

# Future Airspace Strategy Implementation South (FASIS) Bristol Airport

Gateway documentation:  
Stage 1 Define

Step 1B Design Principles  
Engagement Feedback  
for stakeholder final review



Uncontrolled

## Sign-Off

Action	Role	Date
Produced	Airspace Change Specialist	22/11/2019
Reviewed Approved	Bristol General Manager	22/11/2019
Reviewed Approved	Bristol Head of Airside Operations and Safety	22/11/2019

## Publication History

Issue	Month/ Year	Comments
Issue 1.0	November /2019	First issue submitted to the CAA

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# 1. Introduction

This document forms part of the document requirements under the CAA's CAP1616 Airspace Change Process: *Stage 1 Define Gateway, Step 1B Design Principles*.

In September 2019, Bristol Airport Limited (BAL) engaged a representative group of aviation industry and community stakeholders. Bristol Airport provided stakeholders with a list of draft Design Principles, along with context as to how Design Principles are relevant to the UK's Airspace Change Process CAP1616. Feedback and suggestions on the draft Design Principles were received from a variety of stakeholders; this was analysed and used to update our list of Design Principles.

This document describes how stakeholders' feedback has influenced the evolution of the Design Principles. The Executive Summary lists Bristol Airport's final Design Principles amended as a result of the feedback received during the engagement process. The subsequent sections of this document outline our targeted stakeholders; draft Design Principles disseminated to stakeholders; the engagement activities in support of this submission; and a summary of the feedback received and how Design Principles changed as a result of this.

Bristol Airport will now submit this Design Principles document to the CAA, to complete the Stage 1 Define Gateway. The submission of this document is targeting the CAA's December 2019 Gateway Assessment meeting (20/12/2019). Subject to approval of Stage 1, Bristol Airport will formally adopt these Design Principles for the Bristol Airport Limited Airspace Change Proposal (ACP).

Engagement on specific design concepts will occur later in Stage 2, and formal consultation in Stage 3. The design concepts will be evaluated against the final Stage 1 Design Principles as part of Stage 2.

## 2. Executive Summary – List of Final Design Principles

The following list summarises the final Design Principles which have resulted from the engagement process described in Section 3. Some of these Design Principles have changed in response to the engagement feedback received, which is summarised in Section 5.

Design Principles have been split into general categories (e.g. policy, regulation) and prioritised from “A” high – “C” lower. These priorities are partially based on whether the Design Principles are mandatory (e.g. consideration of safety) or where there exist choices and there could be alternative preferences (e.g. should the change minimise the number of people newly overflowed or maximise sharing through managed dispersal). The feedback received on the Design Principles was also taken into consideration when priorities were assigned, as covered in Section 5.

These priorities will be considered when the Design Principles are used to evaluate/ rank design options in the later stages of the Airspace Change Process. The priorities for the first 10 “general” Design Principles can be compared against each other, but not directly against the noise mitigation Design Principles covered below. The noise mitigation Design Principles (DP11 – DP15) have been assigned the same “a” highest - “c” lowest priority scoring but using lowercase characters to demonstrate that these are sub-Design Principles.

Category	Design Principle and Priority	Details
<b>Safety</b>	DP1) Must maintain and where possible, enhance safety standards  <i>Priority A</i>	Safety is at the forefront of everything Bristol Airport does. We believe that it is crucial that a new airspace design maintains and where possible enhances current safety standards.
<b>Policy</b>	DP2) Must accord with the CAA’s published Airspace Modernisation Strategy (CAP 1711) and any current or future plans associated with it  <i>Priority A</i>	CAP 1711 describes what airspace modernisation must deliver including:  - the need to increase aviation capacity; - growth to be sustainable; - the need to maximise the utilisation of existing runway capacity
<b>Regulation</b>	DP3) Must be compliant with all relevant laws and regulations  <i>Priority A</i>	To maintain safety and ensure integration with the wider airspace.
<b>Technical</b>	DP4) Must maximise efficiency by using modern navigation technology  <i>Priority A</i>	The reliance on legacy technology must be removed. Furthermore, aircraft navigation capabilities have increased. To maximise the benefits that these improvements bring, including satellite navigation standards and route positioning accuracy, arrival and departure routes must be designed to make full use of modern navigation technology.
<b>Operational</b>	DP5) Must provide sufficient capacity to support future demand  <i>Priority A</i>	We believe that Bristol Airport will need to respond to future growth opportunities and as part of the Airspace Modernisation Strategy programme will, in accordance with government policy, ensure that any new airspace design is sufficient to cope with increased demand and link efficiently into the national network.

Category	Design Principle and Priority	Details
<b>Environmental</b>	DP6) Should minimise fuel burn and CO <sub>2</sub> emissions per flight as far as possible  <i>Priority A</i>	Bristol Airport should, through airspace design, seek to implement the most efficient flight profiles.
<b>Environmental</b>	DP7) Should use noise-efficient operational practices to minimise the impact of aircraft noise on the local community and stakeholders  **Refer to the Noise Mitigation Design Principles (11-15) **  <i>Priority A</i>	Bristol Airport should, where possible, reduce and mitigate noise and its distribution in order to manage the impact of aviation growth on local communities in line with government policies. The Air Navigation Guidance 2017 states that the priority for airspace below 7,000ft is to minimise the impact of aviation noise, unless evidence demonstrates a disproportionate increase in CO <sub>2</sub> emissions
<b>Operational</b>	DP8) Should maintain or enhance operational resilience of the Air Traffic Control network  <i>Priority B</i>	Bristol Airport should consider airspace and route designs that benefit the operation and resilience of the airport and the national airspace network.
<b>Technical</b>	DP9) Should minimise impact on other airspace users  <i>Priority B</i>	In accordance with the CAA's published Airspace Modernisation Strategy, Bristol Airport should consider designs and procedures that facilitate and accommodate access to airspace for non-commercial users, including General Aviation (e.g. recreational aviation or private transport), Ministry of Defence and other aviation communities.
<b>Technical</b>	DP10) Should minimise controlled airspace (CAS) and impact on adjacent aerodrome and airfields  <i>Priority B</i>	The volume of Controlled Airspace considered by Bristol Airport should be the minimum necessary to deliver a safe and efficient operation, taking into account Procedure Design standards and the needs of adjacent aerodromes and airfields.

The following five "sub" Design Principles have been included as noise mitigations alongside the more general noise-focussed Design Principle 7. Bristol Airport will seek to minimise noise impact where possible, and we will consider local circumstances.

Government guidance also states that minimising noise should be the priority for airspace design below 7,000ft. We recognise that there are several applications of this guidance and have therefore provided the following sub-principles.

Noise Mitigation Design Principle and Priority	Details
<p><b>DP11) Minimise the number of people newly overflowed</b></p> <p><i>Priority c</i></p>	<p>To avoid exposing people to aircraft noise who are currently not exposed</p>
<p><b>DP12) Maximise sharing through predictable respite routes</b></p> <p><i>Priority b</i></p>	<p>Operate multiple arrival and departure routes, and alternate between these routes at different times of the day or days of the week. This would allow communities to have predictable periods of respite</p>
<p><b>DP13) Avoid overflying communities with multiple routes, including from other airports</b></p> <p><i>Priority c</i></p>	<p>Use the opportunity to work with other airports to find a solution for this.</p>
<p><b>DP14) Maximise sharing through managed dispersal</b></p> <p><i>Priority c</i></p>	<p>An alternative approach to maximising sharing is to spread routes over a wider area to share the impact of noise. This would mean each flight path was flown less frequently but a wider area would be affected by noise</p>
<p><b>DP15) Minimise the total population overflowed</b></p> <p><i>Priority b</i></p>	<p>Concentrating aircraft along defined routes to minimise the total number of people exposed to aircraft noise.</p>

## 3. Engagement Activities and Stakeholders

### Bristol Airport Airspace Change Stakeholders

In July 2019, prior to the Stage 1 engagement activities, Bristol Airport Limited (BAL) identified relevant aviation industry and community stakeholders, alongside an associated representative for each.

Bristol Airport used the “Potentially Affected Area” which covers areas that could potentially be overflowed below 7,000ft (as shown on the CAA Airspace Change [portal](#)), to identify relevant aviation industry and community stakeholders. This geographical area covered most of the local aviation and community stakeholders listed below however, Bristol Airport also contacted a number of additional organisations they are mandated to engage with, or who could potentially be impacted.

Bristol Airport engaged with adjacent airports who they will need to coordinate any changes with, due to their close airspace and procedure proximity. We ensured that we engaged with appropriate airspace users who use the airspace around Bristol Airport such as Great Western Air Ambulance and the National Police Air Service. We have also engaged with stakeholders who we are required to contact as part of an airspace change: namely the Ministry of Defence (MoD) and representatives from the National Air Traffic Management Advisory Committee (NATMAC), which covers a wide variety of airlines and aviation organisations.

#### Aviation industry stakeholders:

- Adjacent commercial and private airports (20 – including Cardiff and Exeter)
- Airlines (x18)
- Bristol Airport based companies (Bristol Wessex, Centreline Aviation, ProFred, Western Power Distribution and Bristol University UAVs)
- Bristol Airport Consultative Committee members (x23)
- Bristol FLOPSC Group
- Great Western Air Ambulance
- Local Flying/ Recreational Clubs (Bailey’s Balloons, British Balloon & Airship Club, Mendip Gliding, Avon Hang Gliding & Paragliding, Woodspring Model Aircraft and New Farm Flying)
- MoD (via DAATM and local bases – Boscombe Down, RAF Benson, RAF Fairford, SAS Hereford)
- National Police Air Service
- NATMAC members (x34)
- NATS

#### Community stakeholders:

- Bristol Airport Consultative Committee members (x23)
- Environmental Effects Working Group members (x9)
- Local constituency MPs (x19)
- Local Authorities, District Councils and Planning Teams (x29)
- Town and Parish Councils (x293)

### Engagement Activities

Bristol Airport submitted a Statement of Need for this Airspace Change Proposal (ACP) to the CAA on 11<sup>th</sup> October 2018 ([link](#)). Since this submission, Bristol Airport have met with neighbouring airports Cardiff and Exeter, alongside NATS and ACOG (Airspace Change Organising Group); to ensure all key stakeholders are kept up to date on the progression of the ACP.

The following collaboration meetings have been held since the Statement of Need was submitted.

- A joint ACP and FASI-S (Future Airspace Strategy Implementation – South) meeting was held between Bristol Airport, Cardiff Airport, Exeter Airport and NATS; on the 12<sup>th</sup> October 2018.
  - o This initial meeting was held to understand Bristol Airport’s needs/ requirements from an ACP; it’s alignment with FASI-S; and coordination with adjacent airports.
  - o Cardiff and Exeter Airports also provided updates on their ACP plans and timelines.
  - o Notes from the meeting have been provided <sup>(Ref 1)</sup>.
  
- Another joint ACP/ FASI-S meeting was held between Bristol Airport, Cardiff Airport, Exeter Airport, ACOG and NATS; at Bristol Airport on the 26<sup>th</sup> July 2019.
  - o Updates were provided on Bristol, Cardiff and Exeter’s (separate) ACPs progress.
  - o All airports agreed they would need to work collaboratively as a region; alongside the wider FASI-S programme of work.
  - o Bristol Airport presented their plan for Design Principles engagement.
  - o Notes from the meeting have been provided <sup>(Ref 2)</sup>.

Bristol Airport also provided updates to the Airport Consultative Committee:

- Airport Consultative Committee, 24<sup>th</sup> July 2019
  - o Presentation given by Bristol Airspace, informing members that we were about to embark on the engagement process for our Design Principles; and where this fit in to the wider airspace change process. The slides have been provided separately <sup>(Ref 6)</sup>.
  
- Airport Consultative Committee, 31<sup>st</sup> October 2018
  - o Bristol Airport and NATS presented information on the wider Airspace Change Process. Minutes have been provided separately <sup>(Ref 7)</sup>.

### Design Principles Engagement

The aviation industry and community stakeholders listed in Section 3 were contacted on the 9<sup>th</sup> August 2019 by Bristol Airport. They were invited to participate at an engagement workshop in September 2019 to discuss Bristol’s Design Principles. The workshops were held during the first week of September which gave stakeholders over three weeks to identify a representative, if they wanted to attend.

A small number of Local Authorities, District Councils and aviation stakeholders were sent letters where email addresses were difficult to obtain, or letters had traditionally been sent. The remaining, and vast majority, of stakeholders were emailed.

The letter and email contained the same background information on Airspace Change and why Bristol Airport are required to produce and submit Design Principles as part of this. An example of the workshop invite has been provided as a separate document <sup>(Ref 3)</sup>.

In the email and letters sent, we explained that we were planning on using these workshops to engage on the Design Principles with stakeholders via a two-way discussion; understanding their own specific and local priorities for airspace change, and how they want to see these reflected in the Design Principles. Stakeholders were made aware that this was not a consultation on designs but an engagement on guiding principles which the final design would seek to achieve.

The email also contained a [link](#) to a dedicated page on the Bristol Airport website which describes the rationale for airspace change; why Bristol are committed to airspace modernisation; and a link to a number of FAQs.

In August 2019, we created a set of draft Design Principles for this Airspace Change Proposal which sought to address the safety, environmental and operational objectives of Bristol’s Airspace Change Proposal. These draft Design Principles, alongside some context behind them, were emailed to all



aviation and community stakeholders who had confirmed attendance at one of the four stakeholder engagement workshops, to be held in September 2019. This document has been provided as a supporting document <sup>(Ref 4)</sup>.

The draft Design Principles and background information were sent to the stakeholders who had confirmed attendance at a workshop. We made it clear that these proposed draft design principles were for discussion, and that feedback received at the workshops would be fully considered prior to them being finalised. The Design Principles were sent out a week before the engagement workshops which we felt was enough time for attendees to read through the short document in preparation for the workshops.

## Stakeholder Engagement Workshops

Bristol Airport ran four stakeholder engagement workshops in September 2019 which were focussed on discussing the draft Design Principles; any changes or new principles; and the priorities for these. We ran one workshop for aviation industry stakeholders and three for community stakeholders. This reflected the number of stakeholders from each stakeholder list who responded to the workshops invites. The workshops and number of attendees at each are listed below:

- Tuesday 3<sup>rd</sup> September, attended by 14 aviation stakeholders (Avon Hang Gliding and Paragliding Club, Cardiff Airport, Centerline, easyJet, Executive Jet Charter, Exeter Airport, Light Aircraft Association (Devon Strut), Mendip Gliding Club, NATS Bristol, NATS Cardiff, NATS FASI-S, UAV Systems University of Bristol, Western Regional Balloons, Westonzoyland Flying Club)
- Wednesday 4<sup>th</sup> September, attended by 17 community stakeholders
- Thursday 5<sup>th</sup> September, attended by 11 community stakeholders
- Friday 6<sup>th</sup> September, attended by 13 community stakeholders

The community stakeholder workshops were attended by a good number of parish council representatives from across a wide area.

The four workshops had an identical agenda and were facilitated consistently by a third-party communications company (ComRes). Members from Bristol Airport and NATS were also in attendance to answer any queries related to the airport or airspace. The slides from the workshops have been supplied as a separate supporting document <sup>(Ref 5)</sup>. As mentioned, the four workshops were administered identically, with the same agenda which is summarised below:

- Welcome and workshop overview
- Introduction to airspace modernisation (presented by NATS)
- Purpose of engagement workshops (presented by Bristol Airport)
- Discussion on Airspace Change in small groups (3-5 in each group). The facilitators asked attendees to discuss what priorities they felt Bristol Airport should consider as part of its Airspace Change Proposal. An individual from each group fed the main discussion points back to the whole group.
- Attendees were then asked to discuss the draft Design Principles in more detail, which had been sent to them before the workshops. They were asked to discuss any changes to the Design Principles and prioritise them. Again, individual groups summarised their discussion to the whole group.
- Wrap-up and next steps

Stakeholders were thanked for their attendance and feedback on the draft Design Principles. Bristol Airport explained that this feedback would be analysed and reviewed against the draft Design

Principles. We would clearly articulate why changes are made to the draft Design Principles alongside why changes are not (as summarised in Section 5).

### Engagement Feedback Analysis

Throughout the workshop discussions, independent facilitators from ComRes took notes and summarised key discussion points from stakeholders. We captured this feedback in a spreadsheet alongside information on who made the comment and which organisation they represented. We received just under 500 individual feedback contributions across the four workshops.

We reviewed this feedback and where possible, assigned the individual comments to one/ many of our draft Design Principles. This feedback was collated in a spreadsheet for analysis, with separate worksheets (tabs) for each of the 16 draft Design Principles. There were lots of comments which were included across multiple tabs, because they were applicable to multiple Design Principles. For example, there were several comments relating to DP4 (use of modern navigation technology) which also cited benefits associated with environmental and noise impacts (DP6 and DP7).

The feedback collated for each draft Design Principle was further analysed and grouped into common themes. This allowed us to easily identify feedback which was:

- In support of the draft Design Principle e.g. lots of support for safety (DP1) to be a top priority and not be compromised.
- Not in support of the draft Design Principle e.g. some stakeholders did not support minimising the number of people newly overflowed (DP12) but would prefer for Bristol Airport to focus on protecting tranquillity.
- Feedback which suggested or had the potential to change the Design Principle or description wording.

During the workshops we also received a number of additional comments and feedback which were not wholly relevant to our Design Principles but related to the wider airspace change process and Bristol Airport operations. Alongside the main feedback received for the draft Design Principles, we have themed these comments and responded to the main themes. As this feedback was recorded by a third party, we wanted to provide responses back for stakeholders.

These have been broken down into the following categories and can be viewed in the listed Appendix sections:

- Stage 2 Develop and Assess ([Appendix A](#)); specifically, comments surrounding the design options and development phase of work.
- Stage 3 Consult ([Appendix B](#)); comments related to the consultation phase of work such as the data which will be provided to stakeholders.
- All other comments ([Appendix C](#)).

Our final Design Principles were circulated to all stakeholders who had attended the workshops or expressed interest but were not able to. This was sent three days before submission to the CAA (Friday 22<sup>nd</sup> November) as a courtesy to these stakeholders and to thank them for their input. A final note was sent to all stakeholders on the day of submission (22/11) to inform them that the Design Principles had been submitted to the CAA and uploaded to the portal.

Engagement on specific design concepts will happen later, in Stage 2, and formal consultation in Stage 3, but the design concepts will be evaluated against the final design principles as presented herein.

## 4. Draft Design Principles

The following 16 Design Principles were created by Bristol Airport prior to the stakeholder engagement workshops in September 2019. The Design Principles should encompass the safety, environmental and operational objectives we wish to achieve through our Airspace Change. The Design Principles should be formed through a two-way process involving effective engagement with stakeholders, allowing any local factors to be discussed.

Bristol's draft Design Principles were aligned with our Statement of Need ([link](#)) which outlines the benefits we hope to achieve from an Airspace Change. As covered in Section 3 above, these Design Principles were sent to aviation industry and community stakeholders before attending an engagement workshop; allowing stakeholders time to review and discuss internally.

Category	Design Principle	Details
<b>Safety</b>	DP1) Must maintain and where possible, enhance safety standards	Safety is at the forefront of everything Bristol Airport does. We believe that it is crucial that a new airspace design maintains and where possible enhances current safety standards.
<b>Policy</b>	DP2) Must accord with the CAA's published Airspace Modernisation Strategy (CAP 1711) and any current or future plans associated with it	CAP 1711 describes what airspace modernisation must deliver including: <ul style="list-style-type: none"> <li>- the need to increase aviation capacity;</li> <li>- growth to be sustainable;</li> <li>- the need to maximise the utilisation of existing runway capacity.</li> </ul>
<b>Regulation</b>	DP3) Must be compliant with all relevant laws and regulations	To maintain safety and ensure integration with the wider airspace.
<b>Technical</b>	DP4) Must maximise efficiency by using modern navigation technology	The reliance on legacy technology must be removed. Furthermore, aircraft navigation capabilities have increased. To maximise the benefits that these improvements bring, including satellite navigation standards, arrival and departure routes must be designed to make full use of modern navigation technology.
<b>Operational</b>	DP5) Must provide sufficient capacity to support future demand	We believe that Bristol Airport will need to respond to future growth opportunities and as part of the Airspace Modernisation Strategy programme will, in accordance with government policy, ensure that any new airspace design is sufficient to cope with increased demand and link efficiently into the national network.
<b>Environmental</b>	DP6) Should minimise fuel burn and CO <sub>2</sub> emissions as far as possible	Bristol Airport should, through airspace design, seek to implement the most efficient flight profiles.
<b>Environmental</b>	DP7) Should minimise the impact of aircraft noise on the local community and stakeholders  **Please refer to the Noise Mitigation section which details the methods for consideration**	Bristol Airport should, where possible, reduce and mitigate noise and its distribution in order to manage the impact of aviation growth on local communities in line with government policies.
<b>Operational</b>	DP8) Should maintain or enhance operational resilience of the Air Traffic	Bristol Airport should consider airspace and route designs that benefit the operation and resilience of the national airspace

Category	Design Principle	Details
	Control network	network.
<b>Technical</b>	DP9) Should minimise impact on other airspace users	In accordance with the CAA's published Airspace Modernisation Strategy, Bristol Airport should consider designs and procedures that facilitate and accommodate access to airspace for non-commercial users, including General Aviation (e.g. recreational aviation or private transport), Ministry of Defence and other aviation communities.
<b>Technical</b>	DP10) Should minimise controlled airspace (CAS) and impact on adjacent aerodrome and airfields	The volume of controlled airspace considered by Bristol Airport should be the minimum necessary to deliver an efficient operation, taking into account the needs of adjacent aerodromes and airfields.

A further six noise mitigation draft Design Principles were provided, recognising Government guidance that minimising noise should be the design priority below 7,000ft. Bristol Airport acknowledged that some of the noise mitigation Design Principles contradicted each other however, we wanted to understand how stakeholders would prioritise/ change these.

Noise Mitigation Design Principles	Details
<b>DP11) Use noise efficient operational practices</b>	To operate in a way that minimises the noise impact e.g. maximising altitude wherever possible
<b>DP12) Minimise the number of people newly overflown</b>	To avoid exposing areas to aircraft noise who are currently not exposed
<b>DP13) Maximise sharing through predictable respite routes</b>	Operate multiple arrival and departure routes, and alternate between these routes at different times of the day or days of the week. This would allow communities to have predictable periods of respite.
<b>DP14) Avoid overflying communities with multiple routes, including from other airports.</b>	Use the opportunity to work with other airports to find a solution for this.
<b>DP15) Maximise sharing through managed dispersal</b>	An alternative approach to maximising sharing is to spread routes over a wider area to share the impact of noise. This would mean each flight path was flown less frequently but a wider area (and a greater number of people) would be affected by noise.
<b>DP16) Minimise the total population overflown</b>	Concentrating aircraft along defined routes to minimise the total number of people exposed to aircraft noise.

## 5. Draft Design Principles Feedback

The following sub-sections discuss each Design Principle in turn in the manner “we asked, you said, we did”:

*We asked: The original draft Design Principle and description text*

*You said: A summary of how stakeholder feedback has influenced the Design Principle*

*We did: Any amendments to the Design Principle (or why no changes were made)*

This process is repeated for each Design Principle.

We have assigned a priority to each Design Principle which are described alphabetically where A is the highest priority and C is the lowest. The priorities are based on whether Design Principles must or should be met; alongside the feedback we received.

### Draft Design Principle 1 (DP1): Must maintain and where possible, enhance safety standards

**Original description:** *Safety is at the forefront of everything Bristol Airport does. We believe that it is crucial that a new airspace design maintains and where possible enhances current safety standards.*

#### Feedback Summary

There was strong support for this Design Principle across the engagement workshops, both from aviation and community stakeholders. The vast majority of participants agreed that safety should be maintained or improved; and be the driving Design Principle underpinning the whole design.

This was a number one priority for many of the stakeholders. Whilst some acknowledged that 100% safety was not necessarily achievable, there was widespread agreement that where possible, all efforts should be made in order to ensure safety (maintain if not enhance).

The use of latest technology to maintain/ improve upon current safety levels was popular. There were several discussions during the workshops, that Bristol Airport should ensure that future designs maintain or improve upon ATC and pilot workload. Stakeholders suggested that safety should encompass Human Factor elements such as workload, human errors, communications and appropriate training.

There were some concerns that increases to capacity; changes in separation or new commercial incentives could potentially compromise safety.

#### Conclusion and Final Design Principle Text

The above comments all endorse our overriding safety Design Principle which we will remain unchanged and retain the same description wording against. The relevant concerns raised will form part of Bristol's Safety Assessment which we are required to submit alongside our formal Airspace Change Proposal. This will identify any new/ changing hazards alongside mitigations for all risks.

There is no change to Design Principle 1 or its description, as a result of the feedback received.

**Priority A:** we have assigned the highest priority to this Design Principle as it is a central principle which underpins our entire airspace design. All of the mandatory Design Principles include the wording “must”.

## Draft Design Principle 2 (DP2): Must accord with the CAA's published Airspace Modernisation Strategy (CAP 1711) and any current or future plans associated with it

**Original description:** *CAP 1711 describes what airspace modernisation must deliver including: the need to increase aviation capacity; growth to be sustainable; and the need to maximise the utilisation of existing runway capacity.*

### Feedback Summary

During the engagement workshops, there was general support for modernisation with an agreement that future-proofing, alongside an expansion plan is important. Ensuring that Bristol Airport focuses on sustainability for the future was raised by a number of attendees; not only considering current needs but an awareness of future requirements.

There was agreement that Bristol Airport should ensure that this is aligned with other airports. Feedback, from both aviation and community stakeholders, supported modernisation of Bristol Airport through the better design of airspace and procedures. Alongside DP1 above, there was support for using latest technology to support the Airspace Modernisation Strategy.

A small number of participants raised concerns that modernisation should not compromise safety or environmental impacts. Another participant stated that they were against any increase in capacity.

### Conclusion and Final Design Principle Text

We did not receive any feedback which impacts the original Design Principle and description we sent to stakeholders and therefore, will retain this wording.

Priority A: this Airspace Change Proposal and all associated changes as part of it, are required to be in union with the AMS. All of the mandatory Design Principles include the wording "must".

## Draft Design Principle 3 (DP3): Must be compliant with all relevant laws and regulations

**Original description:** *To maintain safety and ensure integration with the wider airspace.*

### Feedback Summary

There was not much feedback relating to this draft Design Principle however, all comments were in full support of compliance with laws, policy and requirements; as per the Design Principle description. Feedback acknowledged that compliance should be regarded as non-negotiable.

### Conclusion and Final Design Principle Text

There is no change to Design Principle 3 or its description, as a result of the feedback received.

Priority A: compliance with the law is mandatory. All of the mandatory Design Principles include the wording "must".

## Draft Design Principle 4 (DP4): Must maximise efficiency by using modern navigation technology

**Original description:** *The reliance on legacy technology must be removed. Furthermore, aircraft navigation capabilities have increased. To maximise the benefits that these improvements bring, including satellite*

*navigation standards, arrival and departure routes must be designed to make full use of modern navigation technology.*

## Feedback Summary

Draft Design Principle 4 generated a significant amount of discussion throughout the workshops. The majority of stakeholders were in support of this Design Principle and discussed a wide range of perceived benefits. These included improving airspace efficiency; environmental benefits such as noise mitigation from precise routings; and a consistent theme on safety performance benefits, such as a reduction in workload for both controllers and pilots.

Stakeholders support the improved accuracy of navigational systems being used to assist predictability and reduce noise impact. However, there were a number of comments expressing concern that modern technology and more precise routes could lead to “noise ghettos<sup>1</sup>”. Although this comment is a relevant consequence of precision technology, the inclusion of specific noise mitigation Design Principles will aim to limit or reduce the number of people significantly affected by adverse impacts of aircraft noise.

One aviation participant recommended that we remove the wording “modern navigation technology” from the Design Principle, and just focus on maximising efficiency. After consideration, Bristol Airport will retain this wording as this Design Principle is specifically focussed on maximising the benefits of the latest technology and navigation capabilities. This would be lost if removed from the wording.

Another participant suggested that the word “should” in the Design Principle description is replaced by “must”. As the Design Principles relate to Bristol Airport’s Airspace Change Proposal, we feel that the proposed routes should be designed using the latest navigation specification where possible i.e. RNAV (Area Navigation) routes. We feel it’s pertinent to point out that the Design Principle doesn’t stipulate the technology used on-board by aircraft at Bristol Airport, which was also discussed in the workshop discussions.

## Conclusion and Final Design Principle Text

The use of latest technology (e.g. Performance Based Navigation (PBN)) to support improved flight profiles; and minimise the environmental and noise impacts was a common topic and also discussed alongside several other Design Principles (e.g. Design Principles 5, 7 and 13 below).

As the advantage of improved flight accuracy, from using the latest technology, was a common theme, we will slightly amend the Design Principle description to include this (highlighted in green below). There is no other change to Design Principle 4; the actual Design Principle wording will remain the same.

Priority A: the use of modern navigation technology is an enabler for ensuring an efficient airspace design. It is also aligned with the CAA’s Airspace Modernisation Strategy (DP2 has been assigned the same priority). All of the mandatory Design Principles include the wording “must”.

**Final Design Principle description:** *The reliance on legacy technology must be removed. Furthermore, aircraft navigation capabilities have increased. To maximise the benefits that these improvements bring, including satellite navigation standards and route positioning accuracy, arrival and departure routes must be designed to make full use of modern navigation technology.*

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<sup>1</sup> The phrase “noise ghetto” was used by stakeholders throughout the workshops, to describe areas which are heavily impacted by noise e.g. an area which is overflowed by multiple flights along the same precise track.

## Draft Design Principle 5 (DP5): Must provide sufficient capacity to support future demand

**Original description:** *"We believe that Bristol Airport will need to respond to future growth opportunities and as part of the Airspace Modernisation Strategy programme will, in accordance with government policy, ensure that any new airspace design is sufficient to cope with increased demand and link efficiently into the national network."*

### Feedback Summary

There was quite a lot of discussion in the workshops surrounding this Design Principle and how Bristol Airport should look to futureproof and respond to future traffic demand; which the majority of participants supported. Using modern technology (feeding into DP4) to improve the efficiency of the airport and procedures, which passengers and airspace users could benefit from; was supported by several stakeholders.

However, there was quite substantial reticence over a capacity increase; such as a resultant increase in environmental and noise impacts; which community stakeholders would not want to see. A few of these participants specifically responded that they do not want Bristol Airport to have any increase in capacity and associated flight numbers.

### Conclusion and Final Design Principle Text

An objective of this Airspace Change is to support sustainable growth in aviation and maximise the utilisation of existing runway capacity. However, any increase in passenger numbers from the current planning allowance at Bristol Airport will be subject to an entirely independent local planning process.

We have not received any feedback which has the potential to change this Design Principle or its wording therefore, it will remain the same.

Priority A: providing a design which supports future demand is one of the main drivers behind this ACP, and also aligns with the CAA's Airspace Modernisation Strategy. All of the mandatory Design Principles include the wording "must".

## Draft Design Principle 6 (DP6): Should minimise fuel burn and CO<sub>2</sub> emissions as far as possible

**Original description:** *Bristol Airport should, through airspace design, seek to implement the most efficient flight profiles.*

### Feedback Summary

Design Principle 6 created a lot of discussion, alongside emissions in general, and was one of the key discussion topics and concerns throughout the workshops.

The majority of feedback related to this Design Principle was in strong support for environmental impacts to be a priority throughout the airspace change. A lot of participants felt that emissions should not increase and would support the latest technology to mitigate environmental impacts.

There were also lots of comments surrounding the use of more efficient airspace and procedures to mitigate the environmental impact. Specific suggestions, which will feed into our Stage 2 Design work, included: reduced stacking, shorter routes and continuous climbs/ descents. The benefits of more



fuel-efficient aircraft were also mentioned in several comments (covered in Appendix C below; out of scope for the Design Principles).

We received a suggestion to consider other emissions such as nitrogen oxides (NO<sub>x</sub>). As directed by the DfT, we will consider the impacts of carbon emissions (CO<sub>2</sub>/ fuel) as it is the most significant of the greenhouse gases. This serves as a proxy for other emissions with climate effects as there is a direct correlation; eradicating the need to individually measure them all.

Some community stakeholders raised concerns about air quality and health, with several suggesting whether Bristol Airport should include a separate Design Principle covering health and air quality. We feel that the mitigations from this proposed Design Principle would be proportional, if not identical, to this Design Principle. Therefore, we will not introduce a separate Design Principle for health; however, it is worth noting that Bristol Airport will continue to measure local air quality. It should be noted that impacts on health due to noise and GHG emissions will be quantified at Stage 3 and 4 of the ACP process using the DfT WebTag methodology.

Local stakeholders were also concerned that an Airspace Change will cause an increase in emissions with several suggesting that there should be no expansion unless compatible with a reduction in environmental impact. There was a suggestion that the Design Principle language is not urgent enough, specifically the wording “as far as possible”.

As stated above, any increase in passenger numbers would require a separate planning process. Bristol Airport cannot guarantee a reduction in emissions for all flights however minimising, and where possible improving, environmental impact will feature as a central objective of Bristol's Airspace Change.

Finally, we received a recommendation that Bristol Airport should focus on minimising greenhouse gas emissions as far as possible, even if noise impacts increase below 7,000ft. Bristol Airport is committed to minimising all environmental impacts (which includes noise and GHG emissions); however, we are also directed by the DfT that airspace design below 7,000ft should focus on minimising the impact of aviation noise as a priority; which this would contradict. Therefore, we will not be taking this suggestion forward.

## Conclusion and Final Design Principle Text

This Design Principle was seen by many as one of the key priorities; after safety and alongside noise mitigation.

Since we are not able to commit to a total reduction in fuel burn and CO<sub>2</sub> emissions, as suggested by some stakeholders, we will amend the Design Principle to include “per flight”. One of the objectives of this Airspace Change Proposal is to improve the efficiency of Bristol airspace and procedures, which will assist in reducing the environmental impact on a per flight basis. This also aligns with environmental requirements we will have to follow in later stages of this proposal, which require us to supply an assessment of fuel and CO<sub>2</sub> impacts on a per flight basis.

**Final Design Principle wording:** *Should minimise fuel burn and CO<sub>2</sub> emissions **per flight** as far as possible.*

There is no other change to Design Principle 6.

Priority A: although this has not been worded as a compulsory (“must”) Design Principle, we recognise the strong feedback and support we received for this environmental principle. Therefore, we will consider it as a top priority during our on-going design work (alongside DP7); for which we received numerous suggestions and recommendations.

## Draft Design Principle 7 (DP7): Should minimise the impact of aircraft noise on the local community and stakeholders

**Original description:** *Bristol Airport should, where possible, reduce and mitigate noise and its distribution in order to manage the impact of aviation growth on local communities in line with government policies.*

### Feedback Summary

Alongside DP6 (often in the same discussion), DP7 generated a lot of feedback in the engagement workshops. Participants were fully in support of this Design Principle and considered it a priority of an airspace change.

The need to manage or reduce noise impact generated the most support out of all the Design Principles, with community stakeholders being particularly supportive. There were several comments in support of route changes being sympathetic towards local residents; both avoiding populated areas (including future planned housing developments) but also being cognisant of areas enjoyed for their tranquillity (e.g. nearby AONBs). There was also discussion on whether Bristol Airport could share the noise impact by dispersing routes but also providing dedicated respite periods.

There was further discussion on the specific noise mitigation Design Principles which is covered below (Design Principles 11 – 16).

There was a lot of feedback surrounding the positive use of efficient airspace design (technology, design and procedures) to minimise noise impact; examples included maximising altitude and adjusting the length, steepness and location of procedures. These design examples are appropriate but will be considered as part of Bristol's Stage 2 design phase of work alongside associated trade-offs, which were also mentioned by stakeholders.

There were a lot of cross-over comments which also applied to DP4; specifically, the support of the latest technology to mitigate noise. There were also concerns about the creation of "noise ghettos" due to aircraft's ability to fly a given track more precisely. Bristol Airport will take this feedback into consideration during the Stage 2 design work; alongside how improved route options from PBN (Performance Based Navigation) can mitigate these concerns.

Several community stakeholders wanted to see a commitment from Bristol Airport that noise impacts will not worsen and ideally, will reduce. This included a comment to update the Design Principle wording to include "no increased noise impact".

Bristol Airport will mitigate noise impacts as much as possible and prioritise the reduction of impacts below 7,000ft. However, these comments are aspirational, and while we will make best endeavours to reduce noise impacts, we cannot make a firm commitment to reduce noise levels.

### Conclusion and Final Design Principle Text

Following an assessment of the feedback it was decided to combine DP11 '*Use noise efficient operational practices*' with this Design Principle, owing to similarities. A lot of the feedback received for these two Design Principles was identical for both. It was also clear that the benefits of noise-efficient procedures were directly linked to an objective of reducing the noise impact by stakeholders. By including the additional text listed below, we do not see any benefit in having two separate Design Principles.

The description of this Design Principle will be expanded to include: *The Air Navigation Guidance 2017 states that the priority for airspace below 7,000 feet is to minimise the impact of aviation noise, unless evidence demonstrates a disproportionate increase in CO<sub>2</sub> emissions.*

We will also expand the Design Principle wording itself to include “Should use noise-efficient operational practices to ...”; to reflect the stakeholder feedback received.

**Final Design Principle wording:** “Should use noise-efficient operational practices to minimise the impact of aircraft noise on the local community and stakeholders”.

**Final Design Principle description:** “Bristol Airport should, where possible, reduce and mitigate noise and its distribution in order to manage the impact of aviation growth on local communities in line with government policies *The Air Navigation Guidance 2017 states that the priority for airspace below 7,000ft is to minimise the impact of aviation noise, unless evidence demonstrates a disproportionate increase in CO2 emissions.*”

Priority A: although this has not been worded as a compulsory (“must”) Design Principle, we recognise the strong feedback and support we received for a general noise mitigation Design Principle. Therefore, we will consider it as a top priority during our on-going design work (alongside DP6); through the use of noise-efficient practices which generated a lot of discussion and ideas.

## Draft Design Principle 8 (DP8): Should maintain or enhance operational resilience of the Air Traffic Control network

**Original description:** *Bristol Airport should consider airspace and route designs that benefit the operation and resilience of the national airspace network.*

### Feedback Summary

Although there was not a significant amount of discussion in relation to DP8, all of the comments were in support of this Design Principle.

The feedback in relation to this Design Principle was that future designs should improve the overall efficiency of airspace and routes; whilst using systematic airspace management to reduce impacts on other users and communities. There were also a few comments that Bristol Airport should ensure changes are coordinated with other airports (which is also covered under DP9/ 10) and with enroute airspace; alongside equitable access for other airspace users.

### Conclusion and Final Design Principle Text

We have amended the Design Principle description to specifically mention the resilience of the airport, alongside the airspace network, for completeness. This is also backed up by feedback suggesting that changes should also maximise the capacity and efficiency of Bristol Airport.

**Final Design Principle description:** “Bristol Airport should consider airspace and route designs that positively impact the operation and resilience of the *airport and the national airspace network*”.

There is no other change to Design Principle 8.

Priority B: although there was not a lot of discussion from stakeholders in relation to this Design Principle, Bristol Airport upholds the importance of considering the entire network throughout our designs. We feel that this should have a consistent priority with our principles related to impacts on other airspace users (DP9) and consideration of CAS (DP10).

## Draft Design Principle 9 (DP9): Should minimise impact on other airspace users

**Original description:** *In accordance with the CAA’s published Airspace Modernisation Strategy, Bristol Airport should consider designs and procedures that facilitate and accommodate access to airspace for non-*

commercial users, including General Aviation (e.g. recreational aviation or private transport), Ministry of Defence and other aviation communities.

## Feedback Summary

There was a lot of discussion surrounding this Design Principle during the aviation stakeholder engagement workshop.

Participants agreed that Bristol Airport should take other airspace user's requirements and location into consideration; and where possible, changes should benefit other users. We received comments about the consideration and accessibility of specific user groups including GA, gliders, the MoD, special helicopter movements and the future growth of adjacent airports.

Alongside support for the purpose of this Design Principle, there were some concerns raised on the potential impact of an airspace change on other airspace users. GA stakeholders suggested minimal impact on the free movement of GA traffic and no more restricted airspace (feeding into DP10). These concerns support exactly why we are including this Design Principle and will feed directly into the geographical design decisions in Stage 2.

We received a suggestion to change the wording of this Design Principle from "should minimise" to "consider". This has been discussed however we believe that the word "consider" is too dismissive; whilst minimising the impact will hold our design to account when considering other users. Another participant wanted the words "should consider" removed from the description and amended to "avoiding procedures that impinge airspace access for non-commercial users". Bristol Airport cannot commit to there being no impact at all; therefore, we will not take this suggestion forward.

It was also suggested by several stakeholders that Bristol Airport should take note of lessons learnt from previous ACPs where there have been issues relating to the impact on other airspace users.

## Conclusion and Final Design Principle Text

Bristol Airport will consider all appropriate airspace users and current agreements e.g. LoA (Letters of Agreement) which this Design Principle encompasses.

There is no change to Design Principle 9 or its description.

Priority B: despite community stakeholders not expressing much interest, there was good appreciation for the importance of this Design Principle across the aviation stakeholders. We feel that this should have a consistent priority with our principles related to resilience across the network (DP8) and consideration of CAS (DP10).

## Draft Design Principle (DP10): Should minimise controlled airspace (CAS) and impact on adjacent aerodrome and airfields

**Original description:** *The volume of Controlled Airspace considered by Bristol Airport should be the minimum necessary to deliver an efficient operation, taking into account the needs of adjacent aerodromes and airfields.*

## Feedback Summary

Alongside DP9, this Design Principle was a common discussion topic during the aviation stakeholder workshop in particular.

There were several comments suggesting that Bristol Airport should use its current airspace more efficiently; both through route design and consideration of others. There was general support from the

aviation community that Bristol Airport should minimise the amount of CAS required; that it does not infringe on other areas currently used by others; and collaborates with other airports. Stakeholders were concerned about the impact of changing CAS on other local airspace users (similar comments to DP9).

We received some comments suggesting that Bristol Airport should guarantee that there will be no increase in CAS, alongside a small number of comments championing a reduction in CAS.

One stakeholder suggested removing the Design Principle word “minimise”; and suggested using something different such as “consider”, “take into account” or “make most efficient”. There were also a few comments offering advice that Bristol Airport should consider safety issues encountered by previous ACPs, which sought changes to their controlled airspace boundaries.

## Conclusion and Final Design Principle Text

Bristol Airport aims to propose an airspace design which delivers a safe and efficient operation; and considers the needs of adjacent aerodromes and other users. This may require requesting a change to uncontrolled or current controlled airspace; however, we cannot commit to there being no change at all to controlled airspace prior to the Stage 2 design work.

We have considered the recommendation to remove the word “minimise” from the Design Principle wording but feel that it is not appropriate, considering that we cannot guarantee there being no impact at all. However, we propose to include further text to the Design Principle description stating that we will ensure a “safe and efficient operation”. This is in response to several stakeholder comments highlighting the importance of safety and efficiency; alongside being a requisite precursor for when Bristol Airport assesses the volume of controlled airspace required.

**Final Design Principle description:** *“The volume of Controlled Airspace considered by Bristol Airport should be the minimum necessary to deliver a safe and efficient operation, taking into account the needs of adjacent aerodromes and airfields.”*

There is no other change to Design Principle 10.

Priority B: as per DP9, the aviation stakeholders specifically expressed support for this Design Principle. We feel that this should have a consistent priority with our principles related to resilience across the network (DP8) and other airspace users’ impact (DP9) and consideration of CAS (DP10).

## Noise Mitigation Design Principles

We completed the same process for the noise mitigation Design Principles: we asked, you said, we did. These Design Principles generated a lot of discussion, particularly during the community stakeholder workshops. There was very little change to the noise Design Principles, besides from combining Design Principles 7 and 11 together. However, there were some diverging viewpoints across the Design Principles and some more strongly supported than others; which we have tried to reflect through the priorities.

## Draft Design Principle (DP11): Use noise efficient operational practices

**Original description:** *To operate in a way that minimises the noise impact e.g. maximising altitude wherever possible.*

## Feedback Summary

After analysing the comments from the engagement workshops, it became clear that the vast majority which were captured against DP7 (minimise the impact of aircraft noise) were also captured against this Design Principle. They were also predominantly received from community stakeholders.

The main themes have been summarised below, all of which have already been encapsulated under DP7 above:

- Focus on minimising the noise impact for local communities as a priority
- Strong support for more a more efficient airspace design. Some example techniques which were mentioned included continuous approaches/ descents and reducing stacking
- Support for no increase or a reduction in noise impact
- Concern over noise ghettos

## Conclusion and Final Design Principle Text

As covered under DP7 above, we will combine Design Principles 7 and 11 into one as most of the feedback received was duplicated across both Design Principles. We will therefore remove DP11 and capture the wording related to noise efficient practices under a common principle (DP7), focussed on minimising noise impact.

## Draft Design Principle (DP12): Minimise the number of people newly overflown

**Original description:** *To avoid exposing areas to aircraft noise who are currently not exposed.*

## Feedback Summary

Although this noise mitigation Design Principle wasn't discussed as much as others (namely DPs 13 and 15), the majority of feedback was in support of avoiding exposing new people to adverse noise effects. Stakeholders were supportive for Bristol Airport to consider future buildings/ housing developments during the design work. A few design solutions were suggested including operating similar geographical routes to today or flying over rural areas.

However, there was also some specific feedback against this Design Principle from stakeholders who would prefer the future design to prioritise protecting areas of tranquillity (e.g. rural areas, AONBs) or the dispersal of routes.

## Conclusion and Final Design Principle Text

Participants who supported this Design Principle were very specific about the importance of avoiding new people, including new housing developments. These comments reiterated the description and justification of this Design Principle well. As part of the Stage 3 Consult phase of this Airspace Change Proposal, Bristol Airport will engage with local authorities and councils and seek information on any future developments.

However, overall there was not a huge amount of feedback associated with Design Principle and there was some opposition against it; specifically, when compared to other Design Principles.

We will slightly change the Design Principle to state avoid exposing "people" rather than "areas" as the comments relating to this principle were in relation to newly overflown people, rather than a geographical location. We believe that this is a clearer description, focussed on populations rather than just areas.

**Final Design Principle description:** *“To avoid exposing people to aircraft noise who are not currently exposed”.*

There are no other changes to Design Principle 12 as a result of the feedback received; although this will now be referred to as “Design Principle 11” because DP7 and DP11 have been merged together.

Priority c: this Design Principle was not a main priority with stakeholders when compared to other noise mitigation Design Principles, which is reflected by a lower priority. However, we will still include it as it is a noise mitigation approach which does warrant consideration during our design work.

## Draft Design Principle (DP13): Maximise sharing through predictable respite routes

**Original description:** *Operate multiple arrival and departure routes, and alternate between these routes at different times of the day or days of the week. This would allow communities to have predictable periods of respite.*

### Feedback Summary

The topic of respite and this Design Principle were discussed greatly, particularly in the community stakeholder workshops.

The vast majority of feedback received was strongly in support of respite with comments related to the use of dedicated quiet periods; multiple respite routes; and the use of modern technology to enable this (also covered under DP4). Several attendees highlighted that the predictability of flights would be a preference for local communities.

The following two methods of respite were specifically suggested by a number of stakeholders during the workshops, which will be further explored during the Stage 2 Design work:

- Timings: Bristol Airport should define set periods of respite for communities, allowing predictable quiet periods. Ideas included consideration between nocturnal and diurnal flights and minimising flights during unsocial hours.
- Night flights: there was significant support for minimising, or even eradicating, night flights which can impact on sleep quality and patterns.

The only other feedback associated with this Design Principle were a few comments suggesting that there were mixed views across community stakeholders between concentration vs dispersal. This was expected given the contentious nature of noise mitigation and is why Bristol Airport included Design Principles to cover both methods.

### Conclusion and Final Design Principle Text

With the exception of DP11 (which is being merged into a general noise principle) and DP16, this noise mitigation Design Principle received the most comments and highest support.

There are no changes to Design Principle 13 as a result of the feedback received; although this will now be referred to as “Design Principle 12” because DP7 and DP11 have been merged together.

Priority b: alongside DP16, this Design Principle received the most support as a noise mitigation method for future designs.

## Draft Design Principle 14 (DP14): Avoid overflying communities with multiple routes, including from other airports.

**Original description:** *Use the opportunity to work with other airports to find a solution for this.*

### Feedback Summary

There was a very small amount of feedback received across the four workshops in relation to this Design Principle; however, all of the comments were in support of Bristol Airport working alongside other airports to mitigate noise.

Stakeholders were keen to see Bristol Airport working closely with adjacent airports (e.g. Cardiff) to minimise noise; particularly where noise impact areas overlap between airports. Alongside Design Principles 4, 7 and 11; avoiding noise ghettos was also mentioned.

It should be noted that this design principle should be considered alongside the DfT altitude-based priorities. As such this will be a higher priority consideration for routes below 7,000ft. For routes above 7,000ft, this is desirable but a lower priority.

### Conclusion and Final Design Principle Text

The wording and description for this Design Principle will remain the same, which the feedback we received supported. However, this will now be referred to as “Design Principle 13” because DP7 and DP11 have been merged.

Priority c: there was not a great uptake in interest for this Design Principle, however the support received justifies its inclusion.

## Draft Design Principle 15 (DP15): Maximise sharing through managed dispersal

**Original description:** *An alternative approach to maximising sharing is to spread routes over a wider area to share the impact of noise. This would mean each flight path was flown less frequently but a wider area would be affected by noise.*

### Feedback Summary

There were mixed views on the use of managed dispersal although the majority of responses were in support of its use. Stakeholders fed back that they were keen to share any noise impact around; potentially through flights over a larger area or the use of multiple arrival/ departure procedures.

Dispersal and respite (DP13) were often both mentioned as methods which could be used collectively to mitigate noise impact. It was suggested that regular dispersal could also help with predictability for local communities.

Some workshop participants felt that dispersal may be less environmentally friendly and would just spread the impact across more people unnecessarily. A number of other attendees expressed mixed views between dispersal and concentration (as above under DP13 above).

### Conclusion and Final Design Principle Text

There is no change to Design Principle 15 or its description, as a result of the feedback received. However, this will now be referred to as “Design Principle 14” because DP7 and DP11 have been merged together.



Priority c: there was not a great uptake in support for this Design Principle. There were mixed views and a lot of the positive feedback was mentioned alongside the use of respite (which received more support and an associated higher priority, DP 12).

## Draft Design Principle 16 (DP16): Minimise the total population overflown

**Original description:** *Concentrating aircraft along defined routes to minimise the total number of people exposed to aircraft noise.*

### Feedback Summary

This Design Principle was strongly advocated, particularly by community stakeholders. There was agreement that minimising flights over populated and residential areas should be a priority; rural areas including fields, open water and AONBs were proposed. Easterly departures which turn South and flights over Bristol Airport were specifically mentioned as problem areas to avoid in the future.

Minimising the total population overflown using precise routes over less populated areas; alongside an element of respite (as covered under DP13) was a common set of important factors for stakeholders, particularly community representatives.

Alongside Design Principles 13 and 15 above, some attendees were unsure whether concentration or dispersal was a better option. Finally, in conjunction with Design Principles 4, 7, 11 and 14; avoiding noise ghettos was also mentioned as an important focus for local residents.

### Conclusion and Final Design Principle Text

There is no change to Design Principle 16 or its description, as a result of the feedback received. However, this will now be referred to as “Design Principle 15” because DP7 and DP11 have been merged together.

Priority b: alongside DP13, this Design Principle received the most support as a noise mitigation method for future designs.

## 6. Conclusion and Next Steps

As part of the CAP1616 Stage 1 define work, we have identified appropriate aviation industry and community stakeholders, for Bristol’s Airspace Change Proposal. We invited stakeholders to attend a stakeholder engagement workshop where we encouraged discussion on a set of draft Design Principles, which were sent prior to the workshops.

We received feedback on the draft Design Principles and amended some of them, merged two together, and provided an explanation including relative priorities. We compiled this evidence in Issue 1 of the Design Principles document.

We sent this document to all stakeholders who attended the Design Principles engagement workshop; including those who did not attend but expressed an interest.

We will submit this document to the CAA as evidence to support Stage 1B of the CAP1616 Airspace Change Process. In turn, this will complete the evidence required for the Stage 1 Assessment Gateway (document deadline 22<sup>nd</sup> November 2019, for the CAA’s Assessment Gateway scheduled for 20<sup>th</sup> December 2019).

## 7. List of References

Reference	Title and Description
<b>Ref 1</b> Supplied to the CAA	<i>Joint ACP and NATS Meeting Notes – 121018</i> Notes summarising the updates provided on airport ACPs and wider network changes
<b>Ref 2</b> Supplied to the CAA	<i>Joint ACP, ACOG and NATS Meeting Notes – 260719</i> Notes summarising the updates provided on airport ACPs, ACOG and wider network changes
<b>Ref 3</b> For publication	<i>Example Workshop Invite sent to Stakeholders (redacted)</i>
<b>Ref 4</b> For publication	<i>Bristol Draft Design Principles</i>
<b>Ref 5</b> For publication	<i>Bristol Airport Design Principle Workshop Slides (redacted)</i>
<b>Ref 6</b> For publication	<i>Presentation to the Airport Consultative Committee 240719</i>
<b>Ref 7</b> For publication	<i>Minutes from the Airport Consultative Committee 311018 (redacted)</i>

## Appendix A: Comments related to Stage 2: Develop and Assess

Summary of Feedback	Bristol Airport Response
Ecology – understand the future impact on marine ecology and wildlife	Government guidance regarding the environmental impact of an airspace change proposal focusses on the effects on the population, although we would seek to take into account any other specific known sensitive areas or locations.
Flexible use of airspace (FUA) – consider the use of FUA, safety benefits cited	Although not yet at a detailed design stage, one consideration is to explore the potential for flexible routing to assist expedition of traffic during specific demand peaks. This will be progressed in collaboration with other airspace user communities and the NATS-led LAMP project.
Future growth and trade-offs – ensure the future design considers future changes and technology. The design should use forecasting to understand growth patterns and prediction. There are clear trade-offs (e.g. noise/ efficiency/ emissions) which must be clearly articulated, such as the impact they have on each other.	Although this development is not directly part of any airport agreements regarding future growth; forecasts of air traffic at network and local level will be considered in order to model and test proposed solutions. Such solutions will also be costed using methodology applied by the CAA. Trade-offs between agreed Design Principles (e.g. noise vs emissions vs capacity) will be clearly articulated following development and assessment of design options, to inform decision making.
Noise & environment – stakeholders made numerous design-specific comments which could potentially be used to mitigate noise impact. These included: The consideration of east-west departures; dissemination of new procedures; sympathy towards new houses to be built on the fringes of Bristol; noise and environmental impacts to be considered throughout the design process	In accordance with Government guidance, minimising the negative impact of noise will be a priority during the Stage 2 design options development work. As advised in the Government's Air Navigation Guidance, decisions on how aircraft noise is best shared should be informed by local circumstance. Therefore, priorities established during our local engagement on Design Principles will be applied where possible and evaluated following development of options. Noise impact and any trade-offs will be assessed and explained. We will seek information on future housing developments and take this into account when conducting impact analyses.
Non-commercial airspace users – minimise the impact on other users as much as possible. Specifically, not impacting flights from Westonzoyland Airfield and the lowering of controlled airspace east of Bristol were cited.	Our design development will look carefully at aircraft performance, efficiency of airspace classification and maximising the benefits of environmentally efficient flight procedures (e.g. continuous climb and descent operations). Appropriate and proportionate access to airspace for all categories of user will continue to be a principle we will apply commensurate with the requirements of regulatory and Government policy.
Procedures – several suggestions for future procedures such as different take-off profiles; improved interaction between large/ small aircraft; and better links with neighbouring air traffic control zones.	When in the detailed design phase, we will look closely at the performance and flight profiles of the current and expected future aircraft mix at Bristol. We will also liaise closely with adjacent airports to ensure efficient and appropriate profiles to minimise negative environmental impact.
Route design – several comments on specific route design including multidirectional take offs; routes over the channel; stacking over the sea; avoid overflying Bristol; separate helicopter routes in and out; and consideration of aircraft performance.	The detailed construction of routes and holding area(s) will follow mandatory international standards. The design options for the number of routes and their positioning will be based upon operational needs whilst taking the priorities of Design Principles resulting from this stakeholder engagement into

	account.
Tranquillity – quiet areas should be protected e.g. Mendip Hills AoNB, Cotswold AoNB. Designs should consider visual intrusion alongside noise.	Government guidance advises it is desirable to seek to avoid overflying AoNBs and National Parks below 7,000ft, where practicable. At the same time, it is acknowledged that it is not always possible to avoid overflying such areas. Compromises will exist between tranquil areas and Government focus on limiting the number of people adversely affected by aircraft noise. We will conduct modelling and analysis and provide the resulting outputs to inform our recommendations and chosen design options.

## Appendix B: Comments related to Stage 3: Consult

Summary of Feedback	Bristol Airport Response
Several requests for further information and data behind the current operation and proposed changes <ul style="list-style-type: none"> <li>- Ability to compare data geographically</li> <li>- How is (noise) data calculated</li> </ul>	As part of the Consultation material, we will present data showing a comparison between current and proposed changes in noise, environmental impacts (fuel/ CO <sub>2</sub> ), traffic levels and flight paths. We will use visualisations to display our proposed changes so that stakeholders are able to take the location into consideration. We will also include a full description of data sources, caveats and any calculations included.
Would like time to provide a considered response	Our Stage 1 engagement involved contacting a targeted group of stakeholders and inviting them to take part in a workshop to discuss Bristol's draft Design Principles (which were sent out prior to the workshops). The workshops were all run consistently with feedback received and analysed. We did not choose to open up any further communication avenues as we felt we had gathered considerable feedback during the workshops. During the Stage 3 Consultation, stakeholders will be given sufficient time to consider and respond to our proposed designs. Stakeholders will also be given the opportunity to attend a consultation event.
Ensure appropriate stakeholders are consulted with on the proposed changes	Bristol Airport will commence a consultation for all aviation/ community stakeholders including the general public. We will provide documents on the proposed changes; plan consultation events; and give stakeholders adequate time to submit formal responses.
Consult early	We have to adhere to the timeline agreed with the CAA which includes the Stage 3 public consultation commencing in early 2021.

## Appendix C: Other Comments

Summary of Feedback	Bristol Airport Response
Aircraft – can Bristol influence the aircraft fleet i.e. limit the use of older types	Bristol Airport already has restrictions in relation to aircraft types and their ability to operate from Bristol Airport, especially during unsociable hours. One example is Bristol Airport's Noise Quota Count Scheme which incentivises the use of newer aircraft during the night period. The

Summary of Feedback	Bristol Airport Response
	<p>Airport also has a penalty scheme in relation to maximum noise levels for aircraft during the day and night-time. Through the Airport's Noise Action Plan (published 2019) we have made a commitment to review such schemes on regular basis. The Airport is proud to be part of Sustainable Aviation which includes airlines and aircraft manufacturers whom operate from the Airport.</p>
<p>Aircraft - has there been any improvement in less noisy aircraft and procedures being flown higher?</p>	<p>Latest generation aircraft tend to be quieter in operation, although airline operator choice of aircraft is out with the scope of this proposal. Noise mitigation will be a part of any re-designed procedures, utilising best-practice profiles such as continuous climb and descent profiles where possible.</p>
<p>Air traffic - does the ratio of other air traffic (balloons/ helicopters/ drones) need tighter regulation if commercial aviation increases?</p>	<p>We will continue to apply standard UK aviation legislation regarding design and separation of commercial aircraft from other air traffic. Any updates required by Government will be coordinated by the CAA.</p>
<p>AoNBs - consideration of Areas of Outstanding Natural Beauty (AoNB)</p>	<p>We have recorded feedback relating to the consideration of areas enjoyed for their tranquillity, such as AoNBs, under the feedback summary for DP7.</p> <p>As directed in the DfT's Air Navigation Guidance, Bristol Airport will consider local circumstances including the location of AoNBs, in our design work; alongside the feedback received. Under the CAA's CAP1616 guidance, we are also required to provide explicit consideration of any changes to airspace above AoNBs.</p>
<p>ATC recruitment - there should be more focus from NATS on ATC recruitment for some smaller airports</p>	<p>This is outside the scope of this Airspace Change Proposal. NATS has an active recruitment drive for new controllers; information for this can be found on the public nats.aero website.</p>
<p>Capacity – concerns about a potential increase in capacity</p>	<p>Passenger throughput at Bristol Airport is principally determined by demand and controlled through the land use planning system. Bristol Airport currently has planning permission to handle up to 10 million passengers per annum (mppa) and in 2018, over 8.6 million passengers used the airport. Passenger demand is projected to increase to 10 mppa by 2021; beyond which passenger traffic is expected to rise further to 12 mppa by 2026. To meet demand beyond 10mppa, Bristol Airport submitted a planning application to North Somerset Council for the development of the Airport to accommodate 12 mppa. Airspace Change is separate and distinct from the planning application process and Airspace Modernisation is not a requirement for growth of the Airport to 12 mppa.</p>
<p>CAS - there should be no Controlled Airspace (CAS): safety/ conspicuity should be more of a priority</p>	<p>Bristol Airport is not seeking to remove all of their CAS but instead focus on using it more efficiently (as covered under DP10 above).</p>
<p>Comms – Bristol Airport should focus on good relations with local people</p>	<p>Bristol Airport is committed to engaging and consulting with the community. The Airport proactively issues communications to residents and local parishes on a regular basis via letters and newsletters. When undertaking any formal consultation, the Airport hosts events around the local area to ensure that people are given the opportunity to have their say and view our plans and proposals. Bristol Airport believes that community engagement and consultation is an integral part of being a good neighbour. We always aim to engage with local communities at an early stage to allow an informed debate to take place that helps us identify concerns and explore solutions. We're committed to being transparent and playing a positive role in the</p>

Summary of Feedback	Bristol Airport Response
Comms - the redistribution of traffic will result in more complaints	community in which we operate and serve. We have sought feedback on Design Principles which specifically focus on noise mitigation, and which will be used to evaluate design options against. Bristol Airport will continue to monitor and respond to complaints as today.
Conspicuity - concerns that this proposal doesn't include any solutions for electronic conspicuity or GA visibility technology	Technology changes associated with GA/ outside of CAS are out of scope; although access arrangements for non-commercial operators will be addressed as part of any proposed revisions to airspace.
Drones – consideration of drones in the local area	This is an operational process that is not related to the Design Principles phase. Bristol Airport has processes and procedures in place for the management of drones. Anyone using a drone recreationally or commercially must take responsibility for doing so safely and in accordance with the law. It is illegal to fly a drone within 5km of an Airport and those who break the law will face major penalties. For more information visit: <a href="http://www.bristolairport.co.uk/at-the-airport/passenger-information/security/safe-use-of-drones">www.bristolairport.co.uk/at-the-airport/passenger-information/security/safe-use-of-drones</a>
Economy - suggestion for there to be a business/economics Design Principle	This Airspace Change Proposal is not being driven by any economic objectives therefore, a specific Design Principle would not be appropriate. Bristol Airport will also complete an Options Appraisal as part of the Stage 2 Design phase. This will comprise an economic assessment of the Design Options; including a quantified economic impact of the options and associated costs (e.g. deployment, infrastructure and training).
Green spaces – Bristol Airport should consider the amenity value of green spaces (e.g. Felton Common)	Bristol Airport seeks to reduce its impact on external spaces such as Felton Common. However, certain spaces are directly within the Airport's immediate flight path. Such spaces may have a reduction in aircraft activity through this Airspace Change process which is still in its early stages.
Ground infrastructure – improve the surrounding road and transport network around the airport	Bristol Airport is currently preparing a revised Airport Surface Access Strategy (ASAS) which will include short, medium and long-term plan for how people will travel to and from the airport. With clear targets for the growth in sustainable transport use amongst both Airport passengers and employees, the ASAS will ensure that any growth in passengers is accompanied with a growth in the use of sustainable transport modes, including public transport and car sharing. The Airport is also working with regional stakeholders to plan for a mass-transit public transport connection to the airport in conjunction with the regional plans for the city. In addition to this, we will shortly be publishing an Ultra-Low Emission Strategy which will look at replacing as many of our current diesel ground transport fleet with an ultra-low emission equivalent as possible.
Ground operations – consideration of a longer runway	This refers to an operational process on the ground which is not connected to the development of the Design Principles (Step 1B). A runway extension is not being considered and is not in scope for Bristol Airport's Airspace Change.
Ground operations – improve the efficiency of ground operations e.g. create more runway exits	This is out of scope for the Design Principles phase (Step 1B) of Airspace Change. All safety factors will be considered during the Design Phase (Step 2).

Summary of Feedback	Bristol Airport Response
Ground operations – update technical/ ops vehicles over to electric	In addition to the new Airport Surface Access Strategy (ASAS), Bristol Airport will shortly be publishing an Ultra-Low Emission Strategy covering our ground transport fleet. This will consider how we can switch from the current, largely diesel fleet, to an ultra-low emission fleet. Our overall aim will be to replace all of our ground transport fleet with an ultra-low emission equivalent, wherever these are available, to both reduce noise and to reduce the carbon emissions associated with the fleet operations. Already in 2019, we have trialled diesel-electric and fully electric buses on our landside buses, complimenting electric vehicles which are already part of the landside and airside fleet. The Ultra-Low Emission Strategy will set out our aims and the timescales for implementation.
Noise insulation – increase the grant capture area	This is out of scope for the Design Principles phase (Step 1B). The Airport's Noise Insulation Scheme is based on noise contours for the summer daytime season and is reproduced annually. Thereby, this ensures eligible properties are able to be treated prior to the activity of Summer season. The threshold of the scheme to 57dB LAeq is already the lowest threshold of mitigation as per Government policy. As part of Bristol Airport's planning application to increase passenger numbers (a separate and distinct process) an enhanced Noise Insulation Scheme with increased payments will be introduced and the requirement for residents to match funding grants will be removed.
Planning application	In December 2018, Bristol Airport submitted a planning application (ref 18/P/5118/OUT) to North Somerset Council for the development of the Airport to accommodate 12 million passengers per annum (mppa). The proposal includes new infrastructure, improvements to existing facilities and operational changes to accommodate growth; whilst making best use of the existing Airport site. Airspace Change is separate and distinct from the planning process and North Somerset Council's determination of our application. Airspace Modernisation is not a requirement for growth of the Airport to 12 mppa however, Bristol Airport is committed to exploring opportunities to improve airspace arrangements. The Airspace Change process is lengthy so by starting now we can ensure that any potential benefits can be realised as soon as possible.
Pollution – is there data on pollution levels?	Bristol Airport has a continuous air quality monitor on site with measures particulate matter 10 (PM10) and nitrous oxide (NOx) emissions and has a number of diffusion tubes around the Airport's perimeter to monitor the above. The data gathered is provided within the Airport's annual monitoring report which is published on the Airport's website available here: <a href="http://www.bristolairport.co.uk/about-us/environment/environmental-management">www.bristolairport.co.uk/about-us/environment/environmental-management</a>
Procedures - as noise is a primary concern, will a faster climb mean more noise?	There is some evidence that higher-powered climb can create increased noise in the immediate area, but then the overall size of the noise footprint is reduced. Any such options will be examined and reported upon as part of the design options work.
Procedures - introduce a higher approach for modern aircraft and a lower approach for older aircraft	Different procedures for different aircraft types would be impractically complex, such as the updates required to ground-based and airborne systems. This would also introduce an increase in workload for both Air Traffic Control and pilots, whereby human factor errors could have

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	<p>safety consequences.</p> <p>This sort of procedure is outside the scope of this proposal.</p>
<p>Procedures - minimise noise through optimising flight paths/ time of flights of having periods then no flights/ Angling of climb/ type of aircraft used.</p>	<p>Noise mitigation will be a part of any re-designed procedures, utilising best-practice profiles such as continuous climb and descent profiles where possible. In accordance with the preferences expressed as part of the engagement on Design Principles, we will also explore possibilities for respite.</p>
<p>Procedures - rapid descents are a key environmental issue of concern. 'Stacks' issue with aircraft is important consideration – can't do it all over sea so have to pollute over land somewhere</p>	<p>We understand this comment to be based upon descent, then level-off – which can create excess noise. Where possible we will aim to provide for low power continuous descents, although short periods of level flight may be necessary for aircraft stabilisation prior to final approach.</p>
<p>Procedures - stacking should be at a high level</p>	<p>The design, including the levels and location, of Bristol's holding procedure will form part of the Stage 2 Design work.</p> <p>The ICAO PANS-OPS rules include criteria on holding patterns which will have to be adhered to. This documentation includes criteria on holding levels such as aircraft speed at different levels; all of which must be followed when airspace changes are made.</p> <p>Bristol Airport will also consider the environmental impact of any changes to the holding procedure, as covered in DP6.</p>
<p>Public safety zones – consideration of them</p>	<p>All safety factors will be considered during the Design Phase (Step 2).</p>
<p>Safety - is there a safety consideration when looking at fuel and stacking?</p>	<p>Bristol Airport will complete a full safety assessment on the final design which will also be submitted to the CAA. This will include a hazard identification, risk assessment and production of relevant safety cases; encompassing all proposed changes to the current operation, airspace and procedures.</p>
<p>Safety - will modern navigational systems have a back-up/ ground-based navaids continue to be maintained?</p>	<p>All current and future operational systems have back-up procedures and contingency plans in place.</p> <p>NATS is currently leading a project which is rationalising the UK ground-based navigation aid network. This will reduce the current number of these navaids, thus reducing operating costs; but maintaining the necessary level of coverage.</p> <p>This Airspace Change Proposal will not affect any of the above.</p>