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London Biggin Hill Airport ACP-2019-86

Design Principles Report





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1 Design Principles Development

1.1 Background

London Biggin Hill Airport has embarked on this airspace change for 2 reasons:

- In order to be compliant with EASA Regulatory requirements detailed within IR (EU) 2018/1048. This will also meet the requirements within the CAA Airspace Modernisation Strategy.
- If successful, it will also add a layer of resilience to the airport operation by providing a second instrument approach in the event that the current procedure is unavailable.

As part of this redesign, London Biggin Hill Airport must follow guidance provided by the CAA and successfully complete the first 6 stages of CAP 1616 – Airspace Design. In Stage 1 (Define), the CAA require London Biggin Hill Airport to satisfactorily assess the requirement for airspace change by producing a Statement of Need and produce a set of Design Principles that encompass the safety, environmental and operational criteria and policy objectives that London Biggin Hill Airport aims for in developing its airspace change.

London Biggin Hill Airport is required to develop Design Principles, which will inform the design of this new arrival route. CAP 1616 states that it is important for Design Principles to be drawn up through discussion between the Change Sponsor and potentially affected stakeholders at the early stages of the airspace change process. The aim of this engagement is to ensure London Biggin Hill Airport has a good level of understanding of the proposed change, and to ascertain what design considerations are important to stakeholders.

1.2 General Approach to Development of Principles

In airspace change terms this change is constrained by the extant airspace construct and the need for aircraft to be aligned with the runway before landing. This led London Biggin Hill Airport to devise a specific draft set of Design Principles, the details of which are in Section 2 of this document. In order to fulfil the required engagement aims, London Biggin Hill Airport produced and distributed an information leaflet outlining the aims of this proposal. The leaflet contained the initial draft set of Design Principles that the airport had developed through experience and knowledge, to meet its requirement. Stakeholders were asked to comment on the list and to add any further information that they believed the airport should consider as part of the redesign process. The relevant information was also made available on the airport's website at <https://yourairport.co.uk/londonairspace>.

Distribution of the leaflet was undertaken by email with a small number of community stakeholders being contacted by post to ensure inclusion, a follow up communication was issued one week before the end of the engagement period. The stakeholders contacted included airport operators, local planning authorities, the airport's consultative committee, as well as the National Air Traffic Management Advisory Committee (NATMAC). The full list can be seen at Annex A1.



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The draft list of Design Principles had been separated into:

- **Core Principles** – those principles that we believe are essential for reasons of safety, and/or the proper protection of the local amenity
- **Technical Principles** – those features which are required for compliance to UK or EU regulations and do not require any additional non-standard training
- **Operational Principles** – any matters which could impact the operations at the airport
- **Environmental Principles** – those features that impact noise, fuel burn, tranquillity etc

London Biggin Hill Airport's draft principles aimed to provide a balance between what is required to fulfil the scope of this project and the environmental concerns that any change brings. For instance, the draft design principles support the development of options that relate to keeping aircraft higher for longer, continuous descent profiles and possible increased glideslopes as these characteristics help to minimise aircraft noise.

London Biggin Hill Airport requested stakeholder feedback to rank the proposed Design Principles in priority order, with 1 being the highest priority and therefore the most important to the stakeholder. Additionally, there was a request to identify any principle that was felt to be incorrect and/or suggest changes or describe new principles that should be considered, along with a request to advise London Biggin Hill Airport of any other issue or constraint that should be considered in this process.

Following the analysis of the feedback (shown in this document) London Biggin Hill Airport contacted all those who had engaged in this process, on 17th December 2021 to provide an update on the changes.

1.3 Stakeholder Area

To enable engagement with the relevant stakeholders for this airspace change London Biggin Hill Airport considered the geographical area that should be engaged. This was based on the Statement of Need, the current surrounding airspace construct, and the area of expected change. The area shown below, in Figure 1, bounded by the red line shows the initial focus for this engagement, however, the actual engagement, was much wider, and is shown in Figure 2 as the area bounded by the green line, which includes where inbound aircraft are vectored today.



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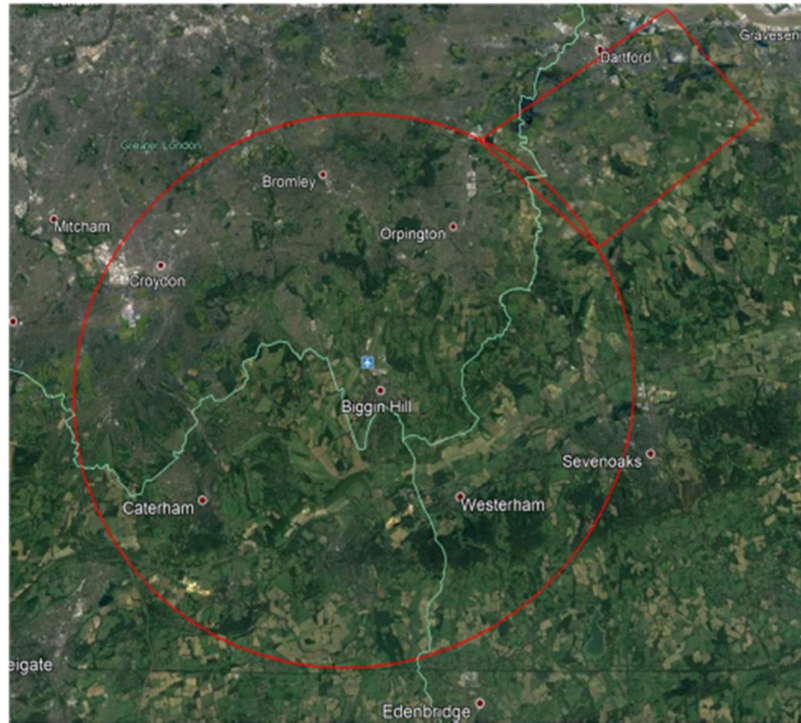


Figure 1 Initial Engagement Focus Area

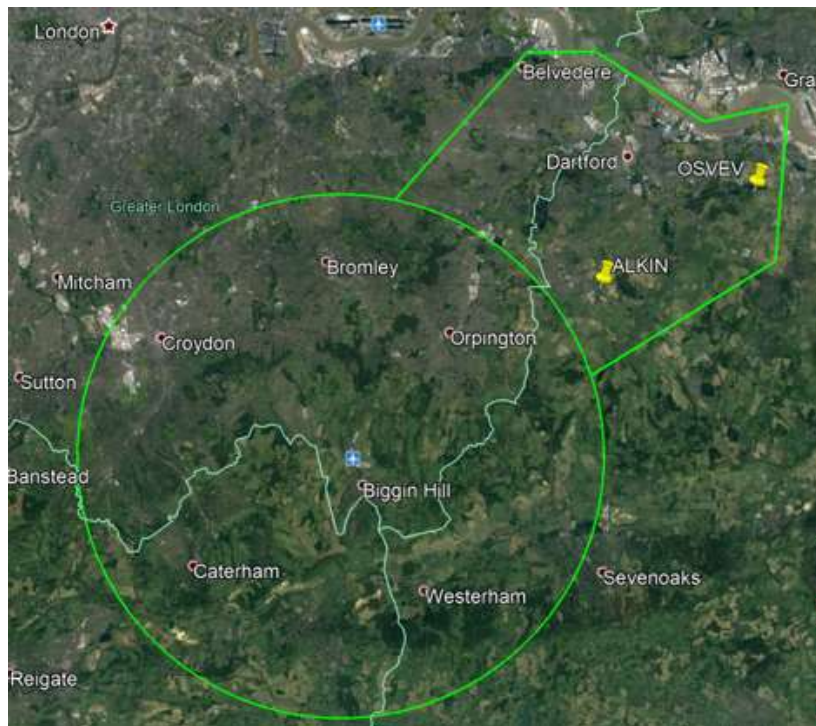


Figure 2 Final Engagement Area



2 Draft Design Principles

2.1 Draft Design Principles

The following principles were drawn up by London Biggin Hill Airport based on experience, expertise, and on-going engagement. The draft principles are shown below:

Draft Design Principles		Category	
A	Safety – New routes must be safe	Core	Safety
B	Compliance – Route should, where possible, be designed to be PANS Ops compliant	Core	Technical
C	Navigation Standards – New routes must be designed to use Performance Based Navigation	Core	Operational
D	Environmental Concerns – Arrival routes should, where possible, be designed to minimise the impact of noise below 7,000 ft and should avoid the overflight of populations not previously overflowed	Desirable	Environmental
E	Efficient Routes – Arrival routes should, where possible, be designed to minimise emissions and optimise operational efficiencies	Desirable	Environmental
F	Replication – Procedure should be designed to mimic existing procedure where possible, whilst meeting the requirements of DP B and C. This will minimise the requirement to overfly areas not previously overflowed by aircraft making an ILS approach	Core	Environmental

Table 1 Draft Design Principles

London Biggin Hill Airport believed these Design Principles are mutually exclusive and all could be used as a framework against which the Design Options can be developed at CAP 1616 Step 2A.

The next section shows how continued engagement with stakeholders was conducted in order to understand the importance stakeholders attached to the Design Principles.



3 Design Principle Feedback

3.1 Review Process

On 27th October 2020, the Draft Design Principles were sent to the identified stakeholders. Stakeholders were asked to rank the Design Principles and offered the opportunity to comment further.

From the leaflet:

We ask that you consider our draft design principles and rank them in priority order, with 1 being the highest priority and therefore the most important to you. Additionally, you may like to tell us why you disagree with any of the principles, or you may wish to suggest changes or describe new principles that we should consider. Please also advise us of any other issue or constraint you feel should be considered in our design process.

3.2 Responses Received¹

From the communications sent out there were 2 responses concerning a request for more time and a link for information, these were addressed separately by the LBHA operational team. Another response concerned communication around engagement versus consultation which again was addressed outside of this process by LBHA. The remaining responses were from the 18 individuals or organisations listed below. Some responses provided a ranking, some provided additional comments, and some did both.

- RAF Kenley
- [REDACTED]
- Defence Airspace and Air Traffic Management (DAATM)
- London Borough of Bromley
- [REDACTED]
- London Heathrow Airport
- PPL/IR Europe
- British Helicopter Association
- NATS
- NetJets
- Guild of Air Traffic Controllers
- NATMAC (Secretary for onward distribution)
- Keston Village Residents Association
- Flightpath Watch Ltd
- Bletchingley Parish Council
- Westerham Town Council
- Transport for London (TfL)
- Treehouse Therapy

¹ Updated for Issue 2



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3.3 Prioritisation Methodology

In order to produce the new prioritised Design Principles detailed in Section 4 below, the priority ranking provided by stakeholders was analysed. As not all returns ranked all the principles, an average score was used in the analysis to avoid skewing the results. The average of the scores attributed to each Design Principle was used to determine the final ranking of the Design Principles. The Design Principle with the lowest average was ranked the highest for importance, the Design Principle with the highest average was ranked the least important.

3.4 Ranking Results

Using the methodology described above the responses resulted in the draft design principles being ranked as follows:

Draft list	New ranking
A	1
B	3
C	4
D	2
E	5
F	6

Table 2 Ranking Results

3.5 Responses²

Of the 18 responses mentioned above, one non-aviation response believed the airport was extending the runways, this has been dealt with separately from this process, by LBHA, as this ACP is not about any increase in capacity or airport infrastructure.

One aviation response stated “no objection” with the proposed timelines and 2 further aviation responses agreed with the draft design principles and their ranking.

One non-aviation response wanted no increase in aircraft over a specific town. This feedback cannot be addressed at this point in the ACP process but is noted.

Some of the responses received made suggestions for a change to the wording associated with a principle and/or suggestions as to the category of a principle, and there was one suggestion for a new principle. That feedback received is listed below:

² Updated for Issue 2



Feedback suggesting changes to wording/category	
1	An aviation response contained some technical design information and suggested the removal of DP F due to the fact that the procedural approach is barely ever used, therefore changing it would have no impact.
2	A non-aviation response requested that Environmental issues, including "minimising noise" and "overflight of population" should be of a much higher priority and should be core.
3	A non-aviation response requested that the retention of the present "funnel" of traffic from Bexley, Petts Wood and Crofton; avoid minimising it further which would inflict more noise and visual impact by the landing flights to R21 on those residents already adversely affected. Fly higher for longer. That DP D Environmental, and DP E Efficient Routes should be Core.
4	A non-aviation response requested that DP D Environmental should be a Core principle. That although PBN is agreed it should rank below environmental concerns and the narrowing aspects associated with it must be avoided, the current approach funnel must not be altered. That helicopters must be incorporated within this, and that Sensitive Areas should be added to DP D.
5	A non-aviation response requested that all environmental principles should be Core
6	An aviation response suggested a DP - minimal impact to other airspace users.
7	A non-aviation response requested that the DP D Environmental should possibly be a Core principle.
8	An aviation response suggested different wording for DP A, addition of Must not erode existing 'safety barriers' that are in place with adjacent ANSPs and DP F, addition of the design must enable existing ATC Procedures to be maintained with adjacent ANSPs. This must include tactical and flexible positioning of aircraft. It must not add to or increase the complexity and workload of adjacent ANSPs
9	An aviation response suggested DP D Environmental should be a Core principle and DP F Replication should be Desirable, especially if a divergence from Replication offers a new track which has the opportunity to overfly lower population density areas.
10	A non-aviation response suggested DP D Environmental should be a Core principle as a way of reducing impacts on communities and expressed concern about the concentration effects of PBN suggesting the need for multiple routes to spread impacts.
11	A non-aviation response suggested keeping aircraft higher for longer and adjusting the angle of descent and suggested that Safety and Environmental concerns should be equal.
12	An aviation response hoped that this change would not restrict cluttered airspace.

Table 3 Responses



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3.6 Assessment of responses³

The feedback received was then assessed as follows:

	Feedback	Assessment
1a	An aviation response contained some technical design information	The technical information will be passed to the designers for the options development stage, it has not been utilised for the principles.
1b	and suggested the removal of DP F due to the fact that the procedural approach is barely ever used, therefore changing it has no impact.	It is correct that the VOR/DME approach is used rarely as most inbound aircraft utilise the ILS, this proposal, if implemented, would expect the same low usage. LBHA wish to maintain the resilience that the current VOR/DME approach provides. Impact assessment of the options developed will occur in the next stage.
2	A non-aviation response requested that Environmental issues, including "minimising noise" and "overflight of population" should be of a much higher priority and should be core.	DP D to become a Core principle is accepted. The specific environmental concerns mentioned are already included within DP D. These issues will be addressed through the options evaluation process during the next Stage of CAP 1616.
3a	A non-aviation response requested that the retention of the present "funnel" of traffic from Bexley, Petts Wood and Crofton; avoid minimising it further which would inflict more noise and visual impact by the landing flights to R21 on those residents already adversely affected. Fly higher for longer.	This "funnel" is achieved through the current radar vectoring practices of the air traffic controllers as they position aircraft for the ILS, changes to any aspect of the ILS vectoring is not part of this ACP. This ACP is to address the VOR/DME approach that is used much less frequently than the ILS. However, this information regarding the funnel and the fly higher for longer suggestion will be passed to the designers to influence options as they are developed in the next stage, it has not been utilised for the principles.
3b	That DP D Environmental, and DP E Efficient Routes should be Core.	Accepted

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	Feedback	Assessment
4a	A non-aviation response requested that DP D Environmental should be a Core principle.	Accepted.
4b	That although PBN is agreed it should rank below environmental concerns	We have utilised the scoring associated with this feedback in accordance with all other ranking responses.
4c	and the narrowing aspects associated with it must be avoided, the current approach funnel must not be altered.	This “funnel” is achieved through the current radar vectoring practices of the air traffic controllers as they position aircraft for the ILS, changes to any aspect of the ILS vectoring is not part of this ACP. However, this information will be passed to the designers to influence options as they are developed in the next stage, it has not been utilised for the principles.
4c	That helicopters must be incorporated within this.	Today, helicopters can utilise both the VOR procedure and radar vectors to the ILS. Should this change be implemented, helicopters will also be able to access this new procedure.
4d	That Sensitive Areas should be added to DP D.	The draft Environmental DP facilitates the opportunity to assess options, (the next stage of this process) against various scenarios, e.g., whether route options impact schools, hospitals, AONB and tranquil areas, therefore this issue will be addressed through the options evaluation; it has not been utilised for the principles.
5	A non-aviation response requested that all environmental principles should be Core	Accepted.
6	An aviation response suggested a DP - minimal impact to other airspace users.	The scope of this project is just to change one procedure with no need to change any other procedure, airspace, or traffic flow and is therefore within the Replication DP. This will not be utilised for the principles.
7	A non-aviation response requested that the DP D Environmental should possibly be a Core principle.	Accepted.



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	Feedback	Assessment
8a	An aviation response suggested different wording for DP A, addition of “Must not erode existing ‘safety barriers’ that are in place with adjacent ANSPs	Accepted.
8b	and DP F, addition of the design must enable existing ATC Procedures to be maintained with adjacent ANSPs. This must include tactical and flexible positioning of aircraft. It must not add to or increase the complexity and workload of adjacent ANSPs.	Accepted.
9a	An aviation response suggested DP D Environmental should be a Core principle.	Accepted.
9b	That DP F Replication should be Desirable, especially if a divergence from Replication offers a new track which has the opportunity to overfly lower population density areas.	In the next Stage of this process – Options Development, an assessment of the options will take place and will assess whether there is any chance to capitalise on the opportunity mentioned here. However, as the scope of this project is minimal – to just change one procedure with no need to change any other procedure, airspace, or traffic flow, it is felt to be appropriate to keep this as a Core principle.
10a	A non-aviation response suggested DP D Environmental should be a Core principle as a way of reducing impacts on communities, and	Accepted.
10b	Expressed concern about the concentration effects of PBN suggesting the need for multiple routes to spread impacts.	In the next Stage of this process various options will be developed, this information will be passed to the designers to help influence those options, it has not been utilised for the principles.
11a	A non-aviation response suggested keeping aircraft higher for longer	This falls within the draft Environmental DP and will be passed to the designers to help influence options as they are developed in the next stage.
11b	and adjusting the angle of descent,	This falls within the draft Environmental DP and will be passed to the designers to help influence options as they are developed in the next stage.



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	Feedback	Assessment
11c	and suggested that Safety and Environmental concerns should be equal.	This responder also provided a ranking which did not show the same score for these 2 elements; therefore, we have taken this to mean that Environmental Concerns should be a Core principle, which has been accepted.
12	An aviation response hoped that this change would not restrict cluttered airspace.	The scope of this project is not to increase capacity at LBHA but just to introduce one procedure with no need to change any other procedure, airspace, or traffic flow and is therefore within the Replication DP. This will not be utilised for the principles.

Table 4 Response Assessment

3.7 Summary of Feedback⁴

LBHA would like to thank all the contributors for their responses. From the feedback received and analysed, there will be no new Design Principles and no draft principles have been withdrawn. New wording will be associated with the Safety and Replication principles, and the categories of Technical, Operational and Environmental remain unchanged. All the principles are now identified as Core and the ranking suggestions received have resulted in a new priority order which will now be utilised. The information received suggesting how options could be developed will be utilised within Stage 2.

⁴ Updated for Issue 2



4 Final Prioritised Design Principles

4.1 Design Principle Review⁵

As a result of the ranking and the analysis described above, the changes to the draft Design Principles are below.

Now	Was	Draft words	Wording change	Category Change
1	A	New routes must be safe	Add and must not erode current ANSP safety barriers	No change
2	D	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	No change as this covers the suggestions made, e.g., fly higher for longer, angle of descent and avoiding sensitive areas	From DESIRABLE to CORE
3	B	Routes should, where possible, be designed to be PANS Ops compliant	No change	No change
4	C	New routes must be designed to use PBN	No change	No change
5	E	Arrival routes should, where possible, be designed to minimise emissions and optimise operational efficiencies	No change	From DESIRABLE to CORE
6	F	Procedure should be designed to mimic existing procedure where possible, whilst meeting the requirements of B and C. This will minimise the requirement to overfly areas not previously overflown by aircraft making an ILS approach	New Procedure should, where possible mimic the existing procedure and/or the existing ILS positioning by ATC vectors	No change

Table 5 Design Principle Review

⁵ Updated for Issue 2



4.2 Final Design Principles

Consequently, the final design principles are shown below:

Priority		Category	
1	SAFETY - New routes must be safe and must not erode current ANSP safety barriers	CORE	Safety
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	CORE	Environmental
3	COMPLIANCE - Routes should, where possible, be designed to be PANS Ops compliant	CORE	Technical
4	NAVIGATION STANDARDS - New routes must be designed to use PBN	CORE	Operational
5	EFFICIENT ROUTES - Arrival routes should, where possible, be designed to minimise emissions and optimise operational efficiencies	CORE	Environmental
6	REPLICATION - Procedure should, where possible mimic the existing procedure and/or the existing ILS positioning by ATC vectors	CORE	Environmental

Table 6 Final Design Principles



5 CAP 1616 - Next Steps

5.1 Next Steps

This document will be submitted to the CAA as evidence to support Step 1B of the CAP 1616 airspace change process ahead of the Stage 1 Define Gateway.

Following the CAA's acceptance of the documentation and subsequent publication further stakeholder engagement meetings will be organised to discuss the Design Options once they are developed. The Design Principles will be used as the framework against which Design Options are developed to address the Statement of Need.

Currently, London Biggin Hill Airport's estimated timeline for subsequent stages of this process is shown in **Error! Reference source not found.** below:

CAP 1616 Stage	Estimated Completion Date
Stage 1 Define	29 January 2021
Stage 2 Develop and Assess	28 May 2021
Stage 3 Consult	27 August 2021
Stage 4 Update and Submit ACP	25 February 2022
Stage 5 Decide	21 October 2022
Stage 6 Implement	January 2023

Table 7 London Biggin Hill Airport ACP Timeline



A1 Stakeholders Contacted - Step 1B

Type	Contact
Airport Users	1 Aviation
	Acropolis Aviation
	Alouette Flying Club
	Alpha Golf
	Arena Aviation
	Avalon Aerojet
	Bombardier
	Castle Air
	Catreus Ltd
	Centreline Air Charter
	Cirrus Aircraft
	EFG Flying School
	Falcon Flying Services
	Heritage Hangar
	Interflight Air Charter
	JT Air Ltd
	Linkinjet
	London Executive Aviation
	Net Jets
	Oriens Aviation
	RAS Completions
	Signature Flight Support
	Shipping & Airlines
	Sovereign Business Jets
	Textron
	Voluxis
Wessex Aviation	
Zenith Aviation	
Local GA Community	East Haxted microlight site
	Green Dragons Warlingham
	Hurley Lodge helicopter site
	Surrey Hills Glider Club - Kenley Aerodrome
	2FTS - Kenley Aerodrome



Type	Contact
	Redhill Aerodrome
	Rochester Airport
	Staffhurst Woods
ANSP	London Heathrow (NATS)
	London City (NATS)
	NATS (Farnborough - LARS)
	NATS Mgr LAMP
	NATS (LTC)
Airport	London Gatwick (LGW) Airport
	London Heathrow (LHR) Airport
	London City (LCY) Airport
Aviation Bodies	NATMAC
	CAA (SARG)
County, City, District and Parish (or equivalent) Councils	Dartford BC
	East Sussex County Council
	Kent County Council
	London Assembly
	London Borough Councils
	London Borough of Bromley
	London Borough of Bexley
	London Borough of Croydon
	Reigate & Banstead BC
	Sevenoaks DC
	Surrey County Council
	Tatsfield Parish Council
	Tandridge DC
	West Sussex County Council
	Badgers Mount
	Bletchingley
	Caterham on the Hill
	Caterham Valley
	Chaldon Village Council
	Chelsham and Farleigh
Crockenhill	
Eynsford	
Farningham	



Type	Contact
	Godstone
	Halsted
	Hextable
	Horton-Kirby
	Keston Village Residents Association
	Knockholt
	Nutfield
	Oxted
	Swanley
	Warlingham
	Westerham
	Whyteleaf Village Council
	Woldingham
	MPs
Bexleyheath & Crayford	
Bromley & Chislehurst	
Croydon Central	
Croydon North	
Croydon South	
Dartford	
East Surrey	
Old Bexley & Sidcup	
Orpington	
Reigate	
Sevenoaks	
Sutton & Cheam	
Other Organisations/ Consultees	London Biggin Hill Airport Consultative Committee
	Woldingham
	CPRE - Kent
	Flightpath Watch
	Natural England
	Surrey Hills AONB
	London Borough of Bromley Residents Federation
	██████████
	Breed Aviation (CI)
	██████████



Type	Contact
	[REDACTED]
	Godstone Preservation Society
	[REDACTED]
	[REDACTED]
	[REDACTED]
	[REDACTED]
	Nutfield Conservation Society
	[REDACTED]
	[REDACTED]

Table 8 Stakeholders Contacted