London Biggin Hill Airport

Airspace Change Proposal Submission
ACP-2019-086

Date: 27th September 2024

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Harston Mill, Royston Road Harston, Cambridge CB22 7GG
01172 422533 / enquiries@ospreycsl.co.uk
Registered in England and Wales under No: 06034579

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1 Introduction

1.1 Introduction

London Biggin Hill Airport (LBHA) intend to introduce new satellite-based Area Navigation (RNAV) Instrument Approach Procedures (IAP), which includes the Missed Approach Procedure (MAP), which will ensure the continued availability of approaches, when older navigation methods are no longer available.

The introduction of an RNAV Approach will meet the requirements of the CAA Airspace Modernisation Strategy (AMS) and will remove dependency on ground-based navigation equipment which is currently being phased out in the UK.

1.2 Background

LBHA has embarked on this airspace change to introduce new Instrument Approach Procedures which includes the Missed Approach Procedure, as the current existing IAP and associated MAP will shortly be removed from use, as they use conventional navigational facilities on the ground that are reaching the end of life and will no longer be available. In addition, the current procedures are only available whilst the BIG DVOR is available and this navigational aid is only available through a contractual agreement with NATS, on a temporary basis. It has been agreed that as soon as the Runway 21 RNAV Approach has been approved by the CAA and implemented, the BIG DVOR will be removed from service by NATS.

If the Runway 21 RNAV Approach ACP is successful, it will also add a layer of resilience to the airport operation by providing a second instrument approach procedure that may be used in the event that the Instrument landing System (ILS) is unavailable.

The proposed procedures can be integrated into UK airspace, which is currently being modernised to incorporate new technologies, such as satellite navigation. This proposal will therefore meet the requirements within the CAA Airspace Modernisation Strategy.

The new IAPs, will not be required for over 99% of the time, as inbound aircraft usually receive radar vectors from Air Traffic Control, until established on final approach using the ILS. As radar vectoring is the most efficient way for the radar service provider to sequence air traffic, it would usually be available from the Thames Director radar unit for the operational hours of LBHA under contract. On the rare occasion that a radar service is not available, LBHA ATC will use the new Runway 21 RNAV Approach as a procedural recovery.

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2 Executive Summary

2.1 Introduction

LBHA proposes to introduce new Instrument Approach Procedures to Runway 21. The proposed procedures will be based on satellite navigation technology and ensure the continued availability of instrument approaches, when older navigation methods are no longer available.

The new IAP will not be required for over 99% of the time, as inbound aircraft usually receive radar vectors from Air Traffic Control, until established on final approach using the ILS. Radar vectoring is the most efficient way for the radar service provider to sequence air traffic. It would usually be available from the Thames Director radar unit for the operational hours of LBHA under contract. On the rare occasion that a radar service is not available, LBHA ATC will use the new Runway 21 RNAV Approach.

2.2 Airspace Solution

LBHA is proposing to introduce a Required Navigation Performance (RNP) IAP to Runway 21 with LNAV and LNAV/VNAV Minima. The procedure will act as a back-up in the event of an ILS failure, but will also future-proof the airfield and provide an alternative to procedures utilising the BIG DVOR, which is due to be removed in the near future.

During Stage 2 of the ACP process, LBHA also considered the introduction of PBN to ILS . This would provide resilience that was effectively removed by the unavailability of European Geostationary Navigation Overlay Service (EGNOS) agreement. The PBN to ILS element would enable aircraft at LBHA to utilise the PBN element of the procedure until they are established on the ILS at the Final Approach Fix (FAF). The advantage of this procedure is that using the ILS provides additional resilience, enabling aircraft to operate into LBHA in lower visibility rather than flying the full PBN approach. This procedure was considered feasible and LBHA are also proposing to introduce an RNP to ILS IAP with ILS and LOC/DME Minima as part of this ACP.

2.3 Engagement and Consultation

The UK Civil Aviation Authority (CAA) requires the undertaking of an Airspace Change Proposal (ACP) for the proposed change, following the airspace change process described in Civil Aviation Publication (CAP) 1616. As a result, the ACP Change Sponsor, in this case LBHA, has developed and assessed options for implementation of the IAPs, conducted engagement with airspace and airport users and other organisations who may be affected directly, or indirectly, by the change, and conducted a public consultation which was open to any individual or organisation that may be affected by the change.

The scope of public consultation was limited to the proposed implementation of new instrument approach procedures to Runway 21 at LBHA. The consultation made it

clear that the existing operational procedures and instructions given by Air Traffic Control (ATC) to arriving aircraft, will continue for the majority of arriving aircraft and these will not be impacted by the proposed change. The consultation was launched on Monday 11th September 2023 and ended on Monday 9th October 2023.

During the consultation, 27 responses were received in total.

After detailed and careful consideration of the responses to the consultation, LBHA has decided to progress Option PE for the approach segment of the procedure, combined with Option 9 for the Missed Approach element of the procedure. Two primary approach procedures are being proposed: a full RNP Approach with LNAV and LNAV/VNAV Lines of Minima and an RNP to ILS Instrument Approach Procedure. In addition, two further approach procedures are being proposed that will allow aircraft to conduct a further approach from the Hold in the event that the aircraft could not land off the initial approach and had to execute the Missed Approach Procedure. The Missed Approach element of the procedure has been modified following the consultation to route aircraft back through the airfield overhead, whilst remaining 2 NM clear of RAF Kenley. Aircraft then route south east initially before turning north to join the Hold at ALKIN, therefore avoiding the built-up areas around Farnborough and Orpington.

3 Current Airspace Description

3.1 Introduction

LBHA is the only dedicated business aviation airport in London. The airport is located in the London Borough of Bromley, approximately 12 miles south east of Central London, as shown in Figure 1 below.

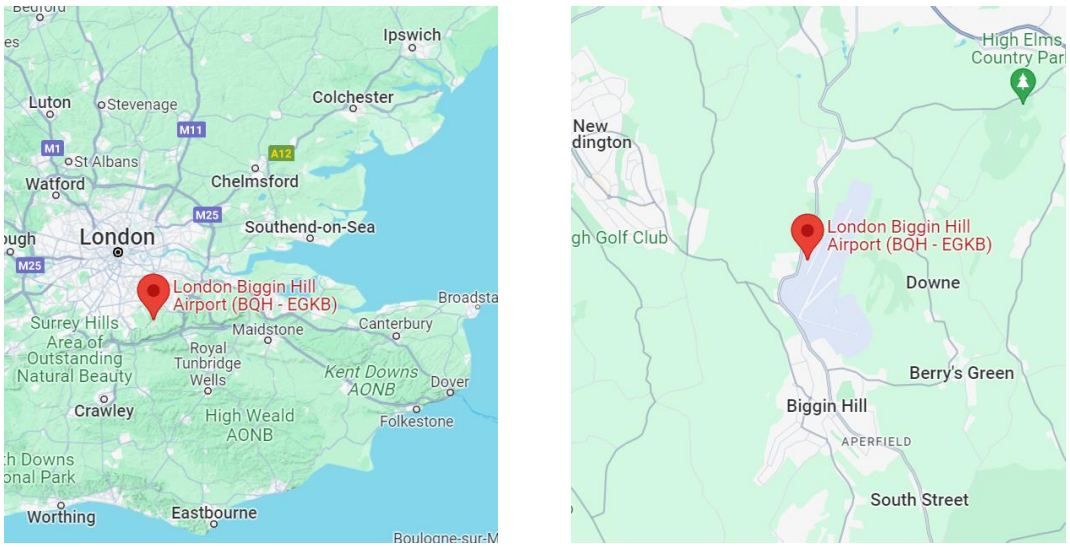

Figure 1 – LBHA Location

3.2 Current Airspace Description

3.2.1 Structures and Routes

LBHA is located in Class G airspace and has an Aerodrome Traffic Zone (ATZ) which comprises of a circle of radius 2.5 NM and extends vertically to 2,000 ft above the level of the aerodrome. The ATZ is established to provide protection to aerodrome traffic including those aircraft at the critical stages of flight (take-off and landing).

London Terminal Control (Swanwick) is the controlling authority for that part of the ATZ from 1,900 ft to 2,000 ft above aerodrome level as this part of the ATZ sits within the London Terminal Manoeuvring Area (LTMA).

The airspace around LBHA is relatively complex, as shown in Figure 2 and Figure 3 below. Immediately above the airport is LTMA 1 airspace, which is Class A Controlled Airspace (CAS) active from 2,500 ft above mean sea level (amsl) to FL195. Heathrow (21 NM north west), Gatwick (13 NM south west) and London City (10 NM north) Airports also lie beneath LTMA 1. Each airport has a Control Zone (CTR), Class D CAS active from the surface to 2,500 ft amsl. Gatwick and London City Airports also have a Control Area (CTA), extending laterally beyond the CTR, which is Class D CAS active from 1,500 – 2,500 ft amsl.

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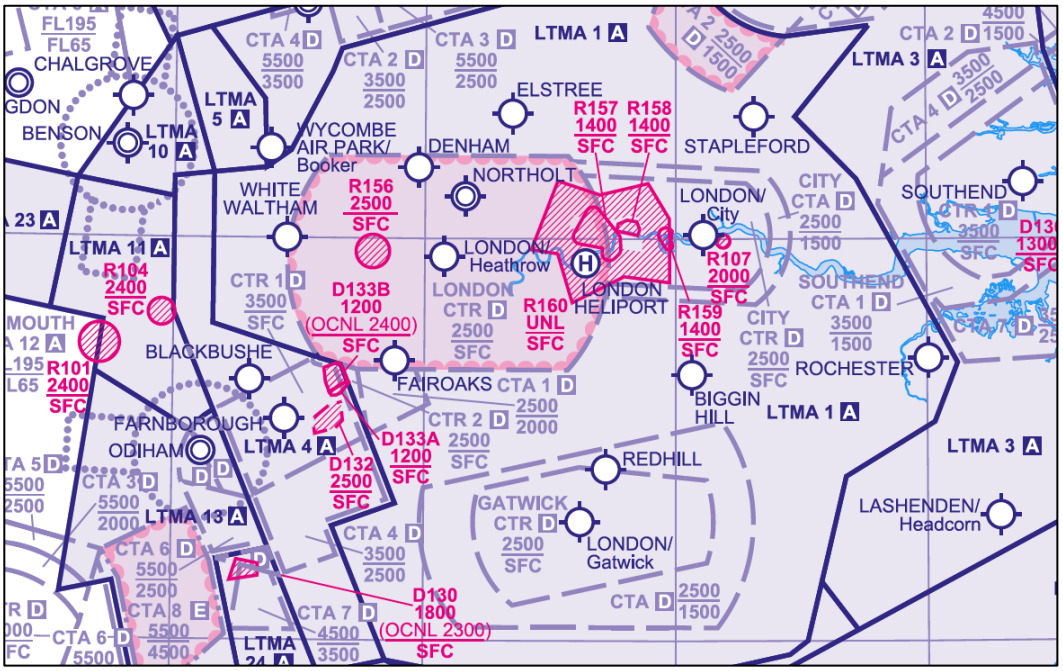

Figure 2 – London Terminal Manoeuvring Area

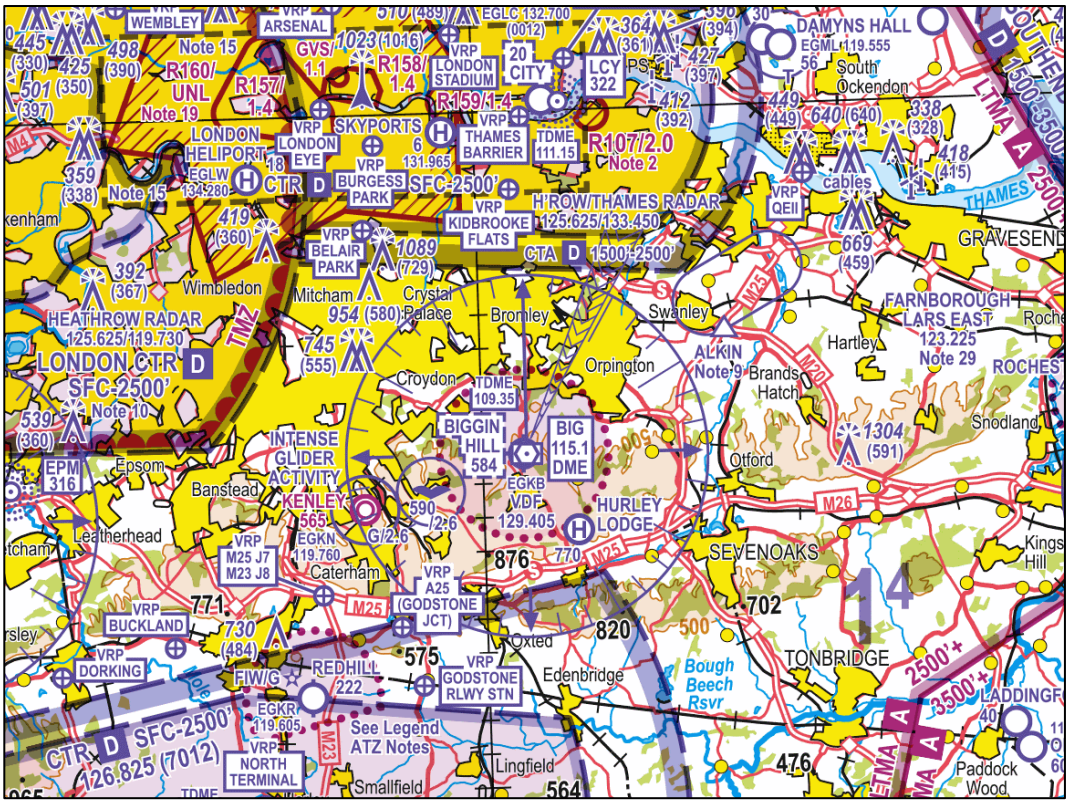

Figure 3 – Current Local Airspace Structure

RAF Kenley lies 5 NM west south west of LBHA. A military Gliding Squadron and civilian Gliding Club both operate from RAF Kenley on Tuesday, Wednesday, Thursday, Saturday and Sunday.

3.2.2 LBHA Current Operations

London Biggin Hill Airport is supported by one 1800m strip of tarmac which provides 2 runways for landing and take-off called Runway 21 and Runway 03. LBHA handled 36,763[1] aircraft movements in 2021 and 46,097 movements in 2022[2], comprising Business Jets, Light Aircraft, military aircraft and helicopters. Due to the prevailing south westerly wind and the availability of an ILS, most aircraft approach and land on Runway 21, approximately 80% of the time. In 2021, there were 14,901 landings on Runway 21 and 3,326 landings on Runway 03. In 2022, there were 19,229 landings on Runway 21 and 3,598 landings on Runway 03. In 2023, there were 16,396 landings on Runway 21 and 3,735 landings on Runway 03.

Of the total movements for 2021, 9,472 arriving aircraft made an Instrument Approach to Runway 21, of the total movements for 2022, 12,879 arriving aircraft made an Instrument Approach to Runway 21 and of the total movements for 2023, 11,279 arriving aircraft made an Instrument Approach to Runway 21. All aircraft making an Instrument Approach will make the approach to Runway 21, as this is the only instrument approach available. These aircraft would normally be radar vectored by Thames Director onto the ILS but if a radar service is not available, aircraft would be required to follow the existing conventional procedure. There were 8 occasions during 2021, 2 occasions during 2022 and no occasions during 2023 when a radar service was not available from Thames Director.

If Runway 03 is in use due to the prevailing wind, the pilot will usually 'break-off' the Runway 21 Instrument Approach at approximately 2 NM from the airfield and visually manoeuvre to land on Runway 03. Any pilots unable to land visually on Runway 03 will execute the Missed Approach Procedure and will either conduct another approach to LBHA or divert to another airfield where the weather conditions would be more favourable.

Of the 37,000 aircraft movements at LBHA throughout 2021, only 17 aircraft were recorded as having conducted a Missed Approach Procedure following an approach to Runway 21. Of the 46,000 movements in 2022, only 10 aircraft were recorded as having conducted a Missed Approach Procedure following an approach to Runway 21. Of the 40,000 movements in 2023, only 9 aircraft were recorded as having conducted a Missed Approach Procedure following an approach to Runway 21.

3.2.3 LBHA Arrivals

As most aircraft arriving at LBHA utilise the high altitude en-route network structure, known as the Approach Transition. Traffic arriving at LBHA exit the network at a reporting point known as OSVEV as shown in Figure 4 below.

[1] Biggin Hill Airport Consultative Committee Minutes 01-22_BHACC_Minutes.pdf (bigginhillairport.com)
[2] Biggin Hill Airport Consultative Committee Minutes January-2023.pdf (bigginhillairport.com)

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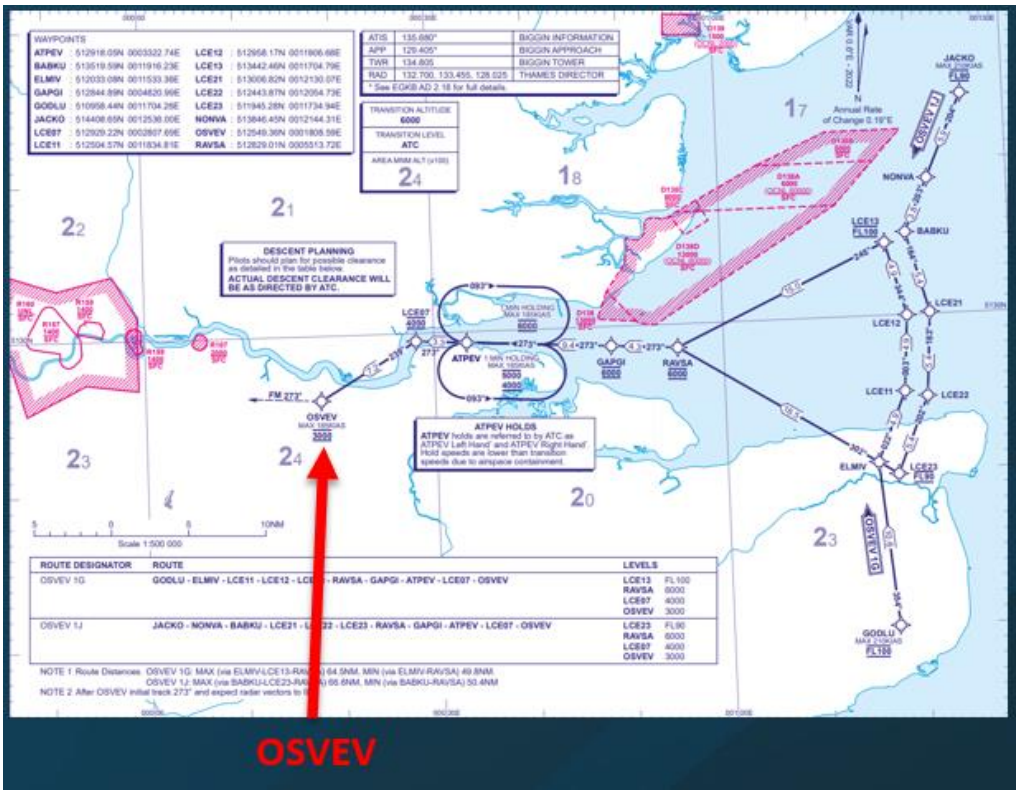

Figure 4 – LBHA – Approach Transition

Arrivals to LBHA are provided with radar vectors from Thames Director Air Traffic Controllers as they approach OSVEV from the east, until they are established on the ILS to land at LBHA. On the rare occasion that radar vectors are not available, aircraft currently use ground-based navigation aids to make the Approach onto the ILS.

The swathe in Figure 5 below (light blue) shows the tracks of arriving aircraft which operate at 3,000 ft amsl or below. There will be no change to flights operating above this level, so they have not been shown. This swathe contains the tracks of all aircraft receiving radar vectoring from ATC during 2021 and 2022, that made an approach to land at LBHA.

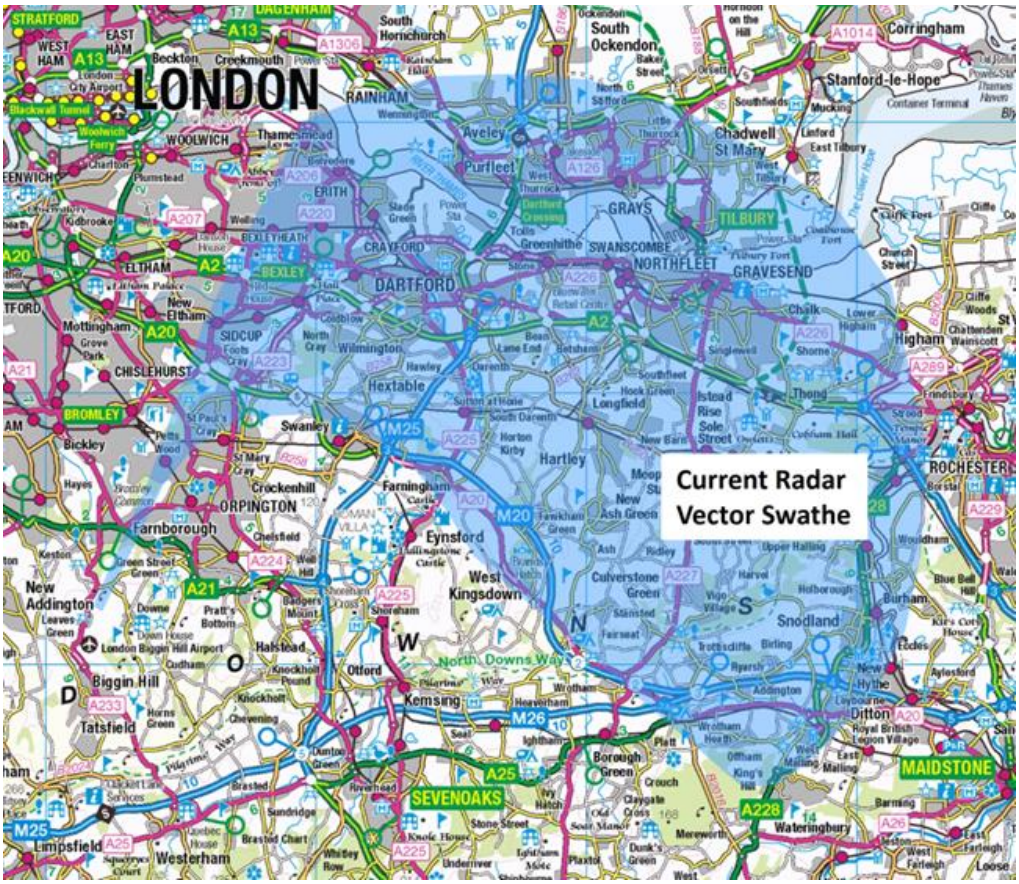

Figure 5 – Runway 21 Arrivals Swathe

3.2.4 LBHA Missed Approach Procedure

When an aircraft approaches an airfield on a published IAP, there will be a point at which a pilot must determine whether or not a safe landing can be achieved. The pilot may not have the airfield in sight due to poor visibility caused by low cloud or fog, or the aircraft may be poorly positioned when approaching a runway due to uncontrolled events, such as a strong gust of wind or an instruction passed from ATC for safety reasons. In this situation, the pilot will execute a MAP which is a standard part of the IAP that allows the pilot to reposition the aircraft to go around for another approach or, divert to another airport where the weather conditions may be more favourable for a landing.

There were only 17 occasions in 2021 and 10 occasions in 2022 when a MAP was executed by aircraft having made an approach to Runway 21.

The red lines in Figure 6 below show the route followed by aircraft executing the existing MAP between January 2021 and October 2022. Not all aircraft follow a specified route as they may be provided with radar vectors by ATC to enable the aircraft to be re-positioned for a further approach or initiate a diversion to another airfield.

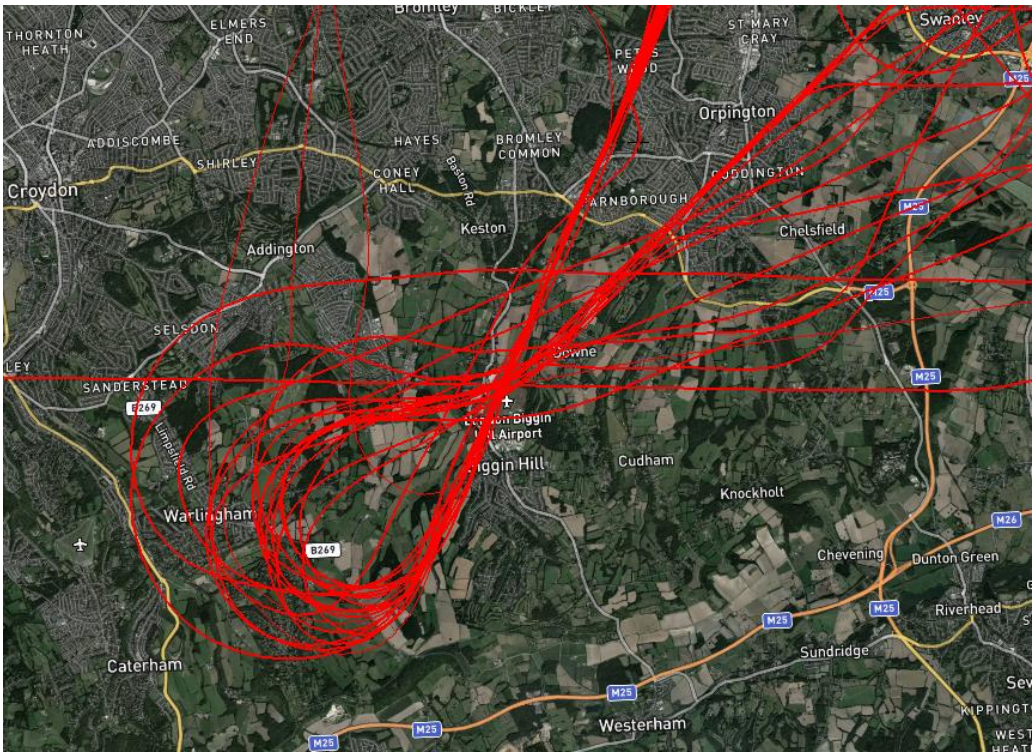

Figure 6 – Missed Approach Tracks

3.2.5 Airspace Usage

LBHA handles a mix of Business Jets, light aircraft, military aircraft and helicopters. LBHA is located in Class G airspace and has an ATZ, radius 2.5 NM and extending vertically to 2,000 ft above the level of the aerodrome. RAF Kenley is 5 NM west of the airfield and operates 2 gliding clubs: one military and one civilian.

The change sponsor considers that the proposed airspace change will not have any significant effect on how the airspace around the airport is used, or the type of operators using the airport.

3.2.6 Proposed Effect

The proposed airspace change is required to introduce new satellite-based Area Navigation (RNAV) Instrument Approach Procedure (IAP), which includes the Missed Approach Procedure (MAP). The new IAP will ensure the continued availability of approaches, when older navigation methods are no longer available.

3.2.7 Operational Efficiency, Complexity, Delays and Choke Points

The Change Sponsor considers that there is no impact for operational efficiency, complexity, delays and choke points in the current situation. However, should radar vectors be unavailable for arriving aircraft and the ground-based navigational equipment becomes unserviceable, aircraft may not be able to make an approach to land at the airport and may have to divert. This will have an impact on operational efficiency.

3.2.8 Safety Issues

There are no current safety issues within the relevant areas of airspace.

3.2.9 Environmental Issues

There are no specific environmental issues within the relevant area of airspace, in the current operation.

4 Statement of Need

4.1 Introduction

A DAP1916 Statement of Need was submitted to the CAA Airspace Change Portal in April 2020.

4.2 Statement of Need

The following text is from the DAP1916 Statement of Need, as submitted in April 2020:

London Biggin Hill Airport is proposing to implement an RNAV (GNSS) Instrument Approach Procedure (IAP), with LNAV and LPV minima, to Runway 21. The IAP will be designed for aircraft in speed categories A, B and C, and will include and RNAV Missed Approach Procedure.

The RNAV (GNSS) IAP will replicate/mimic the existing Runway 21 ILS/DME/VOR procedure. The RNAV (GNSS) Procedure for Runway 21 will not only act as a back-up in the event of an ILS failure, but will also future proof the airfield and provide an alternative to procedures utilising the BIG VOR, which is due to be removed in the near future.

5 Airspace Change Proposal

5.1 Introduction

5.1.1 Objectives/Requirements for Proposed Design

LBHA are responsible for providing the formal instrument procedures into and out of the airport. In this airspace change, LBHA are looking to implement new Instrument Approach Procedures for aircraft arriving at LBHA.

The current existing IAP and associated MAP will shortly be removed from use, as they use navigational facilities on the ground that are reaching the end of life, so will no longer be available. The new procedures, based on satellite navigation, are required to ensure the airport remains resilient by providing a second instrument approach in the event that the ILS is unavailable. These procedures can be integrated into UK airspace, which is currently being modernised to incorporate new technologies, such a Satellite Navigation.

The introduction of a PBN Approach will meet the requirements of the CAA Airspace Modernisation Strategy (AMS) and will remove dependency on ground-based navigation equipment which is currently being phased out in the UK.

The justification for this airspace change is to enable aircraft to continue to make an Instrument Approach to LBHA when radar vectors are not available.

The objectives of this proposal are to:

- Introducing new Instrument Approach Procedures, which includes the Missed Approach Procedure, to ensure that the continued availability of approaches, when older navigation methods are no longer available.
- To meet the requirements of the CAA Airspace Modernisation Strategy (AMS) and remove the dependency on ground-based navigation equipment which is currently being phased out in the UK.

5.1.2 Proposed New Airspace/Route Definition and Usage

The proposed option for this ACP submission is Option PE for the approach segment of the procedure, combined with Option 9 for the Missed Approach element of the procedure. Two primary approach procedures are being proposed: a full RNAV RNP Approach with LNAV and LNAV/VNAV Lines of Minima and an RNAV RNP onto the ILS Instrument Approach Procedure. In addition, two further approach procedures are being proposed that will allow aircraft to conduct a further approach from the Hold in the event that the aircraft could not land of the initial approach and have to carry out the Missed Approach Procedure. Further details of each approach procedure can be found in the following paragraphs.

5.1.3 RNP Approach Runway 21 Option Z

The proposed RNP Approach to Runway 21 Z, shown in Figure 7 below, enables aircraft to join the approach from the en-route network at OSVEV, in a similar position to that which they would do if being vectored by ATC.

Although this option does not replicate the procedure it is replacing, it replicates the likely ground track for aircraft receiving radar vectors from OSVEV to intercept the ILS procedure. The ground-track for this procedure falls within the current radar vector swathe, as shown in Figure 7 below.

The design of the procedure has been modified post-consultation by removing the offset approach to the IF. The IF remains clear of the London City CTR.

The Missed Approach element of the procedure has been modified following the consultation to route aircraft back through the airfield overhead, whilst remaining 2 NM clear of RAF Kenley. Aircraft would then route south east initially before turning north to join the Hold at ALKIN, routing further from Keston and avoiding built-up areas around Farnborough and Orpington. The Hold is flown clockwise based on the point ALKIN, which is the same as today.

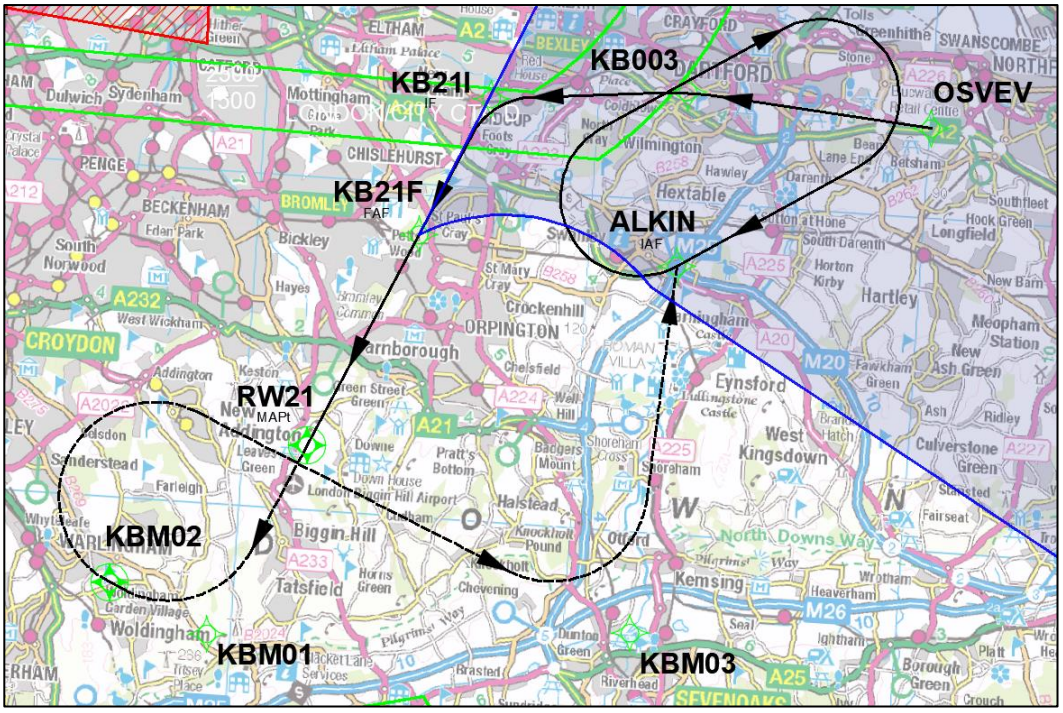

Figure 7 – RNP Approach Runway 21 Option Z

5.1.4 RNP Approach Runway 21 Option Y

The proposed RNP Approach to Runway 21 Y, shown in Figure 8 below, enables aircraft to re-join the approach from the Hold following a missed approach.

The initial part of the procedure is required to enable aircraft to safely self-navigate and re-position to make a further approach to the airfield. The procedure will only be utilised when radar vectors are not available to be provided by ATC and when an aircraft has carried out a Missed Approach Procedure from a previous approach. It is anticipated therefore that this procedure will be rarely used.

Once aircraft have passed OSVEV from the Hold, the approach procedure becomes the same as the procedure described above (RNP Approach Runway 21 Option Z).

Although a new procedure, the ground track flown from the Hold will be very similar to where aircraft carrying out a missed approach and receiving radar vectors back onto the approach currently will fly. Although the ground-track for this procedure falls slightly outside the current radar vector swathe, as shown in Figure 8 below, this area still experiences overflight currently from both arriving and departing aircraft. Therefore, no new populations will be overflown with this procedure.

The Missed Approach element of the procedure is the same as previously described above for the RNP Approach to Runway 21 Option Z.

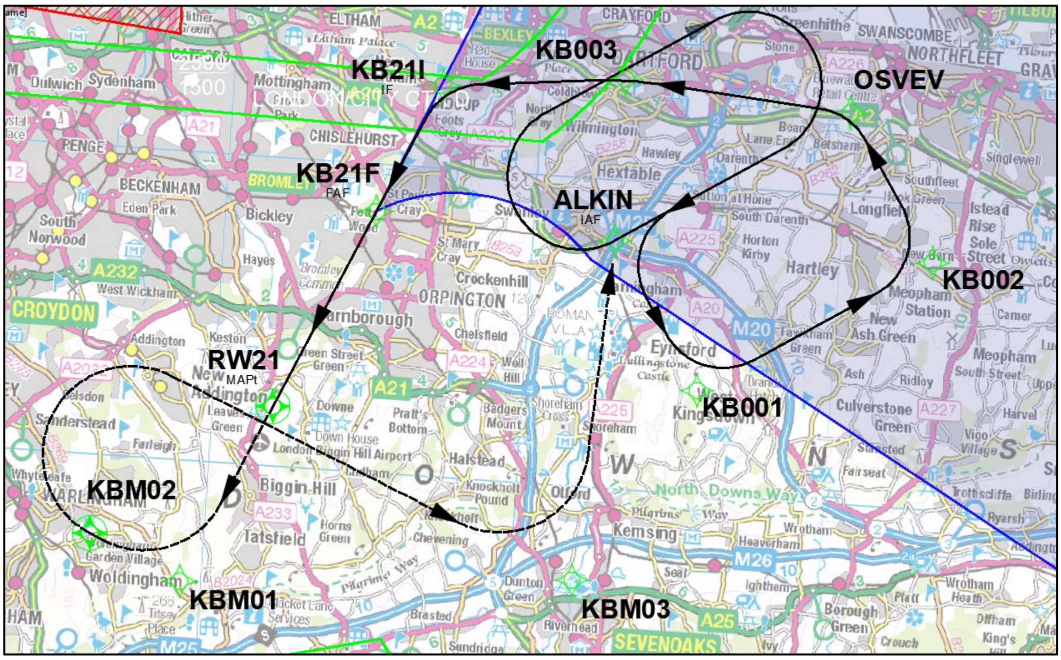

Figure 8 – RNP Approach Runway 21 Option Y

5.1.5 RNP to ILS Approach Runway 21 Option Z

The proposed RNP to ILS Approach to Runway 21 Z, shown in Figure 9 below, enables aircraft to intercept the ILS procedure from the en-route network at OSVEV, in a similar position to that they would do if being vectored by ATC.

Although this option does not replicate the procedure it is replacing, it does replicate the likely ground track for aircraft receiving radar vectors from OSVEV to intercept the ILS procedure. The ground track for this procedure falls within the current radar vector swathe, as shown in Figure 9 below.

The design of the procedure has been modified post-consultation by removing the offset approach to the IF. The IF remains clear of the London City CTR.

The Missed Approach element of the procedure is the same as described above for the RNP Approach to Runway 21 Option Z.

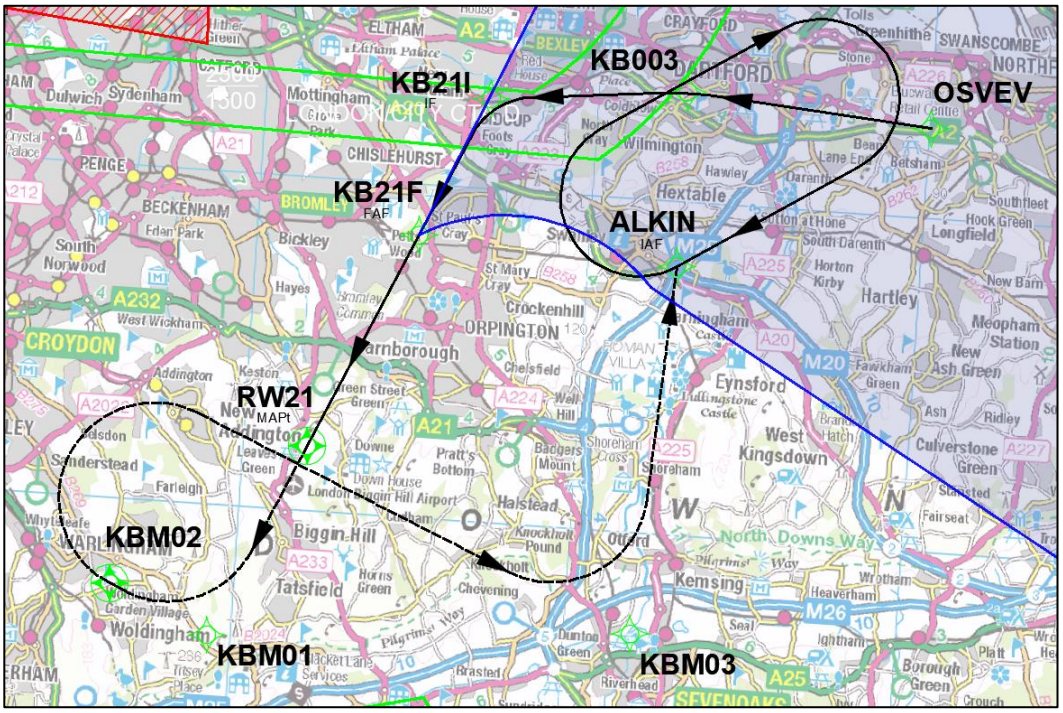

Figure 9 – RNP to ILS Approach Runway 21 Option Z

5.1.6 RNP to ILS Approach Runway 21 Option Y

The proposed RNP to ILS Approach to Runway 21 Z, shown in Figure 10 below, enables aircraft to intercept the ILS procedure from the Hold following a missed approach.

The initial part of the procedure is required to allow aircraft to safely self-navigate and re-position to make a further approach to the airfield. It will only be utilised when radar vectors are not available to be provided by ATC and aircraft have carried out a Missed Approach procedure from a previous approach. It is anticipated therefore that this procedure will be rarely used.

Once aircraft have passed OSVEV from the Hold, the approach procedure becomes the same as the procedure described above (RNP to ILS Approach Runway 21 Option Z).

Although a new procedure, the ground track flown from the Hold will be very similar to where aircraft carrying out a missed approach and receiving radar vectors back onto the approach currently will fly. Although the ground track for this procedure falls slightly outside the current radar vector swathe, as shown in Figure 10 below, this area currently still experiences overflight from both arriving and departing aircraft. Therefore, no new populations will be overflown with this procedure.

The Missed Approach element of the procedure is the same as described above for the RNP Approach to Runway 21 Option Z.

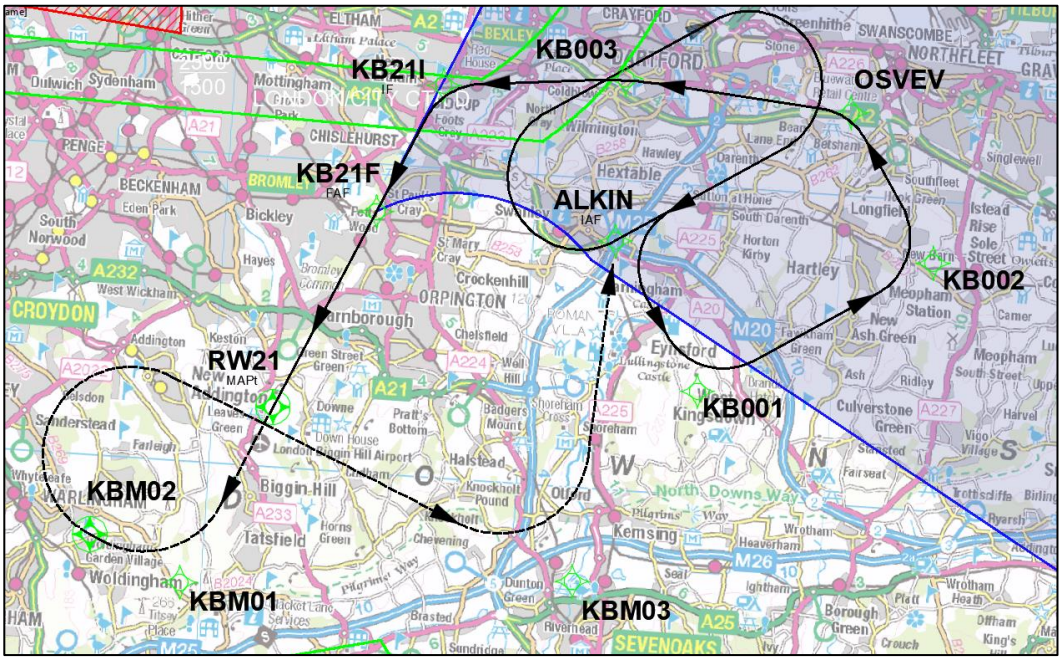

Figure 10 – RNP to ILS Approach Runway 21 Option Y

5.1.7 Changes Between Consultation and Final Proposal

The following changes have been made to the procedures following feedback from the consultation:

- The routing from OSVEV to the Initial Fix (IF) is more direct via an intermediate waypoint, rather than TUNEL.
- The position of the IF has been adjusted so there is no turn onto the FAF. This allows for the LNAV/VNAV aspect of the procedure to be included. This replicates the likely ground track for aircraft receiving radar vectors from OSVEV to intercept the ILS procedure.
- The MAP routes back through the airfield overhead whilst remaining 2 NM clear of RAF Kenley. Aircraft will then route south east initially before turning north to join the Hold at ALKIN, therefore routing further from Keston and avoiding built-up areas around Farnborough and Orpington.
- The introduction of additional procedures to allow the aircraft to re-position onto the approach procedure from the Hold after a MAP has been carried out and ATC are not available to provide radar vectors.

5.2 Engagement and Consultation Activity

During Stages 1 and 2 of the ACP, a range of targeted engagement activities were conducted following the process set out in CAP 1616. Stakeholders have been involved in the development of the Design Principles and their subsequent validation and development of Design Options that addresses the original Statement of Need. These stakeholders are listed in Appendix A1.

The engagement carried out during Stages 1 and 2 was at the stakeholder representative level following CAP 1616; however, some of the Local Town and Parish Authorities were also represented through the auspices of the Airport

Consultative Committee (ACC), the Safety and Noise Review Board and the Light Aviation Steering Group. Details of the engagement activities completed prior to the consultation going live, including a summary of the responses received, can be found on the RNAV (GNSS) RUNWAY 21 Airspace Change Portal.

During Stage 3, LBHA commenced a 4-week consultation period on this proposed airspace change on Monday 11th September 2023. Three arrival options and one missed approach option were considered during the consultation. The published IAP must incorporate a MAP in the event that a pilot does not consider a landing is possible. This is a standard part of the IAP which will allow the pilot to reposition the aircraft to go around for another approach or divert to another airport where conditions may be more favourable for a landing. There was only one MAP option taken forward to consultation as the other options were discontinued earlier in the CAP 1616 process. It was therefore considered that this MAP option would be compatible with any of the 3 arrival options that were being considered.

The consultation was conducted via an online portal where users could submit a formal response alongside viewing the Consultation Document. The Consultation Document provides information on how the consultation was administered; an overview into the current airspace; the proposed changes and impacts of the proposed changes. The consultation period closed on Monday 9th October 2023. A total of 27 responses were received during the consultation period. A full summary of how the consultation was run and assessment of responses can be found in the Consultation Response document.

Following discussion with the CAA, LBHA considers that there is no requirement to re-consult on the changes made to the procedures as a result of consultation feedback and further design work. This is because there will be no changes to the impact, in particular noise and emissions, as a result of the modifications. The modified procedures will still overfly areas that are overflown by the current procedures and the numbers of aircraft that are expected to utilise the new procedure will remain very low compared to the overall number of arrivals at the airport. LBHA considers that there is no fundamental difference between the proposals already consulted on and those which are being applied for. The impact of the changes will not change substantially on any stakeholders already consulted (CAP 1616 Fourth edition paragraph 200).

5.3 Impacts and Consultation

5.3.1 Net Impacts Summary for ACP

Due to the small scale of the ACP, any impacts are expected to be minimal, resulting in minimal (if any) additional noise, greenhouse gas and fuel burn.

5.3.2 Units Affected by the Proposal

This proposal only affects LBHA. Inbound aircraft will continue to receive radar vectors from Air Traffic Control, until established on the ILS as this is the most efficient way for the Thames Director radar unit for the operational hours of LBHA under contract to provide a radar service and sequence air traffic. A Radar Service is available. On the rare occasion that a radar service is not available, LBHA ATC will use these new approach procedures. All other aircraft operating from LBHA will continue to operate as they do today.

5.3.3 Military Impact and Consultation

As a mandatory stakeholder in all airspace changes, LBHA consulted with the MOD directly through RAF Kenley and the Defence Airspace and Air Traffic Management (DAATM) through the NATMAC. The only concern expressed by RAF Kenley was that the Missed Approach Procedure should remain clear of RAF Kenley by 2 NM and up to the London TMA to have no impact. This has been incorporated into the design for the MAP and hence there will be no impact on RAF Kenley operations. DAATM stated that the ACP would have negligible impact on wider MOD operations and that RAF Kenley would reply separately to the DAATM response.

5.3.4 General Aviation Airspace Users Impact and Consultation

LBHA has engaged with General Aviation (GA) airspace users that have been identified as operating in proximity of the proposed changes. These included GA flying clubs and local airfields that have been listed in Appendix A1, as well as national organisations representing the GA community through the NATMAC. The Change Sponsor believes that there will be no impact on GA operations as a result of implementing this change, reflected in the fact that there were no responses received from members of the GA community to the consultation.

5.3.5 Commercial Air Transport Impact and Consultation

There are no Commercial Air Transport (CAT) operations at LBHA. LBHA has engaged and consulted directly with airline operators through the NATMAC as listed in Appendix A1 of this document. There will be no impact on CAT operations as a result of implementing this change, reflected in the fact that there were no responses to the consultation received from organisations representing CAT.

LBHA is a dedicated business aviation airport and LBHA has engaged and consulted directly with those operators that utilise the airport, as listed in Appendix A1. This airspace change will have a positive impact on these operators as it will not only replace an out-of-date conventional procedure but also provide resilience in the event of an ILS failure.

No consultation responses were received from LBHA-based operators.

5.3.6 CO_2 Environmental Analysis Impact and Consultation

This ACP does not consult on environmental impacts.

5.3.7 Local Environmental Impacts and Consultation

This ACP does not consult on environmental impacts.

5.3.8 Economic Impacts

The development of this ACP has not been informed by any economic constraints or opportunities.

5.4 Analysis of Options

5.4.1 Design Principles

In the initial stage of the Design Process, LBHA identified six Design Principles addressing Safety, Environmental concerns, Compliance, Navigation standards, Efficiency and Replication issues, against which all viable options would be assessed. LBHA Consultative Committee, airport stakeholders and selected members of NATMAC were engaged with to review the proposed design principles and suggest if any additional design principles were necessary. These were subsequently approved by the CAA and the shortlist of Design Principles is shown in Table 1 below.

Design Principle	Description
Design Principle 1. Safety	New routes must be safe and must not erode current ANSP safety barriers.
Design Principle 2 Environmental Concerns	Arrival routes should, where possible, be designed to minimise the impact of noise below 7,000' and should avoid the overflight of populations not previously overflown.
Design Principle 3 Compliance	Routes should, where possible, be designed to be PANS-OPS compliant.
Design Principle 4 Navigation Standards	New routes must be designed to use PBN.
Design Principle 5 Efficient Routes	Arrival routes should, where possible, be designed to minimise emissions and optimise operational efficiencies.
Design Principle 6 Replication	Procedure should, where possible mimic the existing procedure and/or the existing ILS positioning by ATC vectors.

Table 1 – Prioritised Design Principles

5.4.2 Comprehensive List of Options and Design Principles Evaluation

Following successful completion of Gateway 1B, 7 inbound options with numerous sub options, and 5 MAP options were identified.

For each inbound option, there were various sub-options as a result of variations applied to the design. Table 2 below summarises the coding of the variations used.

Variation Code	Basic Description
A	Utilises a 3° descent PBN final approach angle, which is currently industry standard.
B	Utilises a 3.2°descent PBN final approach angle.
C	Utilises a 3.5° descent PBN and ILS final approach angle.

Variation Code	Basic Description
T	Utilises a T-bar lateral approach philosophy where aircraft join from either the right- or left-hand side (making a T on the map) of the approach.
D	Utilises a direct routing between OSVEV and ALKIN.

Table 2 – Variation Coding

If utilising a 3.5° descent PBN final approach angle, it will be necessary to establish and publish the maximum temperature permissible to allow the approach to be flown, which is likely to make it unavailable during some of the summer as the actual Vertical Path Angle would then be non-compliant with the design criteria as stipulated in PANS-OPS.

Therefore, due to the periods of unavailability meaning that the Statement of Need will not be met, together with complex operational situation generated, which is contrary to the DP5 criteria, the C option was discontinued.

Further work identified that the T-bar approach options did not fit into the extant air traffic arrangements that exist during the London City hours of operation and would require additional safety work to be undertaken to understand the consequences and any possible mitigation. Additionally, it would result in complex operational scenarios and limited availability. Therefore, all T-bar options were discontinued.

The following comprehensive list of design options was proposed for consideration:

Option 1: Do Nothing.

This would mean that when the VOR is removed from service there would be no IFR approach other than the ILS approach into LBHA on Runway 21. This approach would rely on radar vectors being provided by Thames Director for positioning and there would be no functioning MAP. In addition, by not implementing a PBN approach, LBHA would not be compliant with EASA Regulatory requirements detailed within IR (EU) 2018/1048. Therefore, this option was not progressed.

Option 2A: Do Minimum.

This option would replicate/mimic the current VOR/DME approach which starts from ALKIN. This approach assumes radar vectors from OSVEV to enable inbounds to exit the ATC en-route network using extant procedures, or radar vectors provided by Thames Director for inbounds from the MAP or the south as is the current practice for the VOR/DME approach. Exceptionally, if radar vectors were unavailable the aircraft could self-position. The descent gradient would be 3.0°.

Option 2AD:

This option would be to replicate/mimic the current VOR/DME approach which starts from ALKIN and use a new direct link from OSVEV to enable inbounds to exit the network without radar vectors if necessary. The descent gradient would be 3.0°.

Option 2B:

This option would replicate/mimic the current VOR/DME approach which starts from ALKIN. This assumes radar vectors from OSVEV to enable inbounds to exit the network using extant procedures, or radar vectors by Thames Director for inbounds from the MAP or the south as is the current practice for the VOR/DME approach. Exceptionally, if radar vectors were unavailable the aircraft could self-position. The descent gradient would be 3.2°.

Option 2BD:

This option would be to replicate/mimic the current VOR/DME approach which starts from ALKIN and utilise a new direct link from OSVEV to enable inbounds to exit the network without radar vectors if necessary. The descent gradient would be 3.2°.

Option 3A/B:

Laterally left of the current VOR plate, starting from ALKIN but remaining within current ILS vectoring swathe, the descent gradients would be 3° and 3.2°. This assumes radar vectors from OSVEV to enable inbounds to exit the network using extant procedures, or radar vectors by Thames Director for inbounds from the MAP as is the current practice for the VOR/DME approach.

Discontinued as it proved impossible to design within the constraints and criteria as it would result in a change to the positioning of aircraft as they prepared to land resulting in overflying new people.

Option 4A/B:

Laterally right of the current VOR plate, starting from ALKIN but remaining within current ILS vectoring swathe, the descent gradients would be 3° and 3.2°. This assumes radar vectors from OSVEV to enable inbounds to exit the network using extant procedures, or radar vectors by Thames Director for inbounds from the MAP as is the current practice for the VOR/DME approach.

Discontinued as it proved impossible to design within the constraints and criteria as it would result in a change to the positioning of aircraft as they prepared to land resulting in overflying new people.

Option 5A/B:

From OSVEV and ignoring ALKIN, to enable inbounds to exit the network routing through the centre of the current ILS vectoring swathe, the descent gradients would be 3° and 3.2°. This option was developed to route as close to the centre of the current ILS vectoring swathe as possible.

Discontinued as it proved impossible to design within the constraints and criteria; it would introduce operational complexity and necessitate additional safety work to:

- understand the impact on London City operations due to the increased probability of dependent operations and increased controller workload.
- assess whether extant or new procedures could be utilised to exit the network at OSVEV.

Option 6A/B:

From OSVEV and ignoring ALKIN, to enable inbounds to exit the network using extant procedures, routing down the left of the current ILS vectoring swathe, the descent gradients would be 3° and 3.2°.

Discontinued as it proved impossible to link this design with an ALKIN MAP hold (other hold options not possible due to the constraints of adjacent airspace/operations). Additionally, this option would require safety analysis to assess whether extant or new procedures could be utilised to exit the network at OSVEV.

Option 7A/B:

From OSVEV and ignoring ALKIN, to enable inbounds to exit the network, routing down the right of the current ILS vectoring swathe, the descent gradients would be 3° and 3.2°.

Discontinued as it proved impossible to design within the constraints and criteria; it would introduce operational complexity and necessitate additional safety work to:

- understand the impact on London City operations due to the increased probability of dependent operations and increased controller workload.
- assess whether extant or new procedures could be utilised to exit the network at OSVEV.

Option 8 MAP Do Nothing

This is only possible with Option 1. Any change from the VOR/DME procedure will necessitate a different MAP.

Option 9 MAP Do Minimum

Mimic the current right turn MAP to ALKIN, via the LBHA overhead, and then radar vectors from Thames Director or follow the procedural approach from ALKIN.

Option 10 MAP

Most efficient left turn out back to ALKIN.

Discontinued as it proved impossible to design within the constraints and criteria; it would introduce operational complexity and necessitate additional safety work to understand the impact on Gatwick Airport operations as it penetrates the Gatwick Control Zone and is likely to adversely impact Gatwick Airport Runway 08 departures and Runway 26 arrivals.

Option 11 MAP

Most efficient right turn out back to ALKIN.

Discontinued as it proved impossible to design within the constraints and criteria; it would introduce operational complexity and necessitate additional safety work to understand the impact on Gatwick Airport operations due to the position of the first turn. Additionally this would add operational complexity due to the overflight of the arrival path, resulting in following inbound aircraft being unable to descend until the MAP aircraft provides the required lateral separation.

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Option 12 MAP from stakeholder engagement

Developed from stakeholder feedback received during the engagement period, an option to avoid RAF Kenley.

Discontinued as it did not meet the criteria of avoiding the overflight of populations not previously overflown, or minimising track miles/fuel.

The discontinuation of options has occurred through consistent application of the criteria and constraints set out in Version 2 of the Design Options Development document, which can be found on the CAA airspace change portal for this ACP. This resulted in a Suitable List of options for the approach procedure that were taken forward to the Design Principles Evaluation. The approach procedure options are all compatible with the only MAP option taken forward, Option 9. Performance of these options against the Design Principles is shown in Table 3 below.

	Option				
Design Principle	**2A**	**2AD**	**2B**	**2BD**	**9**
Safety: New routes must be safe and must not erode current ANSP safety barriers.	MET	MET	MET	MET	MET
Environmental Concerns: Arrival routes should, where possible, be designed to minimise the impact of noise below 7,000' and should avoid the overflight of populations not previously overflown.	MET	MET	MET	MET	MET
Compliance: Routes should, where possible, be designed to be PANS-OPS compliant.	MET	MET	MET	MET	MET
Navigation Standards: New routes must be designed to use PBN.	MET	MET	MET	MET	MET
Efficient Routes: Arrival routes should, where possible, be designed to minimise emissions and optimise operational efficiencies.	PARTIAL	MET	PARTIAL	PARTIAL	MET
Replication: Procedure should, where possible mimic the existing procedure and/or the existing ILS positioning by ATC vectors.	MET	MET	PARTIAL	PARTIAL	MET

Table 3 – Design Principles Evaluation

Following the Design Principles Evaluation, Options 2B and 2BD were rejected and Options 2A, 2AD and 9 were accepted and taken forward to the Initial Options Appraisal.

5.4.3 Initial Options Appraisal

At Step 2B of CAP 1616 process - the Initial Options Appraisal – LBHA assessed Options 2A, 2AD and 9 and all options were taken forward into the consultation stage.

5.5 Post Engagement Option

During re-engagement with London City Airport (LCY), concern was raised that Options 2A and 2AD could impact LCY operations. This concern was regarding the location of the Intermediate Fix (IF – Figure 12), which was located slightly north of the existing IF (IF – Figure 11). The new location, which was not identified during the Stage 2 Engagement and would require more sequencing with LCY Arrivals and had the potential to create delays to LCY air traffic. LCY were advised that this approach would only be used on rare occasions and, more likely when LCY was closed.

LCY is dependent on Thames Director for all arrivals into LCY as the Air Traffic Controllers at LCY are Tower-only qualified and have more restrictive operational hours than LBHA. LCY air traffic is currently sequenced with Biggin Hill air traffic by Thames Director to prevent conflictions. On the rare occasion that an aircraft flies the existing VOR/DME Approach, an approval will be required from Thames Director, as the procedure will enter the south eastern corner of the LCY CTA.

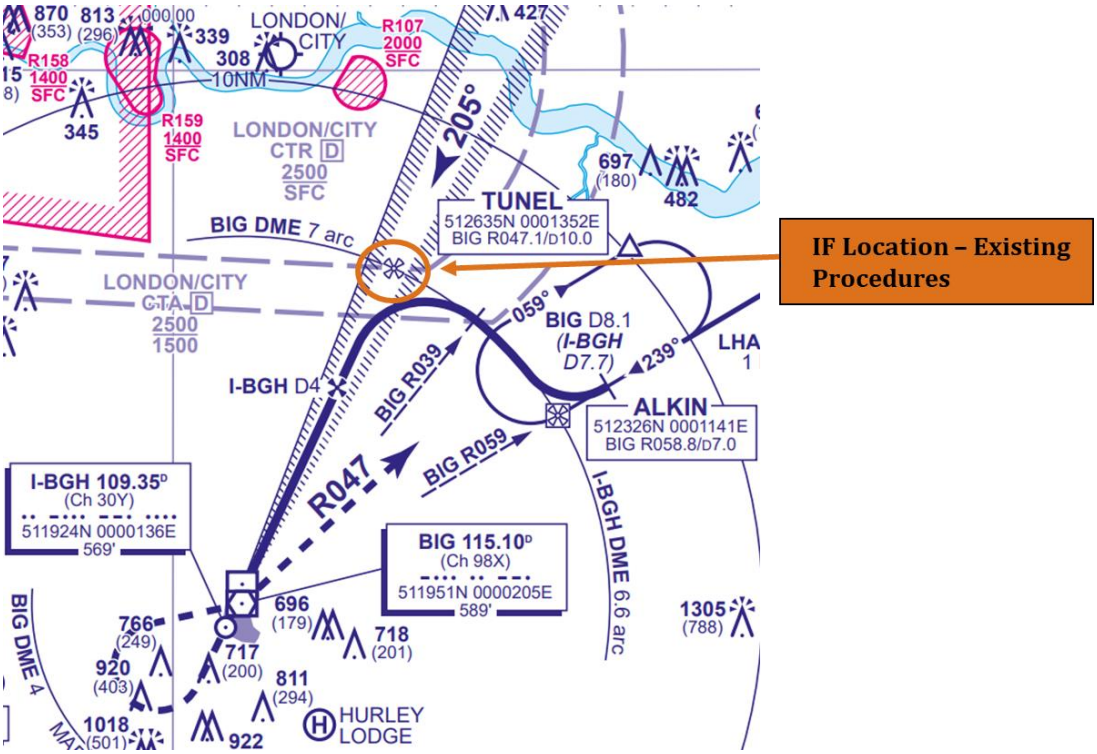

Figure 11 – ILS/VOR/DME Procedure

Although Thames Director would continue to provide approval to fly the new procedure and would not erode ANSP safety barriers, the concern raised by LCY was that LBHA aircraft flying the new procedure would encroach the LCY CTR and therefore be closer to LCY traffic than previously, resulting in either flight delays to

LCY traffic or radar vectoring to maintain radar separation range, increasing controller workload. Although LBHA believed that Options 2A and 2AD would not have an impact on LCY operations, LCY's concerns were noted, which led to the generation of a third option, Option PE. Thames Director advised that they would not be changing their procedures following the introduction of an RNAV Approach at LBHA and radar vectoring would remain the most efficient method of sequencing aircraft, so controller workload would not be impacted.

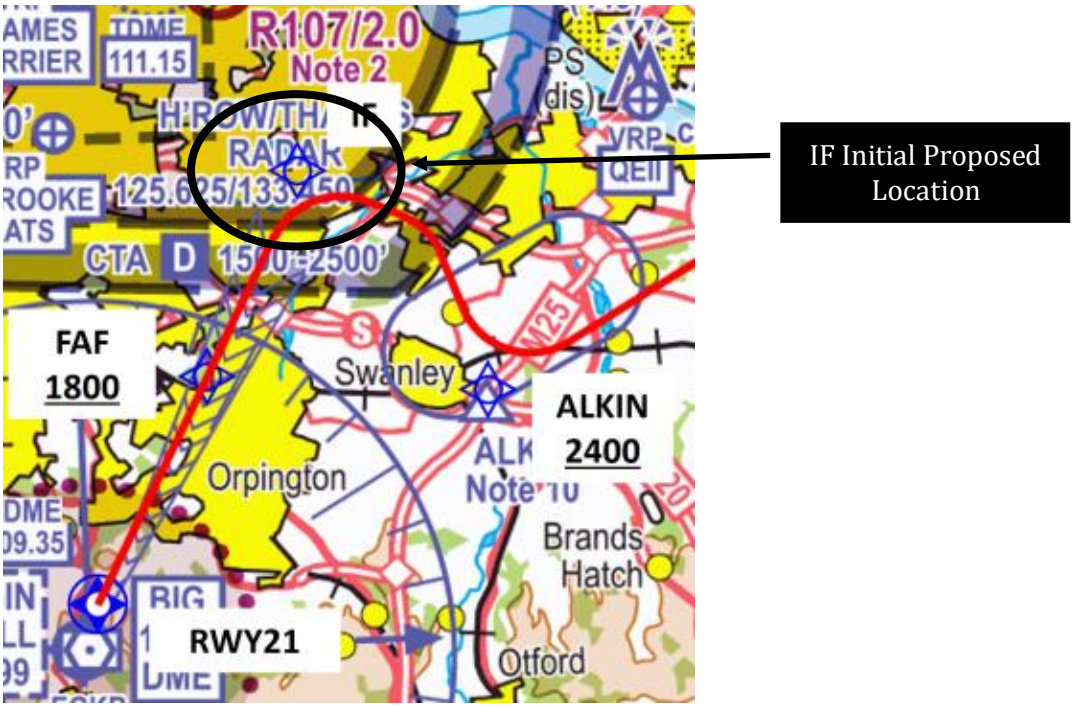

Figure 12 – Proposed Location

Biggin Hill Airport investigated the possible option of moving the new IF to existing location of the IF for the ILS/VOR/DME procedure, which is on the edge of the LCY CTR (Figure 11). Having moved the IF closer to ALKIN, it was found that the PANS-OPS requirements would not permit a turn onto this new location of the IF, whilst maintaining the proposed route from OSVEV and ALKIN.

A new option was designed (Figure 13) where the location of the IF was clear of the LCY CTR. This option would also start at OSVEV but would follow a different route to the existing ILS/VOR/DME procedure and would include an offset approach to the Final Approach Fix (FAF) from the IF and would be PANS-OPS compliant. This option was deemed to be acceptable by LCY and was introduced as an additional Option – Option PE. There would be no additional hazards identified with this option.

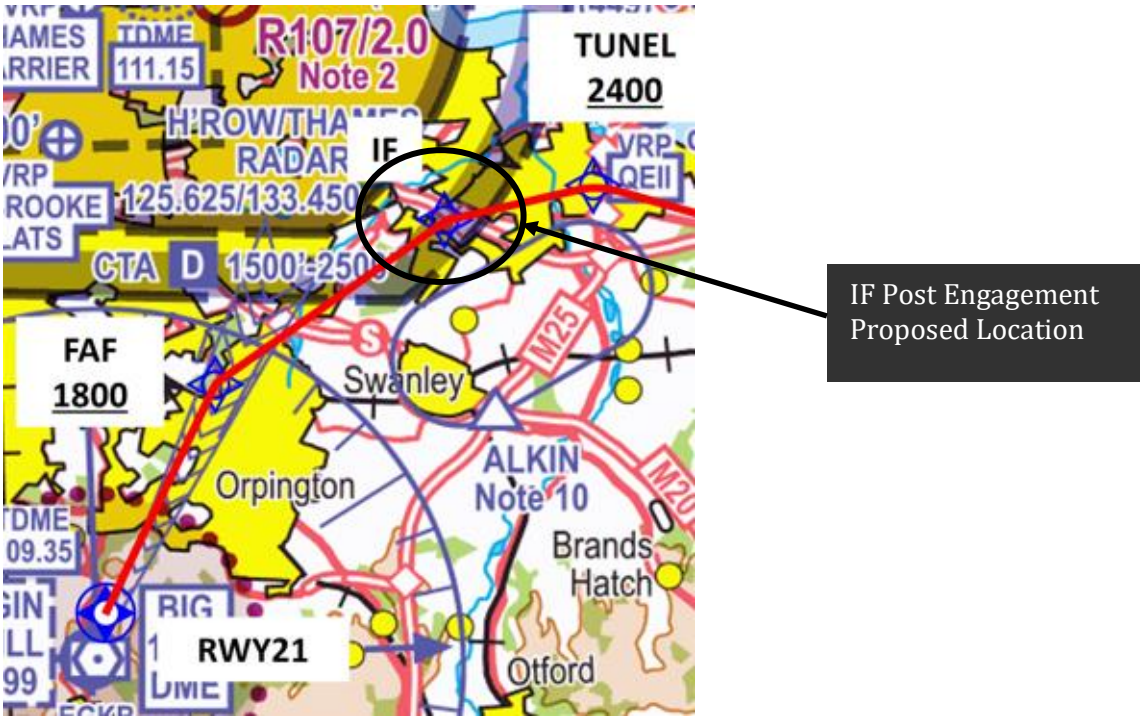

Figure 13 – Post Engagement IF Location

The Option PE falls within the current radar vector swathe, as shown in Figure 14 below.

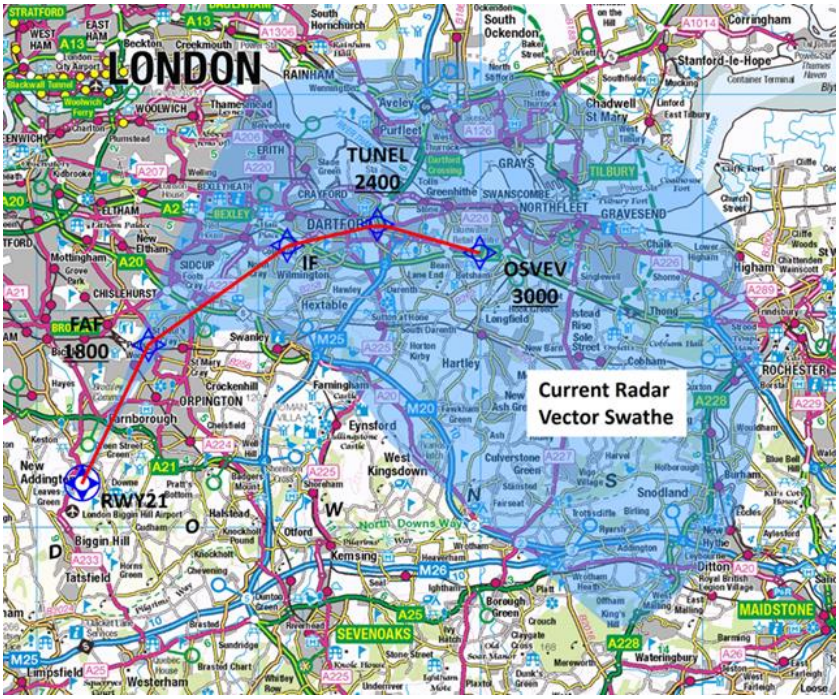

Figure 14 – New IF located within the swathe – Option PE

Although this option does not replicate the existing ILS/VOR/DME approach, it does replicate the likely ground track for aircraft receiving radar vectors from OSVEV to intercept the ILS procedure. Figure 15 shows Option PE with a more detailed representation of the routes followed by IFR aircraft inbound to Runway 21 during June 2023, when Radar Vectors were provided by the Thames Director as depicted by the Current Radar Vector Swathe in Figure 14. In the event that Radar Vectors are not available, there would be a concentration of tracks along the route shown for Option PE. Therefore, Option PE is the optimum design to replicate existing arrival tracks when Radar is available; however, it should be clearly noted that Option PE will only be flown when Radar Vectors are NOT available. There were only 8 occasions during 2021 and 2 occasions during 2022 when radar vectoring was not available from Thames Director, requiring aircraft to fly the full non-Radar procedure.

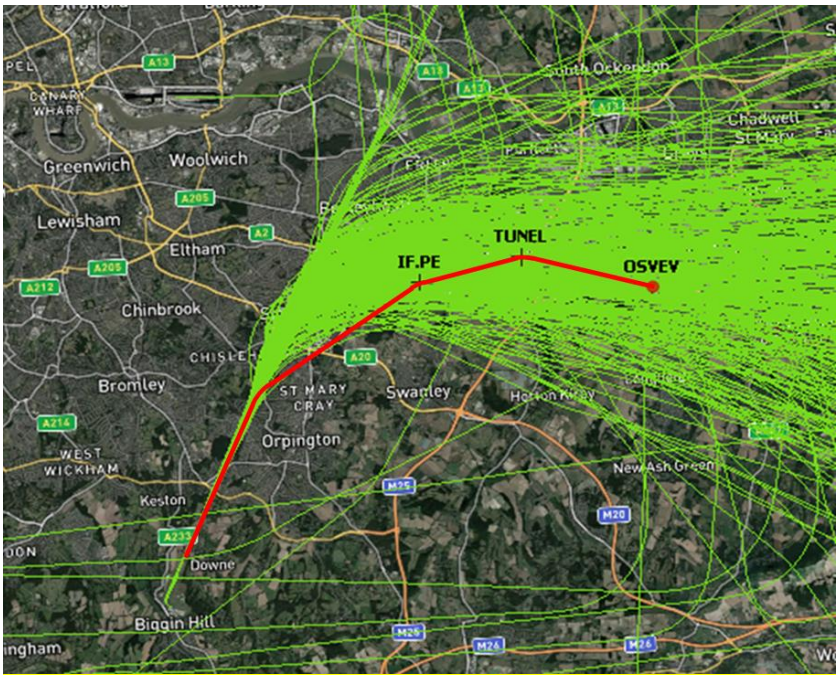

Figure 15 – IFR Arrivals June 2023 – Option PE

The proposed track will not fly over any areas not already overflown or already proposed during the Stage 2 engagement. Therefore, it was not considered necessary to conduct further engagement to introduce this option. This Option PE was included as an Arrival Option for the consultation for this ACP.

Although this option does not replicate the ground track of the procedure it is designed to replace, this procedure will not only act as a backup in the event of an ILS failure but will also future-proof the airfield and provide an alternative to procedures utilising the BIG VOR which is due to be removed in the near future. This is in line with the Statement of Need for this ACP. Table 4 below shows how this option aligns with the Design Principles.

Design Principle 1: SAFETY - New routes must be safe and must not erode current ANSP safety barriers.	MET
Summary of Qualitative Assessment: The procedure design will meet acceptable levels of flight safety.	
Design Principle 2: ENVIRONMENTAL CONCERNS - Arrival routes should, where possible, be designed to minimise the impact of noise below 7,000' and should avoid the overflight of populations not previously overflown.	MET
Summary of Qualitative Assessment: This option falls within the current radar vector swathe and replicates the likely ground track for aircraft receiving radar vectors from OSVEV to intercept the ILS procedure. The proposed track will not fly over any areas not already overflown.	
Design Principle 3: COMPLIANCE - Routes should, where possible, be designed to be PANS-OPS compliant.	MET
Summary of Qualitative Assessment: This option is compliant.	
Design Principle 4: NAVIGATION STANDARDS - New routes must be designed to use PBN.	MET
Summary of Qualitative Assessment: This option is designed using PBN.	
Design Principle 5: EFFICIENT ROUTES - Arrival routes should, where possible, be designed to minimise emissions and optimise operational efficiencies.	MET
Summary of Qualitative Assessment: This option includes a more direct routing between OSVEV and the approach procedure prior to establishing at the FAF.	
Design Principle 6: REPLICATION - Procedure should, where possible mimic the existing procedure and/or the existing ILS positioning by ATC vectors.	MET
Summary of Qualitative Assessment: This option is likely to mimic the ground track for aircraft receiving radar vectors from OSVEV to intercept the ILS procedure.	

Table 4 – Option PE Design Principles Evaluation

5.6 Final Options Appraisal

Option PE has been taken forward for submission following the consultation. This option has been developed into 4 separate approaches, as described in Section 5 above. To remain consistent with previous Options Appraisals conducted as part of this ACP, the Final Options Appraisal will compare the impacts of each arrival option against the baseline option and the Missed Approach option will be compared against the baseline Missed Approach. However, the impacts of each arrival option, together with the Missed Approach element of the procedure, should be considered in together when assessing the impact of the procedure. The Final Options Appraisal can be found at Appendix A3 to this document.

6 Technical Criteria

6.1 Introduction

The change sponsor must bear in mind that the option that is chosen must be compliant with the relevant technical criteria set out in the proforma below. These criteria form the basic structure on which the change sponsor has built this formal proposal. It is vital that the change sponsor identifies any critical interdependencies with neighbouring air navigation service providers (operational, technical or training) and establishes plans to resolve any issues that arise.

6.2 Airspace Description Requirements

The change sponsor must complete those parts of the following proforma that are relevant to its proposal.

	The proposal should provide a full description of the proposed change including the following:	**Description for this proposal**
a	The type of route or structure; for example, airway, UAR, Conditional Route, Advisory Route, CTR, SIDs/STARs, holding patterns, etc	RNP Instrument Approach Procedures to Runway 21 with LNAV and LNAV/VNAV Minima and RNP to ILS Instrument Approach Procedures to Runway 21 with ILS and LOC/DME Minima.
b	The hours of operation of the airspace and any seasonal variations	Normal hours of operation of London Biggin Hill Airport are Monday-Friday 0630 – 2330; Saturday, Sunday and Public Holidays 0800-2200. Use of LBHA is strictly PPR and operations are not permitted outside of the aerodrome operating hours.
c	Interaction with domestic and international en-route structures, TMAs or CTAs with an explanation of how connectivity is to be achieved. Connectivity to aerodromes not connected to CAS should be covered	No impact on current connectivity. Procedures will be utilised when Thames Director (and therefore radar vectors) is not available and will be flown as a Procedural Arrival with Biggin Approach.
d	Airspace buffer requirements (if any). Where applicable describe how the CAA policy statement on 'Special Use Airspace – Safety Buffer Policy for Airspace Design Purposes' has been applied	N/A – There is no proposal to change any of the airspace classifications or sizes. The procedure is designed to fit within the existing airspace.

	The proposal should provide a full description of the proposed change including the following:	Description for this proposal
e	Supporting information on traffic data including statistics and forecasts for the various categories of aircraft movements (passenger, freight, test and training, aero club, other) and terminal passenger numbers	N/A – this proposal would have no impact on the traffic mix. Details of movements and likely utilisation of these new procedures are presented in paragraph 3.2.
f	Analysis of the impact of the traffic mix on complexity and workload of operations	N/A – this proposal would have no impact on the traffic mix.
g	Evidence of relevant draft Letters of Agreement, including any arising out of consultation and/or airspace management requirements	An existing Letter of Agreement between NATS and LBHA, which defines the ATM procedures to be applied between the units, will be updated to reflect the changes in operating procedures as a result of implementing the new procedures.
h	Evidence that the airspace design is compliant with ICAO Standards and Recommended Practices (SARPs) and any other UK policy or filed differences, and UK policy on the Flexible Use of Airspace (or evidence of mitigation where it is not)	Full details on the Instrument Approach Procedure designs for Runway 21 is provided in Appendix A2.
i	The proposed airspace classification with justification for that classification	No changes to existing airspace classifications, including no changes to CAS volumes or classifications.
j	Demonstration of commitment to provide airspace users equitable access to the airspace as per the classification and where necessary indicate resources to be applied or a commitment to provide them in line with forecast traffic growth. 'Management by exclusion' would not be acceptable	No change to access to airspace. LBHA has no control of aircraft in CAS within the London TMA. Outside CAS, the approach will be flown in Class G airspace with no restrictions on other airspace users. No change to access of LBHA ATZ.
k	Details of and justification for any delegation of ATS	No change to the delegation of ATS.

6.3 Safety Assessment

As this proposed option is a replication of the current radar vectoring arrival, there is no perceived additional safety concerns outside the parameters that exist today. The successful operation of the new procedures is technically dependent upon:

- Serviceability and Equipage of aircraft navigational systems.
- Availability of GNSS.

These hazards are applicable to all modern navigational standards and do not present additional safety concerns over and above normal flight operations.

With specific reference to the PBN to ILS section of this option, possible hazards were identified that may lead to increased pilot workload or result in an aircraft failing to establish on the ILS. These are:

- Mode switch from RNAV to ILS.
- Mode switch from ILS to RNAV on MAP.

The level of risk determined in the Safety Case is considered to be REVIEW. The level of risk is of concern and mitigation measures are required to reduce the level of risk to as low as reasonably practicable. Where further risk reduction/mitigation is not practical or viable, the risk may be accepted, provided that the risk is understood and has the endorsement of the Accountable Manager or Head of Department (SATCO) at LBHA.

Neither of these hazards are anticipated to be a safety issue as there are suitable mitigating factors that would reduce the level of risk to as low as reasonably practicable.

6.4 Operational Impact

The change sponsor must complete the following proforma to outline the operational impact.

	An analysis of the impact of the change on all airspace users, airfields and traffic levels must be provided, and include an outline concept of operations describing how operations within the new airspace will be managed. Specifically, consideration should be given to:	**Evidence of compliance/proposed mitigation**
a	Impact on IFR general air traffic and operational air traffic or on VFR General Aviation (GA) traffic flow in or through the area	There is not expected to be any impact on IFR general air traffic and operational air traffic or on VFR GA traffic flow in or through the area. The procedures will only be used on the rare occasion when Thames Director is not available to provide radar vectors.
b	Impact on VFR operations (including VFR routes where applicable)	There is not expected to be any impact on VFR operations.
c	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds	There is not expected to be any impact on procedures and capacity.

	An analysis of the impact of the change on all airspace users, airfields and traffic levels must be provided, and include an outline concept of operations describing how operations within the new airspace will be managed. Specifically, consideration should be given to:	Evidence of compliance/proposed mitigation
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	There is not expected to be any impact on aerodromes and other specific activities within or adjacent to the proposed airspace.
e	Any flight planning restrictions and/or route requirements	There are no flight planning restrictions and/or route requirements anticipated.

6.5 Supporting Infrastructure/Resources

The change sponsor must complete the following proforma to outline the supporting infrastructure and resources.

	General requirements	Evidence of compliance/proposed mitigation
a	Evidence to support RNAV and conventional navigation as appropriate with details of planned availability and contingency procedures	In case of GNSS unavailability, the aircraft will be unable to commence the approach and will either have to continue visually or divert. The likelihood of the loss of GNSS availability is considered improbable and the impact is considered negligible due to the very small number of aircraft likely to be affected.
b	Evidence to support primary and secondary surveillance radar (SSR) with details of planned availability and contingency procedures	LBHA is a non-radar unit. Procedures will be utilised when Thames Director (and therefore radar vectors) is not available and will be flown as a Procedural Arrival with Biggin Approach. No changes to the ATS services are envisaged.
c	Evidence of communications infrastructure including R/T coverage, with availability and contingency procedures	No changes to current procedures.

	General requirements	Evidence of compliance/proposed mitigation
d	The effects of failure of equipment, procedures and/or personnel with respect to the overall management of the airspace must be considered	The implementation of PBN approach procedures places a dependency on GNSS. The technical and operational risks of this are addressed in detail in the safety assessment.
e	Effective responses to the failure modes that will enable the functions associated with airspace to be carried out including details of navigation aid coverage, unit personnel levels, separation standards and the design of the airspace in respect of existing international standards or guidance material	No changes to the ATS services are envisaged and the proposed IFP implementation is in accordance with ICAO PANS-OPS and CAA guidelines.
f	A clear statement on SSR code assignment requirements	No change to existing SSR code assignments.
g	Evidence of sufficient numbers of suitably qualified staff required to provide air traffic services following the implementation of a change	No changes to the ATS services are envisaged.

6.6 Airspace and Infrastructure

The change sponsor must complete the following proforma to demonstrate that the airspace change complies with the airspace and infrastructure requirements set out in UK/European law and policy, ICAO standards and recommended practices, and Eurocontrol standards.

	General requirements	Evidence of compliance/proposed mitigation
a	The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and non-radar environments	The newly designed Instrument Approach Procedures imitate existing traffic patterns and stay within the current airspace structure.

	General requirements	Evidence of compliance/proposed mitigation
b	Where an additional airspace structure is required for radar control purposes, the dimensions shall be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer. This safety buffer shall be in accordance with agreed parameters as set down in CAA policy statement 'Safety Buffer Policy for Airspace Design Purposes Segregated Airspace'. Describe how the safety buffer is applied, show how the safety buffer is portrayed to the relevant parties, and provide the required agreements between the relevant ANSPs/airspace users detailing procedures on how the airspace will be used. This may be in the form of Letters of Agreement with the appropriate level of diagrammatic explanatory detail	No safety buffer required to contain manoeuvres.
c	The Air Traffic Management system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures	No change to ATC procedures. Aircraft utilising new approach will continue to do so under a procedural ATC service.
d	Air traffic control procedures are to ensure required separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures	No change to ATC procedures.
e	Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable	No change to access to airspace. LBHA has no control of aircraft in CAS within the London TMA. Outside CAS, the approach will be flown in Class G airspace with no restrictions on other airspace users. No change to access of LBHA ATZ.
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation	Details will be promulgated in the AIP and published on aviation charts.
g	Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified	Loss of GNSS continuity, integrity and/or availability is notified to the pilot by FMS / GNSS equipment on board. As per flight planning requirements, assessments of RAIM holes is to be undertaken by flight crew and predicted or planned outages of the LPV procedures will be noted by NOTAM. Existing contingency procedures would continue to apply.

	General requirements	Evidence of compliance/proposed mitigation
h	The notification of the implementation of new airspace structures or withdrawal of redundant airspace structures shall be adequate to allow interested parties sufficient time to comply with user requirements. This is normally done through the AIRAC cycle	No new airspace structures or withdrawal of existing airspace structures is needed. This change will be promulgated by AIRAC as per the typical cycle schedule.
i	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace	Traffic uses the same region as today in a similar manner from a communications infrastructure perspective. Demonstrably adequate for the region – published Designated Operational Coverage (DOC) 25 NM/10,000 ft.
j	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered	An existing Letter of Agreement between NATS and LBHA, which defines the ATM procedures to be applied between the units, will be updated to reflect the changes in operating procedures as a result of implementing the new procedures.
k	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests	No change to existing airspace structure. LBHA has no control of aircraft in CAS within the London TMA. Outside CAS, the approach will be flown in Class G airspace with no restrictions on other airspace users. No change to access of LBHA ATZ.

	ATS route requirements	Evidence of compliance/proposed mitigation
a	There must be sufficient accurate navigational guidance based on in-line VOR/DME or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/Eurocontrol standards	N/A – This proposal has no impact on the ATS route structure.
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task	No change – there are no new link routes required as part of this proposal.
c	All new routes should be designed to accommodate P-RNAV navigational requirements	N/A – no new routes.

	Terminal Airspace Requirements	Evidence of compliance/proposed mitigation
a	The airspace structure shall be of sufficient dimensions to contain appropriate procedures, holding patterns and their associated protected areas	No change – no procedures within the proposed area.
b	There shall be effective integration of departure and arrival routes associated with the airspace structure and linking to designated runways and published instrument approach procedures (IAPs)	No change – no proposed changes affecting departure and arrival routes and published IAPs.
c	Where possible, there shall be suitable linking routes between the proposed terminal airspace and existing en-route airspace structure	N/A
d	The airspace structure shall be designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace	No change to airspace structure.
e	Suitable arrangements for the control of all classes of aircraft (including transits) operating within or adjacent to the airspace in question, in all meteorological conditions and under all flight rules, shall be in place or will be put into effect by the change sponsor upon implementation of the change in question (if these do not already exist)	No change to the classification of airspace (remains Class G). Extant procedures for Air Traffic Services Outside of Controlled Airspace apply.
f	The change sponsor shall ensure that sufficient visual reference points are established within or adjacent to the subject airspace to facilitate the effective integration of VFR arrivals, departures and transits of the airspace with IFR traffic	No changes to the ATS services are envisaged.
g	There shall be suitable availability of radar control facilities	LBHA is a non-radar unit. Procedures will be utilised when Thames Director (and therefore radar vectors) is not available and will be flown as a Procedural Arrival with Biggin Approach. No changes to the ATS services are envisaged.

	Terminal Airspace Requirements	Evidence of compliance/proposed mitigation
h	The change sponsor shall, upon implementation of any airspace change, devise the means of gathering (if these do not already exist) and of maintaining statistics on the number of aircraft transiting the airspace in question. Similarly, the change sponsor shall maintain records on the numbers of aircraft refused permission to transit the airspace in question, and the reasons why. The change sponsor should note that such records would enable ATS managers to plan staffing requirements necessary to effectively manage the airspace under their control	Statistics on airspace utilisation are already undertaken by LBHA but will be reviewed on implementation of the airspace change.
i	All new procedures should, wherever possible, incorporate Continuous Descent Approach (CDA) profiles after aircraft leave the holding facility associated with that procedure	The airspace available for LBHA is limited, and a CDA from within the LTMA to join the proposed procedures is not currently possible.

	Off-Route Airspace Requirements	Evidence of compliance/proposed mitigation
a	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered	N/A – the airspace will be established in Class G airspace.
b	Should there be any other aviation activity (military low flying, gliding, parachuting, microlight site etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests	No change to existing airspace structure. LBHA has no control of aircraft in CAS within the London TMA. Outside CAS, the approach will be flown in Class G airspace with no restrictions on other airspace users. No change to access of LBHA ATZ.

6.7 Environmental Assessment

The change sponsor must complete an environmental assessment including the following details:

- all environmental assessment requirements must be consistent with the information presented throughout the engagement and consultation process; there should be no new assessment outputs presented in the final proposal that have not already been presented to stakeholders
- where impacts have been modified since consultation, a rationale for the revision must be presented by the change sponsor; the change sponsor should

be aware that changes to environmental impacts after consultation has closed may mean that the CAA advises on the need for re-consultation

• for all proposals submitted to the CAA, the underlying data and assumptions for assessment outputs must be made available to the CAA; if this is in the form of separate assessment reports, these must be provided

• more information on the metrics and methodology for an environmental assessment is set out in Appendix B and the environmental requirements technical annex.

The change sponsor must complete the following proforma:

	Theme	Content	Evidence of compliance/proposed mitigation
a	WebTAG analysis	Output and conclusions of the analysis (if not already provided elsewhere in the proposal)	The Change Sponsor has concluded that it is not proportionate to conduct TAG analysis due to the minimal impact of this ACP.

	Theme	Content	Evidence of compliance/proposed mitigation
b	Assessment of noise impacts	Consideration of noise impacts, and where appropriate the related qualitative and/or quantitative analysis, including whether the anticipated noise impact meets the criteria for a proposal to be called-in by the Secretary of State (paragraph 5(c) of Direction 6 of the Air Navigation Directions 2017) If the change sponsor expects that there will be no noise impacts, the rationale must be explained	There is not expected to be any change in the impact of noise as a result of implementing these procedures. The majority of instrument arrivals at LBHA will continue to receive radar vectors to intercept the ILS. These new procedures will be utilised in the event that radar vectors are not available. Earlier estimates projected the annual use of this procedure to be approximately 24-28 times per year (approximately twice a month). However, since then, the Radar Service provider (Thames Director) has aligned their provision of service hours with the LBHA operating hours. Therefore, this option is only expected to be flown approximately 8 times a year. Although the exact usage is difficult to predict, this figure is not expected to change significantly in future years as a Radar Service will be available during the LBHA Operating hours. The procedures also replicate the likely ground track for aircraft receiving radar vectors from OSVEV to intercept the ILS procedure. Therefore, there will be no discernible change to the dispersion of traffic and therefore noise impacts as a result. The number of aircraft executing the Missed Approach Procedure is expected to be less than twice per month, and most of these are expected to receive radar vectors to re-establish an approach. No new communities will be overflown by aircraft carrying out the Missed Approach Procedure, so there is expected to be no change in noise impact over current operations.
c	Assessment of CO_2 emissions	Consideration of the impacts on CO_2 emissions, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no impact on CO_2 emissions impacts, the rationale must be explained	The procedures include a more direct routing between OSVEV and the approach procedure prior to establishing at the FAF. This more direct routing means that aircraft are likely to fly fewer track miles than the procedure they are replacing. Aircraft that execute the Missed Approach Procedure and are then required to join the old prior to carrying out a further approach may fly a slightly longer ground track than currently, but the number of aircraft flying this procedure is expected to be very low and will therefore have no significant impact on CO_2 emissions.

	Theme	Content	Evidence of compliance/proposed mitigation
d	Assessment of local air quality	Consideration of the impacts on local air quality, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no impact on local air quality, the rationale must be explained	Like the existing procedure, the majority of local areas overflown are impacted when the aircraft is above 1,000 ft. Parts of Locksbottom and Farnborough are likely to be impacted as the aircraft will be at approximate 1,000 ft around 3 nm from touchdown. This will have the same impact as today's operations. In addition, today's operation involves the overflight of the Princess Royal University Hospital, 2 NM from touchdown; this is unavoidable to ensure a safe and stable approach is flown following the establishment at the FAF, as per today's operations. The location of the FAF and associated flight path remains as close as possible to the current scenario, resulting in no change in terms of air quality. There may be an impact on the Bromley AQMA as aircraft reach the final stages of the approach to land at the airport. However, this will represent no change to the impact on AQMA's from the baseline scenario as the position of aircraft below 1,000 ft on the approach to land will be the same as today's operations. The position of aircraft below 1,000 ft carrying out a Missed Approach Procedure will be the same as today's operation so there will likely be the same impact as occurs in the baseline scenario in terms of local air quality. This option would overfly the eastern portion of the Croydon AQMA. However, aircraft are likely be above 1,000 ft, meaning the impact on local air quality is minimal due to dispersion.
e	Assessment of impacts upon tranquillity	Consideration of any impact upon tranquillity, notably on Areas of Outstanding Natural Beauty or National Parks, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no tranquillity impacts, the rationale must be explained	The closest National Park (NP) to LBHA is the South Downs NP, approximately 23 NM south of the airport. At this distance, it is deemed that there would be no impact on the South Downs NP with this procedure. There may be some overflight of the northerly portion of the Surrey Hills AONB by aircraft carrying out a MAP or leaving the Hold to rejoin the approach procedure. However, by this point, aircraft would likely be between 1,500 ft and 2,000 ft minimising the impact on this area and the impact is not likely to be any different to the current situation.

	Theme	Content	Evidence of compliance/proposed mitigation
f	Operational diagrams	Any operational diagrams that have been used in the consultation to illustrate and aid understanding of environmental impacts must be provided	Paragraph 3.4 of the Consultation Document contains a swathe representing the tracks of arriving aircraft which operate at 3,000 ft amsl or below. The data is derived from actual Instrument Approach Procedure arrivals over a period of time, through an Automatic Noise Operations Management System (ANOMS) which provides a visual representation of aircraft tracks, including those receiving radar vectors from Thames Director. The swathe contains the tracks of all aircraft receiving radar vectoring from ATC during 2021 and 2022, when making an approach to land at LBHA. Paragraph 3.5 of the Consultation Document contains an image showing all the routes followed by aircraft executing the existing Missed Approach Procedure between January 2021 and October 2022. This data is also obtained from ANOMS.
g	Traffic forecasts	10-year traffic forecasts, from the anticipated date of implementation, must be provided (if not already provided elsewhere in the proposal)	A 10-year traffic forecast from 2022 to 2034 was provided in the ACP-2019-86 Stage 2 Gateway Clarifications document dated 11th May 2022. Although total forecast movements are expected to increase over the 10-year appraisal period, the new procedures are not expected to be used more than twice a month and this usage is not expected to vary over this time period.
h	Summary of environmental impacts and conclusions	A summary of all of the environmental impacts detailed above plus the change sponsor's conclusions on those impacts	The impact of noise, CO_2 emissions, local Air Quality and Tranquillity are all expected to be the same or better than current operations. The majority of arrivals at LBHA will continue to receive radar vectors from Thames Director until established on the ILS and will therefore not be affected by this ACP. The new procedures will only be used on the rare occasion that Thames Director is not available, and they are not expected to be used more than twice a month. The impact of using the new procedures will be no different to those experienced when the existing procedures are utilised.

A1 List of Stakeholders

A1.1 Aviation Stakeholders

A1.1.1 LBHA Operators

Operators	
1 Aviation	Acropolis Aviation
Alouette Flying Club	Alpha Golf
Avalon Aerojet	Bombardier
Castle Air	Catreus Ltd
Centreline Air Charter	Cirrus Aircraft
Echelon Air	EFG Flying School
Falcon Flying Services	Heritage Hangar
Interflight Air Charter	JETMS Completions (formerly RAS Completions)
JT Air Ltd	Linkinjet
London Executive Aviation	Net Jets
Oriens Aviation	Signature Flight Support
Shipping & Airlines	Sovereign Business Jets
Textron	Voluxis
Wessex Aviation	Zenith Aviation

Table 5 – LBHA Operators

A1.1.2 NATMAC members

National Aviation Organisations	
Airlines UK	Airspace 4All
Airport Operators Association (AOA)	Airfield Operators Group (AOG)

LONDON BIGGIN HILL AIRPORT
BUSINESS | TRAVEL | COMMUNITY

National Aviation Organisations	
Aircraft Owners and Pilots Association (AOPA)	Airspace Change Organising Group (ACOG)
Association of Remotely Piloted Aircraft Systems UK (ARPAS-UK)	Aviation Environment Federation (AEF)
British Airways (BA)	BAe Systems
British Airline Pilots Association (BALPA)	British Balloon and Airship Club
British Business and General Aviation Association (BBGA)	British Gliding Association (BGA)
British Helicopter Association (BHA)	British Hang Gliding and Paragliding Association (BHPA)
British Microlight Aircraft Association (BMAA)	British Model Flying Association (BMFA)
British Skydiving	Drone Major
General Aviation Alliance (GAA)	Guild of Air Traffic Control Officers (GATCO)
Honourable Company of Air Pilots (HCAP)	Helicopter Club of Great Britain (HCGB)
Heavy Airlines	Iprosurv
Isle of Man CAA	Light Aircraft Association (LAA)
Low Fare Airlines	Military Aviation Authority (MAA)
Ministry of Defence - Defence Airspace and Air Traffic Management (MoD DAATM)	NATS
Navy Command HQ	PPL/IR (Europe)
UK Airprox Board (UKAB)	UK Flight Safety Committee (UKFSC)
United States Visiting Forces (USVF), HQ United States Country Rep-UK (HQ USCR-UK)	

Table 6 – NATMAC members

A1.1.3 Adjacent Airports/ANSPs

Adjacent Airports/ANSPs	
Gatwick Airport	London City Airport
Heathrow Airport	Farnborough Airport
Redhill Aerodrome	Kenley Airfield
Rochester Airport	NATS Ltd

Table 7 – Adjacent Airports/ANSPs

A1.1.4 LBHA Airport Consultative Committee

A1.1.5 LBHA Safety and Noise Review Board

A1.1.6 Light Aviation Steering Group

A1.2 Non-Aviation Stakeholders

A1.2.1 Regional and Local Authorities

Regional and Local Authorities	
East Sussex County Council	Kent County Council
Surrey County Council	West Sussex County Council
Sevenoaks District Council	Tandridge District Council
Tatsfield & Titsey District Council	Dartford Borough Council
Reigate & Banstead Borough Council	London Assembly
London Borough Councils	London Borough of Bexley
London Borough of Bromley	London Borough of Croydon

Table 8 – Regional and Local Authorities

LONDON BIGGIN HILL AIRPORT
BUSINESS | TRAVEL | COMMUNITY

A1.2.2 Town and Parish Councils

Town Councils (TC) and Parish Councils (PC)	
Badgers Mount Parish Council	Bletchingley Parish Council
Caterham on the Hill Parish Council	Caterham Valley Parish Council
Chaldon Village Council	Chelsham & Farleigh Parish Council
Crockenhill Parish Council	Eynsford Parish Council
Farningham Parish Council	Godstone Parish Council
Halstead Parish Council	Hextable Parish Council
Horton Kirby & South Darenth Parish Council	Keston Village Residents Association
Knockholt Parish Council	Nutfield Parish Council
Oxted Parish Council	Swanley Town Council
Tatsfield Parish Council	Warlingham Parish Council
Westerham Town Council	Whyteleafe Village Council
Woldingham Parish Council	

Table 9 – Town and Parish Councils

A1.2.3 National Environmental Stakeholders

National Environmental/Conservation Organisations	
CPRE - Kent	Flightpath Watch
Kent Downs AONB	Natural England
Surrey Hills AONB	Surrey Hill AONB Board

Table 10 – National Environmental/Conservation Organisations

A1.2.4 Members of Parliament

Member of Parliament	Constituency
[redacted]	Beckenham
	Bexleyheath & Crayford
	Bromley & Chislehurst
	Croydon Central

Member of Parliament	Constituency
[redacted]	Croydon North
	Croydon South
	Dartford
	East Surrey
	Old Bexley & Sidcup
	Orpington
	Reigate
	Sevenoaks
	Sutton & Cheam

Table 11 – Members of Parliament

A1.2.5 Other Organisations/Consultees

Other Organisations/Consultees	
Breed Aviation (CI)	Farnborough Park (G Voisey)
Godstone Preservation Society	London Borough of Bromley Residents Federation
Nutfield Conservation Society	Woldingham
[redacted]	

Table 12 – Other Organisations/Consultees

A2 Airspace Definition

A2.1 Aeronautical Information Publication

Appendix A2 – Airspace Definition, including the Aeronautical Information Publication (AIP) entry details, to the LBHA Airspace Change Proposal ACP-2019-086 is delivered as a separate document.

A3 Final Options Appraisal

A3.1 Final Options Appraisal

Appendix A3 – Final Options Appraisal to the LBHA Airspace Change Proposal ACP-2019-086 is delivered a s a separate document.

A4 Glossary

A4.1 Glossary

Term	Meaning
ACP	Airspace Change Proposal
AIP	Aeronautical Information Publication
amsl	Above Mean Sea Level
ANOMS	Automatic Noise Operations Monitoring System
ANSP	Air Navigation Service Provider
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
ATC	Air Traffic Control
ATS	Air Traffic Services
ATZ	Aerodrome Traffic Zone
CAA	UK Civil Aviation Authority
CAP	Civil Aviation Publication
CAS	Controlled Airspace
CTA	Control Area
CTR	Control Zone
CO_2	Carbon Dioxide
DAATM	Defence Airspace and Air Traffic Management
DME	Distance Measuring Equipment
DOC	Designated Operational Coverage

DVOR	Doppler VHF Omnidirectional Ranging Beacon
GA	General Aviation
GNSS	Global Navigation Satellite System
IAP	Instrument Approach Procedure
IF	Intermediate Fix
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LBHA	London Biggin Hill Airport
LCY	London City Airport
LNAV	Lateral Navigation
LPV	Localiser Performance with Vertical Guidance
m	metre
MAP	Missed Approach Procedure
MOD	Ministry of Defence
NATMAC	National Air Traffic Management Advisory Committee
NATS	National Air Traffic Services
NM	Nautical Mile
PBN	Performance Based Navigation
RNAV	Area Navigation
RNP	Required Navigation Performance
SSR	Secondary Surveillance Radar
VNAV	Vertical Navigation