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Airspace Change Proposal - Environmental Assessment


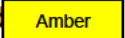

Version: 1.0/ 2016

Title of Airspace Change Proposal	TAG Farnborough Airport
Change Sponsor	TAG Farnborough Airport Ltd
SARG Project Leader	[REDACTED]
Case Study commencement date	20 November 2017
Case Study report as at	1 December 2017
File Reference	

Instructions

In providing a response for each question, please ensure that the 'Status' column is completed using the following options:

- Yes
- No
- Partially
- N/A

To aid the SARG Project Leader's efficient Project Management it may be useful that each question is also highlighted accordingly to illustrate what is: **resolved**  **not resolved**  **not compliant**  as part of the AR Project Leader's efficient project management.

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Airspace Change Proposal - Environmental Assessment

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1.	Introduction	
	<p>This report describes the environmental considerations relevant to TAG Farnborough Airport's proposal to introduce RNAV arrival (Standard Terminal Arrival Routes (STARs)), and departure procedures (Standard Instrument Departures (SIDs) and to create a volume of controlled airspace to enable the safe operation of those procedures.</p> <p>The Airspace Change Proposal (ACP) has been submitted by TAG Farnborough Airport Ltd.</p> <p>This assessment is based upon information presented in the following documents:</p> <ul style="list-style-type: none"> • "Airspace Consultation" [undated, no version] – Parts A-F, plus appendices. • "Airspace Change Proposal" [Issue 1.0, 3 July 2015] • "Airspace Consultation Feedback Report – Part B – The Proposed Airspace Design" [undated, no version] – also submitted as Appendix K of the formal ACP • "Airspace Consultation Feedback Report – Part C – Analysis of the Additional Consultation" [undated, no version] • "Additional Airspace Consultation (Limited in scope and area)" [undated, no version] <p>The original consultation was undertaken in 2014.</p>	
2.	Guidance to the CAA	Status
2.1	Is the proposal consistent with Government policy and/or guidance from Government to the CAA?	Yes
	<p>Guidance issued to the Civil Aviation Authority sets¹ out a framework for the environmental objectives that the CAA must consider when assessing airspace change proposals. In addition to these objectives, there may be other legitimate operational objectives, such as the overriding need to maintain an acceptable level of air safety, the desire for sustainable development or to enhance the overall efficiency of the UK airspace network, which need to be considered alongside these environmental objectives. The Government looks to the CAA to determine the most appropriate balance between these competing characteristics.</p>	

¹ For those Airspace Change Proposals being considered under the CAA's process as set out in CAP725, the relevant DfT guidance is "Guidance to the Civil Aviation Authority on Environmental Objectives Relating to the Exercise of its Air Navigation Functions, January 2014"

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Flights over National Parks and AONBs are not prohibited by legislation as a general prohibition against over-flights would be impractical. Government policy focuses on minimising the over-flight of more densely populated areas below 7,000 feet (amsl), but accepts that reducing CO₂ emissions between 4,000 and 7,000 feet (amsl) can also be a consideration. However, where it is practical to avoid over-flight of National Parks and AONBs below 7,000 feet (amsl), the Guidance asks that the CAA requires sponsors to consider this when developing their proposals.

3.	Rationale for the Proposed Change	Status
3.1	Does the rationale for the ACP include environmental reasons?	Yes
	<p>The ACP states that it has been developed to “reduce environmental impact by reducing over-flight of populated areas at low altitude where possible”. (page 3)</p> <p>In addition, one of the three stated justifications is “to reduce noise impact on the local population”. (page 4)</p> <p>One of the objectives to support this justification is: “To establish a route structure that, as far as practicable:</p> <ul style="list-style-type: none"> • Avoids towns and villages below 4,000ft; and • Avoids major population centres between 4,000ft and 7,000ft.” 	

4.	Nature of the Proposed Change	Status
4.1	Is it clear how the proposed change will operate, and therefore what the likely environmental impacts will be?	Yes
	The various consultation documents and proposal documents serve to explain the likely impacts, though the main indicator used by the sponsor is a calculation of the estimated population that will be overflowed as a result of the airspace change.	

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4.2	Have alternative options been considered, and have the environmental impact of each alternative been assessed?	Yes
	<p>Various options were considered, including “Do Nothing”. As alternatives to establishing controlled airspace, the sponsor considered a TMZ and an RMZ (but no evidence of assessing these in terms of environmental impacts). These were ultimately discounted as feasible options for reasons of inadequate “predictability and controllability”.</p> <p>A range of options were developed in order to address potential issues with other airspace users in the area and with the objective to minimise the number of people overflown. The sponsor confirms that they “prioritised reducing overflight of local populated areas where possible, at the expense of fuel consumption”.</p> <p>As a result of the consultation, Option 25 (which was the design consulted upon) was modified. The option was changed as a result of feedback in order to:</p> <ul style="list-style-type: none"> • “minimize noise impacts, • mitigate impacts on General Aviation (GA) and Sports & Recreational Aviation (S&RA) operations • minimize impact on RAF Odiham • minimize environmental impact of CO₂ emissions, local air quality and tranquillity.” <p>Further modifications with regards to the arrival routes from the south were subsequently made to result in Option 38.</p>	

5.	Noise	Status
5.1	Has the noise impact been adequately assessed?	Yes
	<p>No L_{eq} contours were required to be prepared and presented by the sponsor because, based upon the current extent of the airport’s 57 dBA L_{eq 16hour} contour, the proposed changes will have no effect on those contours; updated noise contours would have shown no difference resulting from this proposal. This also means that by definition, there are no new people that will be <u>significantly</u> affected by noise as a result of this proposal. However, that does not mean that there will not be some people that experience an increase in noise – as the proposal itself notes, the result of introducing PBN procedures is very likely to result in some areas being overflown with greater consistency and regularity whilst other areas will be overflown less. Any areas overflown more often are likely to result in some people experiencing an increase in aircraft noise, but not at levels that would be considered “significant”.</p> <p>SEL footprints were also not required to be prepared because the airport does not operate flights between 2300-0700; SEL footprints are only required if a proposed airspace change is expected to have an impact on flights within those hours (i.e. night flights).</p>	

In addition to providing indicative noise levels for individual flights (L_{max} values) at a range of typical altitudes, the sponsor has chosen to illustrate the difference in the number of people “overflown” as a result of the proposal. “Overflown” can be used as a proxy for indicating those populations that are most likely to experience aviation noise, but it is not a noise metric in itself and interpreting the population counts as such should be done under caution.

Appendix 1 of this report sets out the sponsor’s population counts for those areas that are overflown, both currently and predicted if the proposal is implemented.

Being “overflown” is subjective and there are many individuals who may perceive themselves as being overflown by an aircraft even if it is not directly overhead. In some instances, individuals may in fact describe themselves as being overflown even if the aircraft is some distance away from their location. For this reason, measuring populations overflown with reference to areas only directly beneath aircraft tracks can be misleading. Such tightly defined areas are unlikely to be full representations of the populations that either experience aircraft noise (albeit at relatively low levels). For that reason the statement by the sponsor that “255,000 fewer people would be affected by Farnborough aircraft” is likely to be overly optimistic as it is based upon measuring overflight as directly below an aircraft track.

That is not to say that the proposal won’t result in a reduction in people that are directly overflown by aircraft using Farnborough Airport. The design does seek to avoid direct overflight of centres of higher population in preference to sparser populated areas. The consultation and proposal do acknowledge that some people will be overflown more often and that there will also be some new areas overflown.

Seeking to minimise the number of people overflown by aircraft below 7000ft is consistent with the DfT’s policy as set out in the 2014 version of its Air Navigation Guidance, which was the extant Guidance during the development of the proposal (and continues to apply to the proposal under transitional arrangements).

The sponsor’s assessment of populations overflown was undertaken before the CAA published a recommended methodology for assessing and portraying “overflight” in CAP 1498 which was published in February 2017. The CAA’s methodology recognises and accounts for the fact that aircraft need not be directly overhead in order for an individual to report that they are overflown.

Despite the limitations of the using an “overflight” measure, we can use the sponsor’s population counts in the table at Appendix 1 as a broad indicator of impact, and the following points can be noted:

- In terms of the change in impact resulting from departing aircraft, a large reduction in population overflown (up to 7,000ft) is expected (an approximate reduction of 505,000 people, from around 542,000 to around 37,000). This is consistent with the greater accuracy with which RNAV SIDs are flown. It is also worth noting that the contrary impact is that those people who will be overflown can expect to be overflown more often below 7,000ft (approximately 37,000 people).

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	<ul style="list-style-type: none"> • In terms of the change in impact resulting from arriving aircraft, a smaller scale reduction in population overflowed (up to 7,000ft) is expected (an approximate reduction of 256,000 people, from around 1,069,000 to around 813,000). This is consistent with the expected nature of arriving aircraft; these will continue to be tactically vectored by ATC and therefore not display the concentrated pattern typical of RNAV departures, but still with an element of narrower dispersion as a result of the STARs. It is also worth noting that the contrary impact is that those people who will be overflowed can expect to be overflowed more often below 7,000ft (approximately 813,000 people). • The sponsor has combined these two impacts, taking account of overlapping locations that are affected by both departures and arrivals, to conclude that approximately 255,000 fewer people will be directly overflowed (from around 1,070,000 to 815,000). The contrary impact to this is that the population who will be overflowed (approximately 815,000 below 7,000ft) be overflowed more often, to varying degrees. 	
<p>5.2</p>	<p>Has the noise impact been adequately presented in the consultation and the submitted proposal?</p>	<p align="center">Yes</p>
	<p>Yes – though the presentation of noise impacts will have been achieved through a combination of operational diagrams that illustrate existing traffic patterns, anticipated traffic swathes and routes, plus indicative noise levels for a range of altitudes.</p> <p>In the consultation document, the sponsor explained the general noise impacts thus, which includes recognition that the proposal will affect some residents negatively as a result of any concentration that occurs (Part A: 10.3):</p> <p align="center">“Environmentally, our proposal will narrow the areas where most impact is felt, reducing the population significantly affected, in line with Government guidance. However, it also means that those below the narrower band would be over-flown more often. In some cases, our aircraft would over-fly new locations, in other cases there would be a reduction or removal of aircraft over-flight due to this proposal. In general, if locations get over-flown more often due to this proposal, the aircraft would usually be at a higher altitude. Aircraft that are higher appear smaller and quieter to someone on the ground.”</p> <p>At the time of consultation and development of the proposal the extant policy from DfT was reflected in the 2014 version of their Air Navigation Guidance. In line with that Guidance, the sponsor stated the following in its consultation (Part A: 10.12):</p> <p align="center">“Government guidance also says that it is preferable to concentrate flights along a few routes rather than disperse the flights widely. This means that fewer people would have a higher proportion of noise, because there would be fewer flight-paths for the same number of aircraft to follow. We have used this method in the design process, and will continue to do so.”</p> <p>Consideration of multiple routes as a means of incorporating “respite” was not a feasible option for the sponsor. The location of the airport in relation to other airports (i.e. Heathrow, RAF Odiham, Blackbushe, Fairoaks, Lasham and Gatwick) meant that a design that incorporated</p>	

multiple routes (as proposed to a design that sought to minimise routes and thereby minimise the number of people overflown) was not possible due to airspace limitations.

One aspect of the proposed design is the potential to enable aircraft to climb higher sooner with the result that there will be a reduction in noise levels; the higher the aircraft, the lower the noise levels on the ground. The consultation document explains that (Part A: 10.12):

“Currently, Farnborough departures are prevented from climbing above 3,400ft in the vicinity of the airport (2,400ft if the aircraft take off from Runway 06), due to route interactions with adjacent major airports (e.g. Heathrow and Gatwick). These interactions prevent a continuous climb to cruising altitude, which is the most efficient way to fly. If these routes are changed it would be possible to climb to higher altitudes directly after take-off, 'lifting the lid' on current departure restrictions to a certain extent. This proposal would not guarantee continuous climbs to cruising levels, but it would increase the likelihood of higher, quicker climbs for most departures more of the time.”

In addition, there is an expectation from the sponsor that aircraft arriving from the south will also achieve a more optimal descent profile, and hence achieve a noise benefit by staying higher for longer (Part A: 10.12):

“Farnborough arrivals from the south currently descend below Gatwick air traffic, and maintain a low altitude of 3,400ft for around ten nautical miles and then descend into the arrival traffic pattern (usually between 2,400ft and 2,000ft). Under this proposal, Farnborough arrivals from the south would descend in the same way beneath the Gatwick traffic, but would stay at a slightly higher altitude (4,000ft) for longer.”

Commentary on departure routes (as presented in Option 34)

The following summaries seek to outline the elements of the design that have the potential for having a noise impact. In particular, it notes the key locations where residents may experience increase in overflights. As context for considering the potential impacts, it should be noted the current fleet mix at the airport is 95% small business jets and turbo-props and mid-range airliners are 4.4%, and that the number of aircraft movements at Farnborough are:

- 27,000 in 2016 = an average of 74 movements per day
- Forecast to be 32,000 in 2019 = average of 88 movements per day
- Capped at 50,000 in total = 137 movements per day

SIDs – General

- It is noted that the expectation from the sponsor is that the majority of departing aircraft will typically remain on the SIDs until they reach an altitude of 7000ft. Any tactical intervention by ATC below 7000ft is expected to be uncommon. This is consistent with the expectation of a large reduction in the population that is overflown by departing aircraft.
- Very few non-RNAV departures are anticipated.

- Aircraft using these SIDs may be audible as they climb toward an altitude of 7000ft, and as a result some residents in locations closest to the SIDs may hear aircraft and feel that they are being overflown. However the noise levels would not be considered to be at significant levels, even accepting that the number of flights overflying those locations may increase as a result of the proposed change.

SID – Runway 06

- Runway usage expected to be approximately 20%
- The SID “has been designed to avoid direct over-flight of Guildford, Aldershot and Farnham” (Part B 4.16). Whilst it is correct that the SID avoids direct overflight of these towns, it is noted that it still remains close to the southern limit of Farnham such that residents in that vicinity may perceive that they are overflown. Aircraft are expected to be at 5,000ft at this point.
- Smaller centres of population such as Pirbright, Wood Street Village, Puttenham and Rowledge remain close to the SID track and so it is reasonable to expect that residents in these locations are likely to perceive that they are being overflown.
- After the first turn, the vertical profile of aircraft using the SID is expected to improve in comparison to current departures meaning that they will typically be higher than current departing aircraft.
- The SID crosses the Surrey Hills AONB. Current departures already cross this AONB, but the vertical profile of aircraft using the SID means that it is expected that aircraft will be higher than current departures as they cross this location.
- As traffic achieves 5,000ft, the SID has been designed to avoid direct overflight of the major centres of population such as Alton, Bordon, Liphook, Four Marks, Ropley and New Alresford area below 7,000ft.
- The SID passes directly over Upper Farringdon but at that location about 85% of all departures are expected to be at or above 7000ft.
- As the SID reaches the South Downs National Park, aircraft should be about 1,600ft higher than current departures would achieve due to the removal of airspace restrictions. It remains within the National Park boundary for about 9km before exiting at West Worldham, where aircraft should be at or above 6,000ft.
- 15% of aircraft are estimated to be between 5,000ft-6,000ft at Upper Farringdon. These aircraft are expected to remain on the SID as it continues south, passing over or close to East Tisted, High Cross, Foxfield Green, Ramsdean and Langrish. By Langrish/Ramsdean, these aircraft are expected to be at 7,000ft or above. Residents in these locations may perceive that they are overflown by these aircraft.

SID – Runway 24

- Runway usage expected to be approximately 80%
- The SID “has been designed to avoid direct over-flight of Church Crookham, Fleet, Ewshot, Crondall, Farnham and Alton” (Part B 4.21). Whilst it is correct that the SID avoids direct overflight of these locations, it is noted that it still remains close to Fleet (the southern limit of the town), Ewshot, Crondall and Bentley such that residents in those locations may perceive that they are overflown.
- A new first turn immediately after take-off takes the track of the SID over the MoD training grounds, avoiding the population centres of Fleet and Church Crookham that are currently overflown.

- After passing Ewshot the vertical profile of aircraft using the SID is expected to improve in comparison to current departures meaning that they will typically be higher than current departing aircraft.
- As traffic achieves 5,000ft, the SID has been designed to avoid direct overflight of the major centres of population such as Alton, Bordon, Liphook, Four Marks, Ropley and New Alresford area below 7,000ft.
- The SID passes directly over Upper Farringdon but at that location about 85% of all departures are expected to at or above 7,000ft.
- As the SID reaches the South Downs National Park, aircraft should be about 1,600ft higher than current departures would achieve due to the removal of current airspace restrictions. It remains within the National Park for about 7km before exiting at West Worldham, where aircraft should be at or above 6,000ft.
- 15% of aircraft are estimated to be between 5000ft-6000ft at Upper Farringdon. These aircraft are expected to remain on the SID as it continues south, passing over or close to East Tisted, High Cross, Foxfield Green, Ramsdean and Langrish. By Langrish/Ramsdean, these aircraft are expected to be at 7,000ft or above. Residents in these locations may perceive that they are overflown by these aircraft.

Commentary on arrival routes from the south (as presented in Option 34)

- Unlike the departing aircraft, arriving aircraft will, more often than not, be taken off the pre-programmed arrival route and tactically vectored by ATC. Tactical vectoring by air traffic controllers results in variation of aircraft tracks and because of this, the sponsor has portrayed the arrival routes as swathes rather than a single track.
- Even though tactical vectoring of arriving aircraft occurs currently, the tracks flown by arrivals using the proposed procedures would be more consistent and predictable than the current system. Their expected typical spread of tracks would be narrower than today. Within the anticipated swathe, there may still be areas of concentration, i.e. there is unlikely to be an even dispersion of arriving aircraft across the swathe.
- It is expected that arriving aircraft will typically be between 600ft and 1,000ft higher than the current equivalent traffic, during the descent from 7000ft.
- Arriving aircraft will typically descend over the South Downs National Park within the narrower swathe down to 4,000ft at its northern boundary. Currently this park is over-flown widely, and typically at lower altitudes than are expected if the proposal is implemented.
- The South Downs National Park and Surrey Hills Area of Outstanding Natural Beauty would continue to be overflown by arriving aircraft though generally in a narrower swathe, and at altitudes similar to or higher than today.

Commentary on arrival routes from the north (as presented in Option 34)

For runway 06

- From an altitude of 5,000ft, arriving aircraft from the north are expected to head south-east over Hook and Fleet, to cross the airport (or the final approach track) at 3,000ft-4,000ft, and continue their arrival from the south side of the A31. They will no longer descend to the

final approach track directly from the north in the vicinity of Crookham Village below 2,000ft, a manoeuvre they sometimes currently perform.

- Once south of the airport they will then turn right to join a typical landing pattern similar to today, re-crossing the A31 in the vicinity of Upper and Lower Froyle. They will turn onto final approach near Long Sutton or Well, as the arriving aircraft from the south do currently (and at similar altitudes).
- The South Downs National Park and Surrey Hills Area of Outstanding Natural Beauty would continue to be overflown by arriving aircraft though generally in a narrower swathe, and at altitudes similar to or higher than today.

For runway 24

- Expected to be broadly similar to current traffic pattern for arriving aircraft, though across a narrower swathe.
- The South Downs National Park and Surrey Hills Area of Outstanding Natural Beauty would continue to be overflown by arriving aircraft though generally in a narrower swathe, and at altitudes similar to or higher than today.

Commentary on arrival routes from the south (as presented in Option 38)

- A modified version of Option 34, with a reduction in proposed airspace volume and area.
- This option includes changes to arrivals from the south as previously presented in Option 34. The modification is outlined in the sponsor's document "Additional Airspace Consultation (Limited in scope and area)".
- It shows a representative sample of current radar tracks from arriving aircraft (Figure 12, but without information about altitude) plus illustrations of anticipated traffic patterns (Figure 3, with predicted typical altitudes).
- The document indicates that the general pattern of arriving traffic from the south is expected to move westward, taking the main flow of arrivals more directly over locations such as Midhurst and Easbourne. Figure 3 in the document indicates that this traffic will be expected to be between 4,000-6,000ft. As with Option 34, it also expects a generally narrower dispersion of aircraft than currently occurs.
- The document also confirms that, in line with the expected general move westwards of the pattern of arriving aircraft, the pattern of traffic over the South Downs National Park will also change. Whilst this will be at altitudes below 7,000ft, the change represents a re-distribution of aircraft rather than a change in altitudes or numbers of aircraft (similar to Option 34).

In summary the introduction of the RNAV routes result in greater concentration of aircraft flying those routes meaning some people will be overflown more frequently, but the anticipated concentration of the aircraft flying those routes will result in less people being overflown by Farnborough traffic.

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6.	Emissions	Status									
6.1	<p>Has the impact on CO₂ emissions been adequately assessed?</p>	Yes									
<p>The proposal advises that “The priority below 4000ft agl is to reduce noise impact. Longer routes have been created due to prioritising avoidance of over-flight of populated areas below 4000ft agl. The assumptions used in this calculation are conservative (worst case), hence in reality it is expected that the increase in fuel burn (534 tonnes p.a.) will be less than this figure.”</p> <p>The sponsor’s CO₂ assessment shows that the original proposal is expected to increase track miles for both arrivals and departures. The assessment used representative aircraft types, and also used a fleet mix that conservatively over-estimated the proportion of large jets operating at the airport (i.e. such that it would result in an over-estimate of fuel burn and CO₂ emissions). Estimates of track mileage increases are reasonable based upon a comparison between existing routes and the proposed design.</p> <p>The sponsor’s estimate for the total annual increase in CO₂ if the original proposal is implemented is 1,432 tonnes based on 2015 traffic forecasts (27,000) and 1,697 tonnes based on 2019 forecasts (32,000). These are the sponsor’s “most likely” traffic forecasts. They have also provided an estimate of the increase in CO₂ emissions that is based on “high” traffic forecasts which equate to 45,000 movements in 2015 and 50,000 in 2019. Based upon these “high” forecasts, the estimated total annual increase in CO₂ emission is 2,387 tonnes in 2015 and 2,652 in 2019.</p> <p>Summary of CO₂ emissions assessment:</p> <table border="1" data-bbox="271 963 1507 1106"> <thead> <tr> <th>Total annual increase in CO₂ emissions (tonnes) - estimate</th> <th>“Most Likely” traffic forecasts</th> <th>“High” traffic forecasts</th> </tr> </thead> <tbody> <tr> <td>2015</td> <td align="center">1,432</td> <td align="center">2,387</td> </tr> <tr> <td>2019</td> <td align="center">1,697</td> <td align="center">2,652</td> </tr> </tbody> </table> <p>The subsequent modifications to the designs for the arrivals and departures, and the effect they have upon track mileage is anticipated by the sponsor to be relatively minor in comparison to the estimates outlined above, and on that basis the sponsor asserts that the assessment based upon the design originally consulted upon is still valid as a reflection of the emissions impact for the subsequent revisions.</p> <p>Based upon the actual number of aircraft movements at the airport in 2016 (approx 27,000), the estimates based on the “most likely” traffic forecasts are the most reasonable to use for the purpose of considering the impact for our assessment. The scale of this increase, (approx 1,700 tonnes of CO₂ per year following implementation) is comparatively small.</p>			Total annual increase in CO ₂ emissions (tonnes) - estimate	“Most Likely” traffic forecasts	“High” traffic forecasts	2015	1,432	2,387	2019	1,697	2,652
Total annual increase in CO ₂ emissions (tonnes) - estimate	“Most Likely” traffic forecasts	“High” traffic forecasts									
2015	1,432	2,387									
2019	1,697	2,652									

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6.2	Has the impact on CO₂ emissions impact been adequately presented in the consultation and the submitted proposal?	Yes
	CO ₂ emissions estimates in the consultation material were based on the “most likely” traffic forecasts only.	

7.	Local Air Quality	Status
7.1	Has the impact on Local Air Quality been adequately assessed?	Yes
	<p>The sponsor has set out in the proposal the following information (Part B 6.22):</p> <ul style="list-style-type: none"> • “The only change below 1,000ft in our proposal is the immediate left turn after take-off from Runway 24. • That turn, which is designed to occur when the aircraft passes 750ft, is specifically to turn away from the populated area of Church Crookham and towards the unpopulated Army training ground. Aircraft may well reach or exceed that altitude within the boundary of the airport itself. • We consider that this turn away from populated areas, combined with the altitude of the change, would have no noticeable impact on local air quality. There are no air quality management areas (AQMAs) in the vicinity of the airport that could be affected by this proposal.” <p>We are satisfied that this conclusion is reasonable and that no further assessment of the impact upon local air quality is required. The proposal is not anticipated to increase traffic numbers, and the nature of the change below 1,000ft (as outlined) would not result in an increase in emissions, only a redistribution. The airport is neither in nor adjacent to an Air Quality Management Area and therefore air quality in the vicinity of the proposed airspace change is unlikely to be significantly affected if this change were to be implemented.</p>	
7.2	Has the impact on Local Air Quality been adequately presented in the consultation and the submitted proposal?	Yes
	The impact, or rather the rationale for why there would be no impact, was adequately presented.	

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8.	Tranquillity	Status
8.1	Has the impact on tranquillity been adequately considered?	Yes
	Yes – there are frequent references and demonstrable consideration of the potential impacts on the AONBs and National Parks that are closest to the airport and are overflowed by aircraft that use the airport. In broad terms, there is no anticipated increase in traffic over these areas even though there may be a redistribution of the traffic patterns. The sponsor is expecting improvements in aircraft vertical profiles such that they will typically be higher (and therefore generate lower noise levels) over these areas.	
8.2	Has the impact on tranquillity been adequately presented in the consultation and the submitted proposal?	Yes
	The potential for impacts on tranquillity, specifically in reference to AONBs and National Parks has been adequately presented.	

9.	Visual Intrusion	Status
9.1	Has the impact of visual intrusion been adequately considered?	Yes
	In line with the impacts on tranquillity, visual intrusion has been adequately considered in the context of AONBs and National Parks.	
9.2	Has the impact of visual intrusion been adequately presented in the consultation and the submitted proposal?	Yes
	The potential for impacts on visual intrusion, specifically in reference to AONBs and National Parks has been adequately presented.	

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10.	Biodiversity	Status
10.1	Has the impact upon biodiversity been adequately considered?	Yes
	Yes – there is confirmation in the documentation of consideration of biodiversity impacts by the sponsor, with the conclusion that based upon the nature of the proposal there are unlikely to be any biodiversity impacts. We agree that this conclusion is reasonable for this proposal.	
10.2	Has the impact upon biodiversity been adequately presented in the consultation and the submitted proposal?	Yes
	The potential for impacts on biodiversity has been adequately presented.	

11.	Continuous Descent Approaches	Status
11.1	Has the implementation of, or greater use of, CDAs been considered?	Yes
	The consultation document confirms that “Gatwick and Heathrow route interactions prevent continuous descents to final approach without levelling off.” This demonstrates that the sponsor has considered the possibility of CDAs, but is unable to implement them as part of this proposal.	

12.	Impacts Upon National Parks and/or AONBs	Status
12.1	Does the proposed change have an impact upon any National Parks or Areas of Outstanding Natural Beauty (AONBs)?	Yes
	The statutory purposes of National Parks are to conserve and enhance their natural beauty, wildlife, and cultural heritage and to promote opportunities for the understanding and enjoyment of their special qualities by the public. The statutory purpose of AONBs is to conserve and enhance the natural beauty of their area. In exercising or performing any functions in relation to, or so as to affect, land in National Parks and AONBs, the CAA is required to have regard to these statutory purposes under s.19 and Schedule 2 of the Civil Aviation Act 1982. This duty was re-stated in the revised Air Navigation Guidance issued in 2014.	

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	<p>This duty was also reiterated in the Aviation Policy Framework (March 2013) which stated “the CAA has legal duties to have regard to the purposes of National Parks and Areas of Outstanding Natural Beauty and must therefore take these into account when assessing airspace changes.”</p> <p>Whilst recognising this duty it is also true that flights over National Parks and AONBs are not prohibited by this legislation as a general prohibition against over-flights would be impractical.</p> <p>As noted earlier in this report (Section 8.1) the sponsor has considered the impacts of AONBs and National Parks, concluding that:</p> <ul style="list-style-type: none"> • There will be no increase in traffic over these areas; • The proposed design may result in a change to the traffic patterns over these areas; • In board terms, aircraft are expected to be higher than current traffic over these areas. <p>These aspects should mean that the impact on AONBs and National Parks will be no worse than currently, and has the potential to improve if aircraft do achieve improved vertical profiles.</p>
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13.	Traffic Forecasts	Status
13.1	Have traffic forecasts been provided, are they reasonable, and have these been used to reflect the future impact of the proposal?	Yes
	<p>Yes – traffic forecasts were provided, for 2015 and 2019. The “most likely” forecasts were included in the consultation material, and “high” traffic forecast were included within the CO₂ emissions assessment. For 2015 the “most likely” forecast was 27,000 movements and for 2019 the “most likely” forecast was 32,000 movements. The high forecasts for 2019 are very conservative as they reflect the 50,000 maximum movement limit for the airport. As a comparison, the total of actual movements in 2016 is reported as being approximately 27,000.</p> <p>Fleet mix at Farnborough is 95% small business jets and turbo-props. Mid-range airliners are 4.4%.</p>	

14.	Consultation	Status
14.1	If undertaken, has evidence of non-aviation stakeholder consultation been provided?	Yes

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	Yes, non-aviation stakeholder consultation was undertaken and evidence is provided, including the Consultation Feedback Reports.	
14.2	Has account been taken of the results of the environmental factors raised by consultees or has evidence been provided to indicate why this has not been possible?	Yes
	Yes, the Consultation Feedback Reports details the environmental themes that emerged as a result of consultation responses, and what action if any was taken the sponsor was able to take.	

15.	Compliance with CAP 725	Status
15.1	Have all environmental assessment requirements specified in CAP 725 been met, where applicable?	Yes
	All requirements have been met where applicable.	

16.	Other Aspects	Status
16.1	Are there any other aspects of the ACP, that have not already been addressed in this report, that may have a bearing on the environmental impact?	Yes
	<p><u>Impacts on Heathrow SIDs</u> The ACP Appendix M: Heathrow SID Gradient sets out the anticipated impacts of the changes to the MID and GOSI/GAGSU (formerly SAM) SIDs. For each SID, the aircraft operator is required to inform Air Traffic Control (ATC) prior to departure if the flight is unable to maintain the minimum climb gradient or attain SID altitudes. The change to the SIDs will have no operational impact for vast majority of aircraft that use them as they already achieve the new gradient. Flights from all operators are already required to notify ATC if they are likely to underperform the SID gradient; this requirement would continue, and would act as the 'trigger' for coordination between Heathrow ATC and Farnborough ATC. In the few occasions that this is expected to occur, co-ordination between Heathrow and Farnborough would ensure the aircraft could depart with no need to change its gradient. The case is therefore made by the sponsor that in amending the SIDs to reflect a 5.5% gradient will have no actual impact in the lateral and vertical departure profiles being achieved by aircraft using the SIDs. This especially relates to thrust settings; if thrust settings used by aircraft on these Heathrow SIDs needed to change to accommodate the steeper gradient there was the potential to have a minor but measurable impact upon emissions and therefore local air quality (LAQ). The rationale and evidence provided by the sponsor supports the expectation that thrust settings will not change and therefore there will be no resulting impact on LAQ.</p>	

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Impacts on General Aviation activity

In addition to designing a proposal that seeks to avoid populated areas, the sponsor advises that it has also sought to avoid those areas that are most used by General Aviation. The consultation advised that the proposal “is likely to have an effect on where some light GA aircraft (and a small number of military aircraft) fly. The change of impacts to people on the ground due to this is impossible to predict accurately as GA flights do not follow predictable tracks in the way that passenger and freight flights do.” (Part B 2.46). In order to mitigate such impacts, the sponsor has modified its proposed airspace design to accommodate other airspace users activities and to provide a crossing service with the intention of minimising instances of other airspace users having to re-route and thereby increase their overflight (and resulting noise impacts) of certain areas. These actions by the sponsor should minimise any secondary environmental impacts that are result of a change in other airspace users’ activities; any such impacts are expected to be minor and would be difficult to forecast with any accuracy.

17.	Recommendations	Status
17.1	Are there any recommendations for the Post-Implementation Review?	Yes
	<ul style="list-style-type: none"> • Monitor and record the vertical profiles of departing aircraft post-implementation to enable a comparison with vertical profiles pre-implementation. The sponsor should provide an assessment of any change in climb performance that results from implementing the proposal. • Monitor and record the vertical profiles of arriving aircraft from the south post-implementation to enable a comparison with vertical profiles pre-implementation. The sponsor should provide an assessment of any change in descent performance that results from implementing the proposal. The illustration of vertical profiles as depicted in the Consultation Feedback Report (Part B) should be used as the expected post-implementation outcome. • Provide a comparison between pre-implementation and post-implementation traffic patterns, for aircraft up to 7,000ft. Arrivals and departures to be portrayed separately, using comparable and representative traffic samples. Diagrams should include illustrations of the spread of traffic, plus illustrations of traffic density. • Provide a revised “overflight” population counts for arrivals and departures, using the same methodology as undertaking for the proposal. 	

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	<ul style="list-style-type: none"> • Provide re-confirmation that the airspace change has not had an impact upon the airport's L_{eq} noise contours, using 57 dBA L_{eq} as the threshold, or if it has had an impact, re-present updated noise contours that reflect any such impact plus accompanying population counts. • Update the CO₂ emissions assessment, using actual fleet mix, traffic numbers and radar data of routes flown to determine the annual impact on CO₂ emissions. • Monitor and keep a record of the occurrence of refusals given to General Aviation when access to Farnborough's controlled airspace is requested.
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18.	Government Approval	Status
18.1	Is the approval of the Secretary of State for Transport required in respect of the environmental impact of the airspace change proposal?	No
	No – there is unlikely to be a significant detrimental environmental impact as a direct result of the changes in this proposal.	

19.	Conclusions	
19.1	Can an overall environmental benefit be demonstrated (or justified/supported)?	No
	<p>Some of the potential impacts are positive (reduction in the total numbers of population overflow, improvement in vertical profiles) and some are negative (increase in overflights for some parts of the population, increase in CO₂ emissions).</p> <p><u>Noise:</u></p> <ul style="list-style-type: none"> • There is unlikely to be a change to the airport's L_{eq} noise contours, which would indicate that there will be no change in <u>significant</u> noise impacts. • The proposal is expected to achieve the objective of reducing the number of people overflowed by aircraft using Farnborough Airport. • However, this reduction is also likely to mean that some people will be overflowed more often, to varying degrees. The locations beneath and close to the departure routes are likely to experience the greatest increase in overflights as the new SIDs are expected to result in concentrated traffic patterns. 	

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- It is not possible to predict the scale of this impact with any accuracy – it depends on runway usage, how the new procedures will operate in practice, the achievement of improved vertical profiles etc. But there are contextual factors that are relevant to understanding what those impacts might be – the number of movements at the airport (27,000 in 2016), the type of aircraft that use the airport (predominantly small business jets). These aspects should mean that an increase in noise levels for those people overflown more often is minimised.

CO₂ Emissions:

- The longer routes (both departures and arrivals) that have been designed as an outcome of prioritising noise impacts below 7,000ft (i.e. reducing the number of people overflown) are likely to result in an increase in fuel burn and therefore CO₂ emissions. This increase is relatively small, estimated at an annual total of 1,700 tonnes of CO₂.

Local Air Quality, Tranquillity, Visual Intrusion, Biodiversity

- No impacts anticipated as a result of the proposal.

Outstanding Issues

Serial	Issue	Action Required
1		
2		

Additional Compliance Requirements (to be satisfied by Change Sponsor)

Serial	Requirement
1	
2	

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Environmental Assessment Sign-off/Approval	Name	Signature	Date
Environmental Assessment completed by:	[Redacted]	[Redacted]	1 Dec 2017
Environmental Assessment approved by:	[Redacted]	[Redacted]	12/01/2018

Approver - Environment Comments:

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Appendix 1 – Extract from Sponsor’s Consultation Feedback Report (Part B – Figure 20, page B47)

Overall population likely to be affected

The table summarises the net population over-flown by current flight-paths, and the net population that would be over-flown by the proposed flight-paths, if this proposal was implemented.

Departures	Current pop’n over-flown	Proposed pop’n over-flown	Change in population (net difference)	Change in population (% reduction)
Up to 4,000ft	362,687	21,996	340,691	94%
From 4,000ft-7000ft	179,457	15,212	164,245	92%
All Departures up to 7,000ft	542,144	37,208	504,936	93%

Arrivals	Current pop’n over-flown	Proposed pop’n over-flown	Change in population (net difference)	Change in population (% reduction)
From 4,000ft to the runway	576,113	377,885	198,228	34%
From 7,000ft-4,000ft	493,308	435,123	58,185	12%
All Arrivals up to 7,000ft	1,069,421	813,008	256,413	24%

Combined over-flights (taking into account where departures and arrivals over-fly the same place)	Current pop’n over-flown	Proposed pop’n over-flown	Change in population (net difference)	Change in population (% reduction)
Up to 4,000ft	577,046	377,885	199,161	35%
From 4,000ft-7,000ft	493,308	437,487	55,821	11%
All over-flights up to 7,000ft	1,070,354	815,372	254,982	24%