

Briefing Note

To: Marc Hume (LBB)
CC: Mark Bowen (LBB), Andrew Rogers (LBB), Hedley Pugh (LBB), Susan Frazer (LBB)
From: Vernon Cole
Project: London Biggin Hill Airport
Subject: NAP Recommendations
Reference: 15/0009/M09-3
Date: 16 November 2015

Introduction

Cole Jarman reviewed in March 2015 the original Noise Action Plan proposed by London Biggin Hill Airport to support their application for a variation in operating hours. The report to the London Borough of Bromley Executive Committee dated 17th March 2015 contained 18 summary recommendations that need to be actioned by BHAL in order to render the NAP acceptable from a technical noise impact perspective.

All recommendations, except those that require the agreement of other statutory bodies, e.g. NATS, will need to be implemented to the satisfaction of LBB. This will be covered by the inclusion of conditions and timescales appropriate to the various recommendations in the documentation which will be entered into to vary the lease. Failure to do so, or failure to implement or comply with any other aspect of the Noise Action Plan in accordance with those requirements will result in the agreement for additional hours being revoked

This note sets out each of those recommendations, the date by which they are required to be actioned and the current state of progress.

It also provides further information in relation to:

- noise from helicopter movements,
- the range of aircraft currently based at Biggin Hill Airport,
- noise levels at the Princess Royal University Hospital,
- controls on noise generated by aircraft on the ground,
- response to commentary attributable to Stephen Turner on behalf of Flightpath Watch.

Finally, the note gives details of errata in the Cole Jarman Noise Action Plan Review: Final Report dated 13th October 2015, which is appended to the Executive Report.



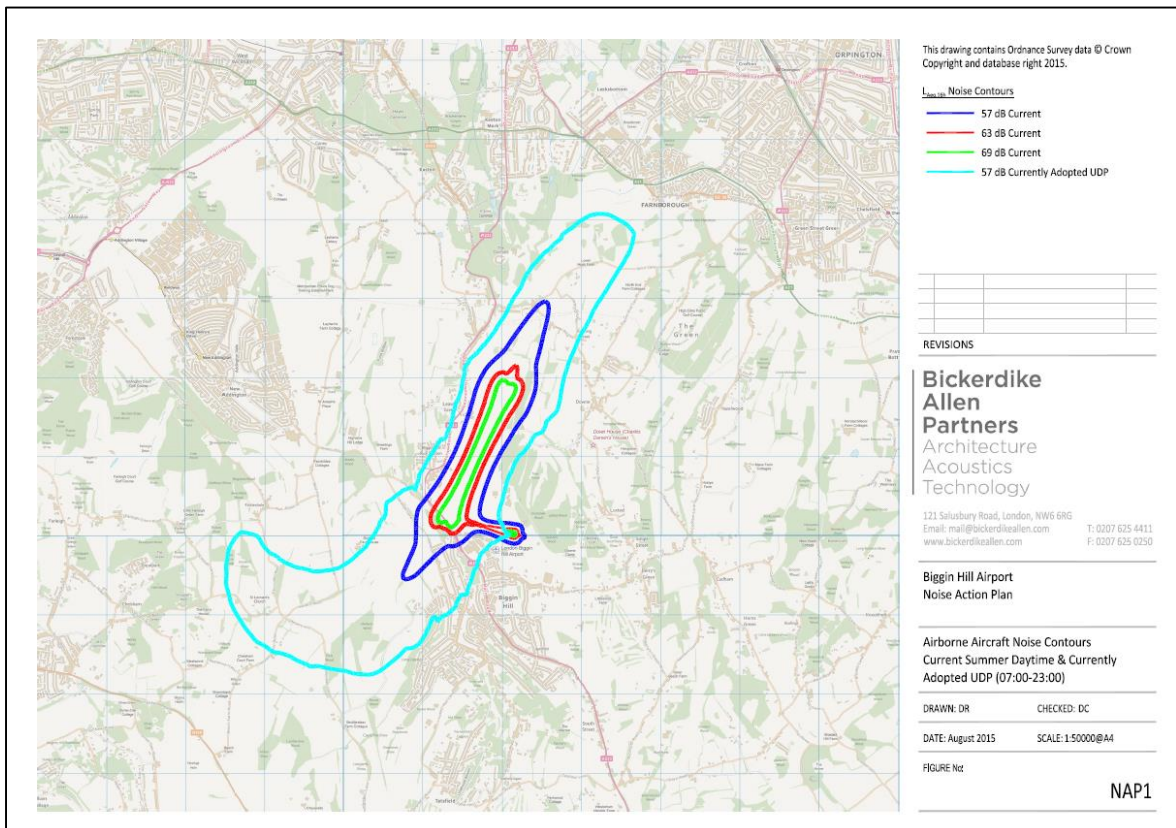
1 Current (2014) Noise Levels

BHAL to quantify and agree with the Council existing noise levels, as they are a baseline measure 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.

Timing: to be implemented prior to acceptance of the NAP.

The original Noise Action Plan issued in September 2014 contained noise contours estimated for the year 2013, but these were not generated based on a detailed assessment of the actual number and mix of operations. They were therefore considered insufficiently precise to establish the baseline noise conditions for current operations.

The current Noise Action Plan (Final) dated 28th August 2015 contains noise contours pertaining to the 2014 movements as Figure NAP1. The contours have been generated based on a detailed assessment of the actual aircraft operations for that year. They are replicated below.



This recommendation is considered satisfied.



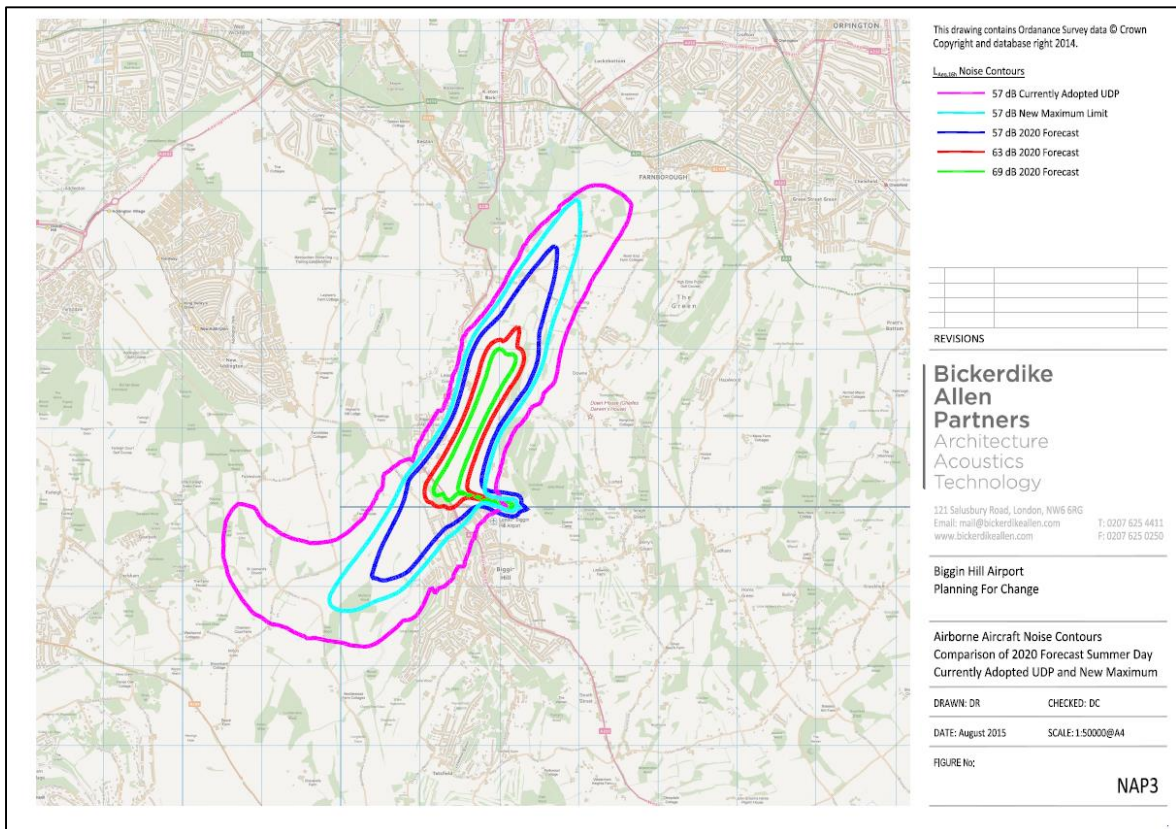
2 Future (2030) Noise Levels

BHAL 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.

Timing: to be implemented prior to acceptance of the NAP.

The original Noise Action Plan issued in September 2014 contained noise contours estimated for the year 2025, but again these were not generated based on a detailed assessment of the forecast number and mix of operations. They were therefore considered insufficiently precise to determine the likely noise effects associated with future operations.

The current Noise Action Plan (Final) dated 28th August 2015 contains noise contours generated based on a detailed assessment of the forecast 2020 movements as Figure NAP3. The year 2020 has been accepted as an appropriate future year for which aircraft operation can reasonably be forecast. The contours are replicated below.



This recommendation is considered satisfied.



3 Operating Hours

Agree to a slightly modified variation to operating hours as follows:

Weekday (as requested): 06h30 to 23h00,

Saturday (1 hour shorter than requested): 07h30 to 23h00.

Sundays and Bank Holidays (1 hour shorter than requested): 08h00 to 22h00.

Timing: to be implemented prior to acceptance of the NAP.

The hours recommended by Cole Jarman were not adopted by the LBB Executive Committee, who wished to impose the following hours restrictions.

Weekday (as requested): 06h30 to 23h00,

Saturday (2.5 hours shorter than requested): 08h00 to 20h00.

Sundays and Bank Holidays (1 hour shorter than requested): 08h00 to 22h00.

These hours imposed by the Executive Committee have been accepted by BHAL and now form the basis of the application.

This recommendation is considered satisfied.



4 Noise Envelopes

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 noise envelopes and the total areas they encompass shall not be exceeded at any time between grant of the Lease variation and the end of 2030.

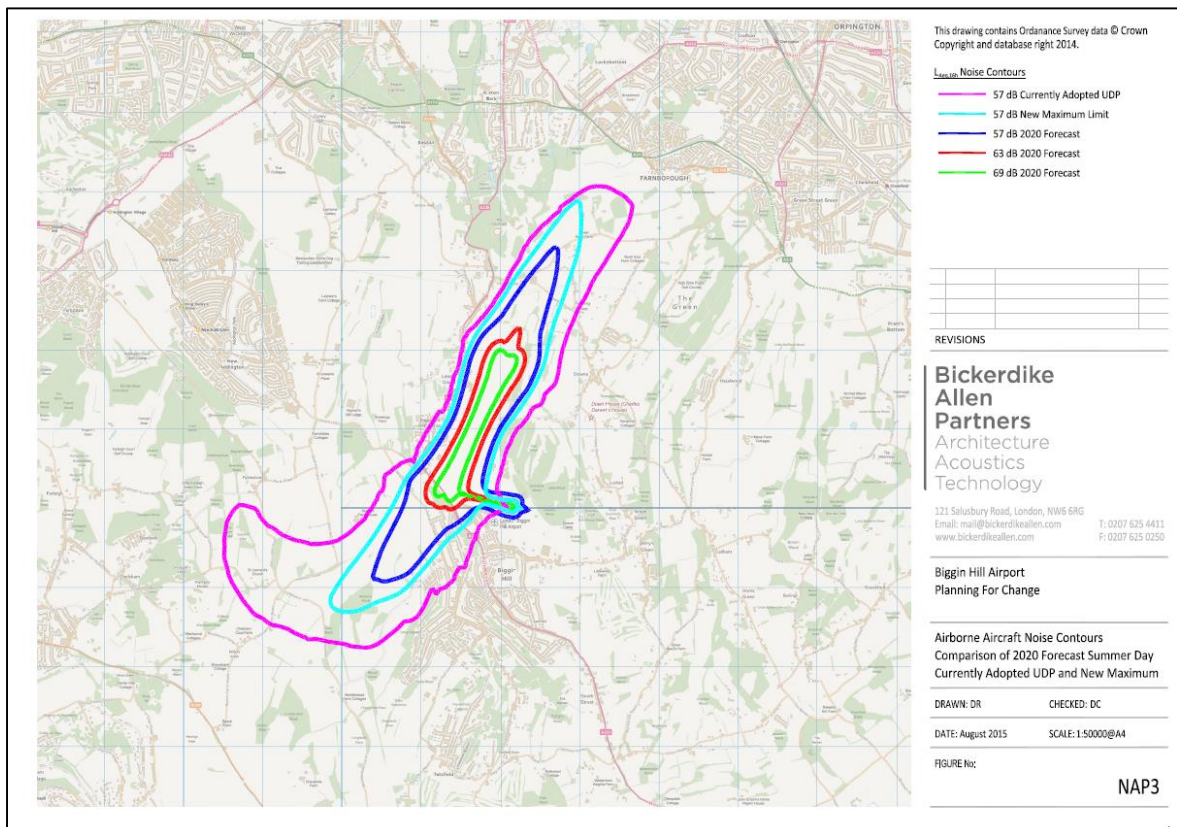
Timing: to be implemented prior to acceptance of the NAP.

4.1 Daytime: 16 hours 07h00 to 23h00

In our first report to committee in March 2015, 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.

In the current Noise Action Plan (Final) dated 28th August 2015 BHAL 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.

The daytime noise envelopes are contained in the noise contours for 2020 movements as Figure NAP3, replicated below.





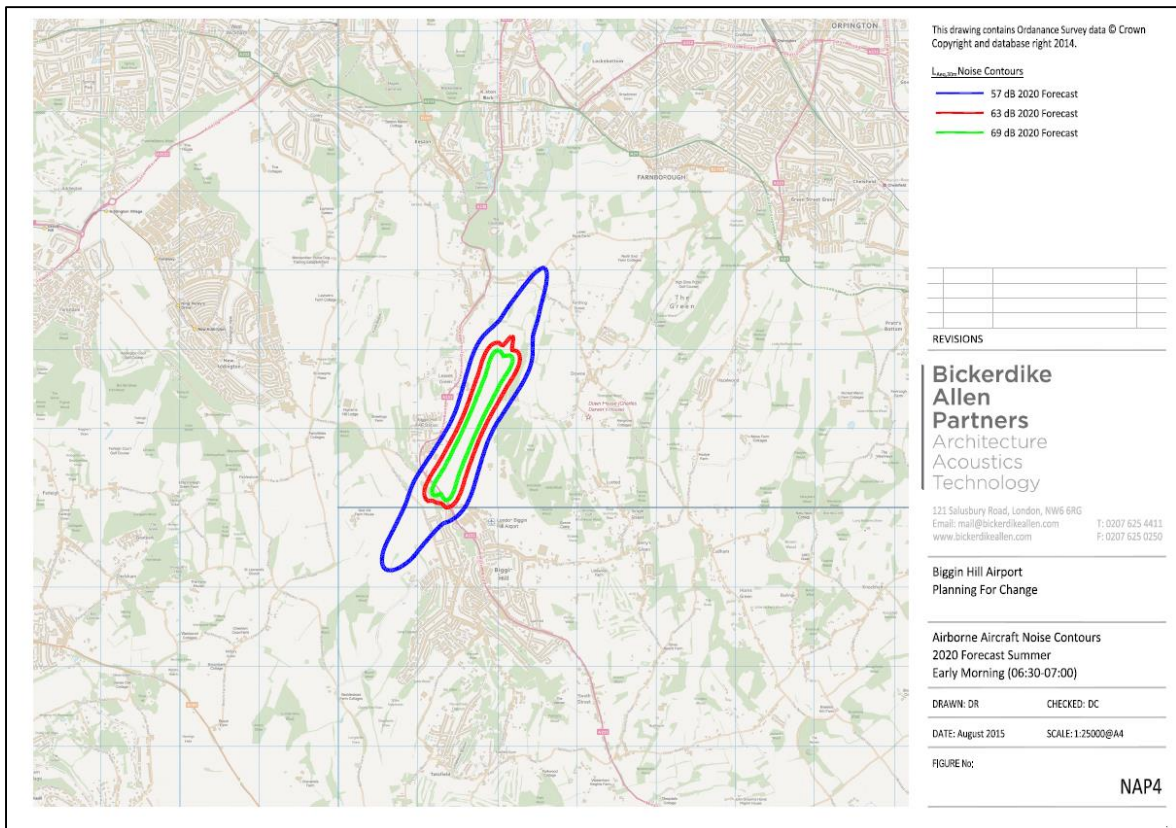
The UDP contour is coloured **magenta**.
The 50% UDP contour is coloured **cyan**.
The 57dB $L_{Aeq,16h}$ daytime noise envelope is coloured **blue**.

4.2 **Night time: 30 minutes 06h30 to 07h00**

4.2.1 In our first report to committee in march 2015, we recommended that operations at the Airport between 06h30 and 07h00 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.

In the current Noise Action Plan (Final) dated 28th August 2015 BHAL have undertaken to use reasonable endeavours not to exceed a 57dB $L_{Aeq,30m}$ noise envelope that has been estimated for operations in 2020. It is equivalent to an average daily number of movements of not more than 2 during the 30 minute early morning period by an aircraft not noisier than the LEAR35.

The night time noise envelope is contained in the early morning noise contours for 2020 movements as Figure NAP4, replicated below.



It should be noted that the Noise Action Plan (Final) dated 28th August 2015 contains a noise envelope that is slightly smaller than that prepared for NAP V1 submitted following the March 2015 Executive Committee decision. This indicates a tighter degree of control than originally indicated.

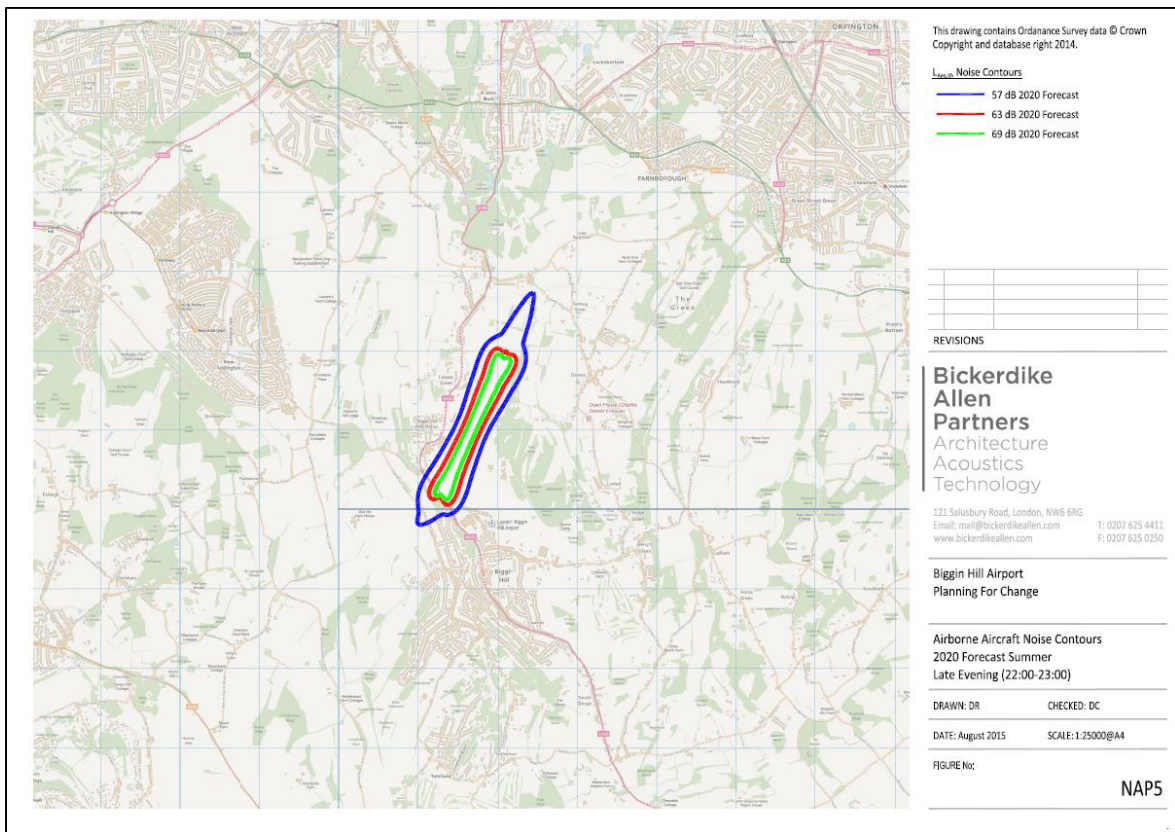


4.3 Evening period: 1 hour 22h00 to 23h00

4.3.1 In our first report to committee in March 2015, we recommended that operations at the Airport between 22h00 and 23h00 be controlled such that the 57dB $L_{Aeq,1h}$ 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.

In the current Noise Action Plan (Final) dated 28th August 2015 BHAL have undertaken to use reasonable endeavours not to exceed a 57dB $L_{Aeq,1h}$ noise envelope that has been estimated for operations in 2020. It is equivalent to an average daily number of movements of not more than 3 during the 1 hour late evening period by an aircraft not noisier than the LEAR35.

The night time noise envelope is contained in the early morning noise contours for 2020 movements as Figure NAP5, replicated below.



4.4 Effect of the Envelopes

Compliance with the noise envelopes is not contingent on BHAL obtaining agreement to any of the operational procedures that require third party approval, e.g. from NATS or CAA.

This recommendation is considered satisfied.

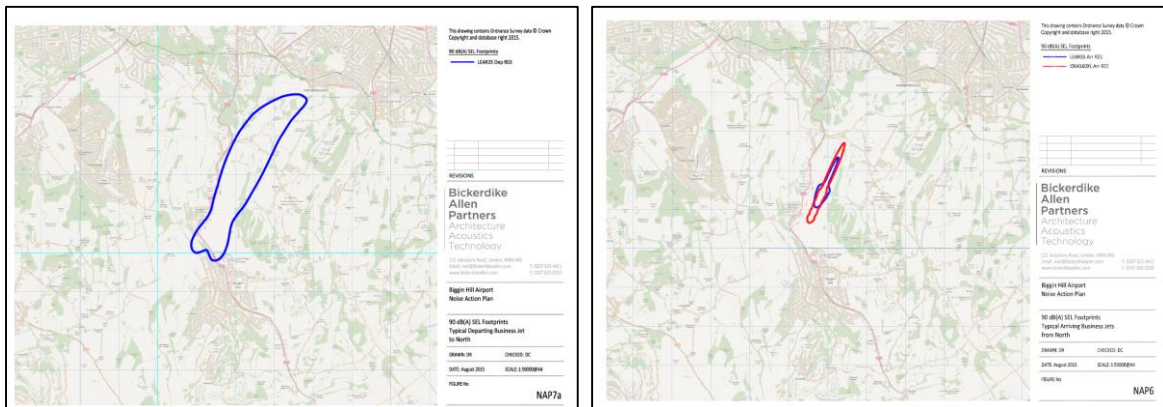


5 Early Morning Departures and Arrivals

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.

Timing: to be implemented prior to acceptance of the NAP.

The current Noise Action Plan (Final) dated 28th August 2015 contains noise 90dBA SEL footprints for departures and arrivals of aircraft that are considered to be typical of those proposed to during the early morning period from 06h30 to 07h00. Departure footprints in each operating direction cover the largest areas and are set out in Figures NAP7a and 7b. They reflect operations by the LEAR35 business jet. Arrival footprints cover a smaller area and are set out in Figure NAP6. We replicate the departure and arrival footprints for aircraft departing to the north east (Runway 03) and landing from the north east (Runway 21).



BHAL have undertaken to use reasonable endeavours to ensure that no operation by any aircraft during the very early morning period generates higher noise levels on departure or arrival than is permitted by the above footprints.

This is expected to lead to a situation where the maximum noise levels generated by aircraft operating during this period are lower than those permitted by the Lease. The Lease only permits operations by based aircraft, and this has historically limited the number of movements during any typical day or week to a figure lower than is expected if the variation in hours is permitted. However, the Lease also sets noise limits for aircraft operating at Biggin Hill airport that are substantially higher than the limits consistent with the noise footprint limits set out above.

The attached note from Bickerdike Allen Partners, A9780-N13-DC dated 13th November 2015, quantifies the degree to which flyover noise levels will be lower on both departure and arrival based on the provisions in the NAP than is currently permitted by the Lease.

This recommendation is considered satisfied.



6 Early Morning Departures and Arrivals

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 BHAL.

Timing: to be implemented prior to acceptance of the NAP.

A 1992 UK Department of Transport study 'Report of a Field Study of Aircraft Noise and Sleep Disturbance' found people in properties exposed to aircraft noise at external single event levels below 90dBA SEL suffer no significant risk of sleep disturbance. At higher levels, the study found that there was a 1 in 75 chance of an average person being awakened. For reference, 90dBA SEL for aircraft flyovers is equivalent to 80dB L_{Amax} .

Given that aircraft operations do not, and in the event of an agreed hours change, will not take place through the night but would only be permitted during the period 06h30 to 07h00, a consideration of average noise levels over the entire night period is not appropriate. It is therefore more relevant to examine the effects of people living within the 90dBA SEL footprints in order to identify the likelihood of the operations in question giving rise to sleep disturbance.

Noise control and mitigation regimes at other UK airports, including Luton and Robin Hood Doncaster Sheffield, contain a provision for making a suitable financial contribution to the cost of enhanced sound insulating glazing to bedrooms of residences affected by departure or arrival noise at this level, providing it occurs not less than once per night on average. Such provision is considered to be current best practice for mitigating the effect of night flyover noise levels where these cannot be reduced by any other means.

BHAL 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 grant scheme will be in line with UK practice and agreed with LBB prior to implementation.

A financial contribution towards enhanced insulation for 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. Enhanced insulation normally takes the form of installing secondary glazing and acoustically rated ventilation.

Following the first full year of NTMKS operation, BHAL 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. BHAL 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.

Further detail on the proposed method of implementing this scheme is set out in Appendix 3 to the Addendum to the NAP produced by BHAL in November 2015. It is replicated below.



Residential properties affected by airport related noise will qualify for inclusion in the RSIS where a property where the airborne noise level created by aircraft using LBHA is in excess of 90 dB SEL at an annual average frequency of once or greater during the night-time period (2300 to 0700 local time).

Data collected from the NMTKS noise monitor positions will be compiled and processed annually in order to identify qualifying properties, if any.

Where LBHA determines that a property qualifies for a sound insulation installation grant pursuant to this RSIS, it will inform the owner or occupant of the property affected, by writing to "The Owner or Occupier" at that address, informing them of the provisions of this RSIS and the grant available.

The Owner (and for the avoidance of doubt, only the owner) of a residential property that is found to qualify for a grant pursuant to the RSIS can apply to LBHA for payment of a grant on the following basis:

1. A grant of £1,800 (one thousand eight hundred pounds) per residence will be made available to the owner of a property qualifying under this RSIS (subject to the annual limits set out in 4 below). The grant is provided to facilitate the installation of improvements designed to reduce internal noise, particularly in bedrooms.
2. The grant will not apply to properties in respect of which construction was first completed after the 1st January 2016, nor will it apply to any new extensions to existing properties the construction of which was first completed after 1st January 2016.
3. The grant will not apply to owners of properties who last purchased that property after 1st January 2016.
4. The grant can only be used to for works that will improve the internal noise climate within the bedrooms of the property. The primary method of improving sound insulation is the installation of secondary glazing.
5. Properties that have received a grant will no longer be eligible.
6. Grants will be entirely funded by LBHA.
7. LBHA will make available a maximum fund of £18,000 (eighteen thousand pounds) per calendar year which will be distributed to qualifying parties on a "first come first served" basis with valid applications being processed in the order in which they are received.
8. The above sums will be index linked to RPI from 1st January 2017 and will be increased annually on the 1st of January each calendar year in line with RPI.

This recommendation is considered satisfied.



7 Limit on Annual Movements

A cap of 50,000 annual movements to be applied.

Timing: to be implemented prior to acceptance of the NAP.

It is understood that the 50,000 movement cap will not form part of the Lease variation for reasons associated with commitments by BHAL to tenants of various parts of the Airport as set out in their individual leases.

From a noise control perspective, the limit on absolute numbers is not essential. The primary noise control mechanisms are vested in the noise envelopes that apply to the daytime, early morning and evening periods as well as the limiting early morning 90dBA SEL footprints. Failure to implement this recommendation does not, therefore, materially affect the noise control provisions that are being imposed.

This recommendation is not considered essential for noise control purposes.



8 Control on types of aircraft permitted to use the Airport

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.

Timing: be implemented before BHAL is permitted to operate in the altered hours.

Noise limits at the noise monitoring terminals cannot be defined until the monitoring locations are selected and agreed. See section 17 of this note.

However, once they are agreed and continuous monitoring of the noise generated by all Biggin Hill aircraft movements is taking place, BHAL have undertaken to refuse access to aircraft demonstrated to be excessively noisy or to be in persistent breach of the authorised procedures and protocols.

Although final details are not yet determined, this recommendation is being acted on in an appropriate manner.



9 Controls on flying training

BHAL 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.

Timing: to be completed within 6 months of the commencement of modified hours operations, to the satisfaction of LBB.

BHAL have provided further detail on the proposed method of implementing this scheme in Appendix 5 to the Addendum to the NAP produced by BHAL in November 2015.

Light aircraft owners normally based at LBHA may opt to install one of a number of EASA Certified systems designed to muffle exhaust output and thereby reduce noise nuisance. Due to the inherent cost of such systems, it is likely that this scheme (the Scheme) will apply to the most frequent users, such as flying schools. However, this is of benefit because the Scheme provides as incentive to the most frequent fliers thereby maximising the benefits of the scheme.

Pursuant to the Scheme, LBHA will offer a 25% discount on published landing fees to owners and operators of light single engine aircraft who elect to fit an EASA or FAA approved exhaust silencer system that can be demonstrated to reduce aircraft noise output by 5dB or more.

The following terms will apply:

1. In order to qualify, the Maximum Authorised Take-Off Mass (MATOM) of the aircraft shall be 2,300kgs or less.
2. Before purchase or installation of any proposed noise reduction system, the owner or operator of the aircraft for which a discount is sought should make a technical presentation to LBHA setting out the noise reduction benefits (as measured during system certification) and showing that the expected noise reduction is likely to be 5dB or more. If LBHA believes that the proposed system meets the terms of this Scheme, LBHA will then confirm in writing its acceptance of the proposed STC as meeting the requirements of the Scheme.
3. The system must remain installed on the aircraft concerned and must remain in a fully serviceable condition.
4. The agreed discount may be withdrawn at the sole discretion of LBHA if it has reasonable grounds to believe that the agreed STC system is no longer installed on the aircraft concerned or is not performing as per manufacturer specifications (for instance due to insufficient maintenance).
5. The discount will apply only once proof (provided to LBHA by way of aircraft maintenance records and visual inspection) that the agreed STC has been installed on the aircraft concerned and a copy of the STC and OEM data sheet has been lodged with LBHA. Once installation has been verified, LBHA will issue a certificate of compliance for discount in respect of the aircraft concerned.

Although final details are not yet determined, this recommendation is being acted on in an appropriate manner.



10 Working with existing operators to reduce noise

BHAL to agree with LBB the proposed code of practice to minimise noise impacts from all operations and to formalise no fly zones.

Timing: to be completed within 6 months of the commencement of modified hours operations, to the satisfaction of LBB.

BHAL have identified that light aircraft operators will be required to remain clear of noise sensitive areas and not to overfly them below 2,000ft AMSL unless specifically instructed to do so by ATC. Noise sensitive areas are shown in Appendix 6 to the Addendum to the NAP produced by BHAL in November 2015 and are replicated below.



Key:

- A Biggin Hill and Tatsfield
- B Leavesden Estate
- C Leaves Green
- D Downe Village
- E Orpington, Farnborough, Crofton Locksbottom
- F Warlingham and Wodingham
- G Keston Village



In general all built up areas should be avoided by light aircraft where possible.

Only areas that are likely to be frequently overflown by light aircraft (because they lie close to frequently used light aircraft flight paths) have been included in this illustration. Noise sensitive areas are based on past experience of noise complaints based on the assumption that those experiencing disturbance are most likely to complain.

BHAL will liaise regularly with aircraft operators in order to promote adherence to existing and future operating procedures and to enforce compliance with these using the NMTKS.

BHAL will continue to review the Standard operating Procedures (SOPs) for all aircraft operations. Where it believes that new SOPs would produce a significant benefit to residents without compromising safety in any way, the existing SOPs would be modified accordingly.

Although final details are not yet determined, this recommendation is being acted on in an appropriate manner.



11 Introduction of GPS based runway guidance system

BHAL 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 BHAL using best endeavours to achieve a successful implementation of the GPS system and agreeing a timetable for its implementation with the Council.

Timing: to be completed within 6 months of the commencement of modified hours operations, to the satisfaction of LBB.

BHAL has already submitted plans for final approval in respect of GPS approach for runway 21 which overlays the existing 21 Instrument Landing System (ILS). Final UK CAA approval is expected imminently.

The new 03 GNS/LPV RNAV Instrument Approach Procedure (IAP) has been designed and submitted to the regulatory authorities.

Although final details are not yet determined, this recommendation is being acted on in an appropriate manner.



12 Changing the height of arriving and departing aircraft

BHAL 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 BHAL using best endeavours to achieve a successful implementation of the altered operating heights and agreeing a timetable for their implementation with the Council.

Timing: requires agreement between BHAL and statutory bodies such as NATS. BHAL shall therefore use all reasonable endeavours to secure the necessary agreements as soon as reasonably practical.

12.1 Current arrangements

Arrivals

Rwy 21 landing into a (prevailing) wind from the south west or thereabouts. Currently around 70% of arrivals.

These come in directly from the north east on a 3° glide path and fly directly over Farnborough Hospital, at which point they are approximately 1,300ft AMSL (~780ft above ground level).

Rwy 03 landing into a (less common) wind from the north east or thereabouts. Currently around 30% of arrivals.

Again, these come in directly from the north east on a 3° glide path and fly directly over Farnborough Hospital, at which point they are approximately 1,300ft AMSL (~780ft above ground level). Just after the hospital they then apply additional power and fly at that altitude on a loop round to the south west of the Airport from where they approach the runway at a 3.5° glide slope (occasioned by the presence of an aerial on the ridge).

Departures

Rwy 21 departing into a (prevailing) wind from the south west or thereabouts. Currently around 70% of departures.

These are relatively uncontested as the aircraft more or less depart over open countryside. They currently climb to a height of 2,400ft AMSL where they remain until effecting an appropriate manoeuvre onto the chosen flight path.

Rwy 03 departure into a (less common) wind from the north east or thereabouts. Currently around 30% of departures.

Again, these aircraft currently climb to a height of 2,400ft AMSL where they remain until effecting an appropriate manoeuvre onto the chosen flight path. Typically this should involve an almost immediate turn to the south to avoid overflying Farnborough and other built up areas. In practice, magnetic north variation over the last 30 years or so has led to the turn taking place later and later, with the effect that there does appear to have been an increase in



the number of aircraft being observed departing over residences in the area around Farnborough and Orpington.

12.2 Proposed arrangements

Arrivals

Rwy 21 landing into a (prevailing) wind from the south west or thereabouts. Currently around 70% of arrivals.

BHAL point out that one of the alterations recently implemented in respect of runway 21 has been to raise the radar vectoring altitude from a previous 1,800ft AMSL to 2,200ft AMSL so that aircraft being vectored to the ILS are now 400ft higher than before. This is of benefit to the northern part of Petts Wood and Sidcup area, but makes no difference in Farnborough or Crofton. Once aircraft are established on the ILS glideslope to land on runway 21, the approach is as it has been since the ILS was installed in 1991 and it will not change for the foreseeable future. NATS has confirmed that these new point merge procedures will commence in February 2016.

ICAO rules do not permit changing the current approach angle as described above in the absence of any obstacle that would render it safer to come in at a steeper angle.

However, with regard to these arrivals, it is not certain that the status quo will continue in perpetuity. The European body regulating arrival paths, UASA, recognise that there are fuel savings and noise benefits to be had from steepening the arrival glide path and expect to put to consultation with the wider ICAO the position that a 3.75° glide slope would be acceptable for the type of aircraft using Biggin Hill. There are no guarantees that such changes will be allowed, but if they are BHAL undertake to adopt them.

Rwy 03 landing into a (less common) wind from the north east or thereabouts. Currently around 30% of arrivals.

It is proposed to use the GPS based runway guidance system to substantially alter the approach paths and landing pattern for aircraft on this track. Please refer to the description of the proposed arrangements dealt with under Recommendation 13. The introduction of the new flight paths for runway 03 is expected to take place in autumn 2016.

Arrivals Generally

It is considered that, subject to the above being an accurate description of what BHAL actually implement, within the strictures of what they are permitted to do by the regulating authorities, BHAL would be complying with the NAP Recommendation 12 on arrivals. Adoption of the new Rwy 03 procedure (see next section) will give rise to tangible noise benefits as at least 30% of aircraft currently arriving relatively low over Farnborough and the PRUH will now fly in high over the Airport and avoid this area completely. If UASA do negotiate an arrival glideslope regulation change with ICAO that permits Rwy21 arrivals to approach at a 3.75° glide slope, the indications are that BHAL will seek to adopt and impose this procedure.



Departures

As far as departures are concerned, BHAL indicate that they will be installing advanced ATM radar as part of the Rwy 03 approach infrastructure. Advanced ATM will allow BHAL to clear aircraft before take-off to higher altitude after departure, thereby allowing aircraft a continuous climb to 4,000ft AMSL in coordination with London Control (potentially cutting Thames Radar out of the equation for departures).

Rwy 21 departing into a (prevailing) wind from the south west or thereabouts. Currently around 70% of departures.

We are advised by BHAL that new air space regulations will permit aircraft to climb uninterrupted to 4,000ft a.s.l. on departure. This means they will clear the locality quicker, leading to lower noise levels on the ground.

Rwy 03 departure into a (less common) wind from the north east or thereabouts. Currently around 30% of departures.

We are advised by BHAL that measures are being undertaken to correct these late turns and that new procedures are being put in place which will ensure that aircraft do turn in a timely manner and avoid overflying built up areas. These modifications would be coupled with the ability to climb uninterrupted to 4,000ft a.s.l. with the consequence of lower noise levels on the ground.

Departures Generally

I am content that, subject to the above being an accurate description of what BHAL actually implement, they would be complying with the NAP recommendation 12 on departures.

Although final details are not yet determined, this recommendation is being acted on in an appropriate manner.



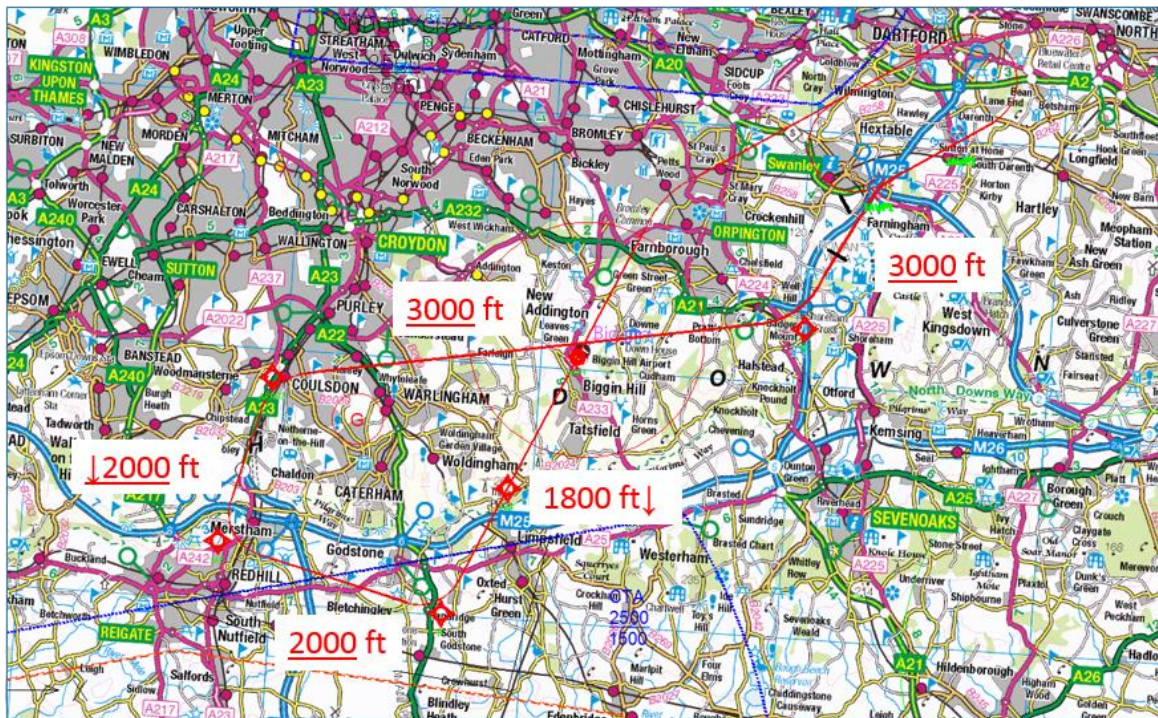
13 Changing the “03 instrument approach”

BHAL 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 BHAL using best endeavours to achieve a successful implementation of the altered approach procedures and agreeing a timetable for that implementation with the Council.

Timing: requires agreement between BHAL and statutory bodies such as NATS. BHAL shall therefore use all reasonable endeavours to secure the necessary agreements as soon as reasonably practical.

NOTE: BHAL will go out to stakeholder consultation for the new 03 approach on 18th November 2015 and after this date, the plans can be shared publicly. They will therefore be to hand when a decision is made on 26th November. Until that time, the information set out below which was presented in July 2015 at the Focus Group session dealing with BHAL’s CAP725 airspace change process, must be considered confidential to members and not for public consumption before the date referred to above.

The proposal is to install the Rwy 03 GPS system which will allow aircraft to approach Rwy 03 as follows:



The significant thing here is that aircraft arriving on Rwy 03 will no longer follow the Rwy 21 procedures over Farnborough and the PRUH. Instead they remain at 3,000ft ASML flying over the Airport from the east and descend to 1,800ft ASML on final approach to Rwy 03 from the south west. This represents an immediate fall in the numbers of aircraft arriving over



Farnborough and the Hospital of at least 30%. BHAL have indicated that the figure may be closer to 40% as the new procedure will encourage more people to use the new Rwy 03 approach than is currently the case.

We cannot comment on or vouchsafe that, but we believe we can rely on the 30% improvement.

For reference, aircraft flying at 1,300ft AMSL over Farnborough when landing on Rwy 21 are expected to generate noise levels at ground level that are in excess of 10dB higher than would be generated by the same aircraft flying at 3,000ft AMSL over Downe and other populated areas beneath the new arrival path for landing on Rwy 03. For the Learjet 35 business jet the L_{Amax} noise level at the ground for a flyover at 1,300ft ASML is indicated as being 69dB while for a flyover at 3,000ft ASML it is indicated as being 58dB.

As referenced in Section 11 above, BHAL point out that the new procedure has been designed, flight tested and submitted to the regulatory authorities by means of a formal 7 step Airspace Change Proposal (ACP). The program is currently at stage 4 of the 6 stages required prior to its full implementation, the final stage 7 being post implementation system review following 6 months of live operation.

The project is indicated as being on track for autumn 2016 implementation, subject to CAA approval.

BHAL indicate they will use all reasonable endeavours to deliver new 03 approach as soon as may be practically possible. A stakeholder consultation (Stage 4) will commence on November 18th 2015 and will last for 12 weeks.

Although final details are not yet determined, this recommendation is being acted on in an appropriate manner.



14 Controls during the new shoulder period

BHAL 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 23h00 on weekends and bank holidays give rise to noise levels that do not breach the relevant limits.

Timing: be implemented before BHAL is permitted to operate in the altered hours.

BHAL have committed to that only aircraft types that meet ICAO Chapter 4 noise standards will be permitted to operate in the early morning hours before 07h00. In addition, BHAL must use reasonable endeavours to ensure that these Chapter 4 aircraft operate within a maximum noise levels set by the noise characteristics of the Learjet 35 or a comparable aircraft.

BHAL will manage and control aircraft movements to ensure that the average noise levels generated remain within the noise envelopes that have been established for the early morning and late evening periods. See Recommendation 4 of this note.

They will also manage and control aircraft movements to ensure that the individual flyover noise levels generated remain within the noise footprints that have been established for the early morning period. See Recommendation 5 of this note.

The primary management control tool will be the Noise Monitoring and Tack Keeping System which will be used to identify whether aircraft breach noise levels consistent with the L_{Aeq} or SEL limits. Where such breaches occur, BHAL may elect to prohibit use of the airport by those individual aircraft or aircraft types during the shoulder periods.

Although final details are not yet determined, this recommendation is being acted on in an appropriate manner.



15 Sanctions for non-compliance with noise abatement procedures

BHAL 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.

Timing: be implemented before BHAL is permitted to operate in the altered hours.

The Maximum Permissible Noise Level (MPNL) limits that need to be applied will depend on the precise location of each monitor. This has yet to be determined, although it will be done in conjunction and close cooperation with LBB. See Recommendation 17 of this note.

Track Violation Limits (TVL) will be determined based on the Noise Preferential Routes and they will be programmed into the NMTKS.

The NMTKS will automatically register all aircraft in breach of either an NMPL or a TVL. BHAL will then issue a Notice of Violation (NOV) to any aircraft operator identified as having violated a TVL or MNPL, seeking an explanation of the violation within 2 weeks. If no reasonable excuse for the violation is provided a fine can be levied against the flight crew or aircraft operator concerned.

If the fine is not paid, the responsible party, flight crew or aircraft operator, will be excluded from using Biggin Hill Airport. Where continuous breaches occur (i.e. more than 3 breaches), the responsible party may be excluded from using Biggin Hill Airport in perpetuity.

The level of fines will be based on a multiple of up to three times the standard landing fee applicable to the aircraft type concerned. The level of fines will from time to time be published in BHAL's terms and conditions of business. The precise fine for any violation will be determined based on the severity of the breach and whether or not it included an element of track keeping, noise limitation or both and whether any mitigating circumstances should be taken into consideration.

The fines shall be paid into a nominated 'Community Fund' which shall be managed and audited by a body appointed by the London Borough of Bromley. Application of the funds, and the bodies or causes benefitting from them, shall be at the sole discretion of this committee.

Although final details are not yet determined, this recommendation is being acted on in an appropriate manner.



16 Relocating the VOR beacon

BHAL to report to LBB on the progress of, and timescale for, implementation of the scheme to relocate the Biggin Hill VOR.

Timing: requires agreement between BHAL and statutory bodies such as NATS. BHAL shall therefore use all reasonable endeavours to secure the necessary agreements as soon as reasonably practical.

BHAL has been informed by NATS that the proposed changes will take place in 2019 when, they are further informed, the Biggin Hill VOR will likely be decommissioned.



17 Noise monitoring and track keeping system

BHAL 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.

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

BHAL 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 BHAL website or an extension to the LBB website.

Timing: be implemented before BHAL is permitted to operate in the altered hours. 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

17.1 System

Current proposals are for BHAL to install and operate a Bruel & Kjaer ANOMS system which is a fully up to date Airport Noise and Operations Management System. The attached data sheet provides some information on the configuration and operational options available with this system. Further details are available on the website:

<http://www.bksv.com/Products/EnvironmentManagementSolutions/AirportEnvironmentManagement/ANOMS>.

Current proposals are to make use of 3 monitors, 2 of which will eventually be located at fixed positions and the remaining one remaining a mobile monitor that can be located at suitable locations within community depending on the nature of the noise investigation to be undertaken. At the outset, all 3 monitors will be mobile so that a variety of monitoring positions can be investigated for suitability prior to making a definitive decision on permanent locations. The process of mobile monitoring and location selection will take place in collaboration with LBB.

BHAL will contract to obtain the necessary radar feed from Heathrow Airport which will be used by the ANOMS system to precisely determine the location of aircraft in the vicinity of



Biggin Hill Airport. The system has the capacity to colour code aircraft to distinguish between those landing at the Airport, those departing from the Airport and those passing through the local airspace en-route but not operating from Biggin Hill. All aircraft are uniquely identified on the system allowing the system to:

- Check the noise levels generated at each monitor by the aircraft movement in question against the Noise Violation Limits. Any transgression will be automatically logged and the relevant fines or other sanctions levied against the operator.
- Determine whether the aircraft is conforming to the designated flight tracks (Noise Preferential Routes) or is flying off track. Again, transgression will be automatically logged and the relevant fines or other sanctions levied against the operator.
- Determine the particular operation that gives rise to any complaints raised by people living in the community, and whether that operation is in violation of the noise limits or track keeping constraints.

The system will be hosted and operated by BHAL, but LBB will have a direct feed allowing relevant personnel to monitor noise and track keeping data in real time, at any time.

The system will also have a web interface allowing members of the public to view operations through Biggin Hill airspace in real time, subject to a feed delay consistent with security requirements. The web feed provided for the ANOMS systems installed at London Heathrow and London Stansted Airports can be viewed here:

<http://webtrak5.bksv.com/lhr4>
<http://webtrak5.bksv.com/stn3>

17.2 System Set Up

The preferred locations for noise monitors will be determined in conjunction with LBB and/or any advisor instructed by them. The results of noise output data from monitors positioned at trial locations will be reviewed for suitability by BHAL in conjunction with LBB and/or any advisor instructed by them. Permanent monitor locations will be agreed between BHAL and LBB and/or any advisor instructed by them based on a joint analysis of the suitability of the data generated by the system.

Permanent noise monitoring locations are likely to require planning consent.

At all monitoring locations, Maximum Permissible Noise Level (MPNL) limits for all aircraft operations will be agreed between BHAL and LBB and/or any advisor instructed by them having regard to:

- The location of the monitor relative to the runway,
- The location of the monitor relative to the Noise Preferential Routes for both departures and arrivals,



- The noise levels predicted at the monitor by the INM noise contour generating program for individual aircraft types,
- The actual noise levels generated at the monitor by individual aircraft types.

Track Violation Limits will be agreed between BHAL and LBB and/or any advisor instructed by them.

17.3 Reporting

Paragraphs 4.31 to 4.35 of the NAP identify BHAL's proposals with respect to the contents and frequency of reports proposed to be submitted to demonstrate compliance with the limits and restrictions attached to the hours variation, if approved. The proposals are in line with the practice adopted at other UK airports, with information being provided on a quarterly and an annual basis as follows:

4.35

On a quarterly basis LBHA will provide the Airport Consultative Committee (ACC) with:

- A report on compliance with procedures given in the UK Aeronautical Information Publication (AIP) to minimize noise, i.e. EGKB AD 2.21 Noise Abatement Procedures (as revised from time to time).
- Report the number of departures and arrivals on each Runway
- Report the movements in the early morning and late evening periods
- Investigate, log, record and report on the output of the NMTKS and provide the ACC with copies of its responses to all noise complaints received from members of the public.

On an annual basis LBHA will:

- Issue a Performance Monitoring Report (PMR) on the actual and forecast summer contours which will contain a description of the contouring methodology used, the inputs to the computations, the contours and the resulting areas expressed in square kilometres. This report will go to the Airport Consultative Committee (ACC) and the Noise and Safety sub-committee of the ACC. On a five yearly basis the report will also include forecast summer contours for 5 years ahead.

An issue of concern has been raised in relation to the noise envelopes in that they (daytime, early morning and late evening) are determined on the basis of a full year of operations. If the reporting of BHAL's performance against these envelopes occurs on a retrospective annual basis, what mechanism is in place to prevent them from being exceeded?

While it is correct that formal reporting of noise levels against the envelopes occurs annually, monitoring of performance against those envelopes occurs on a real time basis. Data from the NMTKS can be used to update actual noise contours generated by the Airport on a regular basis. By considering the actual noise contours on a rolling annual basis, as opposed to a strict calendar basis, real time monitoring of the noise envelope constraints can be undertaken. It is



to be expected that the Airport will allow reasonable headroom in their scheduling of operations to minimise the risk of an actual exceedance of the envelopes occurring.

In addition, it should be noted that the formal report submitted on an annual basis will contain not just the actual noise contours for the year of reporting but also the forecast contours for the year ahead. This will allow any expected trends in the shape and extent of the contours to be properly assessed. In the event that such trends are indicative of the agreed envelope being exceeded, BHAL would be expected to modify their operational forecasts, and operate the Airport in accordance with such modified forecasts, so that the likelihood of an exceedance occurring is minimised.

Although final details are not yet available, this recommendation is being acted on in an appropriate manner.



18 Airport charges

Any variation of hours are conditional on LBB seeking an increase in the amount payable by BHAL 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 BHAL.

Timing: to be implemented prior to acceptance of the NAP.

The revenue to be raised to the benefit of the public purse and the uses to which it is expected to put is detailed in CSACL Report Biggin Hill Airport: Extended Operating Hours, London Borough of Bromley, September 2015 and summarised in the Executive report published on 16th October 2015.

This recommendation is considered satisfied.



19 Helicopters

19.1 Current Operations

We are advised by BHAL that helicopters use the runways as do other aircraft types. They normally operate under Visual Flight Rules (VFR) and can therefore route themselves once outside the Airport's Air Traffic Zone (ATZ). We understand that the Airport encourages them to fly above 2,000ft.

Helicopters fly the visual circuits, where required, or join the Instrument Landing System (ILS) if required or where they are operating under Instrument Flight Rules (IFR).

The restrictions relating to helicopter operations set out in the UK Integrated Aeronautical Information Package (IAIP) are:

EGKB AD 2.16 HELICOPTER LANDING AREA

Helicopters are routed under ATC instruction. Those parking on the main apron will be marshalled.

Helicopters should expect to arrive and depart from marked runways.

EGKB AD 2.20 LOCAL TRAFFIC REGULATIONS

5 Helicopter Operations

(a) In order to avoid noise sensitive areas surrounding the aerodrome, helicopters must conform to normal fixed-wing joining, departure and circuit procedures unless otherwise instructed by ATC.

(b) Pilots of helicopters should take particular note of a noise sensitive area on the northern aerodrome boundary prohibiting close right-base approaches for Runway 21 or direct departures north from Runway 03.

It should be noted that the noise contours contained in the NAP, and hence the noise controlling envelopes that have been agreed, include the contributions of all helicopters expected to use the Airport.

19.2 Local Perception

Helicopters are, by their nature, highly manoeuvrable and capable of flying at virtually any height over any geographic location. Local residents have raised concerns about the noise they generate.

It is not obvious whether these concerns are related to the noise generated by helicopters properly conforming to the procedures identified above or whether they are due to helicopters flying in a more flexible manner. At present there is no means of precisely identifying where or



how high a helicopter is at any point on its flight. We expect this to be corrected once the NMTKS is installed and operating.

It is also expected that once helicopter operators understand that their movements are being properly policed, better conformance to the prescribed procedures will be adopted and this will lead to fewer issues associated with noise generated by helicopters flying low over noise sensitive areas.

19.3 Future Noise Levels

It has been suggested that if helicopters must attain a minimum height of 1,000ft above aerodrome level before leaving the confines of the Airport, this would lead to a betterment of the noise issue.

It should be noted that the NAP contains a provision for implementing such changes where they are deemed to be beneficial in terms of noise, as identified in Section 10 above, namely:

BHAL will continue to review the Standard operating Procedures (SOPs) for all aircraft operations. Where it believes that new SOPs would produce a significant benefit to residents without compromising safety in any way, the existing SOPs would be modified accordingly.

If the output of the NMTKS demonstrates that benefits would be likely to arise from helicopters departing the Airport at this greater altitude, and the change can be effected without compromising safety, then we would expect BHAL to engage in the process of effecting such a change.



20 Based Aircraft

We have been advised in a note from Bickerdike Allen Partners (Ref: A9780-N09—DC, dated 15th September 2015) that based aircraft types at Biggin Hill Airport are currently as set out in the table below.

London Biggin Hill Airport – Based Aircraft Types 2015		
BAE HS 125-700/800/900	Cessna Mustang	Gulfstream G5
BAE 146	Dassault Falcon 10	Gulfstream G550
Beech 90	Dassault Falcon 2000	Gulfstream G650
Beech 200	Dassault Falcon 900	Learjet 45
Bombardier Challenger CL300	Dassault Falcon 50	Learjet 31
Bombardier Challenger CL601	Dassault Falcon 7X	Piaggio Avanti
Bombardier Challenger CL604	Embraer Phenom 100/300	Piaggio Evo
Bombardier GLEX/6000	Embraer Legacy	Numerous piston types
Cessna C550/500	Gulfstream GIII	
Cessna C560 Excel	Gulfstream G4	

Table 1: LBHA Based Aircraft



21 Ground Noise

21.1 Current Provisions

The Operating Schedule of the Lease contains various restrictions and provisions in relation to noise generated by aircraft while on the ground. It is not proposed to alter these and they will therefore remain in force in the event that the hours variation is granted.

21.2 Public Reaction to Ground Noise

Historically there has been a low level of complaints from the public regarding noise from operations at Biggin Hill, and in relation to the specific issue of ground noise, a review of the complaints made over the last 3 years indicate a total of six (6) registered that related to standard operations at the Airport. The incidence is considered very low.

The Airport has compiled a list of all complaints relating to ground noise registered in the last 3 years.

03.06.13	Mr Conroy	Dowding Road, Biggin Hill	propeller engine being revved emitting fumes – northerly winds would have been contributing factor
09.07.14	Mr Brown	Jail Lane, Biggin Hill	helicopter running engine for half hour, using compass swing bay, engineers were unable to quickly adjust compass
15.08.14	Mr Brown	Jail Lane, Biggin Hill	Jet engine noise all afternoon. This was a busy day due to visiting Lancaster Bombers, Typhoon and usual business jets. Northerly winds.
16.08.14	Mr Jenkins	Crossley Close, Biggin Hill	jet ticking over 18h15 to 19h00. Low power engine run on Typhoon
17.04.15	Mrs Freddi	Oaklands Lane, Biggin Hill	global express started engines for dept at Rizon 08h20, 03 Eurocontrol suspended flight. ATC worked to resolve situation, clearance to take off at 09h58.
13.07.15	Mr Enness	Downe Avenue, Downe	continual loud aircraft noise from 5pm onwards
22.08.15	Mr Langridge	Leavesden Estate, Biggin Hill	continual engine noise. Number of different aircraft on and off the ramp that morning.
27.09.15	Mr Langridge	Leavesden Estate, Biggin Hill	continual engine noise. Procedures were followed correctly. Perhaps wind direction?

We are also advised that the noise referred to in the 15th/16th August 2014 complaints was due the Airport hosting the RAF for the Eastbourne Air Show, an irregular occurrence that took place at the specific request of Bromley Council.



21.3 **NAP Provisions on Ground Noise**

Ground noise is not normally considered as part of an airport's NAP, and the Government Guidance¹ to Airport Operators who are obliged to produce NAPs does not specifically refer to ground noise as requiring particular control provisions.

Nevertheless, the Biggin Hill NAP does commit BHAL to drawing up a Ground Noise Action Plan with the aim of minimising noise impact resulting from aircraft operations which may significantly affect noise sensitive residential locations. BHAL are to use reasonable endeavours to publish and adopt the Ground Noise Management Plan within 12 months of adoption of the NAP.

As with other noise control commitments contained in the NAP, the Ground Noise Management Plan will be subject to agreement with LBB.

¹ DEFRA: Guidance for Airport Operators to produce noise actions plans under the terms of the Environmental Noise (England) regulations 2006 (as amended): 2013



22 Noise Levels at the PRUH

BHAL commissioned a further noise survey at the Princess Royal University Hospital and the results were reported by Bickerdike Allen Partners on 4th November 2015.

We have reviewed the report and find that the methodology employed is consistent with what we would expect at the site and that the results can be considered representative of the current noise climate and therefore viewed with confidence.

The report concludes that the external aircraft noise levels at the hospital are in the order of 50dB $L_{Aeq,16h}$ or just below. This finding is consistent with the modelled noise levels, as the 57dB $L_{Aeq,16h}$ contour is indicated as extending to a position short of the hospital by a comfortable distance.

External aircraft noise levels are not at a value that would be considered significant and requiring specific noise control measures at the hospital when considering the provisions of the Aviation Noise Policy.

The report concluded that internal noise levels would be on average well below the levels typically existing in hospitals due to internal plant, equipment and activity. This conclusion was reached on the basis that windows to noise sensitive parts of the hospital would remain closed and well-sealed.

We queried whether this was a valid assumption and whether BAP knew of any noise sensitive parts of the hospital that rely on openable windows for ventilation. The response we received was:

During our latest survey at the hospital we did not access any of the wards, but during our earlier survey in 2009 it was noted that "the hospital was built in the last few years and includes a main three storey building where wards are located. The modern nature of the hospital means that it is double glazed and has some mechanical ventilation. This means ventilation can be provided to the wards with the windows closed although the windows can be opened for additional ventilation if desired".

It is our understanding that the noise sensitive areas of the hospital do not rely on openable windows for ventilation.

We do not have any evidence that this is not the case, and we are not aware of aircraft noise issues causing any specific problems at the PRUH. Furthermore, we do not consider that any changes to noise levels generated by aircraft operations and occasioned by the sought variation in hours will alter this position.



23 *Flightpath Watch: Commentary by S Turner*

23.1 **Introduction**

23.1 We are advised that the information contained on page 9 of the undated Flightpath watch document presented to some members is a summary of an interim briefing note by Stephen Turner. We have not been furnished with a report from Mr Turner, and believe such a report has not been prepared.

23.2 It would appear that the wording of the commentary regarding noise is not actually Mr Turner's, but in fact a report by a member of Flightpath watch of commentary made by Mr Turner.

23.2 **Point One**

23.3 The impact of noise contours associated with the foreseeable level of operations at Biggin Hall has been quantified and appropriate noise envelopes set. It is fundamentally unclear how it can be concluded how the noise levels predicted for the forecast future level of movements has not been assessed.

23.4 The assessment that has been undertaken of this proposal is entirely consistent with the NPSE. Existing and predicted future noise levels have been assessed and the impact of those levels quantified. The Noise Action Plan contains a number of provisions negotiated between LBB and LBHA that:

- Effectively manage noise: the installation and operation of a comprehensive NMTKS with appropriate noise and track keeping limits and system of violation penalties offers a means of management not previously available.
- Effectively limits noise: imposes limits on average noise levels during the daytime, early morning and late evening, as well as limits on flyover noise levels during the night time period. These have not previously applied at the Airport.
- Effectively mitigates noise effects: mandates the provision of enhanced glazing to those residential properties most at risk of being adversely affected by noise levels high enough to pose a risk of sleep disturbance.

23.5 We are accused of focussing on the period between 06h30 and 07h00 which is claimed to show considerable deterioration. This ignores the controls being imposed on operations in this period which limit the noise levels to values below what the Airport is currently entitled to generate. It also ignores the assessment that has been undertaken for the late evening 22h00 to 23h00 periods and the associated limits that have been imposed.

23.3 **Point Two**

23.6 It is pointed out that Chapter 3 is not the most stringent of the noise standards that can be imposed on aircraft, and reference is made to Chapter 4 and Chapter 14 noise limits. No reference is made to the fact that the Lease was drafted in 1994, predating both of these later



standards, and that at the time the values contained in the Lease were the most stringent of the Chapter 3 limits that could be applied.

23.7 Historically there has been a low level of complaints from the public regarding noise from operations at Biggin Hill, and there is no compelling justification for seeking to impose lower noise limits in the Lease Operating Schedule.

23.8 What we have therefore sought to do is impose another layer of noise restriction that works in parallel with the Lease and comes into effect in the event that the hours variation is granted. Those noise restrictions are significantly more onerous than any that can be imposed by application of the Lease alone.

23.4 **Considerations by Flightpath Watch**

23.9 It cannot be determined with certainty that Flightpath Watch have accurately transcribed Mr Turner's views. If they have, Mr Turner is simply incorrect in a number of the assertions he makes, and had he attempted any dialogue with us on any of the issues, any misconceptions could have been discussed and hopefully resolved.

23.10 Irrespective of this, the conclusions drawn by Flightpath Watch in their final two paragraphs do not logically follow from the 2 points described above. The noise control benefits associated with the Noise Action Plan have either been misunderstood or ignored.



24 *Errata* - Noise Action Plan Review: Final

The following minor modifications are required to the Noise report appended to the LBB Executive Report:

Section 3.2, page 5

Timing for implementation of Recommendation 15 shall be Prior to Implementation of Change of Hours Operation. It is also identified as being Within 6 Months of Change of Hours, which is incorrect.

Schedule 15/0009/SCH1/5, page 1

The agreed operating hours on Saturdays are 2.5 hours shorter than requested, not 1 hour as incorrectly stated.

Schedule 15/0009/SCH1/5, page 3

Recommendations 11, 12 and 13 are all stated as requiring LBHA to use best endeavours to achieve implementation of altered operating procedures in agreement with third party authorising bodies (e.g. NATS, CAA). The requirement should be for LBHA to use reasonable endeavours to achieve implementation.

 End of Section

Project: **London Biggin Hill Airport – Noise Action Plan**

File Ref: A9780-N13-DC

Date: 13 November 2015

Subject: **Individual Movement Comparison**

From: D Charles

To:	Name	Company
	Vernon Cole	Cole Jarman
	Will Curtis	London Biggin Hill Airport

1.0 INTRODUCTION

At present the aircraft types that can operate at London Biggin Hill Airport are restricted by a schedule to the Lease. In summary this is to those that meet specific noise levels or those on an Approved List. Under the change sought by the airport additional controls will be introduced on the aircraft types that can operate, in particular for the early morning period 06:30 to 07:00.

The implication of these additional controls is explored below where the noise from individual aircraft types, some of which are currently permitted to operate but will not be in the future during the early morning period, is compared.

2.0 SEL FOOTPRINTS

2.1 Departures

90 dB(A) SEL footprints have been produced for departures from runway 03 and are shown on for Figure A9780/N13/01. The departure route they follow is that the airport advises will be used in the future, which has a slightly tighter turn than that previously assumed. This alteration is the result of correcting for a drift in magnetic north over a number of years.

The footprints are as follows:

- NAP Limited which is that for the INM aircraft type LEAR35, which represents both the loudest and the most common aircraft type forecast to depart in the early morning period,
- MD83 which is an aircraft type that can meet the current specific noise levels but would be restricted in the future,
- Gulfstream G3 which is on the current Approved List and would be restricted in the future.

2.2 Arrivals

90 dB(A) SEL footprints have been produced for arrivals onto runway 21 and are shown on for Figure A9780/N13/02.

The footprints are as follows:

- NAP Limited A and B which are those for the INM aircraft types CNA560XL and LEAR35, which represent the loudest and the most common aircraft types forecast to arrive in the early morning period,
- Gulfstream G3 which is on the current Approved List but would be restricted in the future.
- Current Boeing Business Jet (BBJ) which is an aircraft type that meets the current specific noise levels but would be restricted in the future.

3.0 MAXIMUM NOISE LEVELS

As a further comparison of the aircraft types the maximum noise levels from them have been predicted at a series of points along their flight tracks. The points are at 1 km internals from the northern end of the runway and are shown on Figures A9780/N13/01 and A9780/N13/02. The predicted departure noise levels are given in Table 1 below.

Track Distance from Runway Northern End	Predicted Noise Level, dB L _{Amax}		
	NAP Limited	MD83	Gulfstream G3
1 km	87.8	99.5	93.3
2 km	82.5	93.0	89.1
3 km	79.5	88.9	86.1
4 km	74.2	87.5	84.0
5 km	71.7	86.4	82.5
6 km	70.8	85.9	81.5
7 km	69.7	84.7	80.4

Table 1: Departure Maximum Noise Levels

The predicted arrival noise levels are given in Table 2 below.

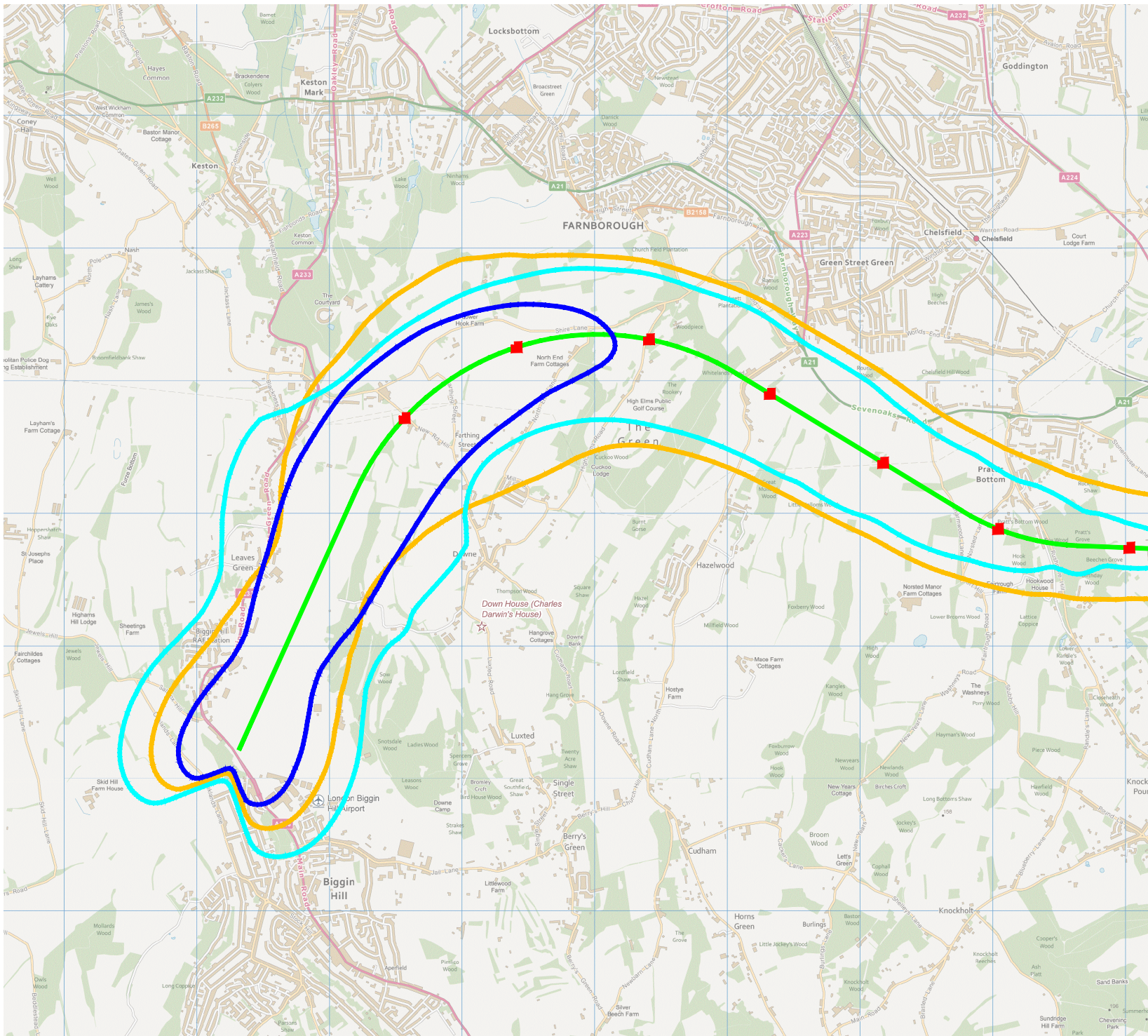
Track Distance from Runway Northern End	Predicted Noise Level, dB L _{Amax}		
	NAP Limited (A/B)	Gulfstream G3	BBJ (Current)
1 km	84.9 / 81.2	87.3	87.2
2 km	80.4 / 76.9	82.6	83.1
3 km	77.7 / 74.4	79.5	80.7
4 km	74.1 / 71.0	75.7	77.6
5 km	71.6 / 68.8	72.7	75.5

Table 2: Arrival Maximum Noise Levels

Duncan Rogers
for Bickerdike Allen Partners

David Charles
Associate

Peter Henson
Partner



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Legend

- NAP Limited
- MD83
- Gulfstream G3
- Departure Track
- Location Point

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**Biggin Hill Airport
Noise Action Plan**

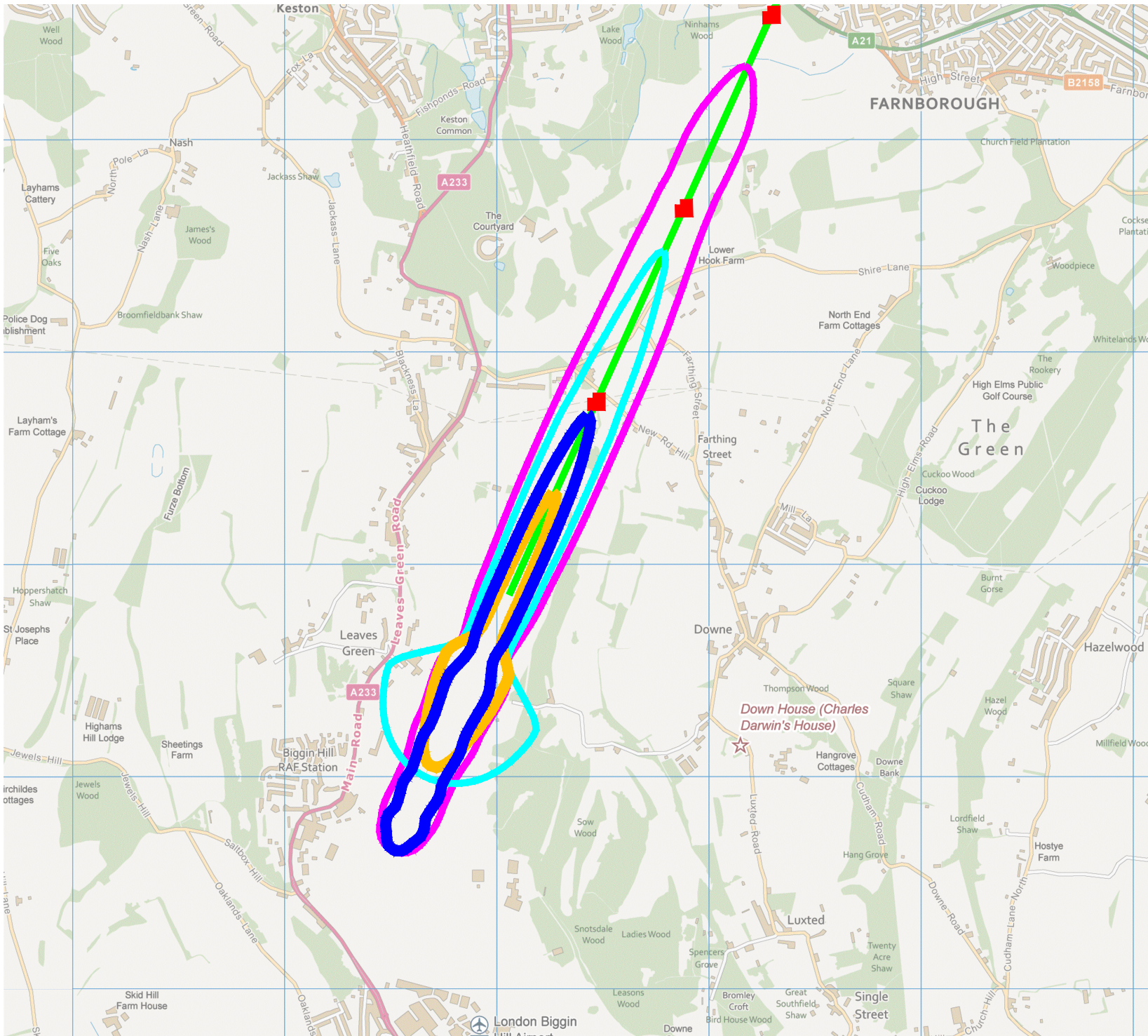
**90 dB(A) SEL Footprints
Runway 03 Departures**

DRAWN: DR CHECKED: DC

DATE: 13/11/2015 SCALE: 1:40000@A4

FIGURE No:

A9780/N13/01



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Legend

- NAP Limited A
- NAP Limited B
- Gulfstream G3
- Boeing BBJ
- Arrival Track
- Location Point

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**Biggin Hill Airport
Noise Action Plan**

**90 dB(A) SEL Footprints
Runway 21 Arrivals**

DRAWN: DR CHECKED: DC

DATE: 13/11/2015 SCALE: 1:25000@A4

FIGURE No:

A9780/N13/02

ANOMS

AIRPORT NOISE & OPERATIONS MANAGEMENT SYSTEM



Advanced Features

- ▶ Detection and alerting of noise and flight rule violations
- ▶ Rule and violation management
- ▶ WebTrak FlyQuiet aircraft operator web site
- ▶ Integrated aircraft registry combining several data sources
- ▶ Wide area radar coverage combining flight tracks from more than one radar
- ▶ Integrated air traffic control playback with flight tracks
- ▶ Airport Operating Mode
- ▶ Air Quality Monitoring
- ▶ NOTAMS Data
- ▶ Mode S tail number integration
- ▶ Automated WebTrak complaint entry
- ▶ Continuous Descent Analysis (CDA)
- ▶ Holding pattern detection and analysis

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Airports choose ANOMS because

- it is simple and cost-effective to use for small airports
- it has the most advanced capabilities for the world's most sophisticated noise programs
- it streamlines the operation of the noise office
- it grows to meet your needs through optional advanced features and modules
- the airport can own and operate or Brüel & Kjær EMS can do it all for them with NoiseOffice managed services
- it's produced by the world's leading supplier of airport noise management systems with the assurance that we will be there for you into the future whilst others come and go.

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Airport Noise & Operations Management System

ANOMS fuses data from a wide range of sources to create a comprehensive view of airport operations and their environmental impact.

ANOMS supports the widest range of data sources; from environment monitoring units that collect noise and weather data, to SkyTrak passive radars for live flight information plus an extensive range of 3rd party data sources including radar and flight plan systems, NMTs, AODBs, AWOS, Metar and ATIS.

The ANOMS desktop is highly configurable to meet the specialized business needs of users throughout the airport. The power of ANOMS is augmented by specialized applications including iVIEW for public presentations and Scenario Builder for noise modeling. The WebTrak subscription module provides the ideal tool for community outreach. The NoiseOffice managed services complete the suite, providing tailored service solutions ranging from simple maintenance programs right up to fully hosted and managed systems with business processes delivery.

BUILDING NEIGHBORHOOD RELATIONS

WebTrak Internet noise and tracks, WebTrak Internet self service complaint entry and investigation, and easy to produce and understand reports provide a wealth of information for the community while needing little effort from staff.

BUILDING AIRCRAFT OPERATOR RELATIONS

New flight and noise rules management measures aircraft operator performance. WebTrak FlyQuiet provides a dialog with aircraft operators to share and promote operational excellence.

BEST WAYS TO HANDLE COMPLAINTS

ANOMS produces accurate answers to complex queries about the noise environment, providing logical and reasonable answers for concerned citizens and other stakeholders.

AIRPORT MANAGEMENT INFORMATION

Information in ANOMS is useful throughout the airport and ANOMS makes it easy to distribute relevant information within the organization.

GOVERNMENT AND REGULATORY REQUIREMENTS

ANOMS has been certified by Governments, Microsoft, and testing laboratories to meet and exceed many standards.



OPERATIONAL EFFICIENCY

Easy to learn and use, a trademark of ANOMS, is even better with automation of routine analysis and reporting through user configured workspaces and queries. Highly visual and intuitive, and integrated with Microsoft Office, ANOMS becomes part of the standard desktop.

SERVICE

While ANOMS is monitoring your airport environment, Brüel & Kjær Service is monitoring ANOMS, using custom processes to measure data quality, issuing alerts and repairing faults; achieving high reliability, data completeness and credibility.

OPERATION

The Brüel & Kjær NoiseOffice manages and operates ANOMS environment monitoring for some of the biggest and busiest airports in the world, including the three BAA London airports.

AIR QUALITY AND EMISSIONS MANAGEMENT

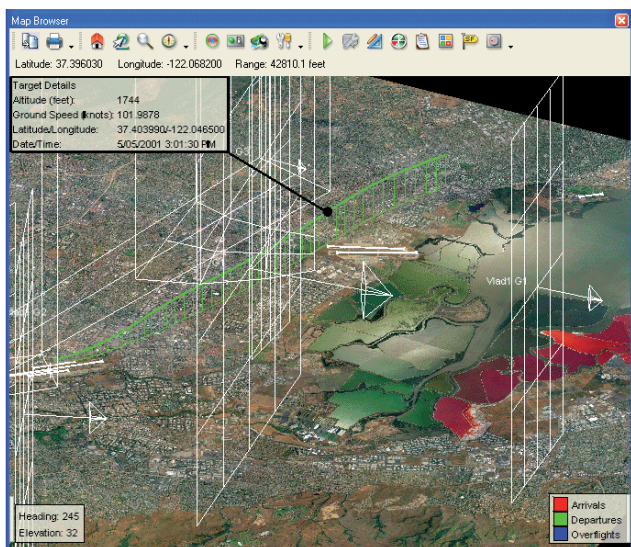
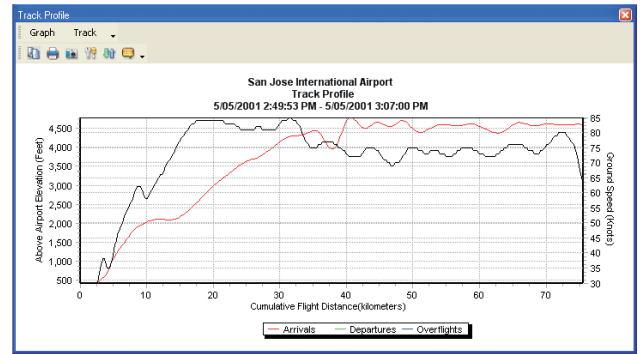
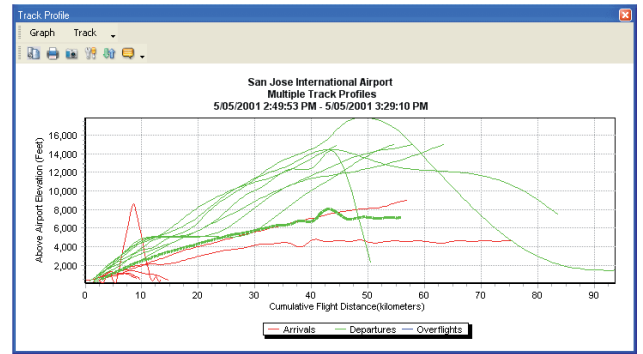
As airport needs in air quality grow, Brüel & Kjær responds with integrated air quality monitoring and emissions handling within ANOMS.

NOISE AND EMISSIONS MODELING

Contour generation for historical data and for the future

ANOMS FEATURES

- ▶ Sensors:
 - Noise and environment monitoring terminals
 - Real time or delayed radar and flight plan data feeds
 - Metar weather
 - NOTAM
 - D-ATIS
 - Air Quality
- ▶ 2-D and 3-D mapping
- ▶ Raster images; auto-load by zoom level
- ▶ Vector layers (roads, water, geographic features)
- ▶ Standard GIS input and output formats
- ▶ User configurable and saved workspaces, formats, layouts, colors
- ▶ Tested and proven smart correlation algorithms
- ▶ Query builder and output to Excel templates
- ▶ Complaint entry, analysis and response letters
- ▶ Address location
- ▶ Gate and corridor entry, editing, queries and penetration plots
- ▶ Point of Closest Approach from address and noise monitors
- ▶ Point of Closest Approach (cylinder and hemisphere track filters)
- ▶ Flight track and noise replay (2-D and 3-D)
- ▶ Interactive data browsers (similar to Excel spreadsheets)
- ▶ Map annotations
- ▶ Select multiple tracks on the map
- ▶ Altitude profile plot
- ▶ Color tracks by operation, airport, altitude, aircraft, airline
- ▶ Manual correlation editing
- ▶ Noise event plot
- ▶ Noise event audio playback
- ▶ Noise event and wind speed correlation
- ▶ Hourly and daily noise levels
- ▶ 1/3-octave noise data
- ▶ C-weight noise data

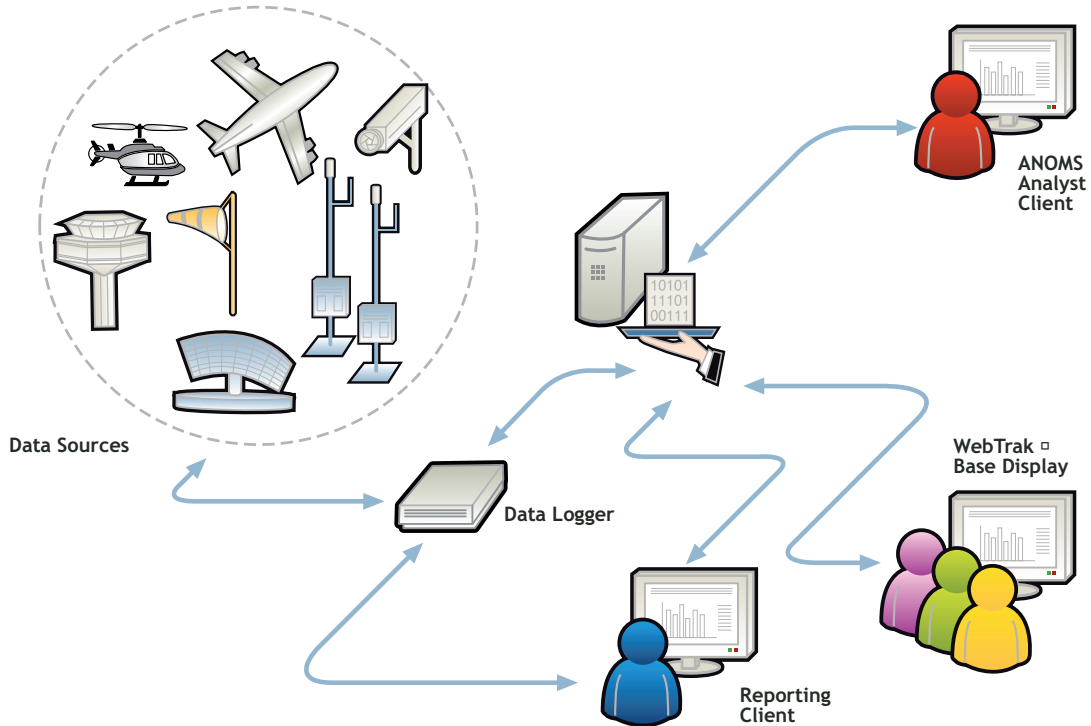


- ▶ Weather sensor data
- ▶ Metar Weather
- ▶ Flight rules (visual or instrument)
- ▶ Multiple airports
- ▶ Classification of noise events by airport
- ▶ Separation of noise levels by airport
- ▶ Measure in low level aircraft noise environments
- ▶ Calibration records
- ▶ Status records
- ▶ Portable noise monitor support
- ▶ Noise monitor set-up and configuration
- ▶ Assignment of noise model tracks
- ▶ Assignment of stage length for modeling
- ▶ Destination city
- ▶ Aircraft owner identification
- ▶ Aircraft and operator category grouping
- ▶ Crystal Reports (custom and standard)
- ▶ Report publication
- ▶ Scheduling of reports and queries
- ▶ Microsoft Certified for Windows Server 2003 and Windows XP
- ▶ Oracle Database
- ▶ Integrated Crystal Reports
- ▶ MS Office Integration
- ▶ Smart thin client
- ▶ Deployed server or remote hosting by Lochard
- ▶ Supports industry standard backup
- ▶ Remote monitoring and servicing by VPN

EXTENSIVE FEATURES AND CAPABILITIES

ANOMS works for the biggest and busiest airports in the world as well as airports with a noise problem but a small staff. ANOMS has been proven in all kinds of operating environments. No monitoring system has anywhere near the feature set of ANOMS.

ANOMS® System 8 Components



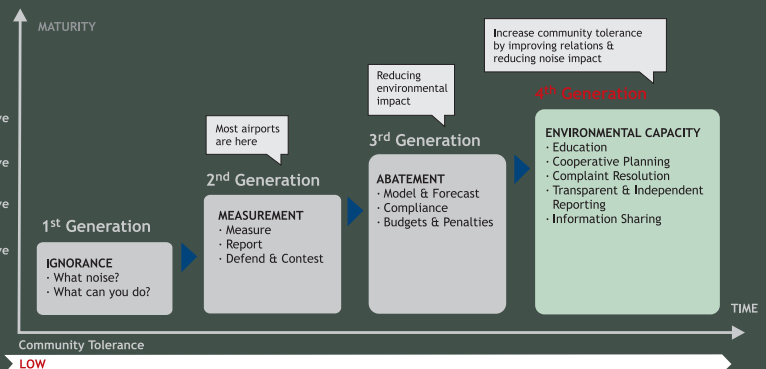
EXPANDING ENVIRONMENTAL CAPACITY

Against a background of continued long term growth in demand, airport master plans establish the major infrastructure investments required to support the growth in movements and passenger numbers.

In many cases, the real growth constraint may not be infrastructure, but the extent to which an airport can manage the environmental impact of growth and the resulting tolerance of the community to that impact.

To address this strategic issue requires a balanced program of impact reduction and tolerance building initiatives using state-of-the-art technologies and capabilities.

We call this "4th Generation Aviation Environmental Capacity Management".



www.bksv.com/ANOMS