31.1 [old budget]
ACTUAL 1998 (ANCON 2, 4.1 mppa)	15.8
FORECAST 1999 (ANCON 2, 5 mppa)	19.6 [new budget]
ACTUAL 1999 (INM, 5.3 mppa)	19.4
ACTUAL 2005 (INM, 7 mppa)	13.5
ACTUAL 2008 (INM, 10.2 mppa)	16.6
ACTUAL 2011 (INM, 9.6 mppa)	14.4
FORECAST 2028 Base Case without Fleet Modernisation (INM, 12.4 mppa)	18.2
FORECAST 2028 Base Case with Part Fleet Modernisation (INM, 12.4 mppa)	15.2
FORECAST 2028 with Development without Fleet Modernisation (INM, 18 mppa)	23.7
FORECAST 2028 with Development with Part Fleet Modernisation (INM, 18 mppa)	19.5

<sup>(1)</sup> ( ) indicates noise contour prediction method, and annual passengers

# Bickerdike Allen Partners

**Table 7: London Luton Airport Night-time Noise Contour Areas**

<b>Scenario<sup>(1)</sup></b>	<b>Area Exposed to 48 dB L<sub>Aeq,8h</sub> and Above, km<sup>2</sup></b>
ACTUAL 1984 (CAA, 1.8 mppa)	85.0 [old budget]
ACTUAL 1998 (ANCON 2, 4.1 mppa)	58.6
FORECAST 1999 (ANCON 2, 5 mppa)	60.6 [new budget]
ACTUAL 1999 (INM, 5.3 mppa)	37.2
ACTUAL 2005 (INM, 7 mppa)	26.6
ACTUAL 2008 (INM, 10.2 mppa)	38.5
ACTUAL 2011 (INM, 9.6 mppa)	35.8
FORECAST 2028 Base Case without Fleet Modernisation (INM, 12.4 mppa)	38.9
FORECAST 2028 Base Case with Part Fleet Modernisation (INM, 12.4 mppa)	32.3
FORECAST 2028 with Development without Fleet Modernisation (INM, 18 mppa)	48.0
FORECAST 2028 with Development with Part Fleet Modernisation (INM, 18 mppa)	40.4

<sup>(1)</sup> ( ) indicates noise contour prediction method, and annual passengers



# Bickerdike Allen Partners

**Table 8: London Luton Airport Daytime Airborne Airport Noise<sup>(1)</sup> at Local Areas**

Ref.	Locations <sup>(2)</sup>	1984 Actual	1999 Actual	1999 Predicted	2011 Actual	2028 (ND)	2028 <sup>(3)</sup> (ND)	2028 (WD)	2028 <sup>(3)</sup> (WD)
1	Old Knebworth Lodge Farm	<54	<54	<54	<54	<54	<54	<54	<54
2	Grove Farm Noise Terminal	60	56	56	55	56	55	58	57
3	Caddington	55	54	56	<54	54	<54	55	54
4	Park Town, Luton	60	60	59	59	60	59	62	61
5	Whitwell	<54	<54	<54	<54	<54	<54	<54	<54
6	Frogmore Noise Terminal	60	60	60	58	59	58	61	60
7	Breachwood Green	63	62	64	<54	54	<54	55	54
8	St Pauls Walden	57	55	56	<54	<54	<54	55	<54
9	Peter's Green	<54	<54	<54	<54	<54	<54	<54	<54
10	Kinsbourne Green	<54	<54	<54	<54	<54	<54	<54	<54
11	Farley Hill School, Luton	<54	<54	<54	<54	<54	<54	<54	<54
12	Slip End	62	58	57	58	59	58	61	60
13	Winch Hill Farm	62	63	63	59	60	59	61	59
14	Harpenden Childrens Home	<54	<54	<54	<54	<54	<54	<54	<54
15	Walkern	<54	<54	<54	<54	<54	<54	<54	<54
16	Stevenage (Eastern Perimeter)	<54	<54	<54	<54	<54	<54	<54	<54
17	Stevenage Station	55	<54	<54	<54	<54	<54	54	<54
18	Rush Green	57	54	54	<54	55	54	56	55
19	Luton (Wondon End)	<54	55	<54	<54	<54	<54	54	<54
20	Luton (South East)	69	67	68	65	66	65	68	67
21	Kensworth	<54	<54	<54	<54	<54	<54	<54	<54
22	Hudnall Corner	<54	<54	<54	<54	<54	<54	<54	<54
23	Flamstead	57	<54	<54	<54	<54	<54	<54	<54
24	Markyate	56	<54	<54	<54	<54	<54	<54	<54

<sup>(1)</sup> All noise levels given to nearest decibel

<sup>(2)</sup> See Figure N-07 for assessment locations

<sup>(3)</sup> With Part Fleet Modernisation

# Bickerdike Allen Partners

**Table 9: London Luton Airport Night-time Airborne Airport Noise<sup>(1)</sup> at Local Areas**

Ref.	Locations <sup>(2)</sup>	1984 Actual	1999 Actual	1999 Predicted	2011 Actual	2028 (ND)	2028 <sup>(3)</sup> (ND)	2028 (WD)	2028 <sup>(3)</sup> (WD)
1	Old Knebworth Lodge Farm	<48	<48	<48	<48	<48	<48	<48	<48
2	Grove Farm Noise Terminal	54	50	51	50	51	50	52	51
3	Caddington	51	50	52	50	49	48	50	49
4	Park Town, Luton	56	52	55	54	55	54	57	56
5	Whitwell	48	<48	49	<48	<48	<48	<48	<48
6	Frogmore Noise Terminal	58	55	59	55	55	54	56	55
7	Breachwood Green	62	60	64	49	49	48	50	49
8	St Pauls Walden	53	49	53	48	48	<48	50	49
9	Peter's Green	<48	<48	<48	<48	<48	<48	<48	<48
10	Kinsbourne Green	<48	<48	<48	<48	<48	<48	<48	<48
11	Farley Hill School, Luton	48	<48	48	<48	<48	<48	<48	<48
12	Slip End	57	53	54	53	54	53	56	55
13	Winch Hill Farm	58	57	60	54	55	54	55	54
14	Harpenden Childrens Home	<48	<48	<48	<48	<48	<48	<48	<48
15	Walkern	<48	<48	<48	<48	<48	<48	<48	<48
16	Stevenage (Eastern Perimeter)	<48	<48	<48	<48	<48	<48	<48	<48
17	Stevenage Station	51	<48	50	48	48	<48	49	48
18	Rush Green	57	54	54	50	50	49	51	50
19	Luton (Wondon End)	50	48	51	<48	48	<48	49	48
20	Luton (South East)	65	61	65	60	61	60	63	62
21	Kensworth	<48	<48	48	<48	<48	<48	<48	<48
22	Hudnall Corner	49	<48	<48	<48	<48	<48	<48	<48
23	Flamstead	50	<48	<48	<48	<48	<48	48	<48
24	Markyate	50	<48	<48	<48	<48	<48	48	<48

<sup>(1)</sup> All noise levels given to nearest decibel

<sup>(2)</sup> See Figure N-07 for assessment locations

<sup>(3)</sup> With Part Fleet Modernisation

2.11 The absolute values of daytime noise at many assessment locations are less than 54 dB  $L_{Aeq,16h}$  and 48 dB  $L_{Aeq,8h}$  in 2011. The most exposed assessment locations are south east Luton, Breachwood Green and Slip End.

# Bickerdike Allen Partners

- 2.12 The change in noise for twenty-four local areas is given in Table 8 and Table 9. These generally show slight reductions in 2011 during the daytime when compared to 1999 conditions, and there are no increases. Considering the night-time situation the night noise levels in 2011 generally show no change or slight reductions when compared to forecast 1999 conditions and are similar to actual 1999 conditions. An increase of 2 dB is assessed for Park Town Luton between 2011 and actual 1999 conditions.
- 2.13 Table 10 indicates the populated dwellings within the 2011 contours. These estimates use current information given and using the CACI database which uses the results of the 2001 census updated to 2011. This method differs from that used by the Airport for most of the Annual Monitoring Reports. Comparison of the data in Table 10 with that given in post AMRs is difficult as both the noise contour methodology and the dwelling/population methods have changed. This latest forecast, for instance, gives higher values than published in the 2011 AMR. For example, the population exposed to 57 dB  $L_{Aeq,16h}$  and above given in AMR 2011 as 5217 has now been estimated as 6726.

**Table 10: 2011 Airborne Aircraft Noise (Dwellings/Population Exposed)**

Noise Parameter		Dwellings within	Population within
Daytime, dB $L_{Aeq,16h}$	57-60	1,800	4,226
	60-63	594	1,677
	63-66	289	813
	66-69	5	10
TOTAL		2688	6726
Night-time, dB $L_{Aeq,8h}$	48-51	3,232	7,678
	51-54	2,048	4,357
	54-57	994	2,757
	57-60	547	1,526
	60-63	10	27
	63-66	1	2
TOTAL		6832	16347

- 2.14 As reported in Appendix N(7) there were 733 complaints from 305 complainants received by the Airport concerning 2011 operations. That number excludes the large number of complaints from Redbourn and Flamstead concerning the Clacton/Dover/Detling runway 26 departure route trial activity. The trial has now ceased. In 1999 1848 complaints related to Luton activity were received from 567 households.

# Bickerdike Allen Partners

2.15 Concentrating on the complaints not related to the trial, the areas from which over 10 complainants per area raised concerns were:

- Caddington
- Flamstead
- Harpenden
- Luton
- Markyate
- Redbourn
- St Albans
- Wheathampstead

The most reported concern in 2011 related to westerly departures, 71% of total complaints; in 1999 65% of total complaints related to departures. The published Annual Monitoring Reports present more details.

2.16 The 2011 daytime airborne aircraft noise as illustrated in Figure N-03 and quantified in Table 10 does expose a considerable number of local residents to noise of 57 dB  $L_{Aeq,16h}$ , in ATWP terms at the level marking the approximate onset of significant community annoyance. Such exposure has occurred for many years.

2.17 These residents are mainly located in parts of Breachwood Green, Slip End and south Luton, with the greatest number in the latter.

2.18 The residents in the area of south Luton adjoining the busy west-bound departure route are exposed to the highest levels. That includes the redeveloped school at Capability Green. There are no hospitals within the daytime contour.

2.19 The night-time contours also stretch from Stevenage to areas south of Markyate, with the largest residential area impacted in south Luton, such exposure has occurred for many years.

2.20 In 2011 31% of all complaints related to night-time disturbance. During that summer there were nightly, on average, 28 arrivals and 20 departures. Departures dominated the activity in the early morning period, arrivals dominated for the rest of the night period 23.00-06.00.

2.21 The SEL analysis given in Appendix N(4) illustrates the extent of the 90 dB(A) SEL footprint for arrivals and departures during the night by the most common and the noisiest types.

2.22 Considering the most common situation in the majority of the night period, 23.00-06.00, of arrivals, the most common aircraft, the Airbus A320, will expose very few people (6 estimated) to significant noise during westerly operations. This aircraft operated 7 arrivals per night.

## Bickerdike Allen Partners

- 2.23 During easterly operations, the number of people exposed increases to just under 500 during arrivals of the Airbus A320. The people so exposed are residents of south Luton.
- 2.24 If the arrival is made by the Airbus A300 B4 cargo aircraft, that operates with only one such arrival per night, for westerly operations the population exposed to 90 dB(A) SEL increases to 70 from the estimated 6 for the Airbus A320; with easterly operation 1971. The latter relates to residents of south Luton and Caddington.
- 2.25 Considering the busiest departure period, 06.00-07.00, the Airbus A319 and A320 carried out in the summer of 2011 nine departures, and on the basis that the 90 dB(A) SEL footprints for the A319 and the A320 are similar, with westerly departures about 1091 people would be exposed to 90 dB(A) SEL and above. These are resident in south Luton.
- 2.26 In that busy period, 06.00-07.00, if easterly operations prevail, then for the Airbus A320 types, the number of people exposed to 90 dB(A) SEL and above is 397. The Airbus A300 B4 cargo aircraft does not operate in that early morning period.
- 2.27 The greatest risk of sleep disturbance arises from the departure of the Airbus A300 B4 cargo aircraft on the westerly departure route. That would expose around 4,500 people in south Luton and Slip End.
- 2.28 The consideration of the 90 dB(A) SEL footprints indicates risk of sleep disturbance for parts of the area indicated by the night-time noise contours illustrated in Figure N-04. These are particularly in areas of south Luton.
- 2.29 The current airborne aircraft noise produces significant noise impact during both the daytime and night-time periods. The level of noise is generally slightly less than forecast when planning permission was given for the current terminal, and in fact slightly less than actually occurred in 1999. The changes at individual localities, as shown in Table 8 and Table 9, vary. Concentrating on the locations where the levels exceed 54 dB  $L_{Aeq,16h}$  daytime and 48 dB  $L_{Aeq,8h}$  night-time indicates that in 2011 the noise levels are very similar to those in 1999.

### Ground Noise Activity

- 2.30 The Airport layout is such that there are no domestic residential buildings overlooking the aprons and taxiways at Luton. The Main Apron which serves the busy contact stands (those that abut to the terminal buildings) is shielded from local view of the occupants of housing in Luton by the large and near continuous hangars which stretch from the Signature Hangar 125 to the West to Hangars 7 and 9 to the East near Airport Approach Road. This explains why only a relatively small number of complaints have been received, e.g. in 2011 only five complaints were received. Of these, three were related to engine ground runs, one to APU noise and one to taxiing to the Cargo Apron at night.

# Bickerdike Allen Partners

- 2.31 In light of these matters, the predictions made of the current and future ground noise use a number of locations as opposed to a full noise mapping. These have concentrated on the North Apron Area, where new stands closer to the local housing are to be provided. For the contact stands by the Main Apron no change in layout is planned, such that any effect would relate only to the greater use.
- 2.32 In the previous E.S. for the Terminal Expansion (1997), the ground noise impact assessment considered both APU noise and taxiing noise for two locations in Eaton Green Road. This approach has been adopted again here, using similar methodology. Appendix N(6) gives details of the elementary assessments made, and Table 11 summarises the results.

**Table 11: Estimates\* of Current Ground Noise/North Apron Area**

Receptor Locations	Ground Noise Estimates dB L <sub>Aeq,T</sub>			
	Daytime		Night-time	
	APU	Taxi	APU	Taxi
Eaton Green Road / Barnston Close	44-50	47	44-50	41
Eaton Green Road / Chertsey Close	43-46	45	43-47	39

\* These estimates are based on initial stand/taxiway assumptions.

- 2.33 The only non-domestic residential building near to an Apron is the Holiday Inn Hotel on Prentice Way that abuts the business aviation parking area that will become the West Apron. The Hotel was designed for this location, which is about 150m from Taxiway A that serves the Main Apron and so should have adequate insulation against the current levels of ground noise.
- 2.34 The short term baseline measurements indicated contributions from ground noise in the residential area to the North. The closest houses are those abutting to Eaton Green Road and experience a much greater ambient noise level from road traffic than from ground noise, see Table 12. Therefore as found in the last analysis reported in the Development Brief, current ground noise due to general operations is not significant. Some adverse community reaction has been recorded related to engine ground runs.

## Road Access Activity

- 2.35 The Airport is served mainly by the A505 links to the A1 (M) and the M11 to East Anglia, and from the M1 Junction 10 by the East Luton Corridor (ELC). Local access is also provided by the A1081 to Harpenden and St. Albans and the B653 to Harpenden.
- 2.36 The previous E.S. for the Terminal Expansion (1997) identified road links with significant numbers of noise sensitive receptors as Eaton Green Road and the A505

# Bickerdike Allen Partners

Vauxhall Way. These are still the road links where access traffic is closest to local receptors. Both roads have had and currently have significant traffic flows.

- 2.37 URS, the traffic specialist advisers to LLAOL, have recently carried out surveys and analysis of current and future traffic flows. Using this information, the typical noise levels resulting from road traffic at a nominal distance of 10m from the carriageway have been calculated.
- 2.38 Short term noise measurements were made at a few locations in the area to the north of the Airport, see Appendix N(5). These indicated daytime road traffic noise levels of 65-68 dB  $L_{Aeq,T}$  for Eaton Green Road and Crawley Green Road, in line with the predictions.
- 2.39 Table 12 notes the results of predictions of existing typical road traffic noise levels along feeder roads around the airport and nearby main roads that pass through residential areas. Predictions are at 10 metres from the carriageway kerb.

**Table 12: Typical Current (2011) Daytime Road Traffic Noise Levels near Local Roads (Predicted at 10m from nearside kerb)**

Road Segment	Daytime Road Traffic Noise (2011), dB $L_{Aeq,16h}$
<b>Vauxhall Way/ Kimpton Road/ Airport Way</b>	
A1081 Airport Way	64
Airport Way ELC Spur (New)	68
Kimpton Road	67
<b>Vauxhall Way/Eaton Green Rd/Harrowden Road</b>	
A505 Vauxhall Way (N)	69
A505 Vauxhall Way (S)	69
Eaton Green Road	67
<b>Eaton Green Road/Airport Approach</b>	
Eaton Green Road (W)	67
Eaton Green Road (E)	68
Airport Approach (Frank Lester Way)	66
<b>Eaton Green Road/Wigmore Lane</b>	
Wigmore Lane	66
Wigmore Place	55
Eaton Green Road (East of Wigmore Lane)	64
<b>A505 Vauxhall Road/Crawley Green Way</b>	
Crawley Green Way (W)	67
Crawley Green Way (E)	67

- 2.40 Table 12 indicates that for Eaton Green Road and Crawley Green Way, where some dwellings are located close to the roadside, noise levels are of a magnitude likely to give rise to the onset of significant disturbance i.e. >66 dB. For most of the other

# Bickerdike Allen Partners

major roads, such as Vauxhall Way (S), the Airport Approach Roads and Kimpton Road, there are few noise sensitive buildings flanking the roads, or, as is the case for Vauxhall Way (N), dwellings are located farther back from the roadside (typically around 30 metres) where noise levels are lower giving rise to a moderate impact currently.

## 3. CONSTRUCTION NOISE

- 3.1 The development involves five main areas in which major construction activities will be necessary. These areas are generally located away from noise sensitive receptors.
- 3.2 As described in Chapter 3 the first phase of work which is planned to be completed by the end of 2017 will include the new road access and remodelled CTA and short term car park, extension of the long term car park, the extension to the parallel taxiway at the eastern end of the runway, the extension and remodelling of the terminal building, the construction of Pier B and some infill to Pier A. The second phase of work which is planned to be completed by the middle of 2019 will include the extension to the south apron and Taxiway Foxtrot. Finally the third phase of work which is planned to be completed by the middle of 2026 will include the multi-storey car park, the extension to the parallel taxiway at the western end of the runway, the stands on the northern apron, the final infill to Pier A and the first floor retail area in the terminal extension.
- 3.3 Table 13 notes the approximate distances between these main construction areas and the closest noise sensitive receptors, most are over 250m distant. As noted in the previous E.S (1997), for typical road construction works 'less than 20% of the people who live beyond 100m of the construction are seriously bothered by construction' (TRRL Supplementary Report SR 502).

The construction works relate to:

- the modification of the 'new terminal' to improve passenger experience;
- the modification to the aprons;
- the construction of Pier B;
- the two extensions to the taxiway serving the unaltered runway;
- the new Taxiway Foxtrot;
- the construction of a new carriageway to the CTA from the Ibis Hotel roundabout.



# Bickerdike Allen Partners

**Table 13: Construction Noise Elementary Assessments: Separation of Residential Buildings from Construction Sources**

Assessment Locations	Separation (m) of Receptor from			
	New Taxiway	New Apron	Pier B	New Carriageway Works
Somerles Farm	650-700	>1000	>1000	900
Dane Street Farm	350-500	>1000	>1000	>1000
Eaton Green Road/Barnston Close	>1000	250-300	750-800	900
Eaton Green Road/Chertsey Close	>1000	250-350	800	>1000
Eaton Green Road/Wigmore Valley Park Centre	>1000	650-800	850-950	>1000
Holiday Inn Hotel	220-250	550-700	450-550	25-150

- 3.4 The noise receptors considered are the Hotel, the isolated properties to the south of the runway e.g. Somerles Farm, and the residential area north of Eaton Green Road.
- 3.5 The previous major works that included construction of the 'new terminal' was assessed to have minimal noise effects on the residential properties in Eaton Green Road. The current works to the terminal are mainly on the south side of the terminal and so screened by the terminal from view from Eaton Green Road. It therefore can be deduced that no impact would occur due to these modification works.
- 3.6 The modifications to the aprons are restricted to small extensions to the width of the South Apron, and to the eastern side of the East Apron, and creation of new aprons sufficient in size to accommodate four Code C aircraft north of Taxiway E. The latter uses land to the south of Princes Way. On Princes Way is the Airport Executive Park with three large buildings (two storeys high) which will face the new apron. In between this new apron and the residential settlement north of Eaton Green Road are several other industrial/office two storey buildings, such that the view of aircraft on the new apron from residential properties in Eaton Green Road will be restricted.
- 3.7 The construction of Pier B is to take place well within the airport site between non noise sensitive areas, i.e. the East Apron and the Short Term Car Park.
- 3.8 The two extensions to the taxiway are distant from the major residential area north of Eaton Green Road.
- 3.9 The new Taxiway Foxtrot is also distant from that major residential area.
- 3.10 The new road works are to take place between the Medium Term Car Park and the West Apron, which are not noise sensitive areas. It will however include works close to the Holiday Inn Hotel. This Hotel was designed and built to address noise from the

# Bickerdike Allen Partners

Airport, and as such should have adequate sound insulation against the temporary road works, and the taxiway works.

- 3.11 To check whether the works can be carried out without risk of unacceptable construction noise effects, predictions have been made for specific locations, see Appendix N(8).
- 3.12 Representative noise levels associated with construction techniques and plant have been obtained from data in BS 5228 Part 1 2009 and the Defra update. These can be used for predicting noise levels at sensitive receptors during the various stages of construction. Table 14 details typical plant and assumptions for stationary and mobile plant.

# Bickerdike Allen Partners

**Table 14: Typical Construction Plant Noise**

Construction Activity/Plant	A-weighted Sound Pressure Level, dB L <sub>Aeq</sub> at 10 m from Source/Activity
<b>DEMOLITION</b>	
<b>Breaking up concrete</b>	
Breaker mounted on wheeled back hoe	92
Pulveriser mounted on excavator	80
Hand-held pneumatic breaker	83
Hand-held hydraulic breaker	93
<b>Breaking and spreading rubble</b>	
Tracked excavator (44t)	82
Tracked excavator (40t)	86
<b>EARTH WORKS</b>	
Dozer	80
Tracked excavator	74
Articulated dump truck	81
Lorry	80
Roller (rolling fill)	79
Vibratory roller	74
<b>CONSTRUCTION</b>	
Road Planer	82
Trenching (wheeled excavator)	70
Trenching (tracked excavator)	74
Concrete mixer truck	80
Poker vibrator	69
Concrete mixer truck	79
Tracked mobile crane	71
Wheeled mobile telescopic crane	78
<b>PILING</b>	
Hydraulic hammer rig (4 tonnes)	87
Hydraulic jacking piling	68
Large rotary based piling rig	83

- 3.13 Based on the noisiest construction activities tentative conservative assessments have been made of the relevant construction noise levels during the construction process, see Appendix N(8).

# Bickerdike Allen Partners

- 3.14 The levels close to the construction activity (10m distant) range from 70 to 82 dB  $L_{Aeq,T}$ . For this assessment 80 dB has been adopted as the appropriate reference source level. Table 15 gives the calculated daily noise levels at the selected receptor locations.

**Table 15: Construction Noise Assessment: Daily Noise Levels**

Assessment Locations	Approximate Sound Level dB $L_{Aeq,12h}$ due <sup>(1)</sup> to Construction Activities			
	On Site Works/Apron Taxiway		Off Site Works/New Access	
	Typical	Worst	Typical	Worst
Somerles Farm	36	37	23	23
Dane Street Farm	40	43	17	18
Eaton Green Road/Barnston Close	40	42	23	23
Eaton Green Road/Chertsey Close	38	42	21	22
Eaton Green Road/Wigmore Valley Park Centre	33	34	19	19
Holiday Inn Hotel	47	48	53	72

<sup>(1)</sup> Assuming for either works, a typical emission level of 80 dB  $L_{Aeq,12h}$  at 10m, and for the worst case the nearest part of the works, and for the typical case the noise from the more distant centre of the works.

- 3.15 There will also be some demolition activity and for that a typical emission level of 90 dB  $L_{Aeq,12h}$  at 10m can be considered representative. During such activity the noise levels would be 10 dB higher than given for the general construction activity in Table 15. Except for the Holiday Inn Hotel the levels are not significant, all less than 55 dB  $L_{Aeq,12h}$ .
- 3.16 This assessment indicates that the demolition and construction works related to the proposed development can be carried out without exceeding the usual construction noise limits for most locations. The results indicated that most of the receptors will experience a noise level less than 55 dB  $L_{Aeq,12h}$ . The exception is the Holiday Inn Hotel which for some of the new access works will be very close to the works. A Construction Environmental Management Plan will be implemented to ensure works are carried out using the best practicable means to minimise work in line with BS 5228. In developing this consideration will be given to such mitigation measures as quiet methods of construction, the introduction of temporary screening and the creation of respite periods.
- 3.17 No significant construction noise impact is predicted for local residents; some impact at the Holiday Inn Hotel might arise from demolition and construction activities.

# Bickerdike Allen Partners

## 4. FUTURE NOISE (2028)

### Airborne Aircraft Activity

4.1 In the consideration of future noise there is a degree of uncertainty over the modernisation that will occur to the aircraft fleet. The two main manufacturers, Airbus and Boeing, are both developing replacement aircraft types, the A320 NEO and the B737 MAX respectively, to the main types currently operating at Luton. The main airlines at Luton also operate fleets with minimum age, and therefore most of the aircraft flying at Luton in 2011 will not be flying there in 2028.

4.2 In their 2012 full year results statement easyJet discuss their future fleet plans and how they are considering the next generation of short-haul aircraft technology, see below.

*The major airframe suppliers have embarked upon the development of the next generation of short-haul aircraft to take advantage of new engine technology being developed by CFM International (a joint venture between General Electric and Snecma) and Pratt & Whitney. Airbus and Boeing are updating their single aisle aircraft with new engines and various other upgrades whilst Bombardier is producing a completely new 100 to 150 seat family aircraft using the latest systems and production techniques. The new aircraft types, which are planned to enter service over the next six years, promise double digit fuel efficiency improvements which are clearly attractive to easyJet.*

*easyJet is making good progress on its technical and commercial evaluation of the next generation of short-haul aircraft technology. As the evaluation advances further, easyJet will bring a proposal to shareholders which will cover both the next generation of deliveries which are likely to be after 2017 and a plan for the bridging period from 2014 to 2017.*

*easyJet's intention for any new aircraft order is to maximise the economic efficiencies of the fleet and to support further returns-focused capacity growth.*

4.3 It therefore appears that easyJet are planning to purchase the next generation aircraft but there are no details at present. The main analysis of the future aircraft noise has therefore proceeded on the worst case basis that no improvement occurs in the noise characteristics of the aircraft fleets at Luton.

4.4 To explore the effect of fleet modernisation contours have subsequently been produced on the basis of replacement of the narrow body single aisle aircraft, such as replacement of the Airbus A320 by the Airbus A320 NEO and the Boeing 737-800 by Boeing 737 MAX. These re-engined aircraft are designed to be quieter than current types. Similar assumptions to those adopted by the Governments' scientists at CAA-ERCD have been used for the noise from the re-engined aircraft.

## Bickerdike Allen Partners

- 4.5 Given the uncertainty over the degree of modernisation two options have been considered. Part modernisation assumes that 50% of the narrow body single aisle transports are re-engined whereas full modernisation assumes that 100% of the narrow body single aisle transports are re-engined.
- 4.6 Publicity information from one of the engine suppliers for the re-engined aircraft from Airbus and Boeing is included in Appendix N(3) which also records the details of both current and future flying operations at the aerodrome; these details have been used in the noise modelling.
- 4.7 Figure N-02 illustrates the future arrival and departure routes, assuming no change to Airspace or Standard Instrument Departure routes. This assumption has to be made as the NATS work programme, LAMP, on reorganised airspace for southern England is in its infancy, with final implementation not before 2020. No firm proposals for change are yet available. With regard to those closest to the Airport, no major changes are possible and so the noise analysis is appropriate. The Airport is however currently working with the operators to improve where possible one of the western departure routes.
- 4.8 Figure N-08 presents the future daytime noise contours for summer 2028. These contours assume no Airport development and relate to the Airport accommodating 12.4 mppa with 127,000 annual aircraft movements. Figure N-09 presents the night-time contours for this future no-Airport-development case.
- 4.9 Figures N-10 and N-11 present the future daytime and night-time contours for the same year, 2028 for daytime and night-time respectively. These relate to the developed Airport accommodating 18 mppa with 157,000 annual aircraft movements.
- 4.10 Figure N-12 illustrates the potential effect of fleet modernisation on the size of the future daytime contours. Contours shown on Figures N-08, N-09, N-10, N-11, N-13 and N-14 assume no fleet modernisation, a very conservative assumption.
- 4.11 Figure N-13 compares the future daytime contours without fleet modernisation at 57 dB  $L_{Aeq,16h}$  with those experienced in 2011. Figure N-14 presents a similar comparison for night-time noise using the 48 dB  $L_{Aeq,8h}$  parameter.
- 4.12 Figure N-15 compares the future daytime contours with part fleet modernisation at 57 dB  $L_{Aeq,16h}$  with and without the development. Figure N-16 illustrates the same scenarios for night-time. Also shown on these figures are the contours for 2011.
- 4.13 Table 6 and Table 7 summarise the past, current and future areas of the daytime and night-time contours respectively.
- 4.14 Table 8 and Table 9 illustrate the airborne aircraft noise levels for twenty-four local areas during daytime and night-time respectively. Table 16 and Table 17 regard the dwellings and populations within the 2028 contours.

# Bickerdike Allen Partners

- 4.15 The daytime noise impacted areas delineated by the 2028 contours range from the rural area near St Paul's Walden to the east to rural areas north east of Markyate. The contours include most of Breachwood Green and Slip End and parts of South Luton. There are approximately 11,784 people resident in the areas covered by the 57 dB  $L_{Aeq,16h}$  contour. This represents the worst case estimate, as with a part fleet modernisation the population exposure reduces to 10,268.
- 4.16 The area of these worst case daytime contours, see Table 6, are well within the area set by the original Luton Budget (1984) contours and exceed the current Budget (predicted 1999) relevant to LBC planning policy LLA1 by 21%. With part modernisation the daytime contour area meets the current Budget.
- 4.17 The area of the night-time noise impacted areas is greater than those for daytime, see Figures N-08 and N-09, and stretches from Stevenage to South of Flamsted. The area of the night-time contours, Table 7, are well within the area set by the original Luton Budget (1984) contours and the current Budget (1999) relevant to LBC planning policy LLA1 whether fleet modernisation is accounted for or not. There are approximately 25,803 people within the contour area, assuming no fleet modernisation.
- 4.18 Table 16 and Table 17 indicate the number of dwellings and the residential population within the 2028 contours, with and without development. These have been obtained using the CACI database, as used for the 2011 data.

**Table 16: 2028 Baseline: Without Development: Airborne Aircraft Noise (Dwellings/Population Exposed)**

Noise Parameter		Dwellings within		Population within		
		No Mod	Part Mod	No Mod	Part Mod	Full Mod
Daytime, dB $L_{Aeq,16h}$	57-60	2072	1927	4406	4440	2930
	60-63	966	514	2668	1429	1888
	63-66	522	377	1458	1078	27
	66-69	10	5	27	10	2
	69-72	1	0	2	0	0
TOTAL		3571	2823	8561	6957	4847
Night-time, dB $L_{Aeq,8h}$	48-51	3084	2992	7449	7072	5893
	51-54	2443	2066	5399	4376	3829
	54-57	1478	986	3636	2718	1597
	57-60	592	544	1605	1520	853
	60-63	187	10	573	27	10
	63-66	1	1	2	2	0
	66-69	0	0	0	0	0
TOTAL		7785	6599	18664	15715	12182

# Bickerdike Allen Partners

**Table 17: 2028 With Development: Airborne Aircraft Noise  
(Dwellings/Population Exposed)**

Noise Parameter		Dwellings within		Population within		
		No Mod	Part Mod	No Mod	Part Mod	Full Mod
Daytime, dB L <sub>Aeq,16h</sub>	57-60	2392	2546	5505	5473	4335
	60-63	1613	1079	3781	2898	1758
	63-66	593	661	1675	1868	1067
	66-69	287	10	802	27	21
	69-72	7	1	21	2	0
TOTAL		4892	4297	11784	10268	7181
Night-time, dB L <sub>Aeq,8h</sub>	48-51	4911	3062	11738	7208	6695
	51-54	2562	2376	5964	5448	4171
	54-57	2082	1661	4496	3899	2755
	57-60	841	542	2379	1547	1446
	60-63	436	291	1205	817	27
	63-66	7	3	21	6	2
	66-69	0	0	0	0	0
TOTAL		10839	7935	25803	18925	15096

- 4.19 Figure 10 illustrates the effect of the fleet modernisation on the 57 dB L<sub>Aeq,16h</sub> daytime noise contour for 2028. The figure presents contours with development on the basis of no fleet modernisation, part fleet modernisation (and full fleet modernisation. Table 16 and Table 17 illustrate the effect on the numbers of people of fleet modernisation. Whereas without fleet modernisation the population equal to or greater than 57 dB L<sub>Aeq,16h</sub> would be 11,784, with part fleet modernisation the population is estimated as 10,268, with full fleet modernisation the population is estimated as 7,181.
- 4.18 The airborne aircraft noise produces significant impact, with an increase in the area affected both during daytime and night-time, see Figures N-11 and N-12. That is on the conservative assumption of no improvement in aircraft noise performance.
- 4.19 In 2028 the daytime impact as now will be significant. Without the Airport development, on the basis of no fleet modernisation, the population exposed to 63 dB L<sub>Aeq,16h</sub> and above would be greater than now, estimated at 1,487 people. The 57 dB L<sub>Aeq,16h</sub> exposure would occur for 8,561 people. These changes relates to increases of 80% and 27% respectively from the current exposure due to an increase in noise of 1 to 2 dB(A).
- 4.20 With the proposed development in 2028, also on the basis of no fleet modernisation, the population impacted will include about 2,498 exposed to the “moderate annoyance level” (63 dB L<sub>Aeq,16h</sub>), and 11,784 above the “low annoyance level”



# Bickerdike Allen Partners

(57 dB  $L_{Aeq,16h}$ ). These changes relates to increases of 68% and 38% respectively from the exposure in 2028 without the development due to an increase in noise of around 1 dB(A). There are approximately 9,500 people now estimated to be within the 57 dB  $L_{Aeq,16h}$  LLA1 1999 predicted noise contour.

- 4.21 The airborne aircraft noise levels for local areas are summarised in Table 8 and Table 9. These generally show that noise levels in the forecast future are similar to 1999 levels in the daytime, although there are differences in some areas. This is particularly the case for Breachwood Green which is shows a large reduction from the 1999 levels. Considering the night-time situation, significant reductions are again observed for Breachwood Green. For other areas the night noise levels in the forecast future generally show slight reductions when compared to forecast 1999 conditions and slight increases when compared to actual 1999 conditions. These changes are due to the contours varying in size but more significantly being different shapes. This arises due to the change in aircraft mix, in particular the removal of non Chapter 3 compliant aircraft which were relatively noisy on departure.
- 4.22 Table 18 and Table 19 bring together the predicted changes at individual locations without fleet modernisation for the locations where with development the daytime levels exceed 54 dB  $L_{Aeq,16h}$  (Table 18) and the night-time levels exceed 48 dB  $L_{Aeq,8h}$  (Table 19).

**Table 18: London Luton Airport Daytime Airborne Airport Noise at Local Areas: Change in Noise Level due to Development (Without Fleet Modernisation)**

Locations	Change <sup>(1)</sup> in 2028 due to development	Change <sup>(1)</sup> from 2011 to 2028 (with development)
Grove Farm Noise Terminal	+2	+3
Caddington	+1	+3
Park Town, Luton	+2	+3
Frogmore Noise Terminal	+1	+3
Breachwood Green	+1	+3
Slip End	+2	+3
Winch Hill Farm	0	+2
Rush Green	+1	+3
Luton (South East)	+2	+3
Average Increase	1.3	2.9

<sup>(1)</sup> All changes given to nearest decibel

# Bickerdike Allen Partners

**Table 19: London Luton Airport Night-time Airborne Airport Noise at Local Areas: Change in Noise Level due to Development (Without Fleet Modernisation)**

Locations	Change <sup>(1)</sup> in 2028 due to development	Change <sup>(1)</sup> from 2011 to 2028 (with development)
Grove Farm Noise Terminal	+2	+2
Caddington	+1	+1
Park Town, Luton	+1	+3
Frogmore Noise Terminal	+1	+1
Breachwood Green	+1	+1
St Pauls Walden	+1	+1
Slip End	+2	+3
Winch Hill Farm	0	+1
Rush Green	+1	+1
Luton (Wondon End)	+1	+2
Luton (South East)	+2	+2
Average Increase	1.2	1.6

<sup>(1)</sup> All changes given to nearest decibel

- 4.23 Figure N-13 compares the 57 dB  $L_{Aeq,16h}$  daytime contours for 2011 with those for 2028 assuming no fleet modernisation. The contours are similar in shape and show small increases. The increases are quantified for the locations in Table 18 as about 1 dB due to the airport development in 2028, and an increase of about 3 dB between 2011 conditions and those forecast for 2028 with the development.
- 4.24 Figure N-15 compares the 57 dB  $L_{Aeq,16h}$  daytime contours for 2011 with those for 2028 assuming part fleet modernisation. The contours are similar in shape, with those for 2011 and 2028 without development almost identical in many parts. The 2028 with development contours show a small increase. The airborne noise levels for the locations are given in Table 8. As in 2028 any modernisation would affect the fleet both with and without development. Similarly the increase between them will be similar to given above. The increase between 2011 conditions and those forecast for 2028 with the development will however be reduced.
- 4.25 The night-time impact as now will be significant, the change from current conditions is generally small, see Table 19. The increase due to the development is about a decibel. The population impacted will include about 6,300 people exposed to the night-time interim target value of 55 dB  $L_{Aeq,8h}$ , and about 25,800 above the night level of 48 dB  $L_{Aeq,8h}$ . In 2028 without the proposed development there would be about 4,300 people exposed to the night-time interim target value of 55 dB  $L_{Aeq,8h}$ , and about 18,660 above the night level of 48 dB  $L_{Aeq,8h}$ . Currently, 2011, there are about

## Bickerdike Allen Partners

2,800 people exposed to the night-time interim target value of 55 dB  $L_{Aeq,8h}$ , and about 16,350 above the night level of 48 dB  $L_{Aeq,8h}$ . Approximately 33,600 people are now estimated to be within the 48 dB  $L_{Aeq,8h}$  LLA1 1999 predicted noise contour.

- 4.26 In addition to the overall noise contours the SEL analysis given in Appendix N(4) which illustrates the extent of the 90 dB(A) SEL footprint for future aircraft has been used in determining the significance of the noise at night.
- 4.27 In the summer of 2028 there are predicted nightly, on average, 31 arrivals and 28 departures without the proposed development, 38 arrivals and 34 departures with the development. Departures dominated the activity in the early morning period, arrivals dominated for the rest of the night period 23.00-06.00.
- 4.28 Considering the most common situations in the night period 23.00-06.00 of arrivals, the most common aircraft, the Airbus A320, will expose very few people (6 estimated) to significant noise during westerly operations. This aircraft will operate 6 arrivals per night with the development implemented.
- 4.29 When wind conditions are different, easterly, the number of people exposed increases to just under 500 during arrivals of the Airbus A320. The people so exposed are residents of south Luton. This assumes the conservative case that the aircraft has not been replaced by the Airbus A320 NEO, if it is then no people will be exposed to 90 dB(A) SEL during easterly or westerly arrivals.
- 4.30 If the arrival is made by the Airbus A300-600 cargo aircraft, that operates with only one such arrival per night, for westerly operations the population exposed to 90 dB(A) SEL increased to 70; with easterly operation 1971. The latter relates to residents of south Luton and Caddington.
- 4.31 Considering the busiest departure period, 06.00-07.00, the Airbus A319 and A320 aircraft are forecast in the summer of 2028 to perform 10 departures without the development, 14 with the development. On the basis that the 90 dB(A) SEL footprints for the A319 and A320 are similar, with westerly departure about 1091 people would be exposed to 90 dB(A) SEL and above. These are resident in south Luton.
- 4.32 In that busy period, 06.00-07.00, if easterly operations prevail, then for the A320 types, the number of people exposed to 90 dB(A) SEL and above are 397. The Airbus A300 cargo aircraft is forecast to operate occasionally in that early morning period. As now this will expose more people to 90 dB(A) SEL levels. The greatest risk of sleep disturbance arises from the departure of the Airbus A300-600 cargo aircraft on the westerly departure route as this exposes the highest number of people to 90 dB(A) SEL. That would affect people in south Luton and Slip End.

- 4.33 Due to future fleet mix of similar aircraft to now, the number of people who will be exposed to 90 dB(A) SEL will not increase. In fact with the arrival of new quieter types, such as the Airbus A319 NEO, Airbus A320 NEO, Boeing 737 MAX, Bombardier C Series etc. the areas exposed to such levels will decrease. Those areas that remain exposed may however be exposed more frequently due to the greater number of movements.
- 4.34 The airborne aircraft noise due to the proposed development, based on the worst case assumption of no fleet modernisation over the next sixteen years, will result in small increases in noise and growth in the noise impacted areas from the situation without the development. The current planning policy LLA1 relates noise impact to that predicted for 1999. This development will produce more impact (21% in noise impacted area terms) during daytime, and less during night-time. If part fleet modernisation occurs as envisaged, the future impact during daytime would be similar to that predicted for 1999, and a third less during night-time on the basis of noise impacted areas.

### **Ground Aircraft Activity**

- 4.35 In view of the small growth (28% in annual movements) in operations envisaged between now (2011) and the future (2028) scenario without the proposed development, ground noise levels will remain very similar to those experienced in 2011 which do cause any significant disturbance. The forecast growth in traffic assuming a constant aircraft mix indicates an increase in ground noise of 1 dB, an imperceptible increase.
- 4.36 The future 2028 ground noise with the proposed development will be slightly different due to the overall increase in activity and the alteration to aircraft stand provision and usage.
- 4.37 The overall increase in activity relates to the 58% increase in overall aircraft movements (99,299 to 156,840). On the simplified assumption of similar aircraft types in 2011 to 2028, this suggests an overall increase in general ground noise level of about 2 dB  $L_{Aeq,T}$ . Such an increase is not considered significant and would not cause a change in reaction to ground noise from that currently assessed, i.e. no significant disturbance.
- 4.38 As well as this overall increase, the development does include modifications to the area near the North Apron. That is the area of ground noise activity closest to local noise receptors, those in the housing abutting Eaton Green Road.
- 4.39 The modifications in this area include the provision of a new hangar to the north of the Cargo Apron, the subject of a separate planning application. This will provide additional shielding for ground noise sources.

## Bickerdike Allen Partners

- 4.40 Under this application areas to the north of Taxiway E will be brought into mixed use for general aviation, cargo and commercial aviation. These remote parking stands may also be brought into use to facilitate overnight parking of commercial aircraft. The stands would clearly not be the more desirable contact type and would require passengers to be bussed to these three stands. Aircraft leaving these stands would use the same area of Taxiway E for push-back and start-up and so would impede aircraft leaving and arriving at the more important existing contact stands. Their use would be limited and is currently expected to consist of only one arrival per day with one departure on the following day per stand.
- 4.41 To assess the possible noise impact from the expected limited use of these extra parking stands, which locate aircraft closer to residential locations than aircraft on Pier A North Stand or on Taxiway E, ground noise has been assessed and is given in Table 20 below.

**Table 20: Estimates\* of Future Ground Noise/North Apron Area**

Receptor Locations	Ground Noise Estimates dB L <sub>Aeq,T</sub>			
	Daytime		Night-time	
	APU	Taxi	APU	Taxi
Eaton Green Road / Barnston Close	47-53	49	47-53	43
Eaton Green Road / Chertsey Close	48-51	47	48-51	41

\* These estimates are based on initial stand/taxiway assumptions.

- 4.42 The future prediction is strongly affected by the screening arising from the industrial units and other buildings that are located between the North Apron and the housing in Eaton Green Road. These other buildings will be affected by other developments not part of this application related to Ocean Sky and Signature.
- 4.43 The future ground noise will be similar to that experienced today; slight increases are forecast. The change in 2028 due to the development, a 23% increase in activity, implies a 1 dB increase in ground noise. No daytime noise impact from ground noise is foreseen; the night-time ground noise could become significant if screening due to existing buildings is reduced and the new stands north of Taxiway E are used for more than overnight parking.
- 4.44 As mentioned earlier, the past experience with respect to ground noise at Luton has only identified engine ground runs as an occasional disturbance. There is no change related to this development in the location used for such tests. Whether there are more or less tests in the future will depend on whether the increased movements are outweighed by the aircraft becoming ever more reliable. No significant change to the number of tests has been assumed.

# Bickerdike Allen Partners

## Road Access Activity

- 4.45 URS have calculated the future traffic flows on the road network around the Airport. Except for the dualling of the access road from the Holiday Inn Hotel to the Central Terminal Area (CTA), the noise related changes relate to changes in the volume of traffic.
- 4.46 Table 21 notes the results of predictions of typical future daytime road traffic noise levels near local roads. Predictions are presented firstly for the case of no further airport development and just normal growth to 12.4 mppa, and secondly for the case with the proposed airport development, 18 mppa. In both cases, the predictions take into account the additional road traffic likely to arise from completion of the committed development in the area.

# Bickerdike Allen Partners

**Table 21: Typical Future (2028) Daytime Road Traffic Noise Levels near Local Roads (Predicted at 10m from nearside kerb)**

Road Segment	Daytime Road Traffic Noise dB L <sub>Aeq,16h</sub>		
	2028 No Airport Development	2028 With Airport Development (difference)	Increase from 2011 – 2028 Without Development
<b>Vauxhall Way/ Kimpton Road/ Airport Way</b>			
A1081 Airport Way	65	67 (+1.3)	(+0.9)
Airport Way ELC Spur (New)	70	70 (+0.0)	(+0.7)
Kimpton Road	69	69 (+0.5)	(+2.0)
<b>Vauxhall Way/Eaton Green Rd/Harrowden Road</b>			
A505 Vauxhall Way (N)	70	70 (+0.3)	(+1.2)
A505 Vauxhall Way (S)	71	71 (+0.1)	(+1.2)
Eaton Green Road	68	68 (+0.4)	(+1.2)
<b>Eaton Green Road/Airport Approach</b>			
Eaton Green Road (W)	68	68 (+0.4)	(+1.1)
Eaton Green Road (E)	69	69 (+0.5)	(+1.0)
Airport Approach (Frank Lester Way)	67	68 (+1.1)	(+0.8)
<b>Eaton Green Road/Wigmore Lane</b>			
Wigmore Lane	67	68 (+0.4)	(+1.0)
Wigmore Place	56	56 (-0.3)	(+1.2)
Eaton Green Road (East of Wigmore Lane)	65	66 (+0.3)	(+1.1)
<b>A505 Vauxhall Road/Crawley Green Way</b>			
Crawley Green Way (W)	68	68 (+0.0)	(+0.8)
Crawley Green Way (E)	68	68 (+0.0)	(+0.9)

Note: Noise levels have been rounded to the nearest integer.

- 4.47 Comparing the results in Table 21 for the No Development case with the baseline conditions (2011) presented in Table 12, there is about a 1 dB increase over time for most locations, a negligible change. For Kimpton Road, the increases expected in road traffic will give rise to less than a 3 dB change in the future over now, irrespective of whether the airport development proceeds, with a consequential minor impact. There are no residential buildings located close to this section of road.

- 4.48 Comparing the case in the future with the airport development in place, against that assuming no airport development, shows little change in road traffic noise conditions from local roads on average less than 0.5 dB. As a result, there will be negligible noise impact from road traffic on the local community as a result of the proposed airport development.

### **5. COMBINED IMPACTS**

- 5.1 As detailed in section 4 there are three main sources of noise from the operation of the Airport, that due to airborne aircraft noise, ground aircraft activity, and road access activity. Some locations may be affected by a combination of noise from various sources so using the separate impact assessments, the combined impact at locations where several sources are significant has been considered.
- 5.2 To the east of the Airport is a largely rural area with isolated properties and the village of Breechwood Green, which the town of Stevenage around 10 km distant. For this area the only significant source of noise is from airborne aircraft and the impact is as described in Section 4.
- 5.3 To the south of the Airport is a largely rural area with isolated properties. For the area close to the Airport there will be contributions from airborne aircraft and ground aircraft activity. Given the much higher engine thrusts used when the aircraft are departing the airborne aircraft noise, which includes this element, is expected to dominate and so the impact is as described in Section 4.
- 5.4 To the north of the Airport is a residential area bounded on the southern edge by Eaton Green Road. In this area, due to the shielding provided by airport buildings including several hangars, the noise from ground aircraft activity is limited. The main source of noise, particular for the closest properties to the airport is road traffic on Eaton Green Road. The impact is therefore as described for this road in Section 4.
- 5.5 To the west of the Airport the airborne aircraft noise is generally the main source, for example for the residential property in Cutenhoe Road and Ludlow Avenue. The area also includes some of the main road access routes and noise from activity on these will be significant in locations close to them. These locations are however not residential and include industrial units to the east of Luton Airport Parkway Station and a large business park alongside the A1081 Airport Parkway where it passes Lower Kidney Wood. For the residential area the impact is therefore as described in Section 4 for the airborne aircraft activity.



## 6. CURRENT NOISE CONTROL AND MITIGATION

### Planning Conditions

- 6.1 The Airport has for many years taken measures to monitor noise produced by aircraft flying into and out of the Airport, and to manage noise by, in particular, controls on the types of aircraft that may operate in the night period. The operational controls are given in the U.K. AIP, see Appendix N(9).
- 6.2 When planning permission was obtained in 1998 for the current passenger terminal, conditions were placed by the planning authority on noise. These were enacted to ensure the Airport fell in line with the “old Luton Noise Budget”. That Budget was the benchmark for air noise impact referred to in the Bedfordshire County Structure Plan and the Borough of Luton Local Plan. The budget related to the actual noise contour areas and the population enclosed in 1984.
- 6.3 With the permission in 1998 conditions 10 – 13 copied below addressed noise control at the Airport:

*“10. Before the development hereby permitted is commenced details shall be submitted to and approved by the local planning authority of a management scheme to restrict the level of noise generation arising from the night-time use of auxiliary power units on the proposed aircraft stands.*

*11. Before the development hereby permitted is commenced an annual noise control scheme shall be submitted to the local planning authority and the airport consultative committee which sets out proposals relating annual aircraft noise from the airport's operation to the forecast aim and contours for 1999 (16 hours and 8 hours with development), submitted in the London Luton Airport Environmental Statement dated 8<sup>th</sup> September 1997 prepared by Stanger Science and Environment on behalf of London Luton Airport Ltd., and which ensure that in any event, this does not exceed the impact as measured in terms of land area and affected for 1984. The submitted proposals shall include, but shall not be confined to, the following:*

*(I) annually submitted daily movement register information;*

*(II)  $L_{eq}$  noise contours for the preceding and current calendar year and forthcoming calendar year for both the daytime (0600-2200 hours GMT) and night-time (2200-0600 hours GMT) periods;*

*(III) arrangements for the verification of the submitted information.*

*12. Before the development hereby permitted is commenced, a day to day noise control scheme shall be submitted to the local planning authority and the airport consultative committee which sets out the proposals for ensuring that individual aircraft noise impact from the airports operation is reduced as far as is practicable in*

# Bickerdike Allen Partners

*the light of development to facilitate 5 mppa. The submitted proposals shall include, but shall not be confined to, the following:*

*(I) fixed point noise monitoring arrangements and a system of financial incentives to promote quietest operations. This shall include penalties for those creating greater noise than specified at the agreed monitoring locations, and credits for those flying quietly.*

*(II) daytime (0600-2200 hours GMT) noise monitoring reporting procedure;*

*(III) fixed point monitoring target noise levels for assessing individual aircraft noise;*

*(IV) night-time (2200-0600 hours GMT) noise monitoring report procedure;*

*(V) a scheme for encouraging the phasing out of Chapter II aircraft operations ahead of legislation.*

*(VI) arrangements for the verification and periodic review of the submitted information.*

*13. No part of the development hereby permitted shall be occupied or brought into use unless and until the schemes required by condition 11 and 12 of this permission have been formally approved in writing by the local planning authority in consultation with the airport consultative committee and implemented.”*

6.4 Subsequent to the grant of that planning permission submissions were made to the planning authority with regard to ground noise (condition 10) and airborne aircraft noise (conditions 11 and 12). These were approved by LBC, and the resultant annual noise control scheme and day to day noise control schemes have been operated since. These include:

- The installation and operation of a noise and track keeping system
- The setting of daytime and night-time noise limits for individual movements and the fining of aircraft that exceed them
- The production of daytime and night-time airborne aircraft noise contours for the summer period each year
- The production of night-time airborne aircraft noise contours for each quarter of every year
- The operation of a complaints handling service.

6.5 The annual noise control scheme is reported upon in the Annual Monitoring Reports (AMR) which are available on the Airport's web site for recent years. The day to day noise control scheme is reported upon four times per year to the London Luton

# Bickerdike Allen Partners

Airport Consultative Committee (LLACC) and its Noise and Track Sub-Committee. The LLACC deliberations on these matters are reported on the LLACC web site.

- 6.6 A key issue for the Airport is night flying, as discussed below.

## **Night Flying Policy**

- 6.7 A voluntary night jet policy was operated in the period 1994-2002. This included restrictions on the number of jet aircraft, those designed as NN/B which did not meet the ICAO Chapter 3 noise standard.
- 6.8 From 2002 onwards a new Night Noise Policy was put in place, and several reviews have been undertaken. The current Issue 8 is in place to 31<sup>st</sup> March 2015, see Appendix N(10).
- 6.9 The policy now includes;

### **Monitoring:**

- By a specialised noise and track keeping system;
- By determining noise of individual departing aircraft at three fixed locations, Frogmore, Pepsal End and Grove Farm off Markyate Road (South of Slip End);
- By reporting quarterly on the number of night movements;
- By complaint analysis, response, and reporting;
- By Continuous Descent Approach (CDA) reporting;
- By Track Keeping reporting;
- By production of quarterly night noise contours;
- By production of annual night noise contours for the summer period.

### **Managing:**

- By differential landing charges;
- By surcharges if maximum noise levels recorded at the fixed monitoring location exceed 82 dB(A)  $L_{max}$ ;
- By extending a ban on non Chapter 3 aircraft to aircraft with a maximum take off weight of more than 11,600 kg;
- By prohibiting flying training between 20:00-08:00 hours;
- By operating a scheduling ban on aircraft rated as QC4/QC8/QC16 between 23:00-05:59, Monday to Saturday, and 23:00-06:59 on Sundays;
- By not permitting engine ground runs in period 23:00-05:59 on week days, and 23:00-06:59 on Saturdays, Sundays and local Public Holidays.

## Noise Action Plan

- 6.11 The Airport prepared a Noise Action Plan (NAP) in accordance with the Environmental Noise (England) Regulations 2006 and after extensive stakeholder and public consultation submitted it to Defra and DoT for approval. Recently, the NAP has been approved and published on the Airport's web site.
- 6.12 The NAP quantifies the noise arising from airborne aircraft using Luton Airport for 2006 by use of noise contours and tables delineating the population and dwellings within the specific annual contours specified by Defra.
- 6.13 As required by the Environmental Noise (England) Regulation 2006 the Airport has repeated the Strategic Noise Mapping on which the NAP was based using the movements for 2011 as opposed to 2006. These later contours are included in Appendix N(3) as well as new contours that would arise in 2028 with the development sought here implemented.
- 6.14 Appendix N(11) contains the NAP which on pages 25 to 27 gives a table of the existing noise control measures and identifying the new measures arising from the consultation over the draft NAP. These 55 measures have been approved by Defra for Luton Airport. They are designed to manage noise issues and effects arising from aircraft departing from and arriving at Luton Airport, and so support the Government's aim – set out in the ATWP – to limit and where possible reduce the number of people in the U.K. significantly affected by aircraft noise.
- 6.15 The approval of the NAP by Defra and DfT indicates acknowledgment that Luton has sufficient noise controls in place, controls fit for purpose for the current impacts. The current and future controls are considered further in Section 7.
- 6.16 With regard to schools the NAP identifies a total of five that were exposed to a daytime level of at least 54 dB  $L_{Aeq,16h}$  although three of these are exposed to less than 57 dB  $L_{Aeq,16h}$ . The most exposed school was subject to between 63 and 66 dB  $L_{Aeq,16h}$ . This school was therefore exposed to a noise level where the Government, as noted in the ATWP and the dAPF, would expect the airport to offer a noise compensation.
- 6.17 Action No. 30 of the Luton NAP is to implement a noise insulation scheme for non-residential noise sensitive buildings commencing in 2013. This scheme will review the latest noise assessment and work to introduce additional mitigation where recommended by Government. As a starting point the latest daytime noise contours for the summer period will be reviewed and the non-residential noise sensitive buildings within the 63 dB  $L_{Aeq,16h}$  contour identified. These will then be contacted with the intention of jointly developing additional mitigation against the aircraft noise. This development could involve onsite testing in addition to predictions.

# Bickerdike Allen Partners

## 7. FUTURE NOISE CONTROL AND MITIGATION

- 7.1 Before considering future controls it is useful to summarise (see Table 22) the predicted impacts for daytime and night-time.

**Table 22: Airborne Aircraft Noise: Dwelling Exposures (Now and Future)**

Year		Estimated Dwellings Exposed	
		Daytime >57 dB L <sub>Aeq,16h</sub>	Night-time > 48 dB L <sub>Aeq,8h</sub>
1999 Predicted (5 mppa)		4,017	14,006
2011 Actual (9.6 mppa)		2,688	6,832
2028 No Development (12.4 mppa)		3,720	7,880
2028 With Development (18 mppa)	Without Fleet Modernisation	4,892	10,839
	With Part Fleet Modernisation	4,297	7,935

- 7.2 The proposed development results in more aircraft movements forecast to be made by similar aircraft. If these aircraft are not replaced by similar size aircraft with new quieter engines (LEAP-1A to C, PW Geared Turbofan) in the period as the Airport provides an increase from 9 to 18 mppa by 2028, then the noise around the Airport will increase.
- 7.3 The Airport has recently prepared a Noise Action Plan for the period 2010-2015. This Noise Action Plan was formally approved by the Secretary of State for Transport and the Secretary of State for Environment, Food and Rural Affairs, and published in January 2012.
- 7.4 The Airport has now proposed in response to the proposed development which focuses on making best use of existing capacity to supplement the 55 action items of the Noise Action Plan with seven new initiatives. These address the amount of activity at night, the noisiness of individual aircraft, the routes flown by individual movements, and mitigation for residential properties. They have been developed following the responses to the consultation on the proposed development.
- 7.5 To control the amount of activity at night there will firstly be a restriction on the number of aircraft movements. Specifically the annual number in the period 23.30 – 06.00 will be limited to 10,200. Furthermore the airport will introduce the Government's Quota Count (QC) system, and so have a similar system to ten other UK airports and one similar to that of Luton's neighbouring airport London Stansted. This will have an annual quota count budget of 5,000 for the period 23.30 – 06.00. As

# Bickerdike Allen Partners

part of this quota count system there will be a ban on operations by aircraft that have a quota count of more than 2 at night (23.30 – 06.00).

- 7.6 For the daytime period airlines will continue to be incentivised to operate aircraft quietly by fining those that cause departure noise levels at the Airport's monitors above set limits. The daytime limits will be progressively reduced from the current value of 94 dB(A) to 85 dB(A) from 1 January 2013, 82 dB(A) from 1 January 2015 and 80 dB(A) from 1 January 2020. The night-time limit has already been recently reduced to 82 dB(A) and a further reduction to 80 dB(A) is proposed. The fine for infringement will be in line with the published levels in the AMR which is up to 400% of the landing fee during the day and up to 600% at night. This will be paid into the Community Fund.
- 7.7 To optimise the benefit of Noise Preferential Routes, the initiatives will reduce the incidence of aircraft diverging from the NPR's by increasing the minimum height they must attain on it, and fining aircraft that fly outside the NPR's from next year. Infringements will incur a penalty of £750 during the day or £1000 at night. The fines will be paid into the Community Fund.
- 7.8 The mitigation of the residual noise is to be achieved as in the recent past at Luton by operation of a noise insulation grants scheme. The new scheme, towards which the Airport will contribute up to £100,000 per annum, is to be managed by LLACC. The regular information already provided by the Airport will be utilised in determining where the mitigation should be directed. The mitigation measures normally comprise the installation of acoustically-enhanced glazing and attenuated ventilators. In addition the Airport will continue to pay £50,000 per annum to its Community Fund which will be independently managed in accordance with existing arrangements.
- 7.9 These initiatives supplement the 55 action items of the approved Noise Action Plan; those items include: -
- Monitoring and reporting based on a state of the art noise and track keeping system, with open access via TraVis, and detailed computer predictions, all reported annually in the AMR and regularly to LLACC.
  - Regular noise impact assessment using contours and reports from the fixed monitors, all reviewed annually.
  - Policing and fines for noisy aircraft day and night and aircraft flying off track.
  - Monitoring of Continuous Decent Approaches (CDA).
  - Action on better departure routes, better track keeping.
  - Action to encourage the voluntary phase out of the noisiest aircraft.
  - Mitigation by a noise insulation scheme.

- 7.10 With these additional measures the Airport's programme includes an appropriate range of controls, incentives, and mitigation measures. These are in line with the Government's latest thinking in their Draft Aviation Policy Framework July 2012.

## **8. RESIDUAL IMPACTS**

- 8.1 The current level of airborne aircraft noise presents a significant adverse impact during the day and night. The level of airborne aircraft noise will remain significant with the proposed development. There are already substantial mitigation measures in place to control airborne noise reducing the residual noise impact. These are detailed above. For the most exposed properties the impact will be further mitigated by the new sound insulation scheme.
- 8.2 The current level of aircraft ground noise does not result in a significant adverse impact during the day and night. Some limited adverse community reaction has been recorded related to engine ground runs which are already subject to noise mitigation measures described above. The proposed development is unlikely to result in a significant change in ground noise level and therefore no significant residual noise impact is anticipated.
- 8.3 The current level of road traffic noise results in a significant adverse impact. The level of road traffic noise is not predicted to increase significantly with the proposed development as a result there will be only a negligible noise impact.
- 8.4 No significant adverse noise impact is predicted for the temporary construction works for most receivers. A short term significant adverse impact at the Holiday Inn Hotel may arise from demolition and construction activities close to the hotel. This on-site hotel will have been designed with sufficient noise mitigation measures to protect guests against aircraft noise. Further to this a Construction Environmental Management Plan will be implemented to mitigate construction noise levels. There remains however the possibility of a residual temporary significant noise impact at the hotel.

## **9. SUMMARY AND CONCLUSIONS**

- 9.1 This report has been prepared by Bickerdike Allen Partners and considers the noise impact of the proposed development at this long established aerodrome.
- 9.2 With respect to noise emission the proposed development may increase noise in certain areas due mainly to increased aircraft movements. The development retains the current runway unaltered, and is envisaged to accommodate aircraft of similar type to those currently operated. No new departure or arrival routes arise from this development.

# Bickerdike Allen Partners

- 9.3 This report addresses the following noise emissions from the airport:
- Airborne aircraft noise
  - Ground noise
  - Road access noise
  - Construction noise
- 9.4 This development has been assessed using the current numerical policies given in the ATWP, dAPF, and the principles delineated in the NPPF and NPSE.
- 9.5 The current airborne aircraft noise produces significant noise impact during both daytime and night-time periods. The current level of noise is less than forecast when planning permission was given for the current terminal, and less than actually occurred in 1999. The noise impacted areas have been so exposed for many years.
- 9.6 The Airport layout is such that there are no residential buildings overlooking the aprons and taxiways at Luton. The Main Apron which serves the busy contact stands (those that abut to the terminal buildings) is shielded from local view of the occupants of housing in Luton by the large and near continuous hangars which stretch from the Signature Hangar 125 to the West to Hangars 7 and 9 to the East near Airport Approach Road. This explains why only a relatively small number of complaints concerning ground noise have been received, e.g. in 2011 only five complaints were received.
- 9.7 Short term baseline measurements indicated contributions from ground noise in the residential area to the North. The closest houses are those abutting to Eaton Green Road and experience an ambient level much greater from road traffic than from ground noise. Therefore as found in the last analysis reported in the Development Brief, current ground noise is not significant.
- 9.8 For Eaton Green Road and Crawley Green Way, where dwellings are located close to the roadside, current road traffic noise levels are of a magnitude likely to give rise to the onset of significant disturbance. For most of the other major roads, such as Vauxhall Way (S), the Airport Approach Roads and Kimpton Road, there are few noise sensitive buildings flanking the roads, or, as is the case for Vauxhall Way (N), dwellings are located farther back from the roadside (typically around 30 metres) where noise levels are lower giving rise to a moderate impact currently.
- 9.9 The development involves several areas in which major construction activities will be necessary. These areas are generally located well away from noise sensitive receptors.
- 9.10 This assessment indicates that the construction works related to the proposed development can be carried out without exceeding the usual construction noise limits for most locations. A Construction Environmental Management Plan will be



## Bickerdike Allen Partners

implemented to ensure works are carried out as quietly as practicable, in accordance with BS 5228.

- 9.11 No significant construction noise impact is predicted for local residents; some impact at the Holiday Inn Hotel might arise from demolition and construction activities.
- 9.12 Taking the conservative view that aircraft noise characteristics do not improve over the next sixteen years, contrary to forecasts by the manufacturers, the future daytime impact as now will be significant, with the proposed development the change from current conditions is generally about 3 dB. The population impacted will include about 2,500 exposed to the “moderate annoyance level” (63 dB  $L_{Aeq,16h}$ ), and 11,784 above the “low annoyance level” (57 dB  $L_{Aeq,16h}$ ). This compares with about 1,500 exposed to the “moderate annoyance level” (63 dB  $L_{Aeq,16h}$ ), and 8,561 above the “low annoyance level” (57 dB  $L_{Aeq,16h}$ ) in the future if the development does not occur. Currently, 2011, there are 823 people exposed to the “moderate annoyance level” (63 dB  $L_{Aeq,16h}$ ), and 6,726 above the “low annoyance level” (57 dB  $L_{Aeq,16h}$ ). Approximately 9,500 people are now estimated to be within the 57 dB  $L_{Aeq,16h}$  LLA1 1999 predicted noise contour.
- 9.13 The night-time impact as now will be significant, the change from current conditions is generally around 2 dB. In 2028 with the proposed development and no fleet modernisation the population impacted will include about 6,300 people exposed to the night-time interim target value of 55 dB  $L_{Aeq,8h}$ , and about 25,800 above the night level of 48 dB  $L_{Aeq,8h}$ . In 2028 without the proposed development there would be about 4,300 people exposed to the night-time interim target value of 55 dB  $L_{Aeq,8h}$ , and about 18,660 above the night level of 48 dB  $L_{Aeq,8h}$ . Currently, 2011, there are about 2,800 people exposed to the night-time interim target value of 55 dB  $L_{Aeq,8h}$ , and about 16,350 above the night level of 48 dB  $L_{Aeq,8h}$ . Approximately 33,600 people are now estimated to be within the 48 dB  $L_{Aeq,8h}$  LLA1 1999 predicted noise contour.
- 9.14 The airborne aircraft noise due to the proposed development, based on the worst case assumption of no fleet modernisation over the next sixteen years, will result in small increases in noise and growth in the noise impacted areas from current (2011) circumstances. The current planning policy LLA1 relates noise impact to that predicted for 1999. This development will produce more impact (21% in noise impacted area terms) during daytime, and less during night-time. If fleet modernisation occurs as envisaged, the future impact during daytime would be similar to that predicted for the 1999 development, and a third less during night-time on the basis of noise impacted areas.
- 9.15 In 2028, the effect of the development will be small increases in daytime noise, around 1 dB  $L_{Aeq,16h}$  and in night-time noise of also about 1 dB  $L_{Aeq,8h}$  for the most exposed locations. The night-time activity during the summer months is forecast to

## Bickerdike Allen Partners

increase from approximately 48 operations now to 59 in 2028 without the proposed development, 72 with the development.

- 9.16 The current level of aircraft ground noise does not result in a significant adverse impact during the day and night. The proposed development is unlikely to result in a significant change in ground noise impact.
- 9.17 Comparing the case in the future with the airport development in place, against that in the future assuming no airport development, shows little change in road traffic noise conditions from local roads. As a result, there will be negligible noise impact from road traffic on the local community as a result of the proposed airport development.
- 9.18 The Airport has for many years taken measures to monitor noise produced by aircraft flying into and out of the Airport, and to manage noise by, in particular, controls on the types of aircraft that may operate in the night period.
- 9.19 The Airport prepared a Noise Action Plan (NAP) in accordance with the Environmental Noise (England) Regulations 2006 and after extensive stakeholder and public consultation submitted it to Defra and DoT for approval. Recently, the NAP has been approved and published on the Airport's web site. The approval of the NAP indicates acknowledgment that Luton has sufficient noise controls in place, controls fit for purpose for the current impacts.
- 9.20 The Airport's Noise Action Plan, which sets out current and proposed mitigation measures, will be updated periodically and not less than every five years in accordance with current Government legislation.
- 9.21 The Airport has now proposed in response to the proposed development which focuses on making best use of existing capacity to supplement the 55 action items of the Noise Action Plan with seven new initiatives. These address the noisiness of individual aircraft by banning at night the noisier aircraft, QC 4 and above, and incentivising airlines to operate aircraft quietly by fining those that cause departure noise levels at the Airport's monitors above set limits for night-time and daytime. To optimise the benefit of Noise Preferential Routes, the initiatives will reduce the incidence of aircraft diverging from the NPR's and fine aircraft that fly outside the NPR's from next year.
- 9.22 The control of night noise is to be improved by adopting the Government's Quota Count (QC) system, so having a similar system to ten other UK airports and similar to that of Luton's neighbouring airport London Stansted.
- 9.23 The mitigation of the residual noise is to be achieved as in the recent past at Luton by operation of a noise insulation grants scheme. A scheme for non-residential buildings is to commence in 2013 as described in the Airport's Noise Action Plan, and a second scheme for residential properties is proposed to accompany the development.

- 9.24 The Airport's programme includes an appropriate range of the controls, incentives, and mitigation measures. These are in line with the Governments latest thinking in their Draft Aviation Policy Framework July 2012.