



*HEATHROW - STAGE 1A DEFINE – IPA DESIGN PRINCIPLES*

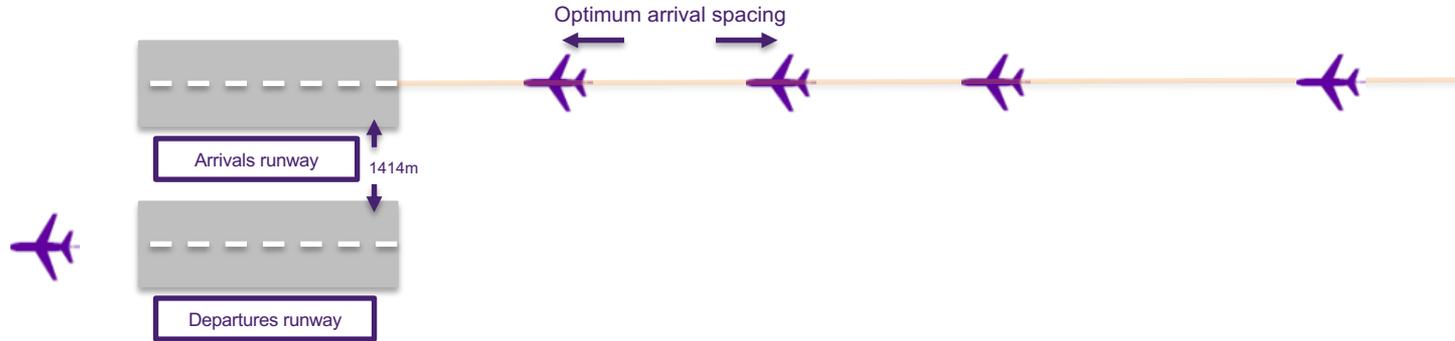
*OCT 2018*

**Heathrow**  
Building for the future

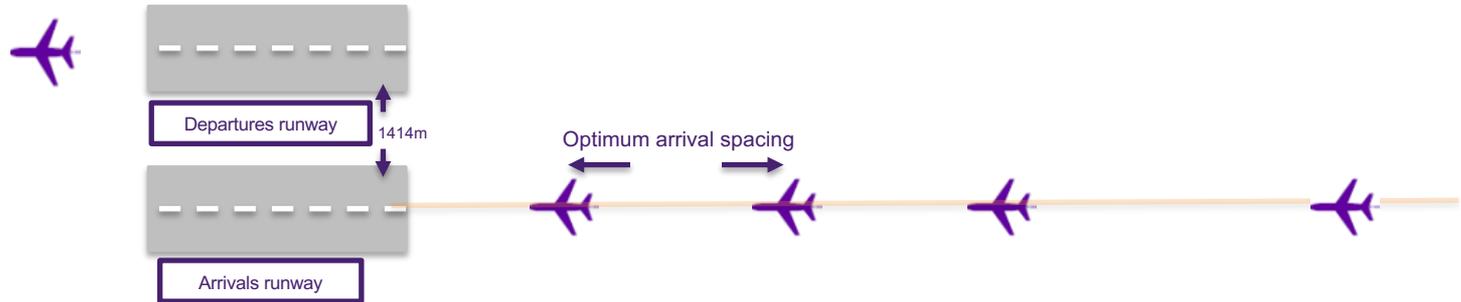
## CURRENT OPERATIONS

- Heathrow's two runways currently operate simultaneously. One runway for departures, one for arrivals.
- In this mode, the runways are operated independently – arrivals to one runway do not affect departures from the other, & vice versa.
- In certain circumstances Heathrow can invoke a procedure known as “Tactically Enhanced Arrivals Mode (TEAM)”, enabling us to land some arriving aircraft on the departure runway.
- However, in this mode, the arrivals to both the departure and arrival runways are dependent on each other and cannot land at the same time, i.e. the number of aircraft landing on the arrivals runway is reduced to accommodate those landing on the departures runway.
- This dependency reduces the number of aircraft that could feasibly be landed on both runways.

# CURRENT OPERATIONS



ALTERNATING TO



## LANDING ON THE DEPARTURES RUNWAY

Although most of the time we use one runway for departures and one for arrivals, when there is a build-up of delays both runways can be used for landing. This can also be known as TEAM

We can land on the departures runway when airborne holding delay reaches certain thresholds:

- Between 06:00 and 06:29 where there is a forecast delay of 10 minutes or more
- Between 06:30 and 07:00 where there is a forecast delay of five minutes or more

(Between 06:00 and 07:00 there is no limit on the number of arrivals that can land on the designated departures runway)

- After 07:00 where there is a forecast delay of 20 minutes or more<sup>1</sup>

After 07:00 no more than six arrivals per hour are permitted to land on the designated departures runway<sup>2</sup>

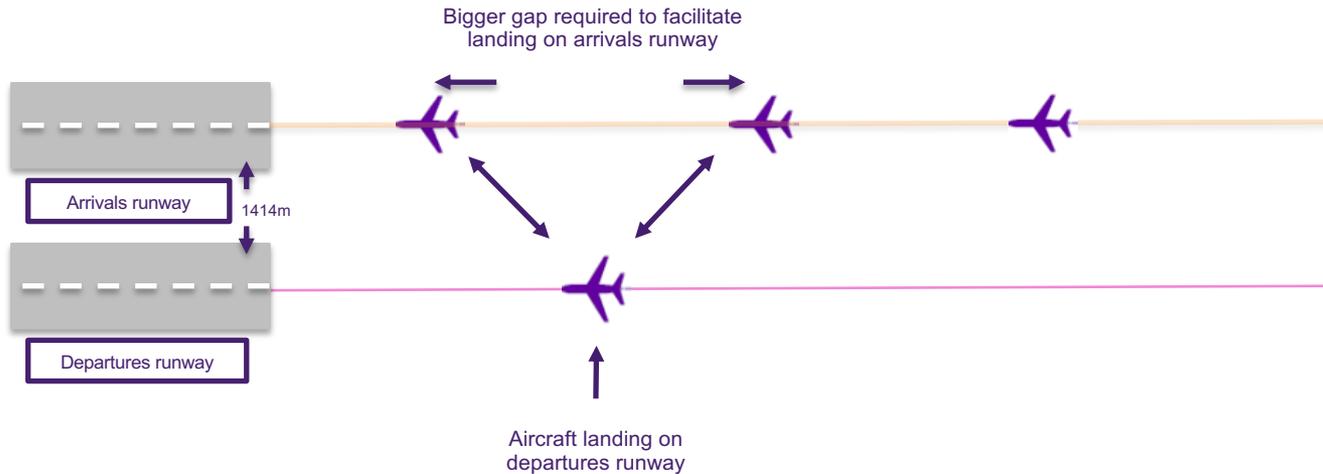
### Easterly operations

Landing on the departures runway after 06:00 is also permitted on easterly operations. This is a similar practice to westerly operations although the Government limits do not apply to the numbers of arriving aircraft landing on the departures runway after 07:00.

<sup>1</sup> These rules apply to westerly operations only.

<sup>2</sup> Landing more than 6 per hour may occur for safety reasons only

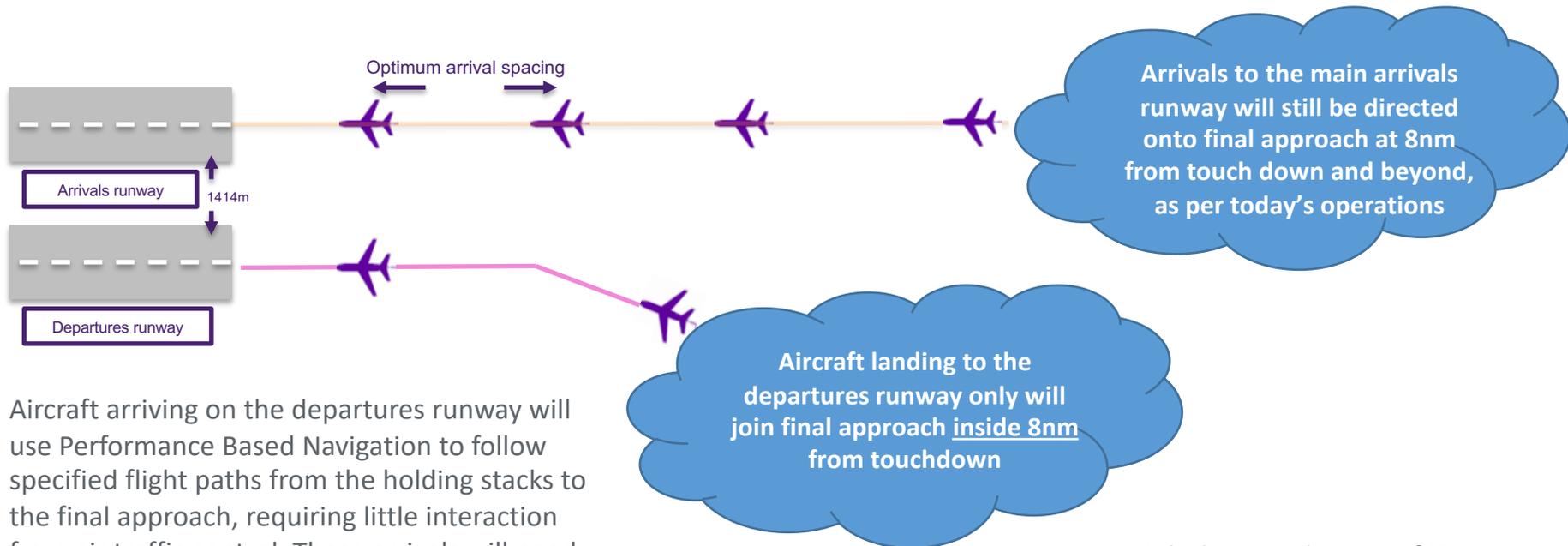
## LANDING ON THE DEPARTURES RUNWAY



- When arriving aircraft are allowed to land on the departures runway, arrivals to the departures and arrivals runway must be spaced by at least two nautical miles.
- To achieve this, the spacing between aircraft on the landing runway has to be increased compared to when only one runway is used for landing.
- This additional spacing means that fewer aircraft land on the arrivals runway. So, even if six aircraft were to land on the departures runway in an hour, the overall landing rate across both runways for that hour only increases, on average, by two aircraft.

## WHAT IS IPA?

Independent Parallel Approaches (IPA) will seek to remove the dependency between simultaneous arrivals to both runways so that the landing rate on the arrivals runway does not have to reduce to enable additional aircraft to land on the departures runway.



Aircraft arriving on the departures runway will use Performance Based Navigation to follow specified flight paths from the holding stacks to the final approach, requiring little interaction from air traffic control. These arrivals will need to join final approach closer than 8nm from touchdown to ensure that the tracks of the aircraft using the main landing runway remain unchanged.

This will require a change to Heathrow's Noise Abatement procedure, subject to approval from The Department for Transport.

With the introduction of IPA, aircraft landing on the arrivals runway would continue to be directed by air traffic control as they are today and be vectored onto final approach outside 8nm from touchdown.

## *IPA IN THE CONTEXT OF FUTURE EXPANSION*

- Whilst Heathrow is operating within its maximum capacity of 480,000 Annual Transport Movements (ATMs), IPA will increase resilience which will enable more efficient prevention of and recovery from delays. We are therefore planning to introduce IPA in 2022, regardless of whether we expand.
- As part of our DCO we are also considering putting forward plans to increase the ATM cap to release additional capacity. This would be an interim measure some years ahead of the opening of the new runway.
- The use of IPA between 06:00 and 07:00 has the potential to directly support an increase in declared capacity in the hour. IPA also provides increased resilience if there are additional ATMs before the opening of a new runway.
- IPA is also one of a host of measures (eTBS, RECAT, EU598) which will support Heathrow's ambition to enable a longer scheduled night time ban.
- By increasing resilience, IPA has the potential benefits of:
  - Fewer arrivals on the departures runway, improving respite periods because we can land more aircraft in the hours when we do land on the departures runway.
  - A reduction in the number of late running flights because we are more efficient when we land on the departures runway.
  - A reduction in aircraft holding in Heathrow's stacks because we prevent and recover more quickly from delay.

## *IPA – WHAT DOES THIS MEAN IN PRACTICE?*

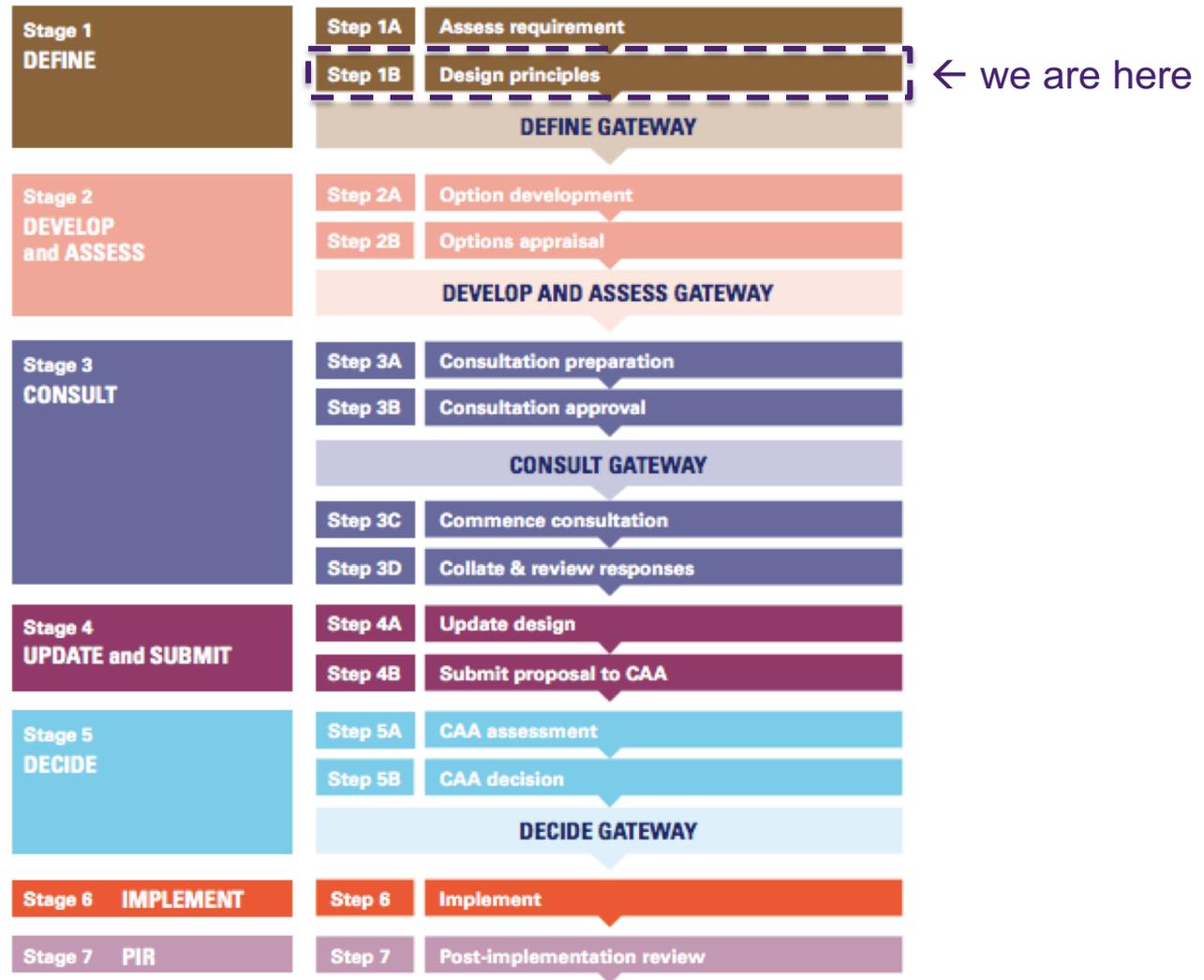
- The new flight paths needed for IPA will be using Performance Based Navigation (PBN) and will need to 'fit' into Heathrow's existing airspace and for safety reasons need to be designed to avoid the existing arrival swathes into Heathrow.
- Therefore, those aircraft landing on the departures runway will not be able to operate wholly within the existing arrivals swathe and will fly over some new areas.
- Heathrow's existing arrivals will remain unchanged as they will continue to operate within Heathrow's current arrival swathe.
- We will not be seeking to make a change to the rules on the maximum number of aircraft allowed to land on the departures runway per hour.
- The IPA routes will only exist in a two-runway environment and will be superseded by our airspace design for expansion.

## CAA CAP1616

- In January 2018 the CAA launched its guidance on the regulatory process for changing airspace design: CAP1616.
- CAP1616 provides a process framework to be used when designing airspace and is split into seven stages as shown on the next page.
- We are now in the 'Define' stage of the process whereby Heathrow is seeking views on the proposed design principles to be used in considering the airspace design options for IPA.
- We will be aiming to submit the final set of design principles to the CAA for the Stage 1 Define Gateway in December 2018.

# CAA AIRSPACE CHANGE PROPOSAL PROCESS (CAP1616)

Figure 1: Overview of the airspace change process



## *WHAT IS A DESIGN PRINCIPLE?*

- The CAP1616 guidance requires the production of design principles for each airspace change.
- Design principles essentially provide a list of high level criteria that the proposed airspace design options should meet. They also provide a means of analysing the impact of different design options and a framework for choosing between options.

CAP1616 states that:

- The development of design principles should provide “a shortlist of principles to inform the development of airspace design options” and a “framework against which airspace design options are evaluated”.
- Principles “are in no way immutable and, as a part of the process for the establishment of the airspace design principles, should be challenged as part of the ongoing dialogue with stakeholders”.

## *HOW HAVE WE DEVELOPED DESIGN PRINCIPLES?*

Heathrow has a long history of engagement through established groups:

- Heathrow Community Noise Forum (HCNF)
- Heathrow Community Engagement Board (HCEB)
- Airline groups
- Heathrow Strategic Planning Group (HSPG)
- Future Airspace Strategy Industry Implementation Group (FASIIG)

Earlier this year we also conducted a public consultation asking for views on potential design principles to be used in the redesign of airspace required for Heathrow's third runway.

After reviewing the consultation feedback and engaging further with relevant stakeholder groups, Heathrow developed a set of 10 design principles.

These were submitted to the CAA on 31<sup>st</sup> August and were approved at the Define Gateway meeting on 28<sup>th</sup> September.

Having gained significant insight into our stakeholders' priorities for airspace design, we propose to use a similar, but not identical, set of design principles for IPA as our starting point for this discussion.

## HEATHROW'S MANDATORY DESIGN PRINCIPLES FOR IPA

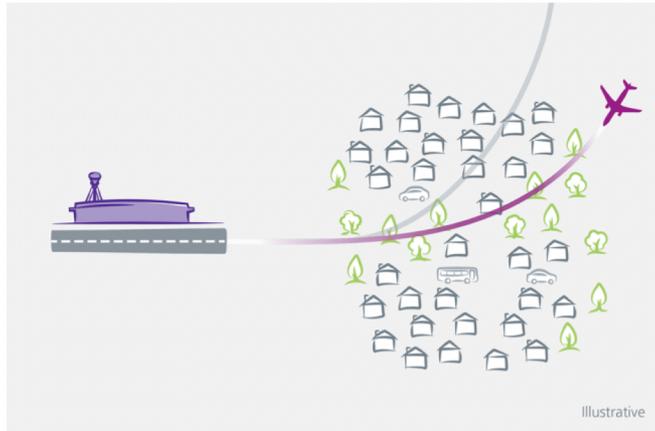
1	Must be safe
2	Must meet Heathrow's capacity requirements
3	Must meet three NPSe noise policy tests
4	Must meet local air quality requirements
5	Must base our airspace design on the latest navigation technology widely available

## *HEADLINE DESIGN PRINCIPLES FOR IPA FOR PRIORITISATION*

There are 4 categories within which the Design Principles can be placed:

- a. Minimising noise
- b. Minimising fuel and CO<sub>2</sub>
- c. Maximising operational efficiency (air traffic control workload)
- d. Minimising impact on other airspace users

a



## Minimise the impact of aircraft noise

Future airspace design will comply with Government regulation and policy on noise impact. In addition to this Heathrow will aim to reduce effects on health and quality of life from noise by considering local circumstances, and by contributing to improvements where possible.

a

b

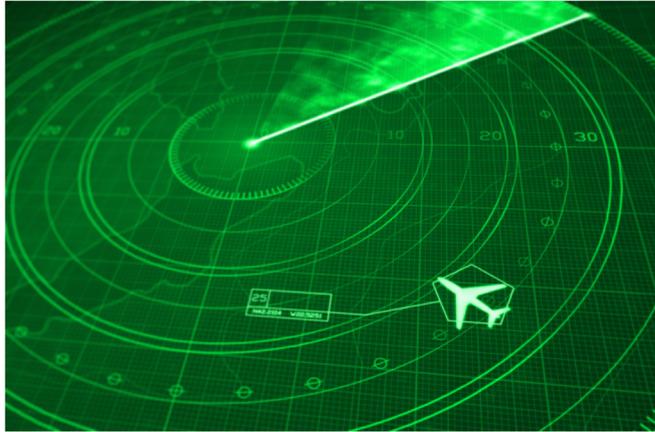


## Minimise fuel requirements and greenhouse gas emissions

Heathrow would seek to minimise the amount of fuel and CO2 emissions required by our flight paths, by keeping flight paths as short and direct as possible. Heathrow would avoid long and complicated paths that require more fuel (and therefore greater cost) for airlines.

b

c

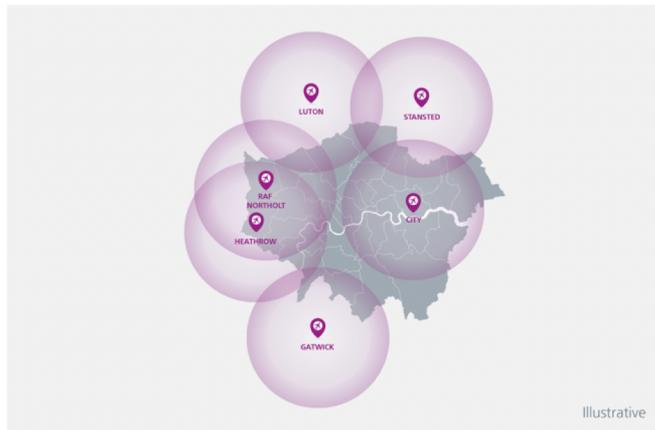


## Simple and efficient flight paths for operational efficiency

Heathrow would prioritise simple flight paths that minimise the workload of pilots and air traffic control.

c

d



## Minimise impact on other airspace users

Heathrow would minimise our impact on other airspace users, especially neighbouring airports of Luton, Gatwick and RAF Northolt.

This means Heathrow are willing to share airspace where necessary, only seek extra airspace where justifiable and look for opportunities to give away airspace that is not essential for future operations.

d

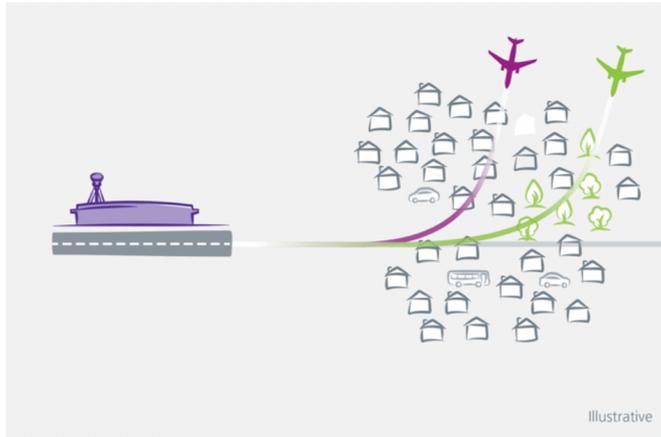
## *NOISE DESIGN PRINCIPLES FOR DISCUSSION & PRIORITISATION*

There are lots of different ways that you can apply the principle of minimising noise, and they are sometimes contradictory. For example, should you spread flight paths over a wider area (affecting more people) or try to concentrate them (affecting less people but with those people overflowed to a greater extent)?

The following slides present 4 noise-related design principles:

- e. Minimising the number of people newly affected by noise
- f. Providing predictable respite from noise
- g. Minimising the total number of people affected by noise
- h. Avoiding multiple flight paths over the same community

e



## Minimise the number of people newly affected by noise

IPA flight paths will overfly areas not currently regularly overflowed by Heathrow arrivals. Where possible, we will avoid putting in routes over the most heavily populated areas.

e

f

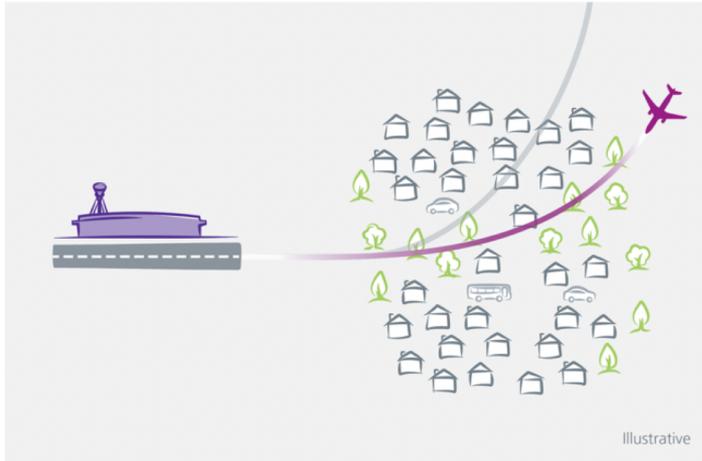


## Design multiple flight paths, with only one flight path active at a time to provide predictable respite from noise

Heathrow would provide local communities with predictable respite from noise by scheduling the use of different flight paths by day/week/month so that communities can look ahead and know when they are likely to be overflowed. The use of additional flight paths would mean each flight path was flown less frequently but more people would be affected by noise.

f

g

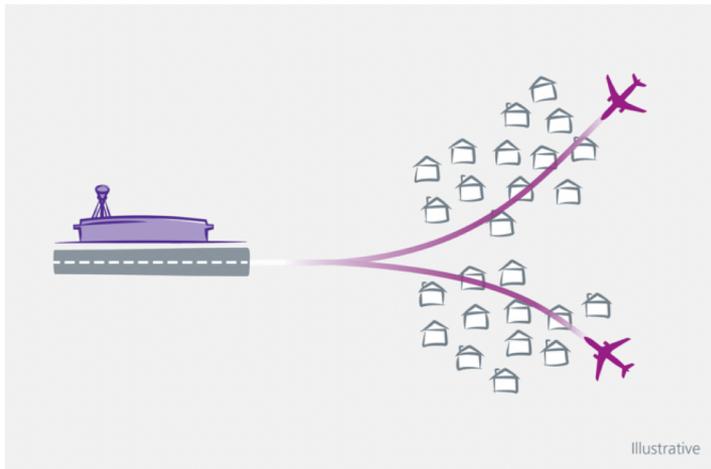


## Minimise the total number of people affected by noise

Heathrow would aim to put flight paths over the areas with the lowest number of people. This will mean fewer people overflowed, but each of those communities would be more affected compared to other design principles. This will lead to planes concentrated over a smaller number of routes.

g

h



## Avoid multiple flight paths over one community

Where possible, Heathrow would aim for different IPA flight paths to be placed over different communities and avoid using the same airspace as routes from nearby airports

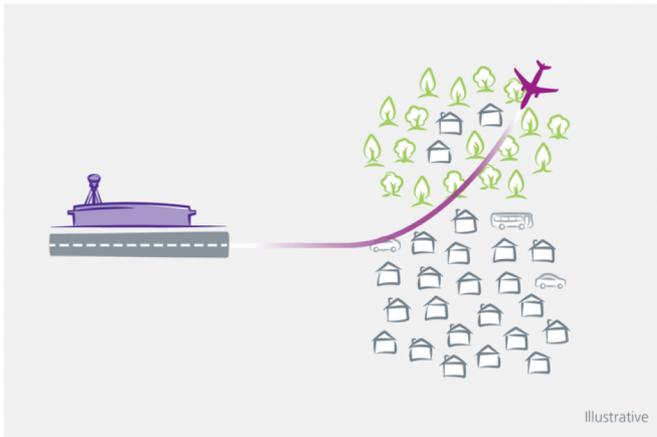
h

## *OTHER DESIGN PRINCIPLES FOR DISCUSSION & PRIORITISATION*

We'd now like to look at some further principles. This time, we want to understand whether or not you agree that Heathrow should be:

- i. Prioritising rural areas over urban areas
- j. Prioritising parks and open spaces over residential areas
- k. Prioritising commercial and industrial areas over residential areas

i

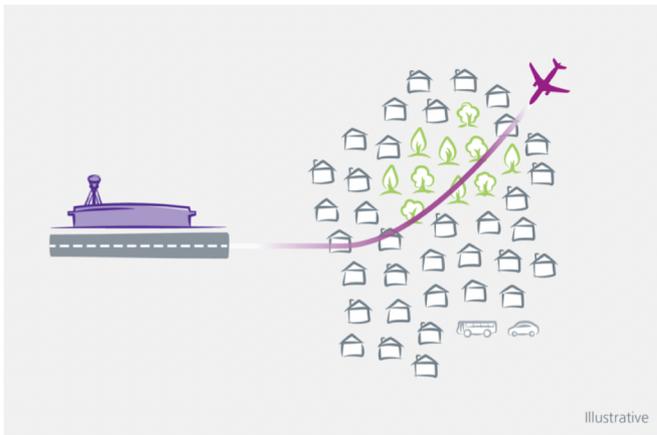


## Prioritise flight paths over rural areas, rather than over urban areas

Heathrow would aim to put planes over rural areas rather than urban areas, as they are less populated.

i

j



## Prioritise flight paths over parks and open spaces, rather than over residential areas

Heathrow would aim to put planes over parks and open spaces rather than residential areas in towns and cities.

j

k



## **Prioritise flight paths over commercial and industrial areas, rather than residential areas**

Heathrow would aim to put planes over commercial areas (like shopping centres and business parks) and industrial areas (like factories and warehouses) rather than residential areas, wherever possible.

k

## PRIORITISATION

- CAP1616 highlights that design principles can be contradictory, for example where avoiding one kind of impact is likely to increase another:

*“some of the principles may contradict one another and some may be prioritised over others: this will be an iterative process and a qualitative one rather than a purely numerical exercise with binary answers.”*

- Prioritisation of design principles help our airspace designers to compare different design options when we reach that stage of the CAP1616 process.



## Independent Parallel Approaches (IPA) Design Principle Engagement - Discussion Guide

### Overview

Changes to flight paths are submitted to and approved by the CAA, following the Airspace Design Guidance provided in its document known as 'CAP 1616'. This guidance sets out a process framework following a multi-stage approach for changing airspace. The first stage of this process is to develop a set of 'design principles'. To do this we are engaging with a number of established community and industry groups, local authorities and members of the general public through focus groups.

There are a number of core principles that we must accommodate when introducing new flight paths for Independent Parallel Approaches (IPA). These include Government policy, safety, environmental and operational factors. However, beyond these core requirements there are a number of options and 'trade-offs' to choose between when deciding where to position the future IPA flight paths. At this first stage, we are looking for your feedback to help decide how the principles should be prioritised when faced with different options or trade-offs.

The positions of the future IPA flight paths have not been decided yet. There will be two public consultations - the first of which will begin in January 2019 - where we will be seeking feedback on the geographic areas within which flight paths could be positioned, known as 'design envelopes'. At a later stage, there will be a further public consultation on the flight path options (i.e. our proposals for the actual routes where aircraft will fly).

Your area may see changes in future as a result of the introduction of IPA. Some areas that are not currently overflown by arrivals into Heathrow will be in the future, while other areas currently overflown by arrivals may experience fewer in the future.

Therefore, at this first stage, we would welcome as much feedback as possible on the IPA design principles and how they should be prioritised to ensure we consider a wide range of views from all the stakeholder groups we are engaging with.

### Core Design Principles for IPA

There is always one principle that must be met – safety. There are then other principles that Heathrow has to accommodate – such as Government policy, environmental and operational factors. For example:

- We have to make sure we are able to meet our capacity requirement
- We have to make sure we don't break Government regulations on the amount of aircraft noise and the impact on air quality
- We have to use the latest technology

However, beyond these core requirements there are a number of options and 'trade-offs' to choose between. For example, we could choose to prioritise reducing the noise impact on local communities, or prioritise minimising fuel requirements for the airlines and CO<sub>2</sub> emissions. We would like you to consider each of these priorities and see which you think is the most important.



## Heathrow Airport IPA Design Principles Engagement - Discussion Guide

### Design Principles Categories

There are 4 categories within which the design principles can be placed:

- a. Minimising noise
- b. Minimising fuel and CO<sub>2</sub>
- c. Maximising operational efficiency (air traffic control workload)
- d. Minimising impact on other airspace users

We want to find out which principles you think are most important to your area. We would like you to prioritise principles a-d in terms of which you believe are more/less important to your area.

### Noise Design Principles

There are lots of different ways that you can apply the principle of minimising noise and they are sometimes contradictory. For example, should we implement more new routes to spread flight paths over a wider area (affecting more people) or minimise the number of new routes (affecting less people but with those people overflowed to a greater extent)?

There are 4 noise-related design principles that we have presented:

- e. Minimising the number of people newly affected by noise
- f. Providing predictable respite from noise
- g. Minimising the total number of people affected by noise
- h. Avoiding multiple flight paths over the same community

We would like you to prioritise noise principles e-h in terms of which you believe are more/less important to your area.

### Other Design Principles

We'd now like you to look at some further principles. This time, we want to understand whether or not you agree that Heathrow should be:

- i. Prioritising rural areas over urban areas
- j. Prioritising parks and open spaces over residential areas
- k. Prioritising commercial and industrial areas over residential areas

We would like you to prioritise noise principles i-k in terms of which you believe are more/less important to your area.

### Feedback

You also have the opportunity to propose any other design principles that you think we should consider and we ask that you include those in a prioritised order.

Together with your prioritisation and any other principles you have suggested please give as much other supporting rationale for your decision.

For example:

- Why is a design principle more/less important to your area?
- Why should Heathrow not prioritise a certain design principle?



## Heathrow Airport IPA Design Principles Engagement - Discussion Guide

All comments and feedback need to be received by the **9<sup>th</sup> November 2018** by emailing [airspace@heathrow.com](mailto:airspace@heathrow.com).

### Next steps

The feedback we receive will be collated, analysed and fed into the production of a final set of principles. This will be considered alongside other requirements such as policy, safety and environmental. We will then present our final proposed list of design principles, either in workshops or via email.

We aim to submit the final set of design principles to the CAA for the 'Stage 1 Define Gateway' in December 2018.

If accepted by the CAA, they will then be used to qualitatively evaluate our airspace design options as we move towards the next stage in the process.

We will continue to engage with you at key stages throughout the design process for IPA, including at two public consultations – the first in January 2019.