

London Biggin Hill Airport

Noise Action Plan Review: Final

Report 15/0009/R2

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London Borough of Bromley

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Attachments

Glossary of Acoustic Terms

Schedule 15/0009/SCH1/Rev2

NAP progress against noise control recommendations

Schedule 15/0009/SCH2

Operating hours at Biggin Hill Airport



1 Introduction

- 1.1 London Biggin Hill Airport Ltd. (LBHA) have applied to alter the permitted hours of operation allowable under the terms of the 1991 lease with the London Borough of Bromley (LBB). They wish to be able to accommodate flights earlier in the morning and later in the evening on all days of the week.
- 1.2 Accompanying the application was a draft Noise Action Plan, prepared by Bickerdike Allen Partners (BAP) as document 7597342v1, setting out a number of measures that will be implemented at the Airport in order to control and contain noise. Cole Jarman Report 15/0009/R1//Rev 2 dated 17 March 2015 reviewed the content of the draft NAP and commented on the benefits, adequacy and potential shortcomings of what is being proposed.
- 1.3 Resulting from this assessment, the report set out a series of conditions, controls and obligations which it was recommended are imposed on the Airport in order to satisfactorily control noise emission if the lease modification is agreed.
- 1.4 Partly relying on the content of the report, the Executive Committee determined in March 2015 to approve the application to vary the lease subject to a number of detailed recommendations concerning aircraft noise control being adopted and implemented by LBHA. Since that time, detailed technical discussions have been held between LBAH and LBB and a number of revisions to the NAP have been submitted and considered.
- 1.5 This report sets out our assessment of the Final version of the NAP, dated xxx, and determines whether the noise control provisions and technical recommendations made in our first report can be considered satisfied.

2 Noise Action Plan: Rationale

2.1 **Obligation on LBHA**

- 2.1.1 The Environmental Noise (England) Regulations 2006 (as amended) place a duty on airport operators to produce Noise Action Plans where they are obliged to produce strategic noise maps under EU Directive 2002/49/EC. It applies to civil airports having more than 50,000 movements per year, excluding those purely for training or light aircraft
- 2.1.2 LBHA does not fall into this category at present nor is it expected to in the forecast future: therefore it is not obliged to prepare a NAP under the Regulations.
- 2.1.3 However, LBHA is applying for a variation to the terms of its Lease and that variation, if approved, is expected to lead to an increase in aircraft noise levels at certain times of the day, to the detriment of people living in affected areas. In order to consider granting that variation, LBB, as the Landlord, would expect LBHA to offer certain measures, by way of compensation or mitigation, to offset the increased noise impact during the extended hours. LBHA have offered a NAP as a means of specifying the additional noise control measures they propose to employ.



- 2.1.4 If a NAP was not being proposed, the necessary compensation and mitigation measures would need to be set out in an alternative manner. The precise manner is not stipulated by any current Regulations nor by the Lease, but nonetheless suitable proposals would need to be submitted and approved.
- 2.1.5 A NAP is a convenient means of defining the appropriate noise control and mitigation since clear guidance is available on the process to be adopted in its formulation and many airports in the UK have produced and regularly update Noise Action Plans.
- 2.1.6 Therefore, while LBHA are not obliged by Regulation to submit and agree a NAP with LBB, the process has become an intrinsic and necessary part of the application to vary the Lease. Only if the NAP satisfies the technical noise control and mitigation requirements deemed necessary to offset the extended hours noise impact, would a variation to the Lease be considered.

2.2 Method of Assessment

- 2.2.1 If the noise control and mitigation provisions of the NAP outweigh or balance the disbenefits of additional aircraft noise early in the morning or late in the evening, then technical objections on noise grounds to the sought Lease variation are removed. In coming to a view on whether this is likely to be achieved, above all a *reasonable* approach must be used: the test of reasonableness is an important gauge of whether the application to vary the Lease is being dealt with appropriately by LBB.
- 2.2.2 So far as reasonableness is concerned in relation to technical noise issues, we are bound to consider the potential noise impacts by reference to Government policy, accepted published guidance and noise control and mitigation practices that are adopted at other UK airports. Where LBHA proposals are consistent with best practice used at other such airports, this is indicative of a positive approach being proposed. It is questionable whether it would be reasonable to seek a greater degree of commitment.

2.3 Scope of NAP

- 2.3.1 So far as the application to vary the Lease is concerned, the primary objective of the NAP should be to indicate how noise associated with operations during the sought additional hours will be controlled and mitigated and how any residual impacts can be compensated.
- 2.3.2 It is a fact, however, that there is currently no systematic monitoring of aircraft operations that are already permitted under the terms of the existing Lease. There is no means of knowing exactly how much noise is generated by any individual arrival or departure at the Airport, and there is no means of knowing how closely aircraft adhere to the published NPRs (Noise Preferential Routes).
- 2.3.3 One consequence of this is that the large number of complaints about aircraft noise and track keeping that have been generated since the application to vary the Lease was made cannot easily be investigated. Queries as to the type of aircraft involved, the area overflown and whether it complied with the Lease noise limits cannot easily be answered. As part of the discussion on what constitutes a suitable NAP for Biggin Hill, means of addressing these shortcomings needs to be included.



2.3.4 Table T1 below sets out what are perceived to be the significant technical noise issues at Biggin Hill Airport, whether associated with current permitted operations or expected if the permitted hours are altered, and how they are addressed by the NAP.

Category	Noise Issue	NAP Proposal
Varied Lease	Early morning noise levels	Defined noise envelope for 30 minute movements not to be exceeded Maximum departure noise level limited to specific value Properties at risk of increased awakening qualify for enhanced glazing to bedrooms
	Late evening noise levels	Defined noise envelope for 30 minute movements not to be exceeded.
Existing Lease	Daytime noise levels	Defined noise envelope for 16 hour movements not to be exceeded
	Permissible noise levels	NAP commits to absolute future noise level contour being no more than 50% of that set out in current UDP
	Monitoring	NAP commits to the installation and operation of a comprehensive noise monitoring and track keeping system
	Noise control	Limits on noise generated by individual aircraft will be set and system of fines imposed for violation Code of practice to minimise noise from all operations to be imposed
	Track keeping control	System of fines to be imposed for off track flying GPS based runway guidance system to be installed Seeking to maintain aircraft on tracks that keep them as high as possible over noise sensitive areas Seeking to establish a controlled 03 instrument approach flight path

T1 Noise issues addressed by the Noise action Plan



2.3.5 It can be seen that the NAP seeks to address significant technical noise issues at Biggin Hill irrespective of whether they are attributable to the sought variation in hours. This means that comprehensive monitoring of the future noise climate can be undertaken permitting a degree of control and transparency of operations that has hitherto been missing.

2.4 Timescale

2.4.1 The original version of the NAP provided details of the noise contours for the level of traffic expected in 2025. Subsequent versions of the NAP attempted to include more detailed information on the forecast level of activity through to the year 2030.

2.4.2 On the one hand, providing details of the expected noise impacts over a longer period of time gives the sense of greater certainty as to what the future conditions will be like. On the other hand, LBHA identified that forecasting so far into the future was inherently unreliable and as a result they sought to apply a significant 'factor of safety' in the forecast numbers. A consequence of this was that the noise envelopes that they felt able to commit to were larger than those set out in the original NAP.

2.4.3 On discussion, LBHA felt they would be more confident to commit to forecasts over a 5 year period (to 2020) than a fifteen year period (to 2030), and we therefore agreed the following approach to the commitments set out in the NAP:

- Forecasts of aircraft types and numbers would only be provided for a 5 year period, and would be updated every 5 years in accordance with the review timescale agreed for the NAP.
- LBHA would use reasonable endeavours to control noise from operations during the 5 year period so that none of the noise envelopes (daytime, early morning or evening) or noise footprints (90dBA SEL) contained in the NAP are exceeded.
- LBHA commit to future daytime noise level contour noise being greater in extent than 50% of the UDP daytime noise contour.

2.4.4 We are content that this gives suitable technical controls on noise over a suitable period. In the event that concerns regarding the implementation of the NAP or the rigour of applying the necessary controls are raised during the initial 5 year period, this will significantly influence the nature of the negotiation to be had on the revision to the NAP for the next period.

3 Recommendations

3.1 Status of Recommendations

3.1.1 Attached Schedule 15/0009/R2/SCH1 tabulates the summary recommendations made in our report R1 dated March 2015. The status of each recommendation resulting from the latest version of the NAP is identified.

3.1.2 Many of the recommendation we made relate to noise control measures that LBHA themselves proposed, simply seeking clarification that they would be implemented and detail of the



methods to be employed. In many cases, the adoption of the controls is accepted in principle, but further information needs to be prepared by LBAH and submitted for approval by LBB within an appropriate timescale.

3.2 **Timing for Implementation of the Recommendations**

The following guidance is offered in respect of the timescales appropriate for the recommendations set out in Schedule 15/0009/Sch1/Rev1. These need to be discussed and agreed with LBHA to ensure that all practical matters are properly considered.

Prior to Acceptance of the NAP

Recommendations 1 to 6 all require action and agreement between LBHA and LBB prior to final acceptance and sign-off of the NAP. In principle this is achieved.

Recommendations 7 and 18 also require action and agreement between LBHA and LBB prior to final acceptance and sign-off of the NAP. Further discussion is required to determine whether these remain open or can be closed.

Prior to Implementation of Change of Hours Operations

Recommendations 8, 14, 15 and 17 shall be implemented before LBHA is permitted to operate in the altered hours. So far as recommendation 17 is concerned, the procurement and installation of the NMTK system shall be completed prior to any change of hours operations, and thereafter a period of 3 months shall be agreed for the commissioning, calibration and development of suitable monitoring procedures.

Within 6 Months of Change of Hours

Recommendations 9, 10, 11, and 15 shall be completed within 6 months of the commencement of modified hours operations, to the satisfaction of LBB.

As Soon as Reasonably Practical

Recommendations 12, 13 and 16 all require agreement between LBHA and statutory bodies such as NATS. LBHA shall therefore use all reasonable endeavours to secure the necessary agreements as soon as reasonably practical.

4 Control of Noise

4.1 **Operating Hours**

- 4.1.1 Attached Schedule 15/0009/SCH2 sets out the chronology of the change in operation hours at Biggin Hill Airport.
- 4.1.2 LBHA initially sought changes to the operating hours which were considered by us in Report 15/0009/R1//Rev 2: we recommended a reduction in the additional hours. The Executive



Committee chose not to adopt our recommendation but considered that a further reduction in the permitted hours on Saturdays would be appropriate.

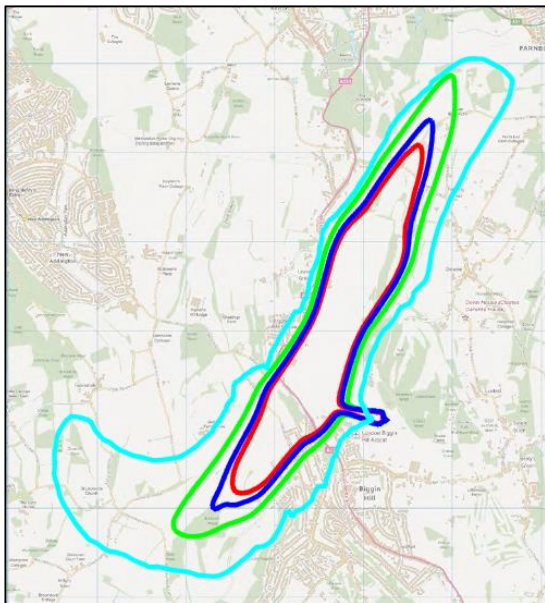
4.1.3 LBHA have accepted the hours adopted by the Executive Committee.

4.2 Recommended Noise Limits

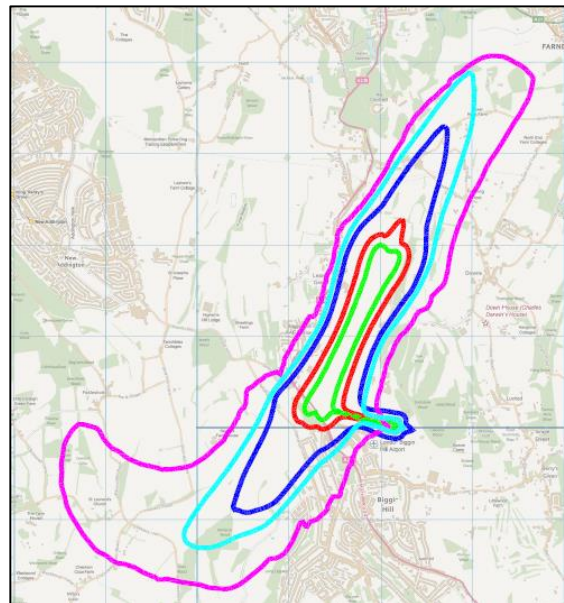
Daytime Noise Envelope

4.2.1 We recommended that operations at the Airport should be controlled such that the 57dB $L_{Aeq,16h}$ contour originally indicated for 2030 be treated as a *noise envelope*, such that the total area it encompasses is not exceeded at any time between grant of the Lease variation and the end of 2030.

4.2.2 In the final version of the NAP LBHA have undertaken to use reasonable endeavours not to exceed a 57dB $L_{Aeq,16h}$ noise envelope that has been estimated for operations in 2020. They have additionally undertaken to remain within a noise envelope equivalent to 50% of the current UDP contour area.



NAP V1: March 2015



NAP Final: August

4.2.3 Unfortunately the colour scheme for these contours is inconsistent from one version of the NAP to another, but comparing the two figures above:

- The UDP contour (cyan in NAP V1, magenta in NAP Final) can be clearly seen and are, as expected, identical in shape and extent.
- The 50% UDP contour (green in NAP V1, cyan in NAP Final) can be clearly seen and are, as expected, identical in shape and extent.
- The 57dB $L_{Aeq,16h}$ daytime noise envelope (blue in both figures) has very slightly altered in shape but is virtually identical in terms of extent and areas affected.

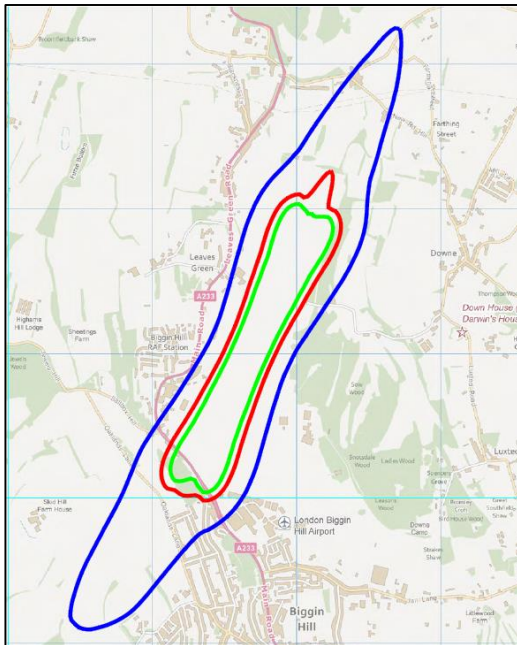


4.2.4 For these reasons, we consider this recommendation to be fully adopted.

Night time Noise Envelope

4.2.5 We recommended that operations between the hours of 06h30 and 07h00 at the Airport be controlled such that the 57dB $L_{Aeq,30m}$ contour originally indicated for 2030 be treated as a *noise envelope*, such that the total area it encompasses is not exceeded at any time between grant of the Lease variation and the end of 2030.

4.2.6 In the final version of the NAP LBHA have undertaken to use reasonable endeavours not to exceed a 57dB $L_{Aeq,30m}$ noise envelope that has been estimated for operations in 2020.



NAP V1: March 2015



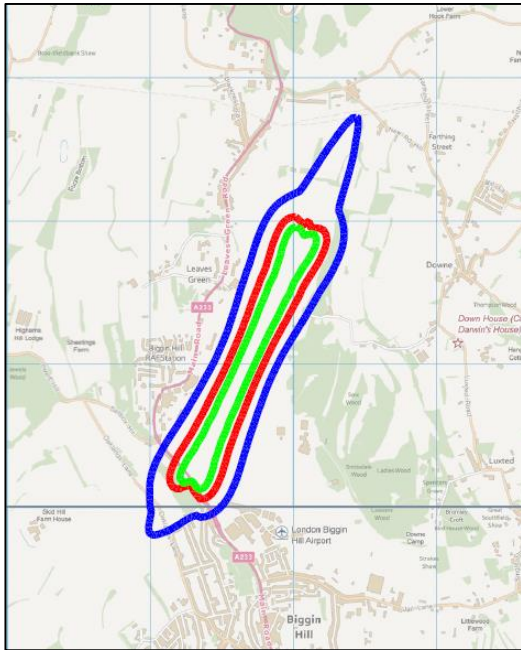
NAP Final: August

4.2.7 It can be seen that the NAP Final version contains a noise envelope that is slightly smaller than that prepared for NAP V1, indicating a tighter degree of control than originally indicated. For this reason, we consider this recommendation to be fully adopted.

Evening Period Noise Envelope

4.2.8 We recommended that operations between the hours of 21h00 and 23h00 on weekdays and between 20h00 and 23h00 on weekends and bank holidays at the Airport be controlled such that the 57dB $L_{Aeq,30m}$ contour yet to be defined for 2030 be treated as a *noise envelope*, such that the total area it encompasses is not exceeded at any time between grant of the Lease variation and the end of 2030.

4.2.9 In the final version of the NAP LBHA have undertaken to use reasonable endeavours not to exceed a 57dB $L_{Aeq,ih}$ noise envelope that has been estimated for late evening period (22h00 to 23h00) operations in 2020.



NAP Final: August 2015

4.2.10 No comparison can be made between the above noise envelope and that prepared for NAP V1, as there was none. However, the limited extent of the 1 hour noise contour as indicated fully reflect an aggregate operation rate of not more than 3 movements in the 22h00 to 23h00 period on any given day. For this reason, we consider this recommendation to be fully adopted.

Early Morning Departures and Arrivals

4.2.11 We recommended that no aircraft departing the Airport between the hours of 06h30 and 07h00 shall generate higher noise levels or give rise to a larger 90dBA SEL footprint than that indicated for a particular aircraft type (Learjet 35).

4.2.12 We also recommended that no aircraft arriving at the Airport between the hours of 06h30 and 07h00 shall generate higher noise levels or give rise to a larger 90dBA SEL footprint than those shown for R21 arrivals for either of aircraft type Learjet 45 or Cessna 560XL. Although only a small percentage (6%) of arrivals are expected on R03, they shall only be permitted by aircraft that do not generate higher noise levels or give rise to a larger 90dBA SEL footprint than was indicated for these aircraft types.

4.2.13 In the final version of the NAP LBHA have committed to allow only ICAO Chapter 4 compliant aircraft to operate before 07h00. They have also undertaken to use reasonable endeavours to ensure that these aircraft operate within a maximum noise level commensurate with the noise characteristics of the Learjet 35 or comparable aircraft. It should be noted that the take-off noise level limit this implies between 06h30 and 07h00 is approximately 6dB lower at all flyover locations than that permitted by the limits set out in the Lease.

4.2.14 For this reason, we consider this recommendation to be fully adopted.



4.3 Mitigation: Residential Sound Insulation Scheme

- 4.3.1 We recommended that a grant for sound insulation enhancement to bedroom windows shall be made to those residences at which a noise level in excess of 90dBA SEL occurs at an annual average frequency of once or greater during the early morning period of (06h30 to 07h00).
- 4.3.2 LBHA have undertaken to put in place a sound insulation scheme for certain residential properties in order to mitigate the effects of aircraft noise during the period 06h30 to 07h00 (Early Morning Period). The details of the grants scheme will be in line with UK practice and agreed with LBB prior to implementation.
- 4.3.3 A financial contribution of up to £1,500 towards double glazing of bedrooms within properties within an area affected by noise will be available where it can be demonstrated that there is an annual exceedance of a defined noise level. LBHA propose to maintain an annual budget of £15,000 for the scheme.

Qualifying Properties

- 4.3.4 Following the first full year of NTMKS operation, LBHA have undertaken to process all recorded noise data relating to the Early Morning Period and will accurately determine the geographical area that is regularly exposed to 90dBA SEL during this period. LBHA will then determine the resulting footprint area and adopt to determine properties meeting the eligibility threshold for the RSIS. Implementation will proceed after discussion with LBB on prioritisation.
- 4.3.5 On this basis, we consider the qualification aspects of this recommendation to be satisfied.

Funding

- 4.3.6 A financial contribution of up to £1,500 towards double glazing of bedrooms within properties within an area affected by noise will be available where it can be demonstrated that there is an annual exceedance of a defined noise level. LBHA propose to maintain an annual budget of £15,000 for the scheme.
- 4.3.7 In terms of the funding offered to individual properties by LBHA, aspects of other schemes adopted in the UK can be considered:
- *Gatwick Airport*: homes across Surrey, Sussex and Kent can apply for up to £3,000 towards double glazing for their windows and doors as well as loft insulation. All habitable rooms would be eligible for sound insulation treatment. Qualification is determined in relation to a red line zone that is in turn defined by aggregate aircraft noise levels.
 - *Stansted Airport*: acoustic insulation is offered to properties located within the 63dB $L_{Aeq,16h}$ daytime noise contour. All habitable rooms would be eligible for sound insulation treatment. Of the 1,044 properties qualifying for noise insulation, 517 (approximately 50%) have taken up the scheme. In excess of £1.4m of sound insulation has been provided, equating to just over £2,700 per property.
 - *Luton Airport*: the scheme provides a grant up to the value of £3,000 index linked per property in order that noise insulation can be provided in up to 5 habitable rooms. In terms of aircraft



noise, qualifying properties are exposed to noise in excess of the 63dB $L_{Aeq,16h}$ daytime noise contour, or the 55dB $L_{Aeq,8h}$ night time noise contour or an airborne noise level in excess of 90dBA SEL occurring at an average annual frequency of once or more per night (23h00 to 07h00). Luton Airport maintain an annual budget of £100,000 for the scheme.

- 4.3.8 If one considers that only bedrooms, and not all habitable rooms, are covered under the LBHA proposed scheme, the funding per property proposals can just be considered comparable on aggregate, but slightly deficient compared to that offered at Luton Airport. Allowing for a typical qualifying property to contain three bedrooms, if the funding per property were to be increased to £1,800 index linked, it would be in line with industry best practice.
- 4.3.9 So far as the annual funding proposal of £15,000 is concerned, it cannot currently be determined whether this would be sufficient to ensure that all affected properties whose occupiers took up the offer would be properly funded.
- 4.3.10 On current proposals, it is expected that there would be no more than 2 movements on average during the 06h30 to 07h00 period on any given day. Taking the worst case of these always being departures (the noise footprint covers the largest area) and allowing for the normal runway split of 70% SW and 30% NE, then only those properties located within the south westerly footprint would qualify. The precise number that may qualify is not known, but based on estimates provided by BAP for other, related noise contours a figure of 300 is used as a pessimistic estimate.
- 4.3.11 Allowing for a 50% uptake on the offer of grant to upgrade glazing to bedrooms, 150 properties may require treatment. At £1,500 per property, this would require a total funding budget of £225,000. At the proposed funding rate of £15,000 per annum, it would require 15 for all properties to be treated. If the grant per property is increased to £1,800 index linked, we would recommend the annual funding budget be similarly increased.
- 4.3.12 It should also be recognised that growth in early morning traffic up to the point at which properties may become eligible for sound insulation grant is not likely to be instantaneous. There may therefore be a number of years with a level of early morning movements that does not trigger the sound insulation grant. It is recommended that during this period the committed annual funding is still provided so that when the sound insulation grant scheme does become active, a suitable fund has already been established that can be used to insulate the worst affected properties.
- 4.3.13 It is emphasised that the comments on funding are based on the assumption that up to 150 residential properties may qualify for and require sound insulation works to their bedrooms. Further detailed analysis of the early morning movements forecast over the five year period of the NAP would be required in order to more accurately define the number of properties that will require funding for sound insulation.
- 4.3.14 Taking these factors all together, we recommend that the detail of funding the proposed Residential Sound Insulation Scheme be the subject of further discussion.



5 Noise Monitoring

- 5.1 We recommended that LBB make it a condition of any agreement to vary the Lease that BHAL take responsibility for installing and running a suitable noise monitoring system.
- 5.2 LBHA have undertaken to acquire, install and maintain a continuous Noise Monitoring Track Keeping system (NMTK). It is proposed to utilise two fixed monitoring locations along with a mobile units at the commencement of the scheme, positions to be agreed with LBB.
- 5.3 The NMTK system will operate using radar information supplied by the London Heathrow radar head and supported by information from aircraft transponders. The system will be capable of providing highly accurate height and track keeping data for aircraft using Biggin Hill Airport. It will also record and display data for aircraft overflying the Biggin Hill en route to other airports.
- 5.4 LBHA have proposed to meet the acquisition, installation and running costs of the NMTK system from levies raised from aircraft using the Airport.
- 5.5 While final proposals for the actual system to be installed have not been submitted, early indications are that LBHA are considering a system supplied by Bruel and Kjaer. This is considered to be a state of the art system and capable of supplying all the information that would be required to properly monitor aircraft track keeping and the noise levels they generate.
- 5.6 The benefits from having such a system on hand to properly monitor aircraft activity cannot be over-estimated. It is apparent that the vast majority of complaints generated by residents of Bromley concerning aircraft noise cite aircraft flying 'off track' or aircraft operating at Biggin Hill which are not authorised under the terms of the noise limits contained in the lease. There are often disputes as to whether an offending aircraft is actually operating from Biggin Hill or merely using the local airspace.
- 5.7 The NMTK system being proposed would provide information that would clearly identify whether aircraft are off track or excessively noisy and help to settle disputes as to whether aircraft are operating from Biggin Hill or not. It would also provide actual data that can be used to demonstrate whether the noise envelopes and noise limits that have been incorporated into the Noise Action Plan are actually being met.
- 5.8 For these reasons, and accepting that there is a degree of detailed information yet to be provided and agreed, we consider this recommendation to be met, in principle.

6 Ground Noise

- 6.1 We identified that noise from aircraft on the ground has not to date been assessed, and that it should not be ignored but should be subject to controls and monitoring as necessary.
- 6.2 LBHA have undertaken to use reasonable endeavours to publish and adopt a ground Noise Management Plan within 12 months of adoption of the NAP.



- 6.3 Subject to LBB having the opportunity to review, comment on and agree the Plan, we consider this recommendation to be met in principle.

7 Conclusions

- 7.1 We have identified a number of areas where further detailed work and agreement is required in order to fully implement the provisions of the Noise Action Plan.
- 7.2 Subject to these being satisfactorily concluded, we consider that final Noise Action Plan submitted by London Biggin Hill Airport will satisfy the technical noise issues associated with the sought Lease variation.

■ End of Section

Recommendation	Status	Commentary
<p>1 <i>Current (2014) Noise Levels</i></p> <p>LBHA to quantify and agree with the Council existing noise levels, as they are a baseline measures of conditions experienced by people in the community around the Airport, and to produce and agree with the Council a set of noise contours that reflect these conditions.</p>	Acceptable	2014 contours quantified and presented.
<p>2 <i>Future (2030) Noise Levels</i></p> <p>LBHA to establish and agree with the Council the limits on noise within which the Airport must operate and reasonable mitigation measures it shall be bound to implement</p>	Acceptable	<p>50% UDP contour established as the absolute not to be exceeded daytime contour through the foreseeable operating period at the airport.</p> <p>NAP now incorporates 5 year forecasts of movements and associated noise contours with commitment to use reasonable endeavours not to exceed them.</p>
<p>3 <i>Operating Hours</i></p> <p>Agree to a slightly modified variation to operating hours as follows:</p> <p>Weekday (as requested): 06h30 to 23h00, Saturday (1 hour shorter than requested): 08h00 to 22h00. Sundays and Bank Holidays (1 hour shorter than requested): 08h00 to 22h00</p>	Acceptable	Executive Committee's modified hours accepted.
<p>4 <i>Noise Envelopes</i></p> <p>Operations at the Airport are controlled such that the 57dB L_{Aeq} contours submitted by Bickerdike Allen Partners (BAP) for the daytime, early morning and evening periods are treated as <i>noise envelopes</i> and the total areas they encompass shall not be exceeded at any time between grant of the Lease variation and the end of 2030</p>	Acceptable	Current version of the NAP contains forecasts and contours that now reflect the 5 year time horizon considered appropriate by LBHA. The noise envelopes that LBHA propose to use reasonable endeavours not to exceed are included.





5	<i>Early morning departures and arrivals</i> No aircraft departing the Airport between the hours of 06h30 and 07h00 shall generate higher noise levels or give rise to a larger 90dBA SEL footprint than those submitted by BAP for the relevant departure and arrival modes.	Acceptable	Commitment to absolute ICAO Chapter 4 noise limit and use of reasonable endeavours to ensure Lear 35 90dBA SEL departure and arrival are not exceeded.
6	<i>Early morning departures and arrivals</i> A grant for sound insulation enhancement to bedroom windows shall be made to those residences at which a noise level in excess of 90 dB SEL occurs at an annual average frequency of once or greater during the early morning period of (06h30 to 07h00). The grant is to be wholly funded by LBHA.	Acceptable (subject to)	This element now included, meaning the proposed mitigation measures are technically in line with best industry practice and people most affected by noise from operations during the night time period get the benefit of amelioration. Further analysis of early morning movements is required in order to define whether funding proposals are appropriate.
7	<i>Limit on annual movements</i> A cap of 50,000 annual movements to be applied.	Acceptable	This cap is not considered essential for controlling noise. The noise envelopes and departure/arrival footprints are the primary tools used for this purpose.
8	<i>Control on types of aircraft permitted to use the Airport</i> Noise limits to be agreed with LBB that reflect the maximum noise levels likely to be generated by the aircraft mix forecast to operate in 2030. All aircraft will be monitored against these limits and appropriate sanctions employed in the event of the limits being exceeded.	Acceptable (subject to)	Installation and implementation of the Noise Monitoring and Track Keeping system, with precise limits and sanctions procedures defined is subject to final agreement on the details. LBHA propose to update forecast and actual noise contours every year.
9	<i>Controls on flying training</i> LBHA to agree with LBB details of the scheme that will incentivise operators of light and training aircraft to install noise suppression equipment or to replace noisy aircraft. They will also submit details of the new permitted operating hours for flying training flights on circuits.	Acceptable (subject to)	LBHA must submit to LBB details of the scheme for final agreement.
10	<i>Working with existing operators to reduce noise levels</i> LBHA to agree with LBB the proposed code of practice to minimise noise impacts from all operations and to formalise no fly zones.	Acceptable (subject to)	LBHA must submit to LBB details of the scheme for final agreement.



11	<i>Introduction of GPS based runway guidance system</i> LBHA shall continue to update LBB on the progress of, and timescale for, implementation of the scheme to improve the accuracy with which aircraft can be tracked and routed into and out of the Airport. Any amendment to the current hours is to be conditional on LBHA using best endeavours to achieve a successful implementation of the GPS system and agreeing a timetable for its implementation with the Council.	Acceptable (subject to)	LBHA must submit to LBB details of the scheme for final agreement.
12	<i>Changing the height of arriving and departing aircraft</i> LBHA shall continue to update LBB on the progress of, and timescale for, implementation of the scheme to adopt operating procedures that raise the height of all aircraft arriving at and departing from the Airport. Any amendment to the current hours is to be conditional on LBHA using best endeavours to achieve a successful implementation of the altered operating heights and agreeing a timetable for their implementation with the Council.	Acceptable (subject to)	LBHA must submit to LBB details of the scheme for final agreement.
13	<i>Changing the "03 instrument approach"</i> LBHA to update LBB on the progress of, and timescale for, implementation of the scheme that confines aircraft to much more tightly defined routes at specified heights when arriving from the north and routing onto a runway 03 landing. Any amendment to the current hours to be conditional on LBHA using best endeavours to achieve a successful implementation of the altered approach procedures and agreeing a timetable for that implementation with the Council.	Acceptable (subject to)	LBHA must submit to LBB details of the scheme for final agreement.
14	<i>Controls during the new shoulder periods</i> LBHA to agree with LBB details of the measures that will be implemented to ensure that the numbers and type of aircraft operating during the early morning period between 06h30 and 07h00 and also during the late evening period between 21h00 and 23h00 on weekdays and 20h00 and 22h00 on weekends and bank holidays give rise to noise levels that do not breach the relevant limits.	Acceptable (subject to)	Current version of the NAP contains forecasts and contours for the 5 year time horizon considered appropriate by LBHA. The noise contours that LBHA propose to use reasonable endeavours not to exceed are known. Details of measures to ensure they shall not be exceeded (subject to reasonable endeavours test) require to be submitted.



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| 15 | <i>Sanctions for non-compliance with noise abatement measures</i>
LBHA to agree with LBB detailed procedures for the setting of appropriate noise limits for all aircraft, how they are to be monitored and reported and the form of sanction that will apply. The agreed procedures will need to define how sanctions imposed on noisy operators can benefit the local community, who suffer the effects of the excess noise. | Acceptable
(subject to) | LBHA must submit to LBB details of the scheme for final agreement. |
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| 16 | <i>Relocating the VOR beacon</i>
LBHA to report to LBB on the progress of, and timescale for, implementation of the scheme to relocate the Biggin Hill VOR. | Acceptable | |
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17 *Noise monitoring and track keeping system*

LBHA to take responsibility for installing and running a suitable noise monitoring system. The system shall be suitable for accurately recording the individual flyover noise levels associated to each aircraft operation and for deriving the long term average aircraft noise levels for the purpose of validating the noise contours.

The following procedure to be adopted:

- Maximum departure noise levels that would apply to operations during the daytime and during the early morning shoulder period.
- These would typically be defined as Noise Violation Limits and built into a transparent system of monitoring and control.
- Fines are paid into a 'community fund' for the benefit of those suffering the consequences of excessive noise.

The system to be installed and operated in a manner that meets LBB's noise monitoring requirements and gives LBB officers direct access to real time data and simple summary reports on a defined or an ad hoc basis.

LBHA are to operate a suitable noise inquiry and complaints handling system.

LBHA will also be required to develop proposals for incorporating track keeping into the monitoring system. The system shall provide access to a real time display of aircraft movements with information on aircraft location and height being clearly displayed. The access shall be via the LBHA website or an extension to the LBB website.

Acceptable
(subject to)

LBHA must submit to LBB details of the scheme for final agreement. details to include confirmation of the timing of the installation, program for commissioning, date on which the system shall be 'live' and confirmation that the procurement, installation and running costs will be met by LBHA.



Acceptable Addressed in CSACL Report *Biggin Hill Airport: Extended Operating Hours, London Borough of Bromley, September 2015*.

18 *Airport charges*

Any variation of hours are conditional on LBB seeking an increase in the amount payable by LBHA to reflect the increased level of business activity at the Airport including an element to reflect the increased level of noise generated during unsocial hours and to take into account any public purse expenditure required as a result of the increased business at the Airport. The 'unsocial hours' additional charges shall be consistent with those that are levied at other, comparable airports in order not to place an unreasonable burden on LBHA.



Scenario	Period	Monday to Friday	Saturday	Sunday & Public Holiday
Currently Permitted		07h30 – 21h00 ¹	09h00 – 20h00 ²	09h00 – 20h00 ²
Sought by LBHA	Full Duration	06h30 – 23h00	06h30 – 23h00	08h00 – 23h00
	Morning Extension	06h30 – 07h30	06h30 – 09h00	08h00 – 09h00
	Evening Extension	21h00 – 23h00	20h00 – 23h00	20h00 – 23h00
	Additional Time ³	3h	5h 30m	4h
Recommended by CJ	Full Duration	06h30 – 23h00	07h00 – 23h00	08h00 – 22h00
	Morning Extension	06h30 – 07h30	07h00 – 09h00	08h00 – 09h00
	Evening Extension	21h00 – 23h00	20h00 – 23h00	20h00 – 22h00
	Additional Time ³	3h	5h	3h
Adopted by Committee	Full Duration	06h30 – 23h00	08h00 – 22h00	08h00 – 22h00
Accepted by LBHA	Morning Extension	06h30 – 07h30	08h00 – 09h00	08h00 – 09h00
	Evening Extension	21h00 – 23h00	20h00 – 22h00	20h00 – 22h00
	Additional Time ³	3h	3h	3h

¹ Aircraft normally based at the Airport can depart from 06h30 and arrive until 22h00.

² Up to a maximum of 3 flight movements shall be permitted on Saturdays and Sundays between 08h15 and 09h00 to permit an operator based at the Airport to operate a scheduled service to France.

³ This is the additional time for which non-based aircraft would be permitted to operate from the Airport.



Glossary of Acoustic Terms

L_{Aeq} :

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq} .

L_{Amax} :

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the “fast” sound level meter response.

L_{A10} & L_{A90} :

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_n .

L_{AX} , L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

Perceived Noise Level

Perceived Noise Level: this measure is used specifically for the evaluation of aircraft noise, taking account of the high pitched whine generated by jet engines. There is an approximate relationship between the PNL and the A-weighted noise level as follows:

$$PNL = L_A + 13\text{dB}$$

EPNdB

Effective Perceived Noise Level: this is calculated by integrating the energy over the time period during which the tone corrected perceived noise level is within 10PN dB of the maximum value and normalising with respect to a reference time of 10s.

