Phase One Engagement Material

Stage 2 Develop and Assess

MAG
London Stansted
Airport

Appendix 3 outlines the materials shared during the phase one stakeholder engagement.

Contents

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LONDON STANSTED AIRPORT FUTURE AIRSPACE

Stage 2 – Develop and Assess
Phase one engagement - Route options discussion

June 2021

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London Stansted
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Welcome – Stage 2 video

London Stansted Airport – Airspace change timeline

We are here ▼ (Stage 2)

2020		2021/2022	2022/ 2023	2023	Early 2024	Late 2024	2025 onwards
Stage 1 **Define**		Stage 2 **Develop and assess**	Stage 3 **Full public consultation**	Stage 4 **Update and submission of proposals**	Stage 5 **Decision**	Stage 6 **Implementation**	Stage 7 **Post-implementation review**
Step 1A In December 2018 we sent the CAA our Statement of Need, which was approved and provisionally classed as a Level 1 change.[1]	**Step 1B** We gathered views on Design Principles during early 2020. Our Stage 1 work was approved by the CAA in the summer of 2020.	Using the Design Principles produced during Stage 1 as a framework to evaluate different design options, we will develop and assess options for any airspace change. We will send details of those design options to the CAA for approval in Spring 2022.	We will prepare to consult the public on these options. Once we have approval from the CAA to proceed, a formal consultation will take place in 2022/ 2023.	We will update our airspace change proposal, taking stakeholders' feedback into account, before sending it to the CAA in 2023.	We expect the CAA's decision on whether to approve any airspace change in early 2024.	If approved, any airspace changes could be put in place in late 2024.	The CAP1616 process gives the CAA and airports 12 months to review any change that has been made to airspace.

All future dates are provisional pending CAA approval and alignment with the wider Airspace Modernisation Strategy

[1] Level 1 changes are high impact changes to notified airspace design which have the potential to alter traffic patterns below 7,000ft

Step 1B – our design principles

Stage 2 process – gathering views

We are here

1 Step 2A

Engagement one - Sharing the design envelopes

2 Step 2A

Feedback considered, routes developed

3 Step 2A

Engagement two – sharing route designs and design principles assessment

4 Step 2A

Feedback considered, options further developed

5 Step 2B

Initial options appraisal

June

In discussion sessions like this one, we will be sharing the design envelopes together with details of how these have been developed, for feedback and input.

July - August

Taking account of feedback, design envelopes will be further enhanced and specific route options will be developed.

September

Potential route options will be shared at another round of discussion sessions in September. We'll also share the assessment of how each option performs against the design principles, for feedback.

October - November

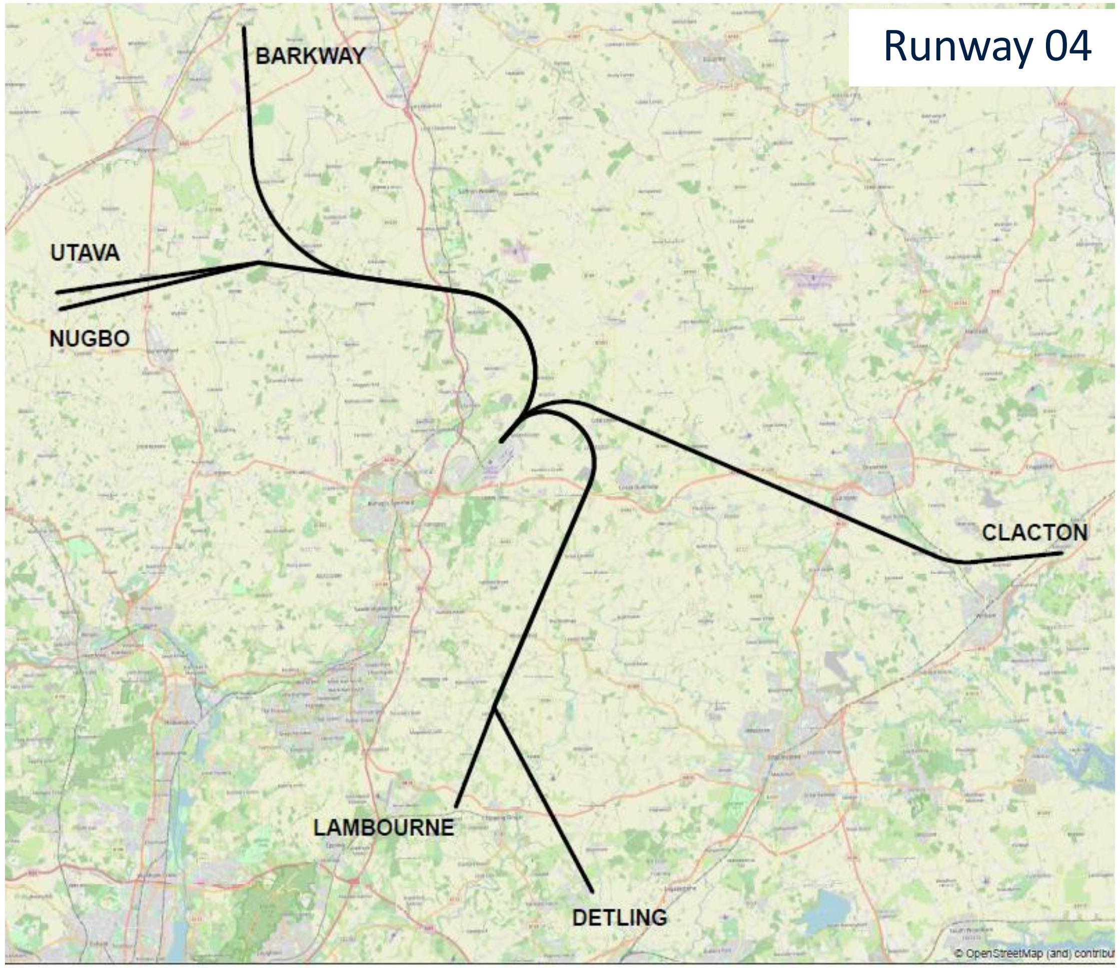
Taking account of feedback, options will be refined further.

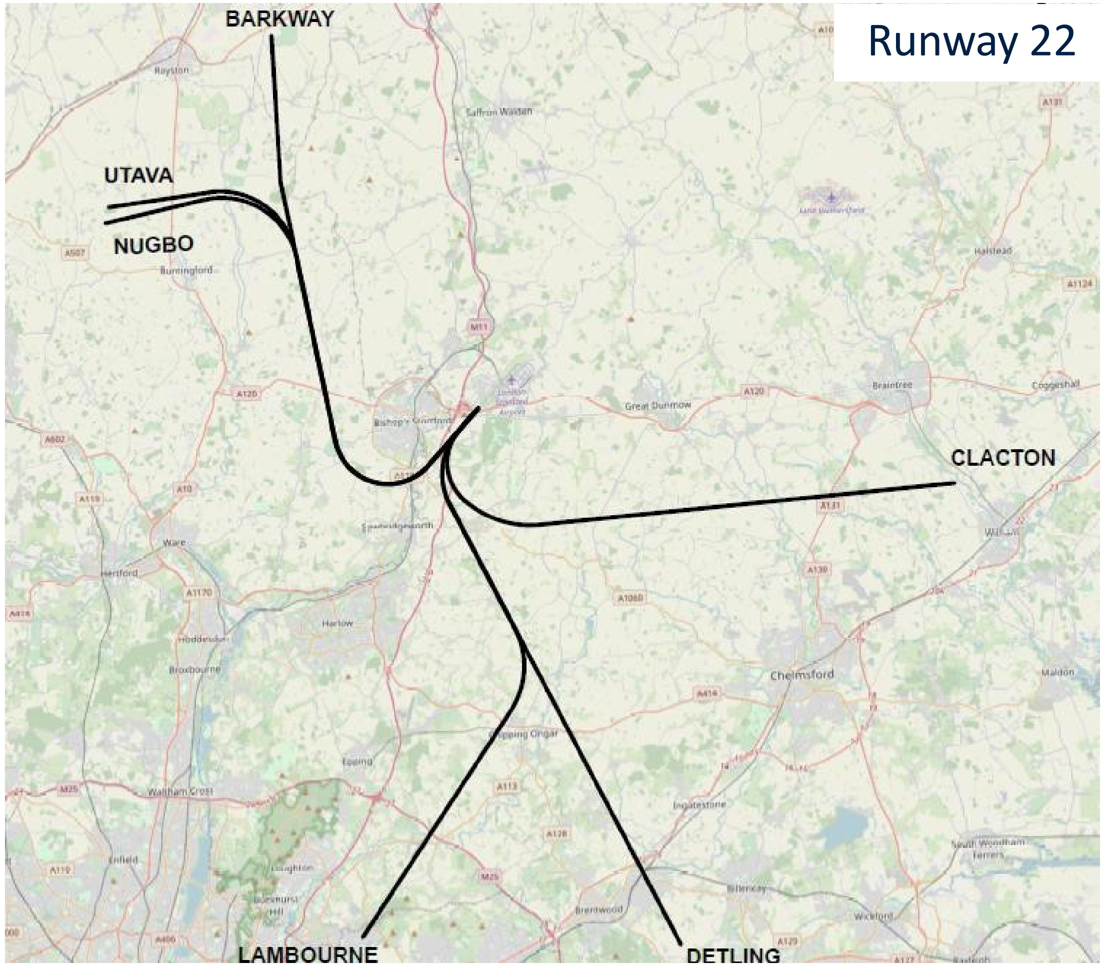
December - February

The options will be subject to an initial options appraisal to determine the likely impact of each. Once complete, full details of all the work undertaken at Stage 2 will be submitted to the CAA for assessment.

HOW AIRCRAFT CURRENTLY ARRIVE AND DEPART

Departures – SID's (Standard Instrument Departures)





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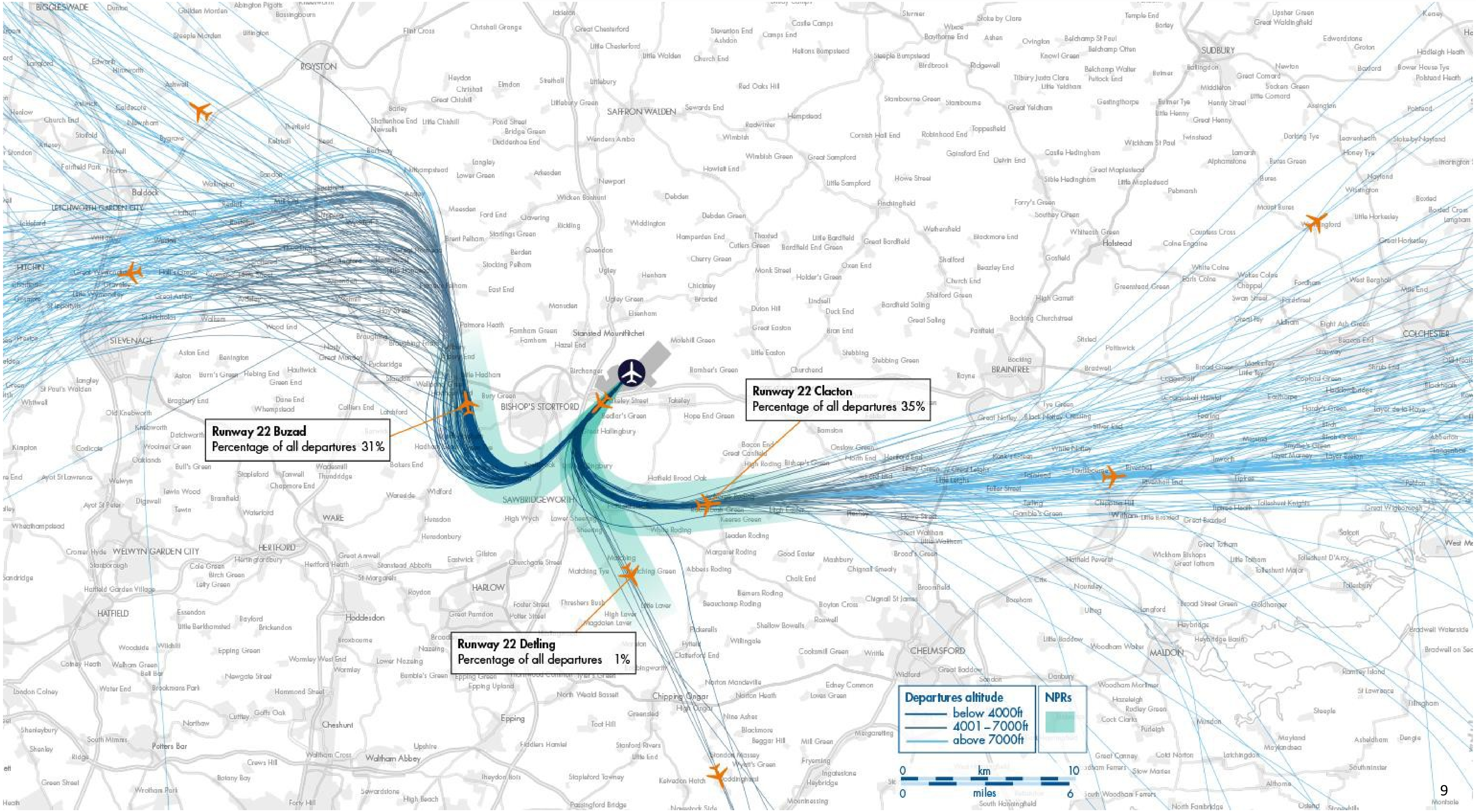
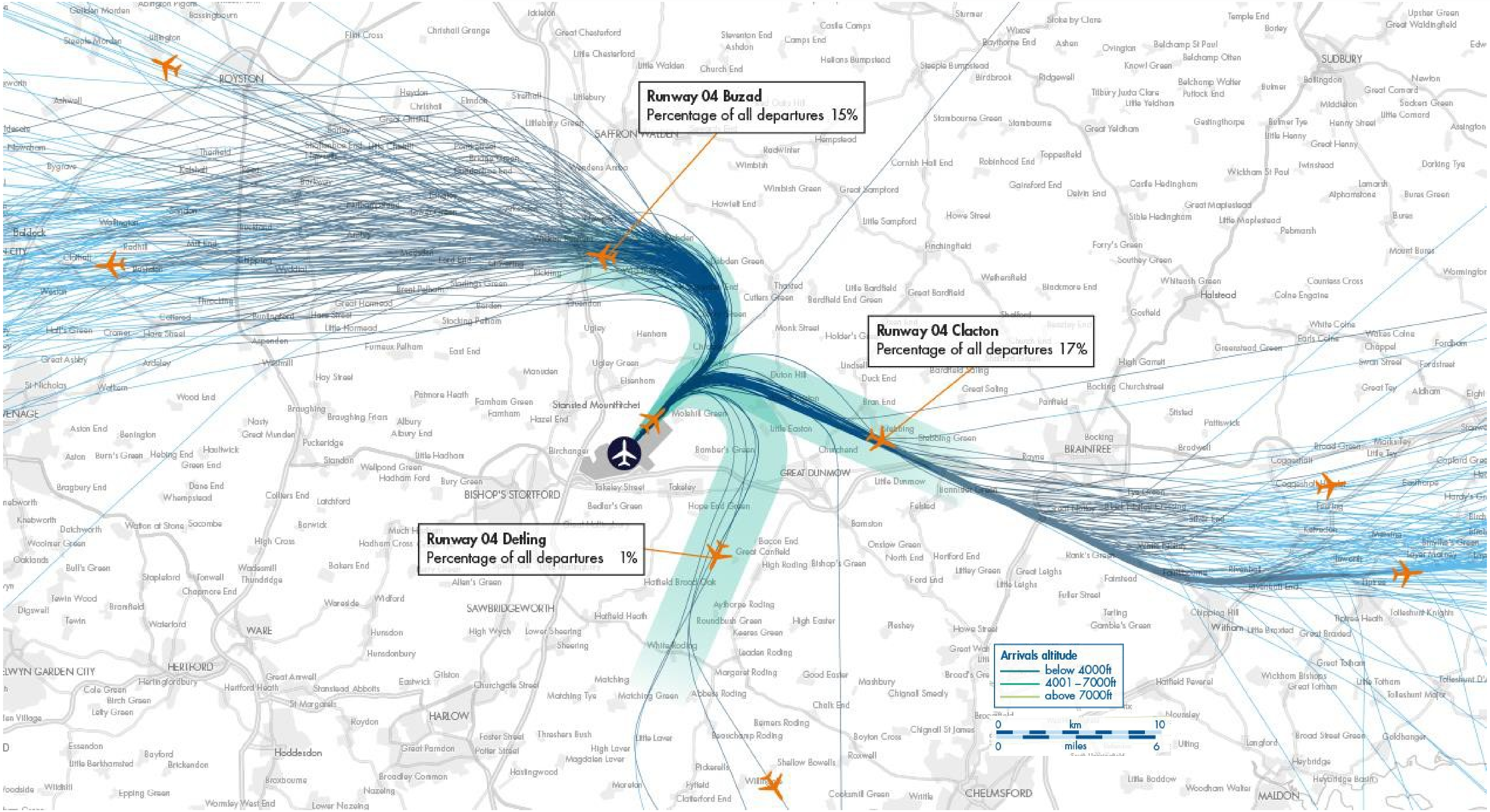
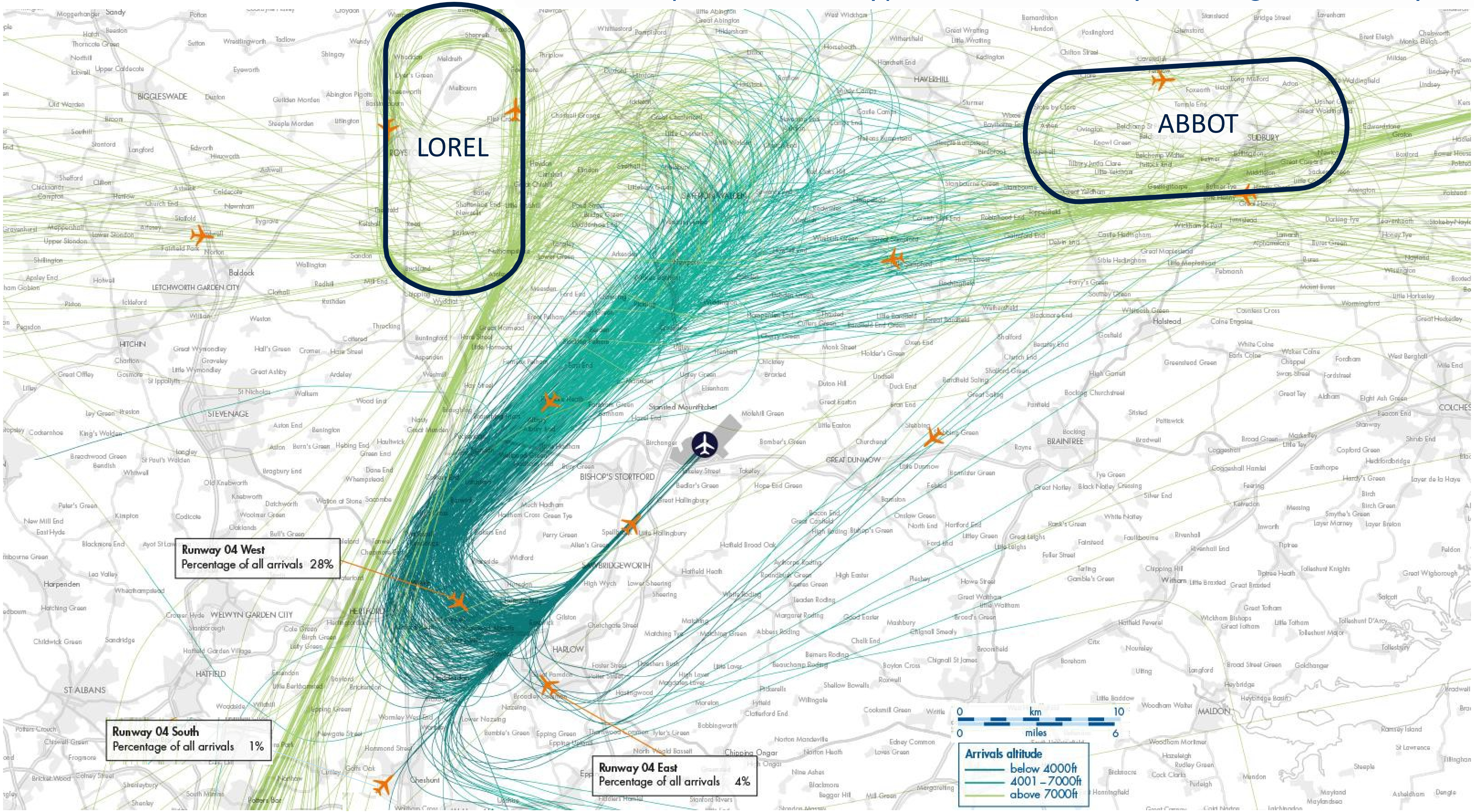
Current Operations - A typical summers day departing from Runway 22



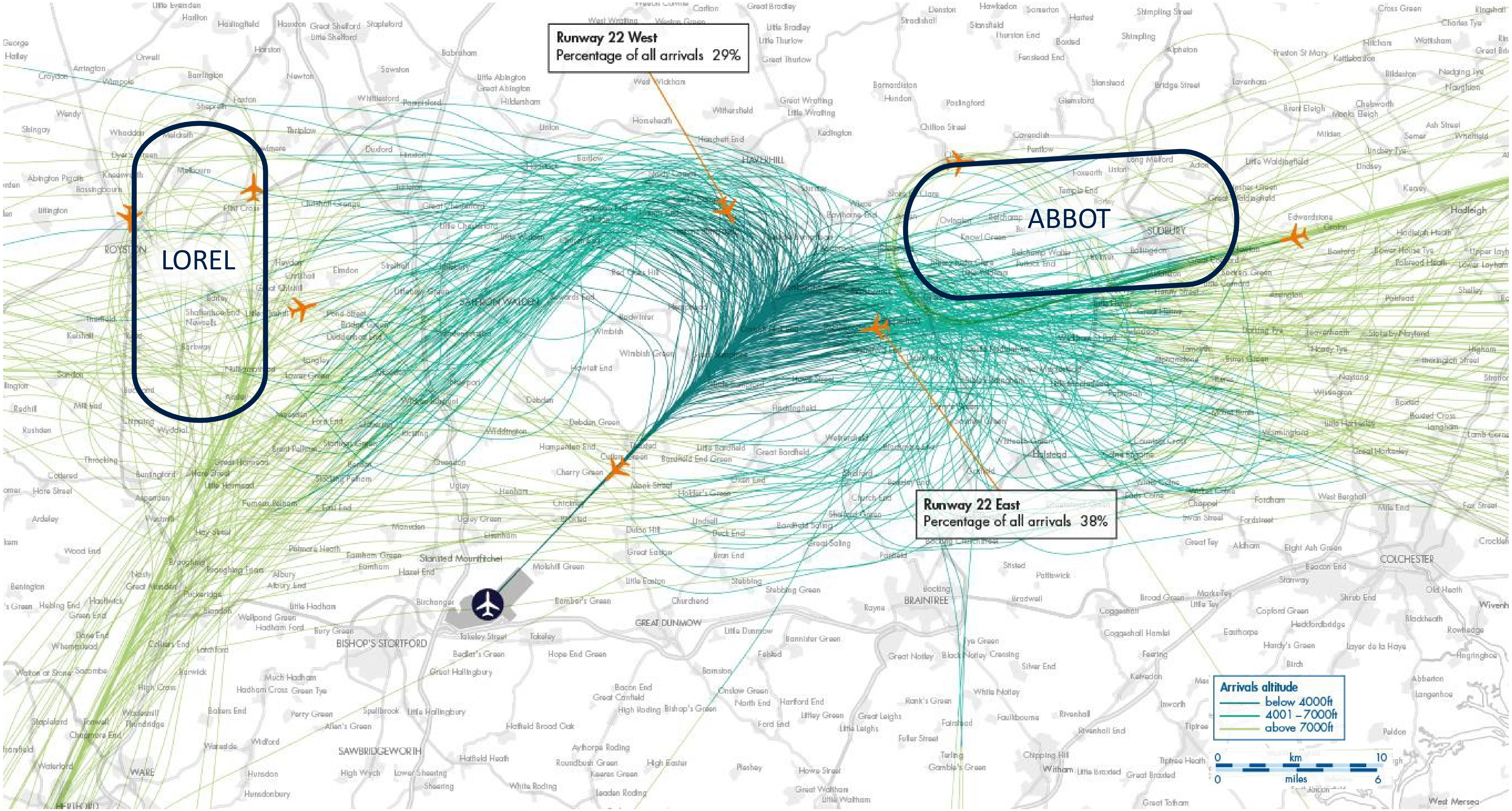
Current Operations - A typical summers day departing from Runway 04



Current Operations - A typical summers day arriving on Runway 04

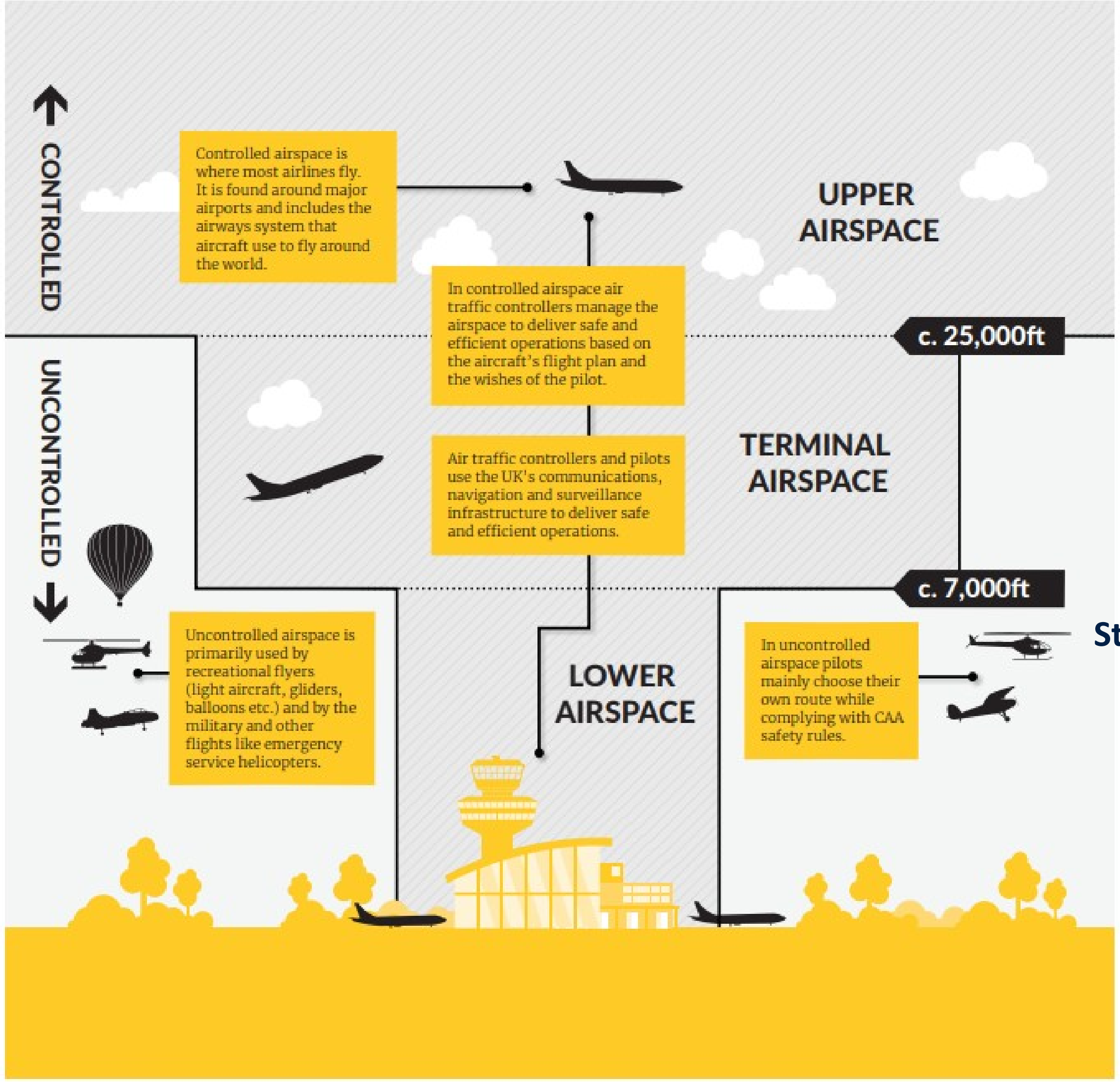


Current Operations - A typical summers day arriving on Runway 22



DEVELOPING A COMPREHENSIVE LIST OF OPTIONS

What is airspace?



NATS design

Stansted design

Airspace is :

- 3 dimensional and divided into a number of vertical layers
- Used by commercial flights, general aviation and the military.
- Stansted has its own controlled airspace within the complex London airspace network
- Our future designs will need to integrate with this and all the other London airports

The foundation of our route design

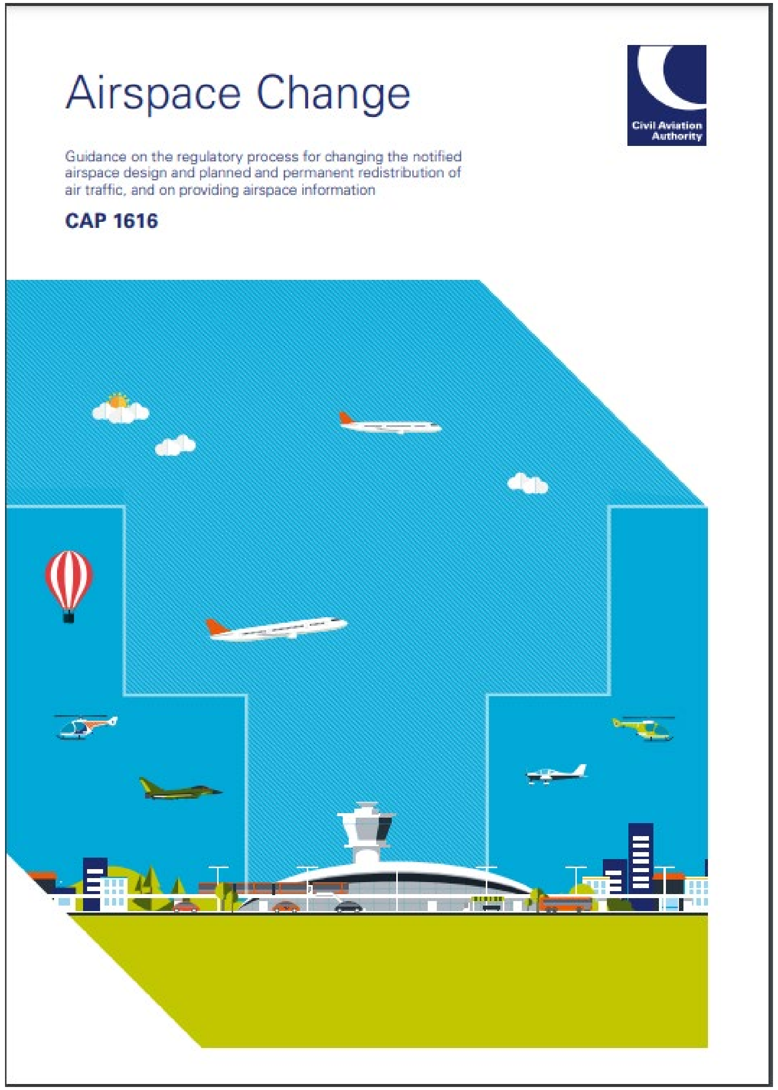
Our responsibility is from ground to 7,000ft. Above that is the responsibility of NATS

Each Departure route option has two points which define the start and finish of each route

- The start point is the runway
- The finish is at 7,000ft where the route option joins with the NATS upper (network)

For Arrivals the reverse applies:

- The start point is at 7,000 ft (i.e. where the arrival leaves the NATS upper (network) airspace
- The finish is the runway

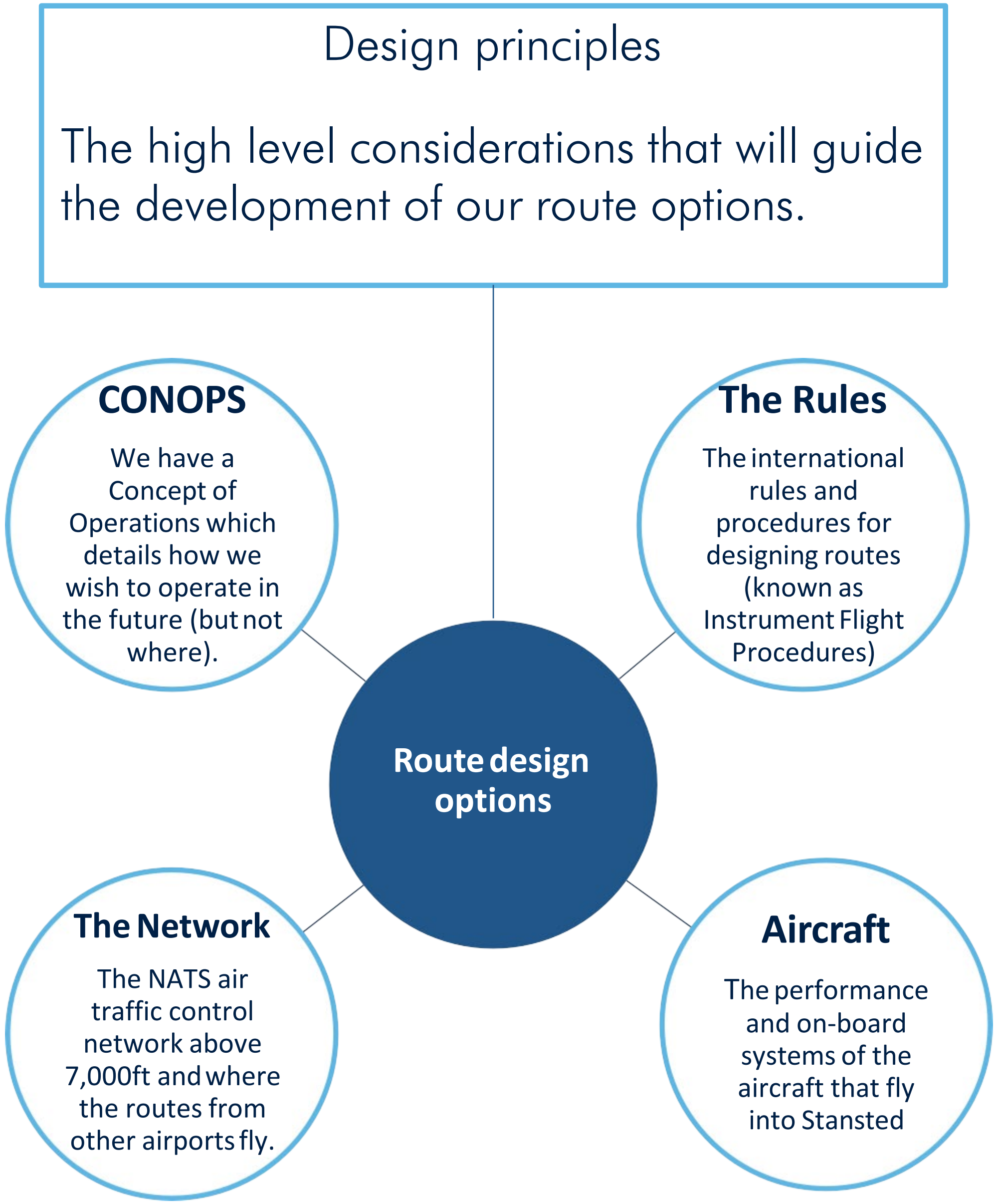


Route design considerations

Our route options need to take several things into consideration. Each of the considerations listed here implement aspects of our agreed design principles and contribute to our design in a different way;

- Some provide an opportunity
- Others create a constraint

But we cannot ignore any of them if we are to get a balanced design.



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Design principles – guide the development of the options

S | Safety
Safety is our highest priority; our routes must be safe for airspace users and communities on the ground, and must comply with national and international industry standards and regulations.

P | Policy
Any changes must be consistent with the CAA's Airspace Modernisation Strategy and the FASI-S programme, taking into account the needs of other change sponsors and airspace users.

D | Demand
The airspace design must provide for the utilisation of aircraft movements permitted by planning permissions and within statutory limits in force at the airport.

C | Change
Where we choose routes that fly over new areas there will have to be a clear and objective benefit in doing so.

T | Technology
Routes should be designed to make use of the latest widely available aircraft navigation technology and facilitate continuous climb and descent to/from both ends of the runway.

Noise

N1 | In order to address the effects of aircraft noise, each route should seek to minimise the number of people overflown.

N2 | The use of multiple routes and/or other forms of respite, such as different time periods and balanced runway mode when operationally viable, will be considered.

N3 | Where practical, our route designs should avoid, or minimise effects upon, noise sensitive receptors. These may include designated sites and landscapes (such as SSSI and AONB), cultural or historic assets, and sites providing care.

B | Balance
Our designs will consider both noise and emissions, and seek to strike the best balance. In so doing, we will take account of the Government's altitude-based priorities, which emphasise minimising noise below 7,000 feet.

E | Efficiency
We will seek to minimise the amount of controlled airspace that we require, and our future route designs should ensure an efficient and systemised operation at Stansted, minimising interactions with other airports and maintaining priority access for emergency services.

A | Alternatives
Where the adoption of modern navigation standards and/or flight profiles mean that some aircraft cannot fly the new routes, we will seek to minimise the environmental impacts from those aircraft.

Design consideration – The rules

Policy

Safety

Design principle

INTERNATIONAL RULES

The rules for route design are governed by the International Civil Aviation Organisation (ICAO) under a document called PAN-OPS 8168.

This stands for Procedures for Air Navigation Services – Aircraft Operations and sets out aspects such as:

- Minimum clearances between aircraft and obstacles (such as buildings or masts)
- Climb and descent gradients
- When an aircraft can turn, and how tightly and at what speed.
- The standards that apply to aircraft using satellite based navigation.

UK RULES

The UK rules are driven by ICAO and regulated by the Civil Aviation Authority (CAA).

In addition to CAP1616, they have also set policies and guidance on many aspects of route design.

These include the Airspace Modernisation Strategy which our 'Policy' design principle requires us to be consistent with.

Design consideration – Aircraft

Alternatives

Technology

Our Technology principle states we should make use the latest widely available aircraft technology

To make sure we know what technology airlines have, we conducted a Fleet Equipage Survey which asked questions about current and 2025 aircraft fleets.

This gave us information on:

- Their ability to fly different standards of satellite navigation routes,
- Climb performance,
- The types of onboard navigation equipment they have.

It will make sure we design to a widely available standard but provide an alternative for those that require it– in line with our Design Principle Alternative. Most importantly of those that responded we confirmed:

- All aircraft can use the more accurate modern technology (PBN)
- Departing aircraft could all climb at the rate that is required by the NATS network.

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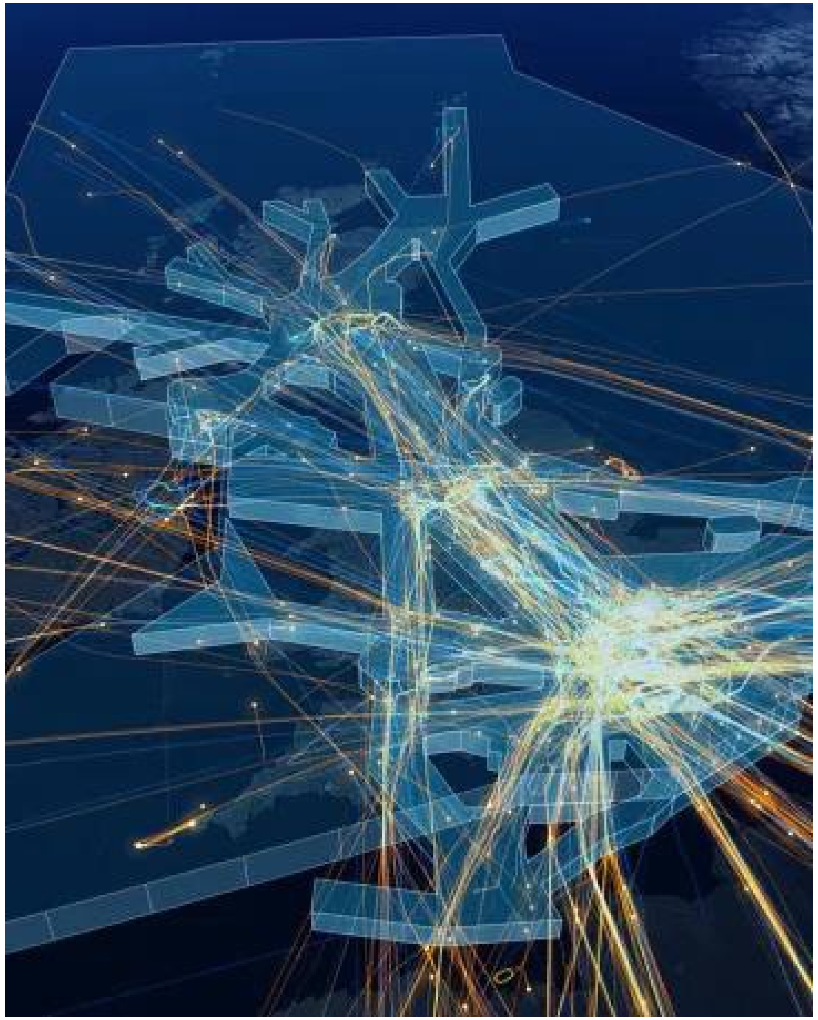
Design consideration – The NATS Network

Efficiency Policy Safety

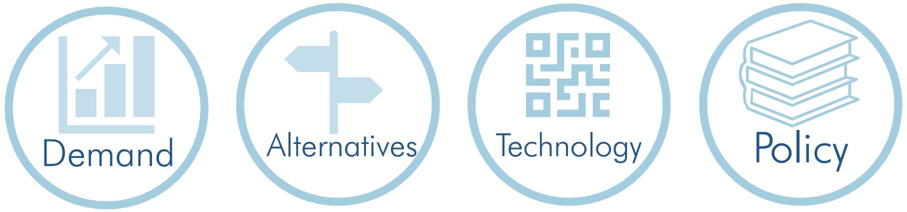
Design principle

The Network airspace structure is a little like motorways in the sky.

- In designing our routes we need to consider the airspace structure (who uses different parts of the airspace) and where flights to and from other airports in the London area are operating.
- This aligns with our Design Principle Safety (S).
- This creates some constraints on our designs, based on where other airports have routes (or where we expect them to be).
- As the designs mature we'll share our options with other airports and work together to resolve any interactions.



Design consideration – The CONOPS



Design principle

CONOPS (Concept of Operation) is a technical document that gives the specification of how we wish to operate (but not where).

It takes input from:

- The Fleet Equipage Survey
- Operational plans for Stansted Airport
- Design Principles
- The CAA Airspace Modernisation Strategy

It provides a specification for the designers to create the route options.

Some of our CONOPS criteria

- Routes designed to Performance Based Navigation (PBN) Principles.
- Minimum departure climb gradients of 6% with optimised routes to 8%
- CAT IIIB ILS (Instrument Landing System) to be used for final approach.
- No reliance upon ground based navigation aids (DVOR).
- Design routes to ensure minimum ATC intervention, with Continuous Descent and Continuous Climb Operations.
- Routes to be independent of other airports below 7,000ft
- The system to support 55 movements per hour (combined arrivals and departures)

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So how have these contributed to the Design Option development?

Step 1

Determine where we could fly between the ground and 7,000ft. To do this we look at aircraft performance and the rules and regulations. This creates a 'design boundary'.

→ **Design boundary**

Step 2

Consider the airspace around us, identifying constraints, with a particular focus on safety.

→ **Constraints**

Step 3

Using our design principles and supporting CONOPS, consider what we want to achieve.

→ **Design options**

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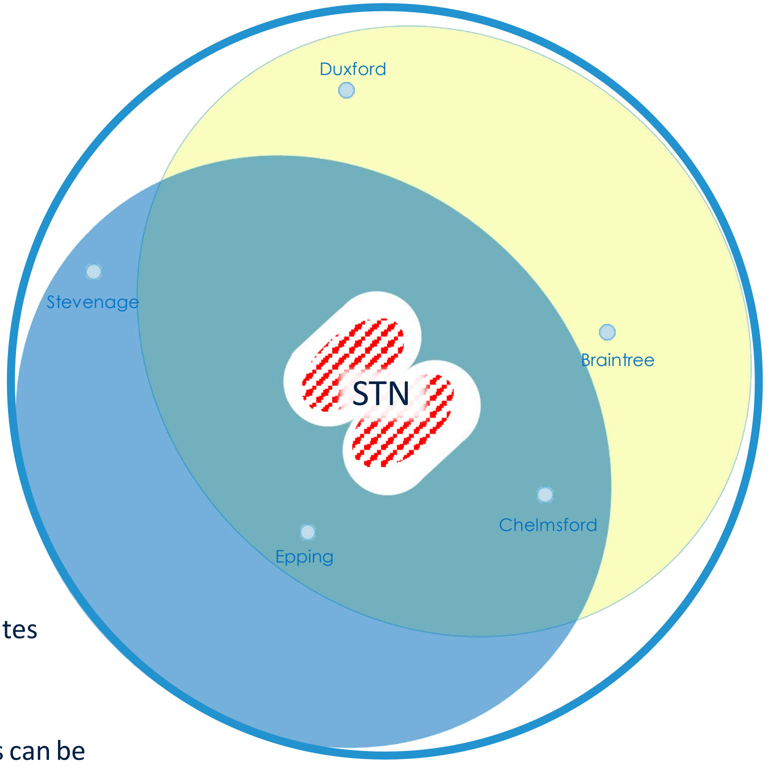
Step 1– The boundary for departures



Area where departure routes can't be designed

Area where 22 departures can be designed to 7,000ft

Area where 04 departures can be designed to 7,000ft

This doesn't define where aircraft will fly, just the viable design area below 7,000ft.

The first stage is understanding where departures could fly

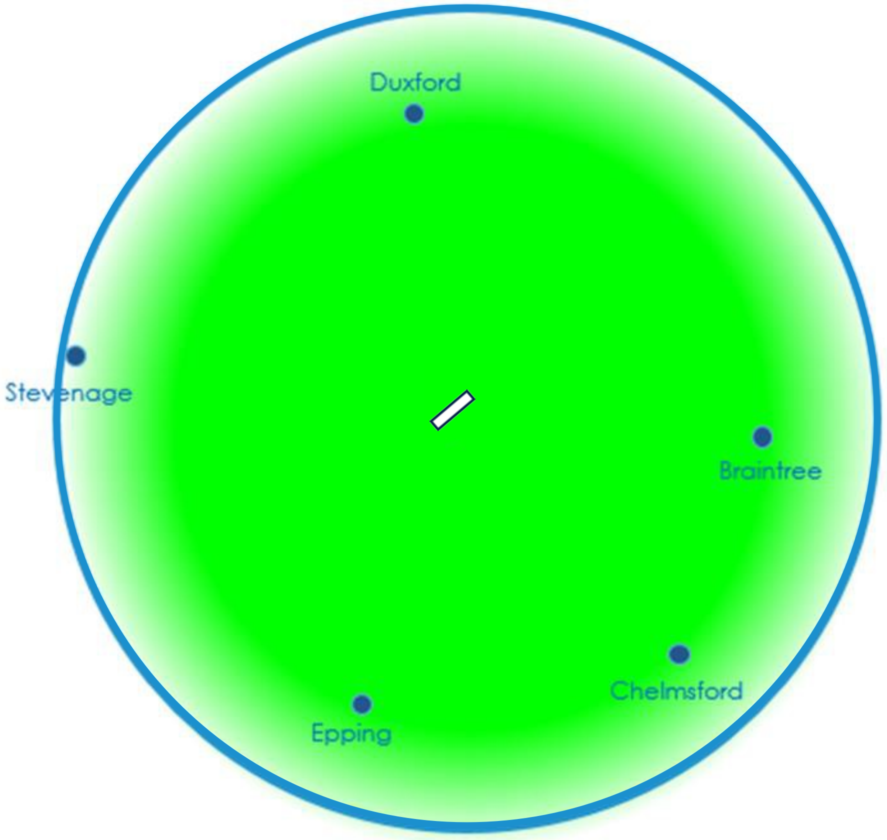
- From the Fleet Survey we know that all aircraft can climb on a gradient of at least 6%.
- The first step is to understand where an aircraft would reach 7,000ft based on this gradient.

This establishes the blue line and aligns with the Design Principle Technology (T) on constant climb operations.

Next we apply the ICAO Rules on procedure design.

- This uses the rules on turns to create a more realistic design area
- It also shows where we cannot design departures.

Step 1 – The boundary for arrivals



We apply a similar logic on arrivals

In line with our Design Principle Technology, all arrivals should facilitate Continuous Descent Approach (CDA) from 7,000ft.

- These are both more fuel efficient and reduce noise

If we apply known information on aircraft performance we can plot how far out an aircraft would need to start its decent to the runway

- The outer edge is the furthest point away, with the shallowest gradient to facilitate a CDA.
- The closer to the airport, the more realistic a CDA becomes

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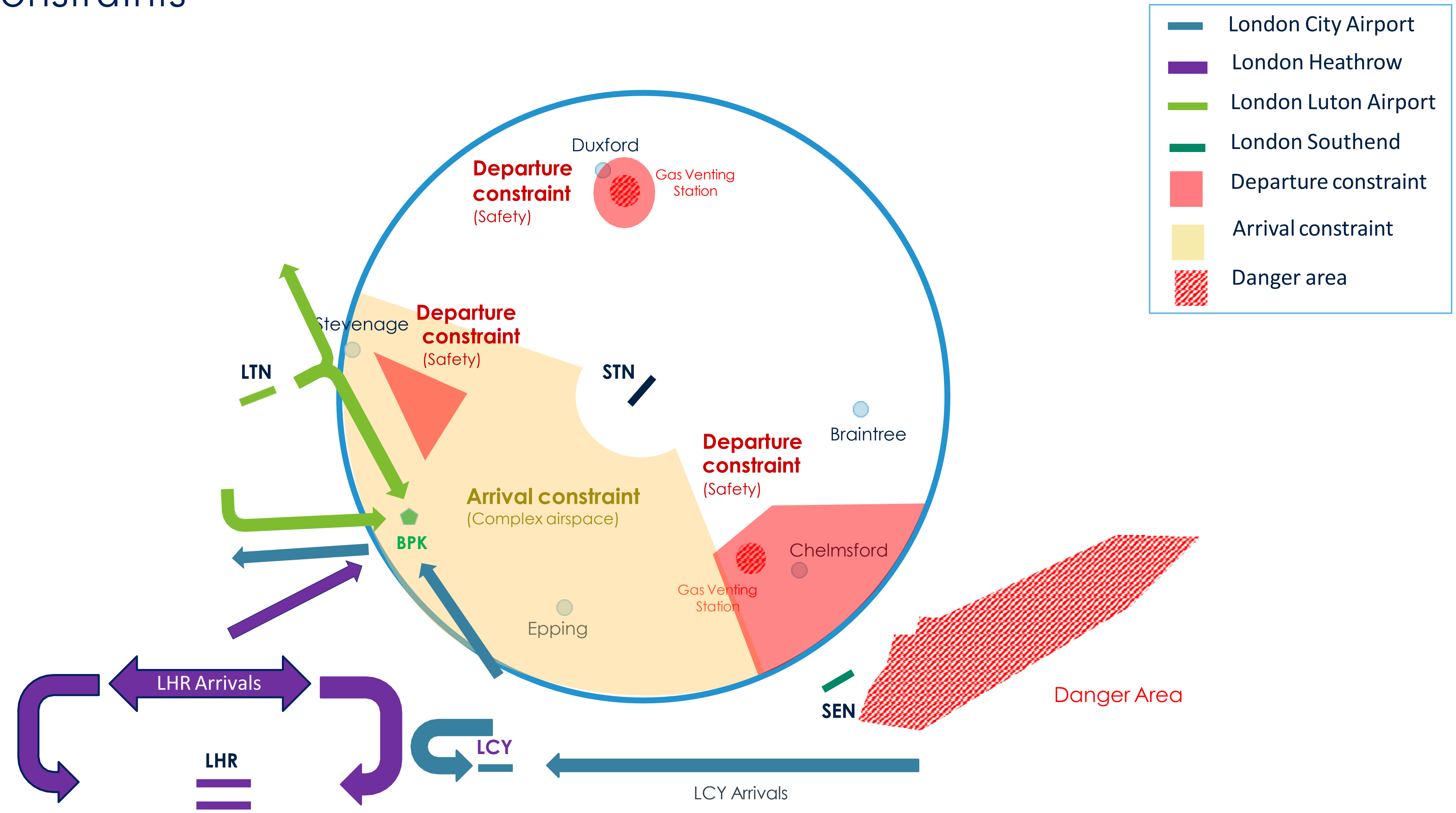
Step 2 - Constraints



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Step 3 – Design options

- At step 1 we established a **design boundary** for departures and arrivals
- We then identified our **constraints** at step 2
- At step 3 we have used all the design principles and the supporting CONOPS document to develop **design options**

Some of our CONOPS criteria

- Routes designed to Performance Based Navigation (PBN) Principles.
- Minimum departure climb gradients of 6% with optimised routes to 8%
- CAT IIIB ILS to be used for final approach.
- No reliance upon ground based navigation aids (DVOR).
- Design routes to ensure minimum ATC intervention, with Continuous Descent and Continuous Climb Operations.
- Routes to be independent of other airports below 7,000ft
- The system to support 55 movements per hour (combined arrivals and departures)

The design options - Departures

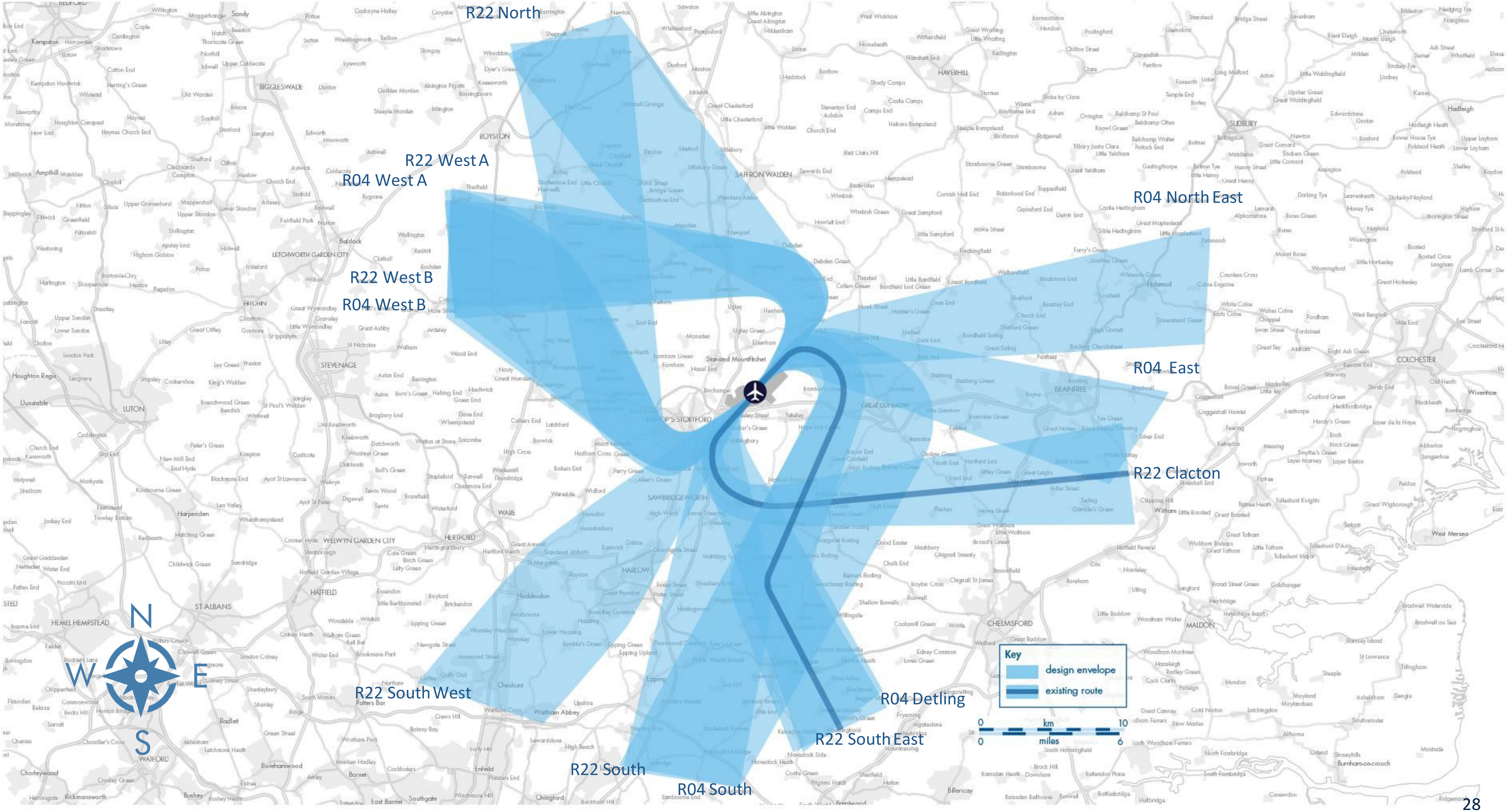
We are required by the CAA to look at:

- The 'do nothing'
- The 'do minimum'
- A range of Options to meet the Statement of Need and the design principles.

Our departure options are based on aligning with our design principles and :

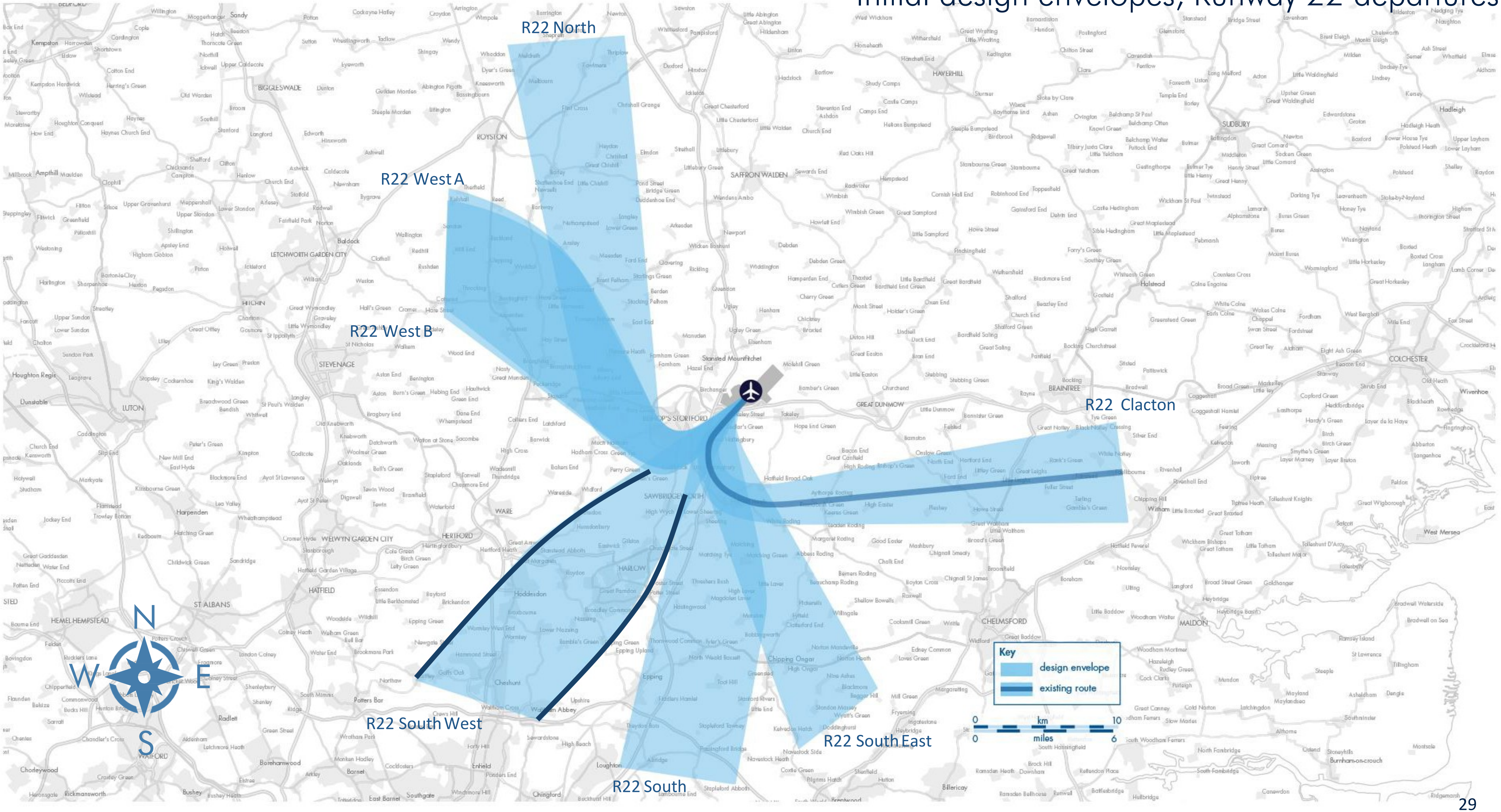
- Updating to PBN standards
- Identifying broad design envelopes where it may be viable for us to place routes
- Seeking additional options where there is a clear and objective benefit.

Initial design envelopes: Departures options



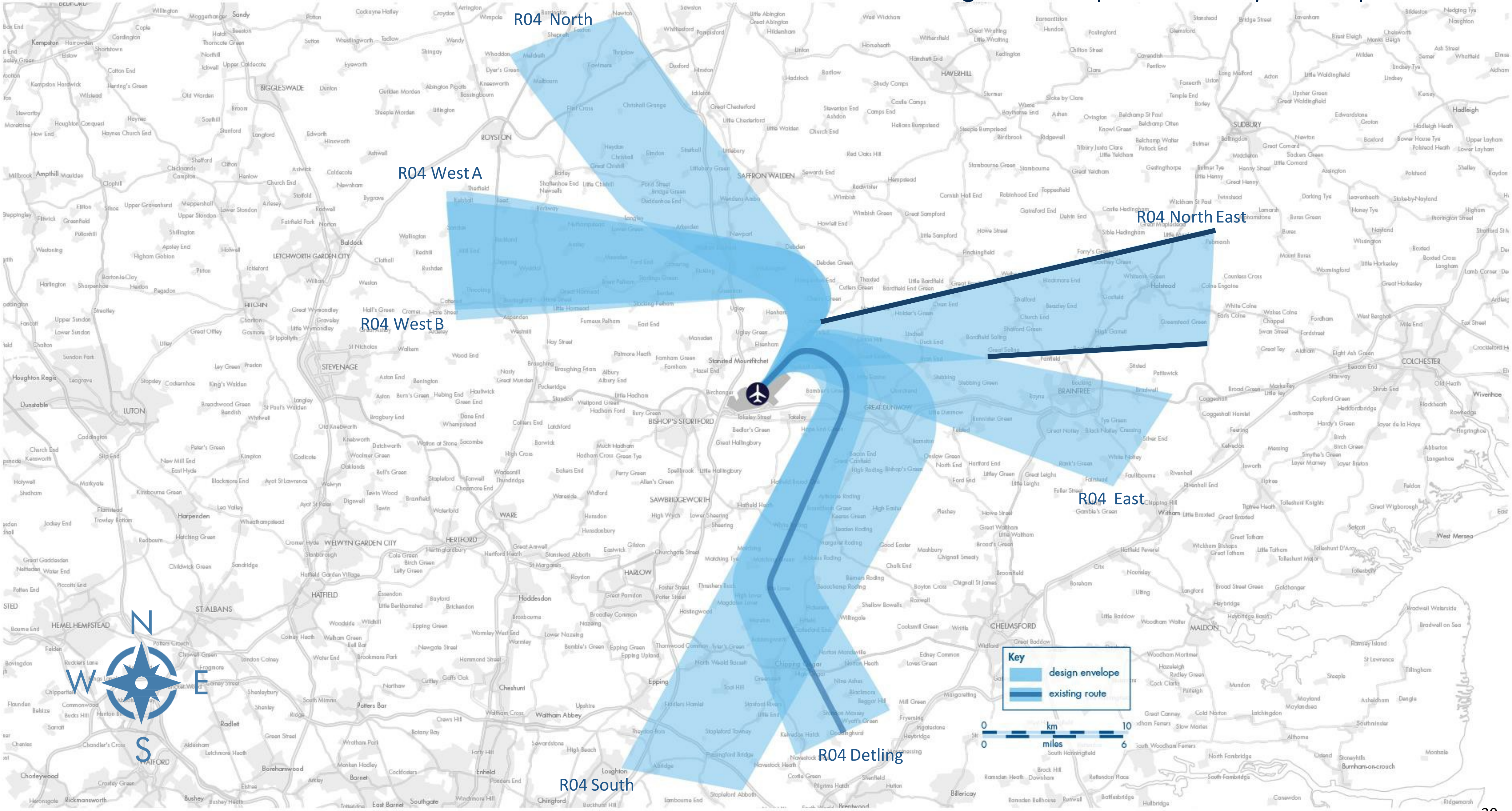
This map shows initial options envelopes not routes. These are for discussion only and do not represent final options.

Initial design envelopes, Runway 22 departures



This map shows initial options envelopes not routes. These are for discussion only and do not represent final options.

Initial design envelopes, Runway 04 departures



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FEEDBACK

Q1. Taking account of the identified constraints and design considerations have we identified design envelopes for departures that align with our design principles?

Q2. Within the design envelopes, are there any local factors we should be aware of when designing routes?

Q3. If we were to replicate our current routes (do minimum scenario) how could we improve them?

Q4. Is there any other feedback on the initial options envelopes identified?

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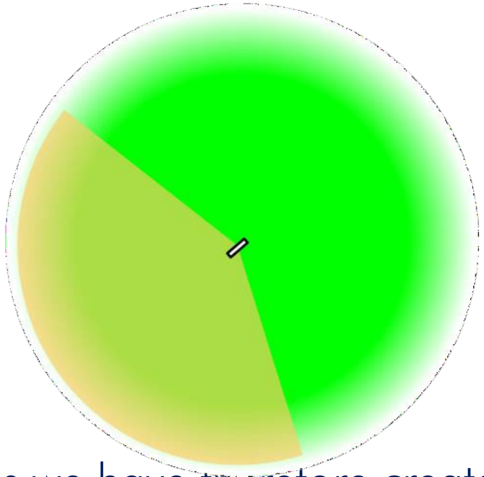
The design options – Arrivals

The points where arrivals could route are shown by the green area (in slide 23) but have constraints to the south west.

Our starting point is at 7,000ft, and we have looked at 2 main criteria for the position of this point :

- To facilitate Continuous Descent Operations (CDO) we need to create more equidistant arrivals to both runway ends
- To ensure an efficient and systemised operation at Stansted that limits interactions with other airports, we've not started our arrivals routes to the south west (due to traffic from Luton, Heathrow and London City)



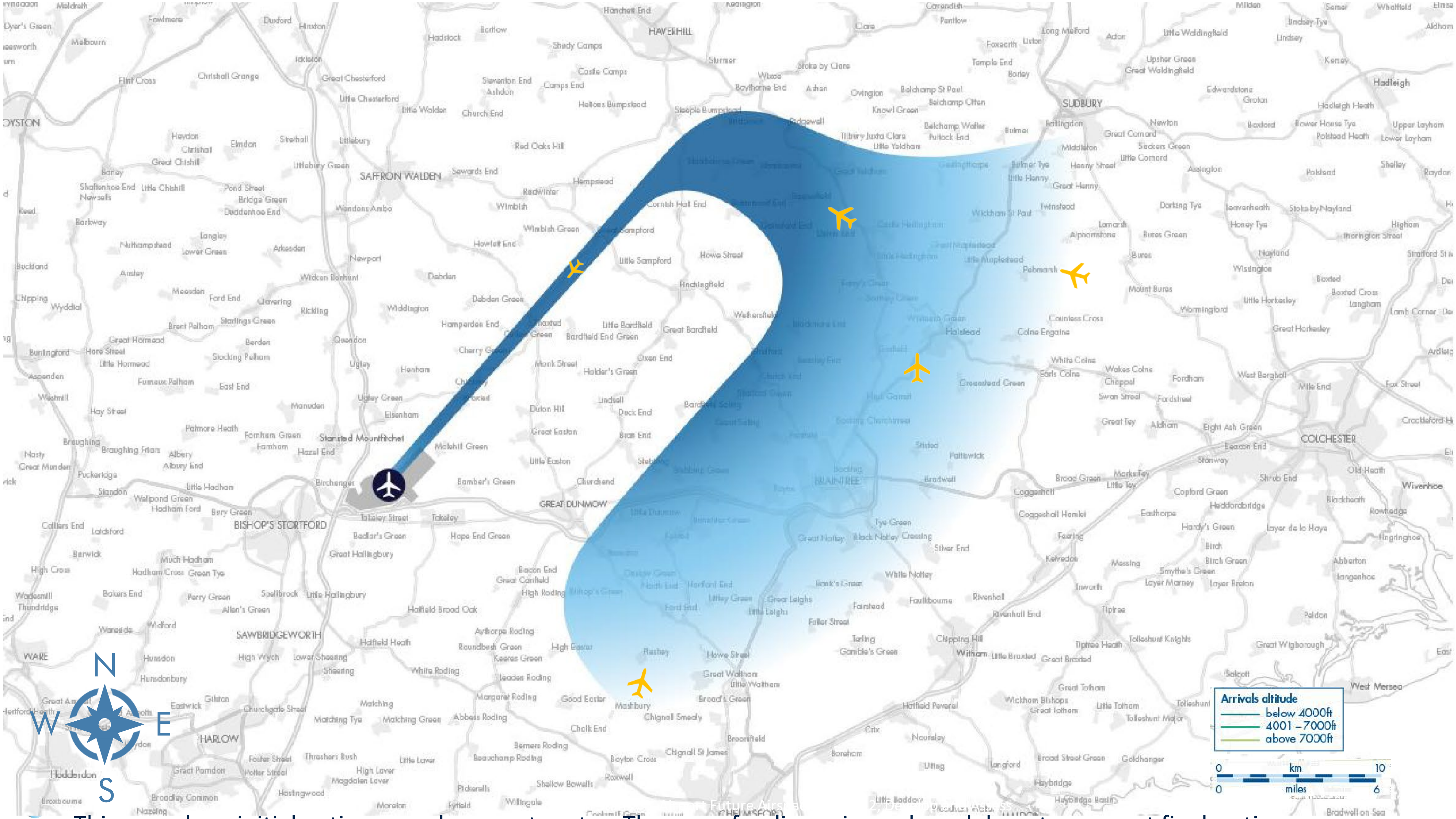
Our design envelopes for arrivals are therefore placed in three alternative areas as below;

- 90 degrees to the runway
- West of the airfield (in an area includes the current LOREL hold)
- East of the airfield (in an area that includes the current ABBOT hold)

The Design Principle Technology (T) also requires us to use the latest technology. For arrivals we have therefore created performance based navigation (PBN) arrival route options that take traffic from 7,000ft to the point where they join the final approach.

- This enables aircraft to fly along pre-determined flightpaths and removes the need for significant vectoring by ATC.
- If adopted this will result in less dispersed tracks than currently

Initial arrival design envelopes, Runway 22 – East



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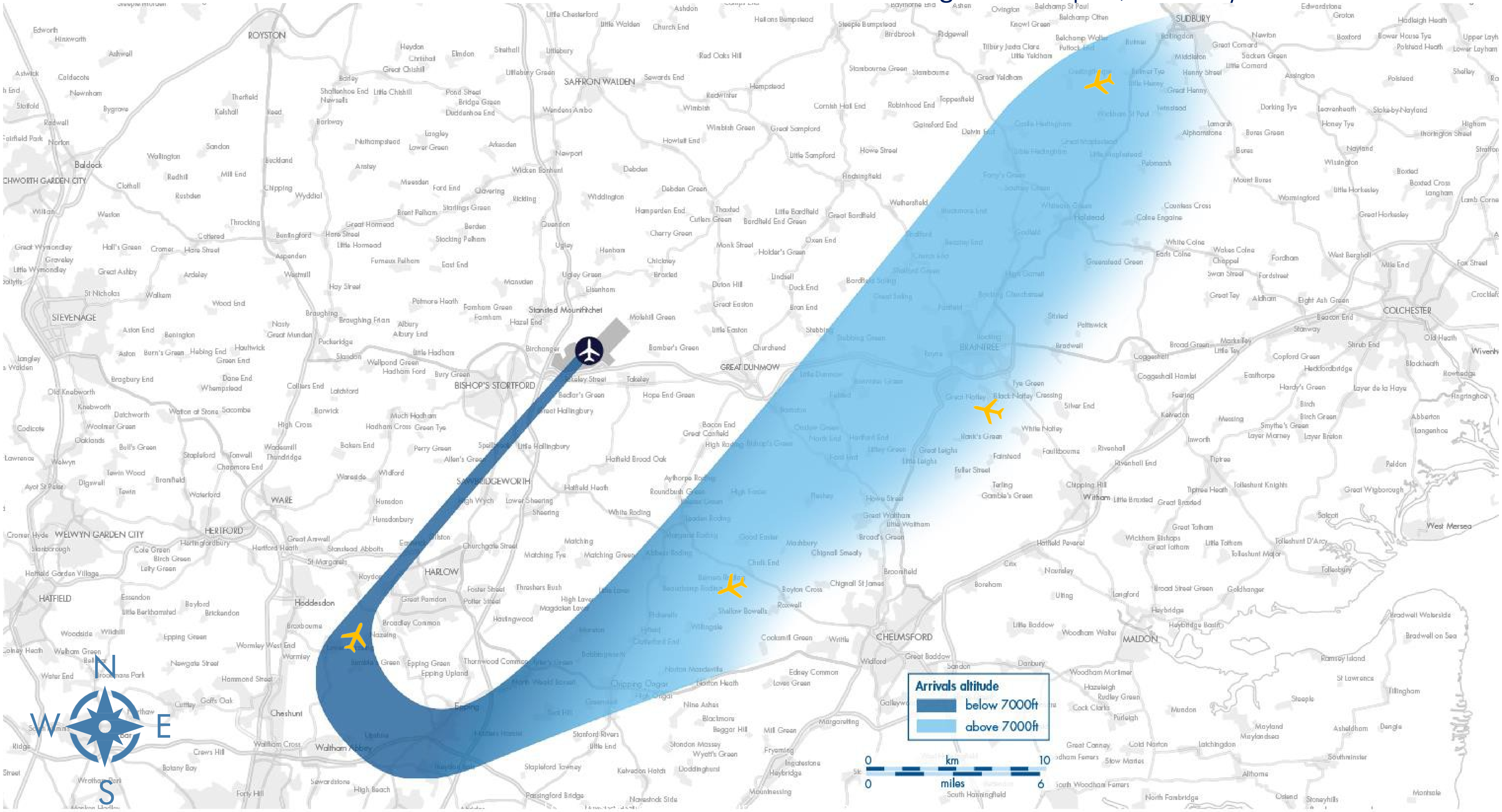
Initial arrivals design envelopes, Runway 04 arrivals – East



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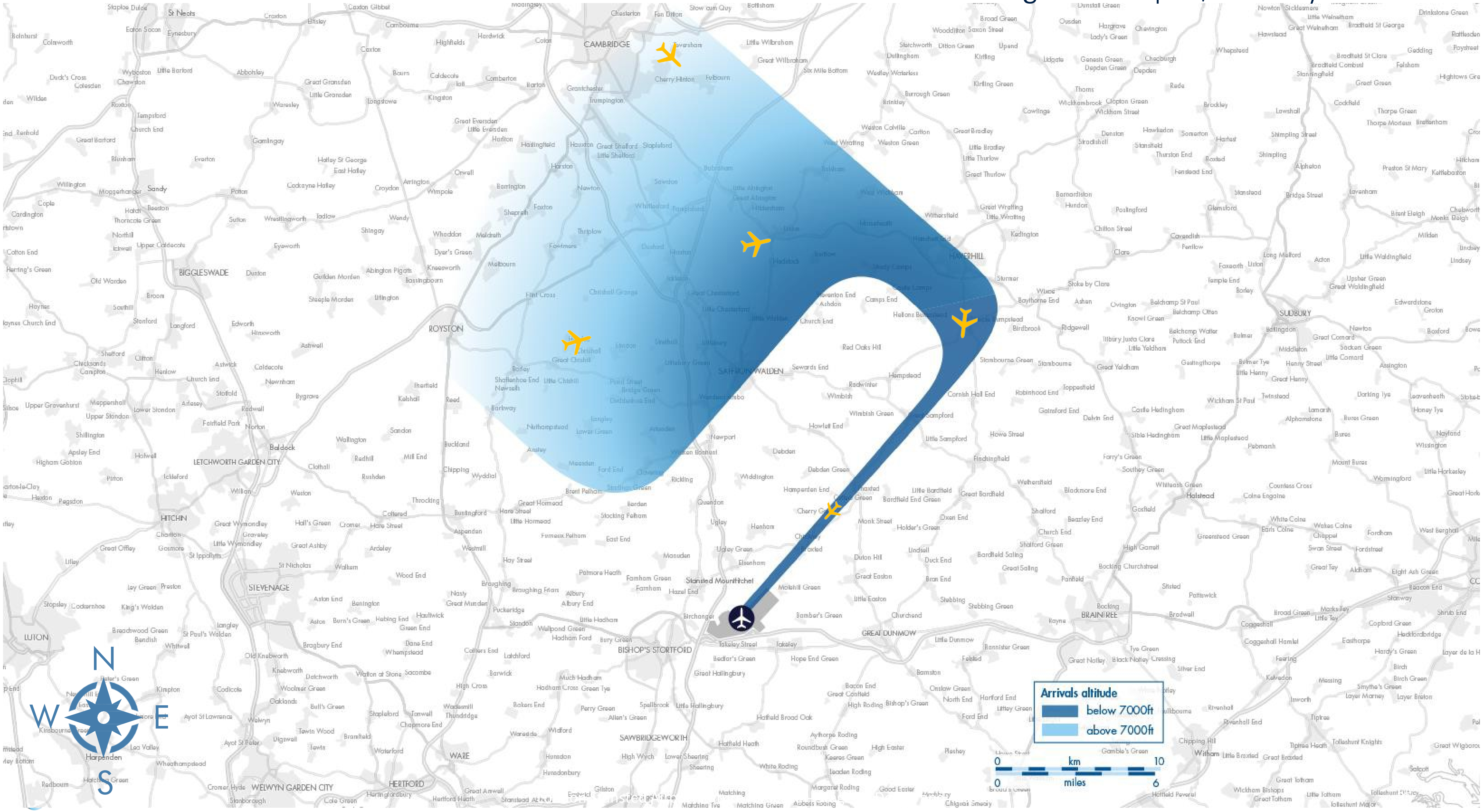
Initial arrivals design envelopes, Runway 22 – West



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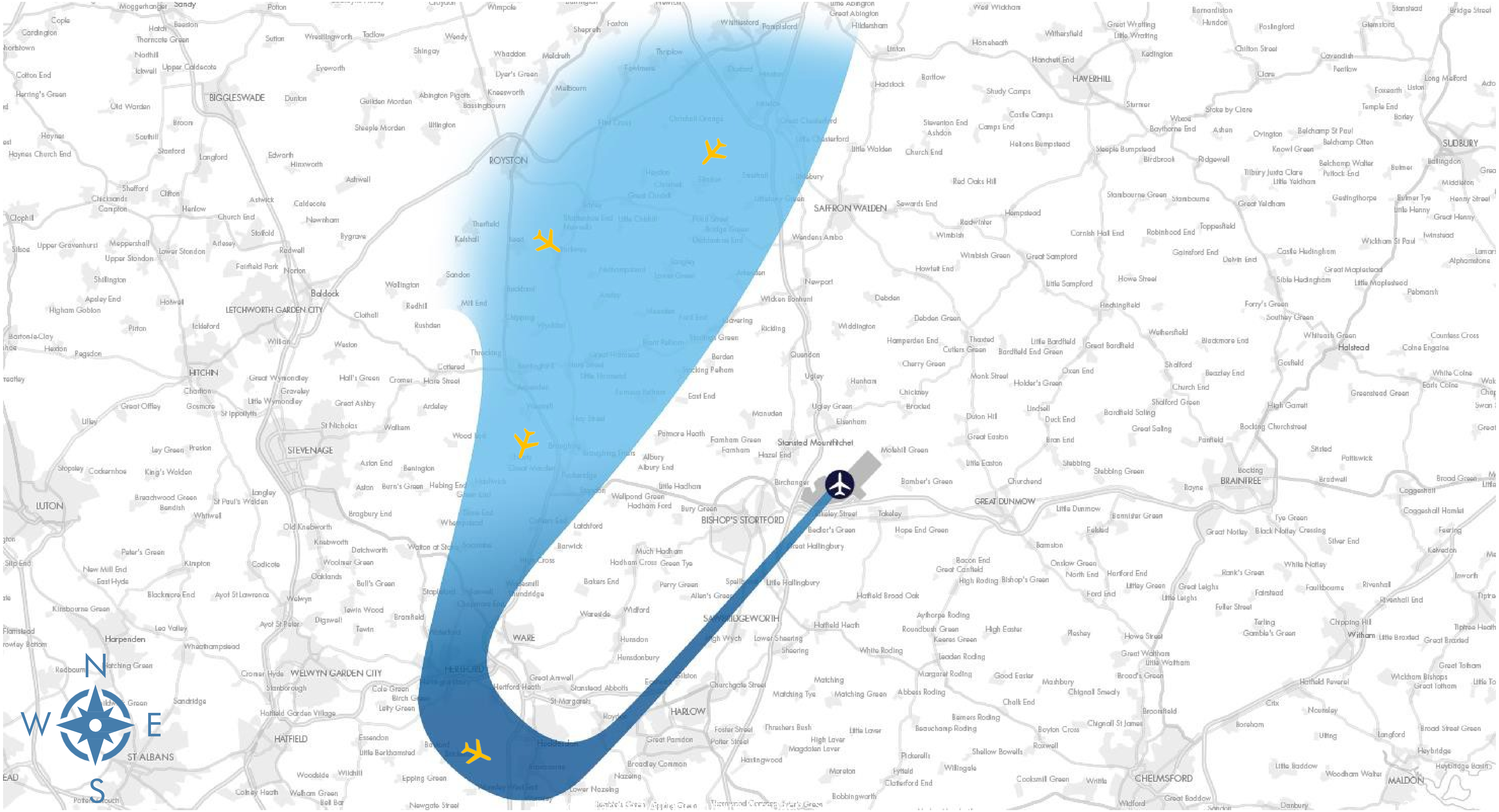
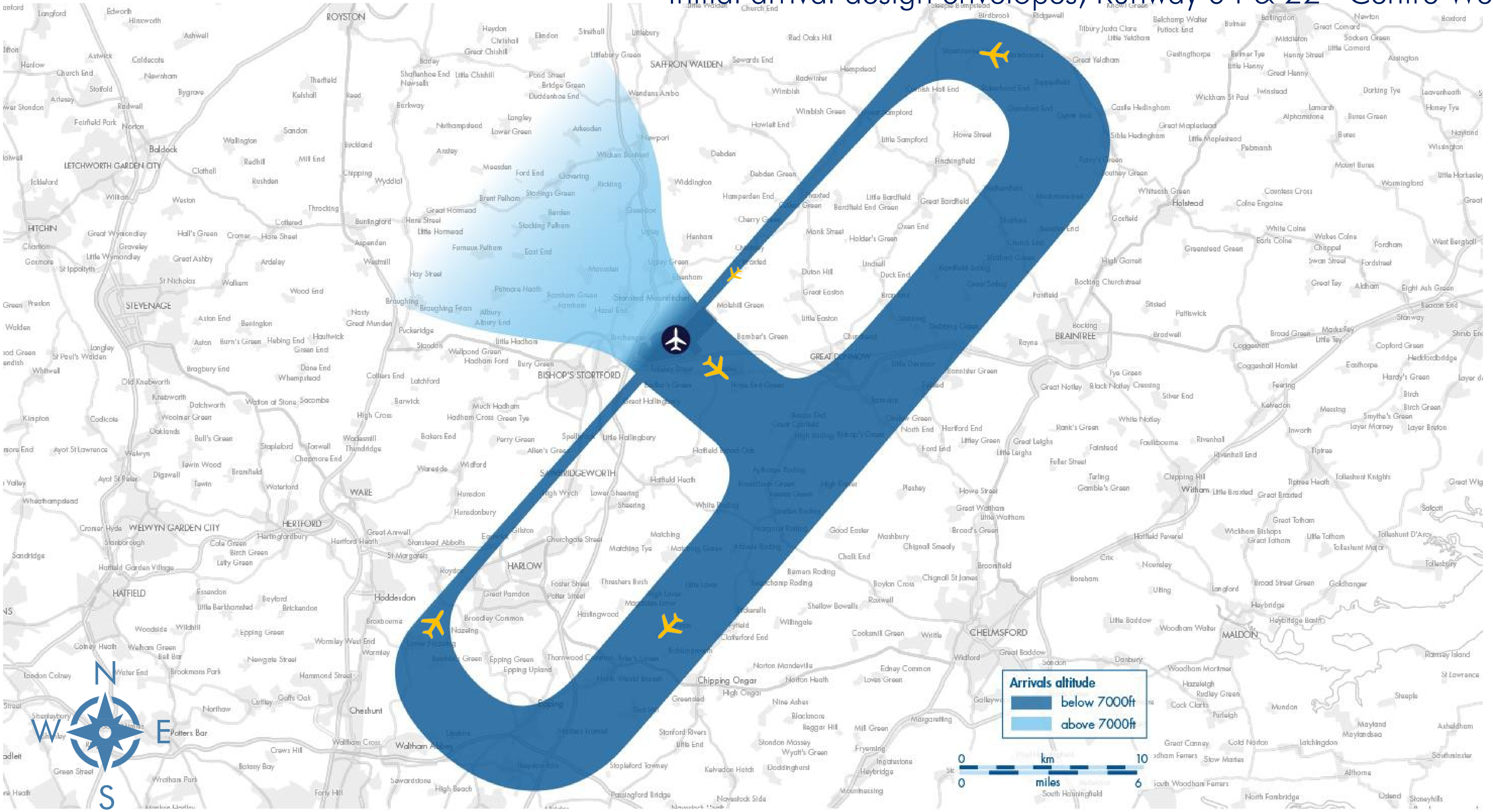


This maps shows initial options envelopes not routes. These are for discussion only and do not represent final options.

Initial arrival design envelopes, Runway 04 & 22– Centre West



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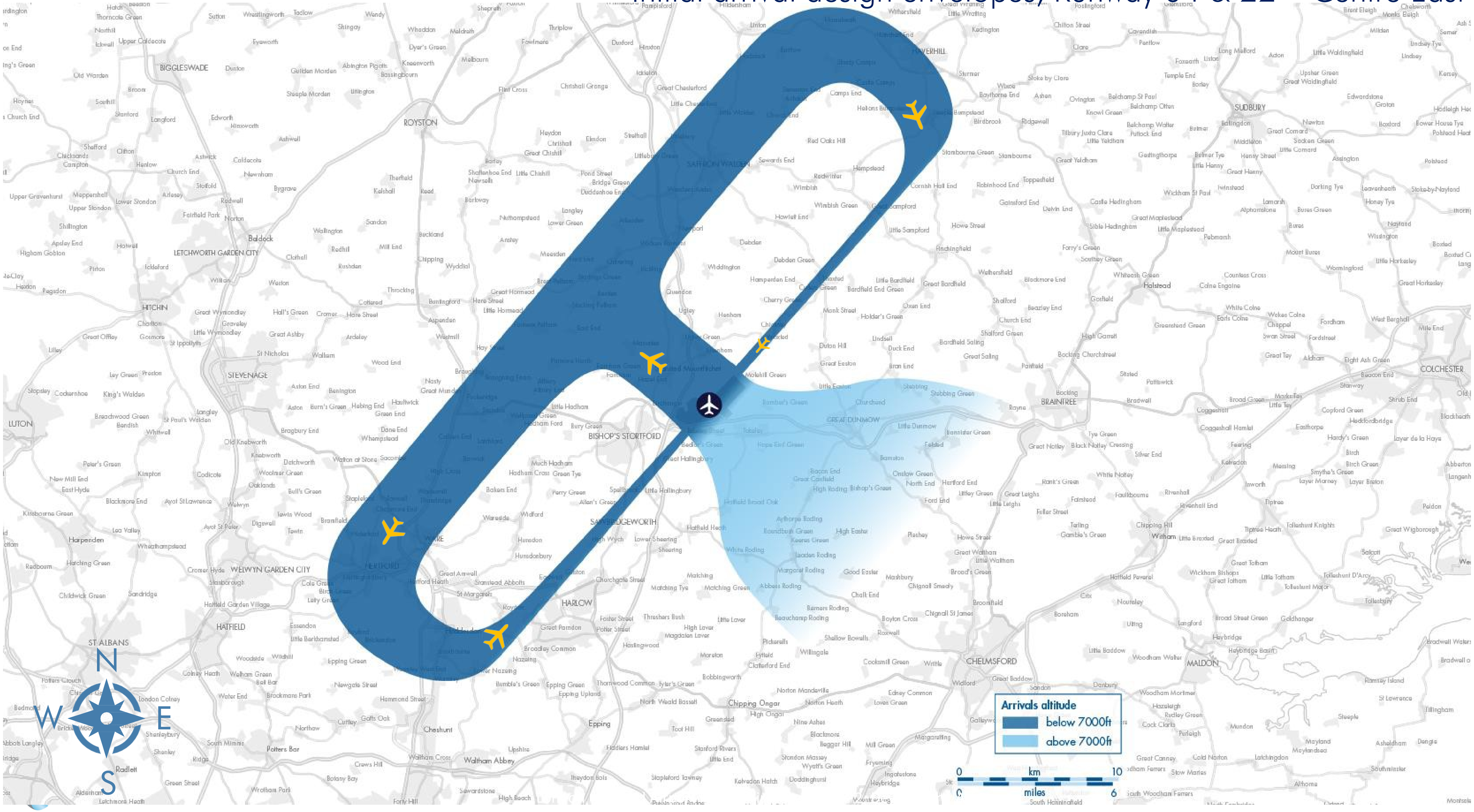
Initial arrival design envelopes, Runway 04 & 22 – Centre East



This map shows initial options envelopes not routes. These are for discussion only and do not represent final options.

FEEDBACK

Q1. Taking account of the identified constraints and design considerations have we identified design envelopes for arrivals that align with our design principles?

Q2. Within the identified areas, are there any local factors we should be aware of when designing options for the position of the arrival route?

Q3. Is there any other feedback on the initial options envelopes identified?

Q4. Are there any comments/ feedback on the do-nothing scenario? If we were to replicate our current routes (do minimum scenario) how could we improve them?

London Stansted Airport Future Airspace

Stage 2 – Develop and Assess

June 2021

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London Stansted Airport Future Airspace

STAGE 2 – DEVELOP AND ASSESS

Thank you for taking part in our discussions about the future of airspace at London Stansted Airport. As we develop our plans, the feedback we receive from stakeholders (the people and organisations who can affect, or be affected by, any changes to airspace) will influence the decisions we make.

This document provides useful background information for the upcoming discussion session(s). Sources of further information are provided in this document and there will also be the opportunity to ask any questions on the information provided here at our discussion sessions.

WHY IS AIRSPACE CHANGING?

The Government has set out a programme, called the Airspace Modernisation Strategy, to modernise airspace across the whole of the UK. This provides a once-in-a-generation opportunity to update the way millions of flights are managed across the country.

The way airspace is currently managed in the UK has changed little since the 1950s, despite the huge increase in air traffic over that time. Although advances in technology have brought improvements, a lot of how our skies are managed was designed for a different era. In order to manage current and future levels of air traffic more efficiently and realise the benefits of new technologies (including satellite navigation), it is essential that the way we use our airspace is modernised.

Despite the effect COVID-19 has had on the aviation industry, the need to modernise the UK's airspace remains unchanged and is still a clear priority for the Government. The potential benefits are significant. Upgrading airspace is essential for taking advantage of new technologies and can offer opportunities to reduce noise and emissions, enhance capacity, reduce delays and make sure that aircraft continue to meet the highest levels of safety.

THE IMPORTANCE OF AIRSPACE MODERNISATION AT LONDON STANSTED

London Stansted Airport sits within some of the busiest airspace in the world. Our region is especially complex due to how close we are to other airports such as London Luton and London City which leads to crossing traffic flows. This increases the workload of air traffic controllers and may result in delays and inefficient flight paths.

Airspace modernisation could simplify this situation. It may also offer a wide range of benefits to our local communities and passengers. For example, it might help to reduce fuel burn and carbon emissions, help us to better manage how noise impacts local communities, reduce the need for aircraft holding on both departure and arrival and reduce delays for passengers.

Due to the complexity of airspace in the South East, it is important that any changes to airspace are co-ordinated with other nearby airports. For this reason, we are part of a co-ordinated programme of change, as part of the Future Airspace Strategy Implementation South (FASI-S) group of airports. Each airport is required to modernise airspace in its local area at heights of up to 7,000ft amsl (above mean sea level). In addition, NATS, (the UK's air traffic control provider) will be re-designing routes in upper airspace above 7,000ft, to fit with the changes made by airports at lower level so that together the entire air traffic system is improved.

THE AIRSPACE CHANGE PROCESS

In 2018, the Civil Aviation Authority (CAA), the industry's regulator, published a new process, (CAP1616), to manage changes to airspace. This process consists of seven stages with CAA approval required at the end of various stages in order to progress.

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Stage 1 **Define**	Stage 2 **Develop and assess**	Stage 3 **Full public consultation**	Stage 4 **Update and submission of proposals**	Stage 5 **Decision**	Stage 6 **Implementation**	Stage 7 **Post-implementation review**
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PROGRESS SO FAR

London Stansted Airport completed Stage 1 in 2020. This required the airport to submit a statement of need in Step 1A, which set out the need for change, and then produce a set of design principles in Step 1B. Design principles are a set of high-level considerations that will guide the development of our eventual route design options. These were developed through engagement with stakeholders, including many of you, to ensure they were reflective of the priorities and concerns that were most important to those potentially affected by airspace change at Stansted. The design principles that were developed are set out below.

S | Safety
Safety is our highest priority; our routes must be safe for airspace users and communities on the ground, and must comply with national and international industry standards and regulations.

P | Policy
Any changes must be consistent with the CAA's Airspace Modernisation Strategy and the FASI-S programme, taking into account the needs of other change sponsors and airspace users.

D | Demand
The airspace design must provide for the utilisation of aircraft movements permitted by planning permissions and within statutory limits in force at the airport.

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Where we choose routes that fly over new areas there will have to be a clear and objective benefit in doing so.

T | Technology
Routes should be designed to make use of the latest widely available aircraft navigation technology and facilitate continuous climb and descent to/from both ends of the runway.

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N1	In order to address the effects of aircraft noise, each route should seek to minimise the number of people overflown.
N2	The use of multiple routes and/or other forms of respite, such as different time periods and balanced runway mode when operationally viable, will be considered.
N3	Where practical, our route designs should avoid, or minimise effects upon, noise sensitive receptors. These may include designated sites and landscapes (such as SSSI and AONB), cultural or historic assets, and sites providing care.
B	**Balance** Our designs will consider both noise and emissions, and seek to strike the best balance. In so doing, we will take account of the Government's altitude-based priorities, which emphasise minimising noise below 7,000 feet.
E	**Efficiency** We will seek to minimise the amount of controlled airspace that we require, and our future route designs should ensure an efficient and systemised operation at Stansted, minimising interactions with other airports and maintaining priority access for emergency services.
A	**Alternatives** Where the adoption of modern navigation standards and/or flight profiles mean that some aircraft cannot fly the new routes, we will seek to minimise the environmental impacts from those aircraft.

In August 2020, the CAA assessed and approved the work carried out at Stage 1, allowing the airport to proceed to Stage 2, develop and assess.

STAGE 2 – DEVELOP AND ASSESS

This stage focuses on developing route options that address the statement of need and align with our design principles. This stage consists of two steps. At Step 2A, a comprehensive list of route options will be developed, refined and assessed against the design principles and in Step 2B, the options are more closely assessed to understand their likely effects, both positive and negative.

We will undertake two phases of stakeholder engagement at Step 2A. The discussion session you will shortly be attending will form part of the first of these two phases, you will also be invited to take part in a second phase in September 2021.

The airport has appointed expert route designers, Osprey, to help us consider a range of route options. Based on Osprey's work, at the discussion you will shortly be attending, we will explain how we have identified areas where it may be appropriate for us to place routes for arriving and departing aircraft. We will also set out those areas which we propose to discount from further consideration, explaining our reasons. We will share with you the work carried out to identify these areas and explain how this has been developed. We would then like your feedback so that we can consider whether we have interpreted the design principles appropriately, and to identify factors we should take account of as we develop and refine route options.

This feedback will contribute to further design work, which will identify specific route options. These specific routes options will then be assessed to see how well they meet the design principles. This work will then be shared for feedback at the next stage of discussion sessions, planned for September.

Taking on board feedback from these discussions, the list of options will then be taken forward for further assessment.

Once we have completed the further evaluation, details of the work carried out at Stage 2 will then be submitted to the CAA for assessment at the end of February 2022[1]. Subject to the CAA's approval, the airport will then proceed to Stage 3 of the airspace change process where the refined options will be subject to full public consultation.

HOW AIRCRAFT CURRENTLY ARRIVE AND DEPART

In order to assess the potential effect of any airspace change, it is important to understand how the airport currently operates.

London Stansted has one runway. One end of the runway, where aircraft arrive and depart in a south-westerly direction, is referred to as runway 22. The other end, where aircraft arrive and depart in a north-easterly direction, is known as runway 04. For safety and operational reasons, aircraft depart and land into the wind so wind direction dictates which end of the runway to use. This is determined at all times by Air Traffic Control. At London Stansted, the wind usually comes from the south west. For this reason, aircraft arrive and depart in a south-westerly direction around 70% of the time, although this can vary from month to month and year to year.

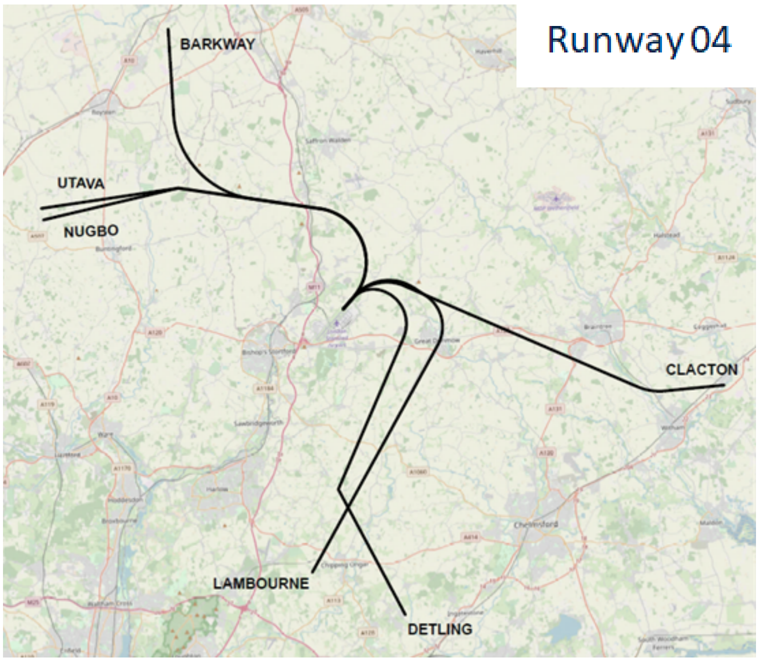
DEPARTURES

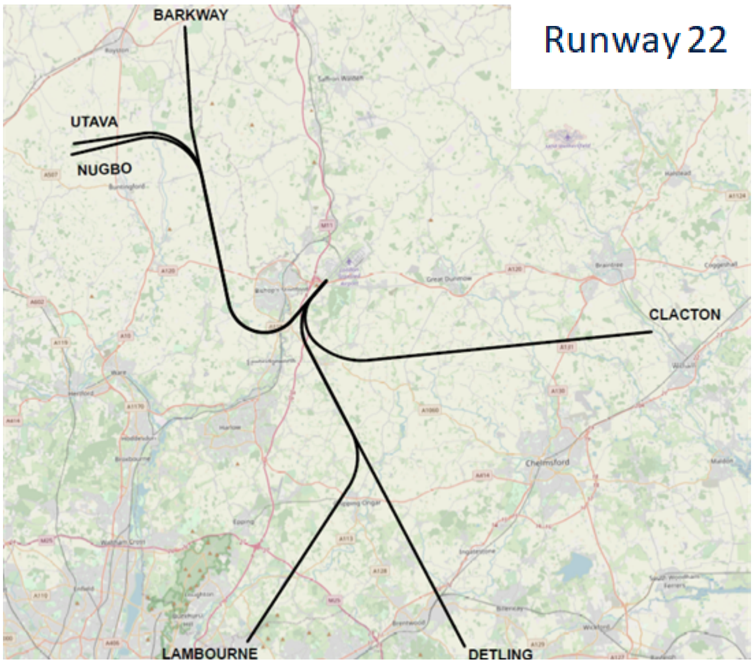
All jet and most propeller aircraft departing the airport follow set routes called standard instrument departures (SIDs). These simplify the departure process by providing the aircraft's computer system with several waypoints and a climb profile (the rate at which to increase height by distance travelled) they need to follow to make sure they accurately follow the SID and remain safe. At the end of the SID, which is typically between 5,000 feet and 7,000 feet, the aircraft join the upper airspace network. At present, most of the SIDs at Stansted rely upon ground based navigation aids (a marker, signal or device that guides and navigates an aircraft) which are being withdrawn from service in the coming years.

At Stansted we currently have six of these SIDs from each end of the runway, so 12 in total. They have been designed to create the access we need to the upper airspace network in a safe manner, and their design has been influenced by the need to minimise noise, interactions with arrivals into Stansted, and traffic to and from other airports. These interactions also influence how or when they can be used, so whilst there are six SIDs from both runway ends, in practice only four are regularly used from each runway direction. In total, both the Lambourne and Barkway SIDs are typically used for less than 1% of departures. In addition, the Detling route can only be used at night due to airspace restrictions.

The maps overleaf show where the SIDs are located.

[1] This date is currently still to be confirmed by the CAA





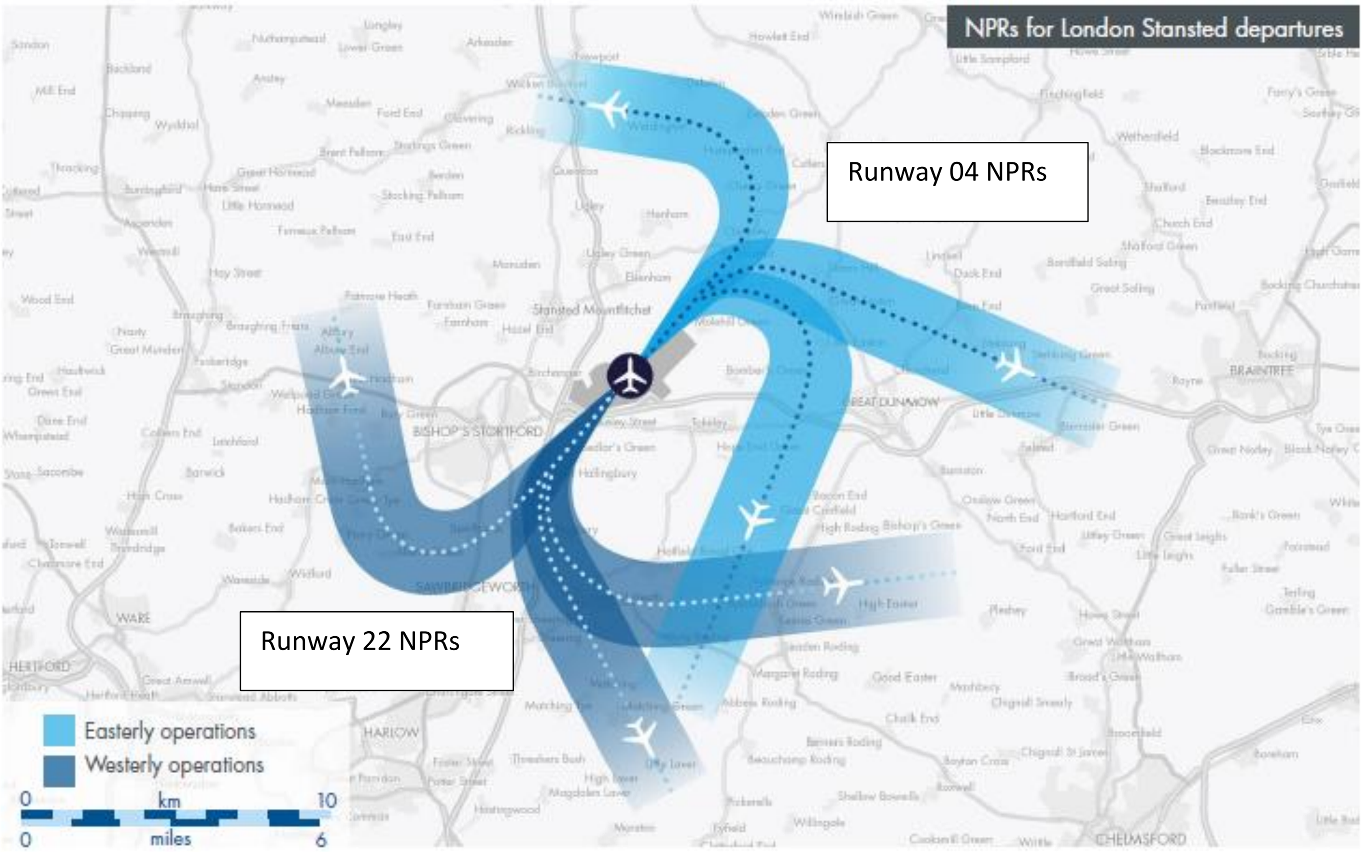
We monitor how each aircraft flies, and we expect aircraft to stay within a 'corridor' that extends up to 1,500 metres either side of the centreline of the SID. This corridor is known as the Noise Preferential Route (NPR). Departing aircraft must remain within the NPR corridor until they have reached a minimum height of 4,000ft amsl (above mean sea level) or 3,000ft amsl on two of the SIDs during the day (4,000ft at night).

There are currently six NPRs– three for each end of the runway which cover the SIDs most frequently used.

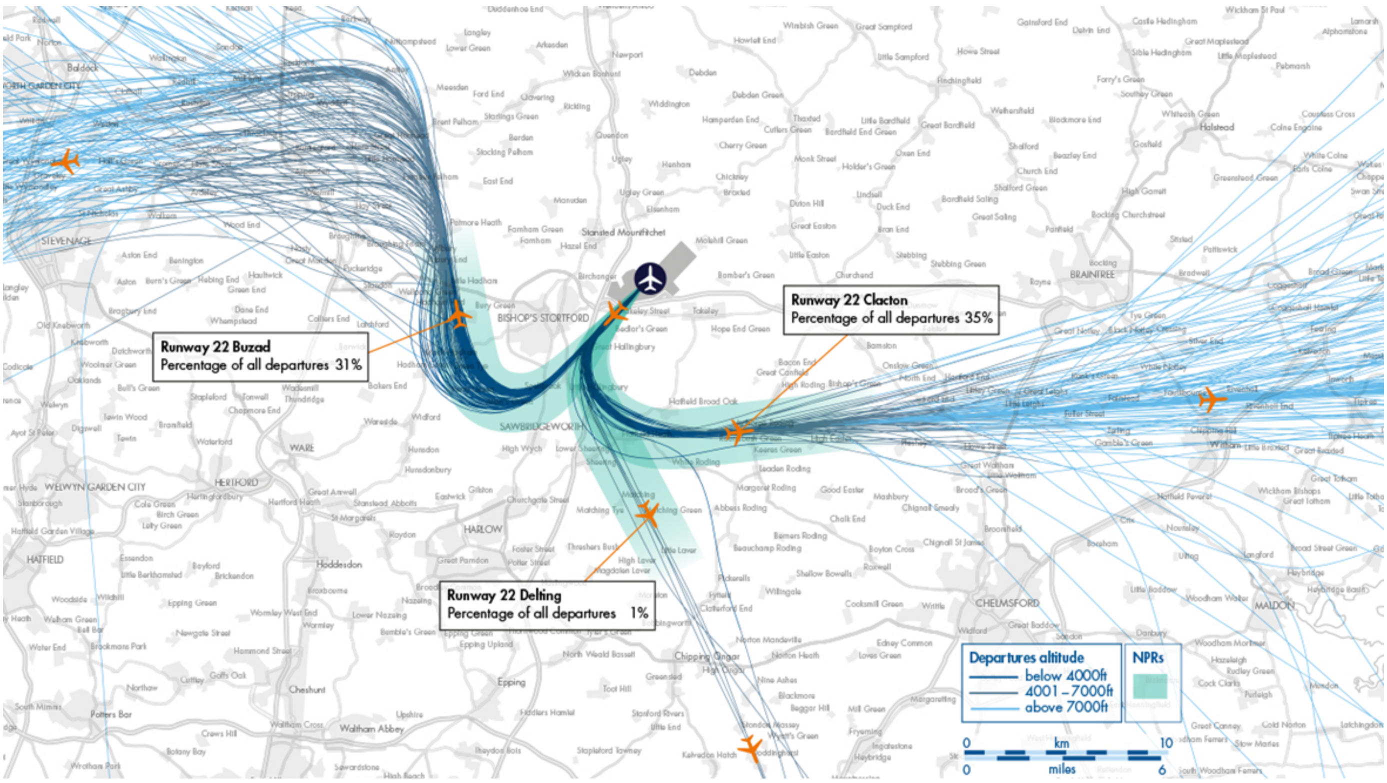
In 2015, the airport began the first stage of airspace modernisation by trialling the use of satellite guidance on two of the SIDs. The results were very successful in enabling aircraft to track a more precise route and the feedback we received from public consultation was mostly positive. The CAA approved the introduction of the trial on a permanent basis. The technique we trialled and then implemented using satellite guidance is known as performance-based navigation, or PBN. PBN does not rely on ground-based aids, so is unaffected by the plan to remove them from service. PBN also enables aircraft to track a more precise route on initial departure. This provides an opportunity to reduce the number of people directly overflown and also means that aircraft tracks over the ground are more concentrated than previously.

Track keeping on departure is closely monitored, over 99% of departing aircraft fly within the NPR corridor.

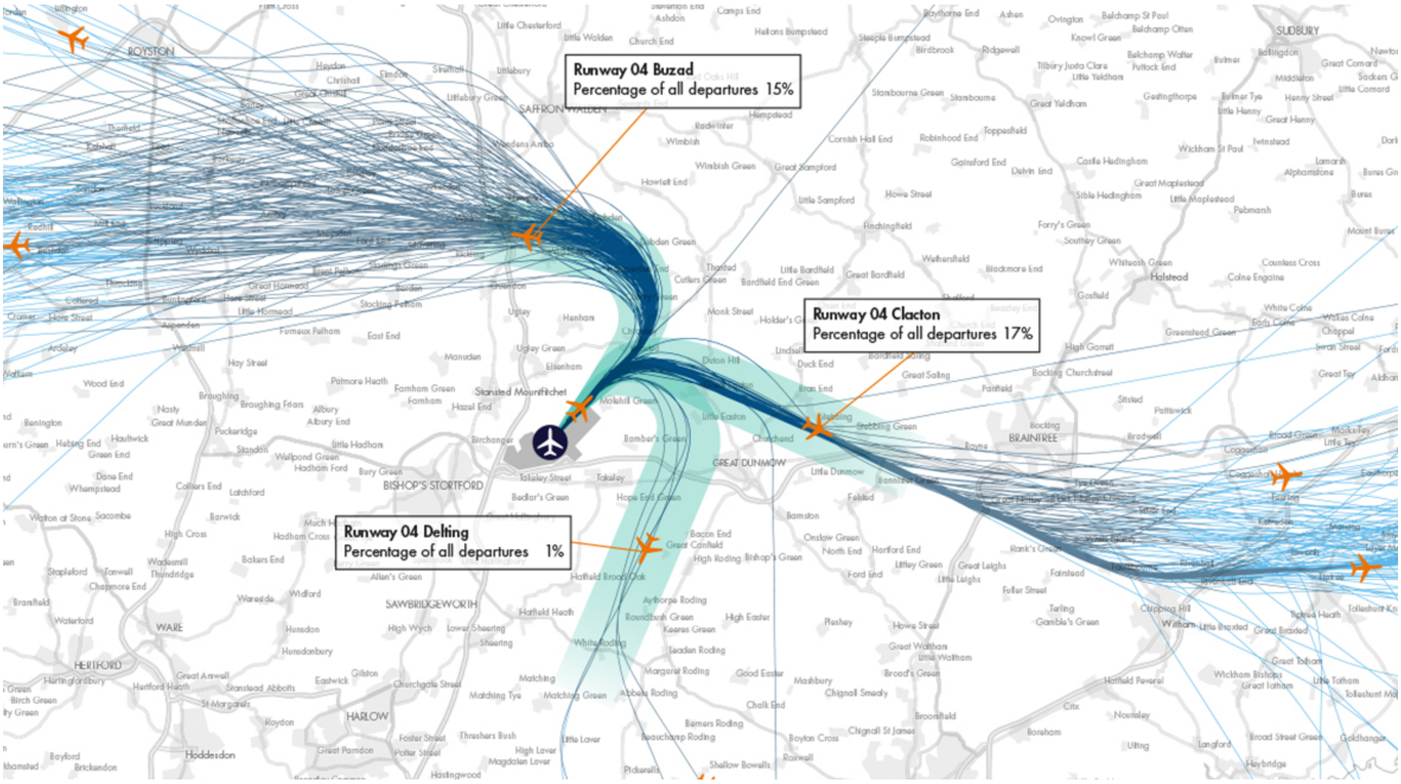
The map overleaf shows where the current NPRs are located.



The map below shows where aircraft fly when following these departure routes on runway 22 on a typical day. The colour key shows where aircraft are below 4000ft and when they're between 4,000ft and 7,000ft. The light blue shows when they are above 7,000ft and will have joined the upper airspace network. You'll see that the runway 22 Detling route to the south east is used infrequently, typically for only 1% of departures, again this is because it is restricted to night use.



The next map shows departures on a typical busy day when runway 04 is in operation. As you can see, like 22 departures, the 04 Detling route is used infrequently, again this is because of the restriction it when it can be used.

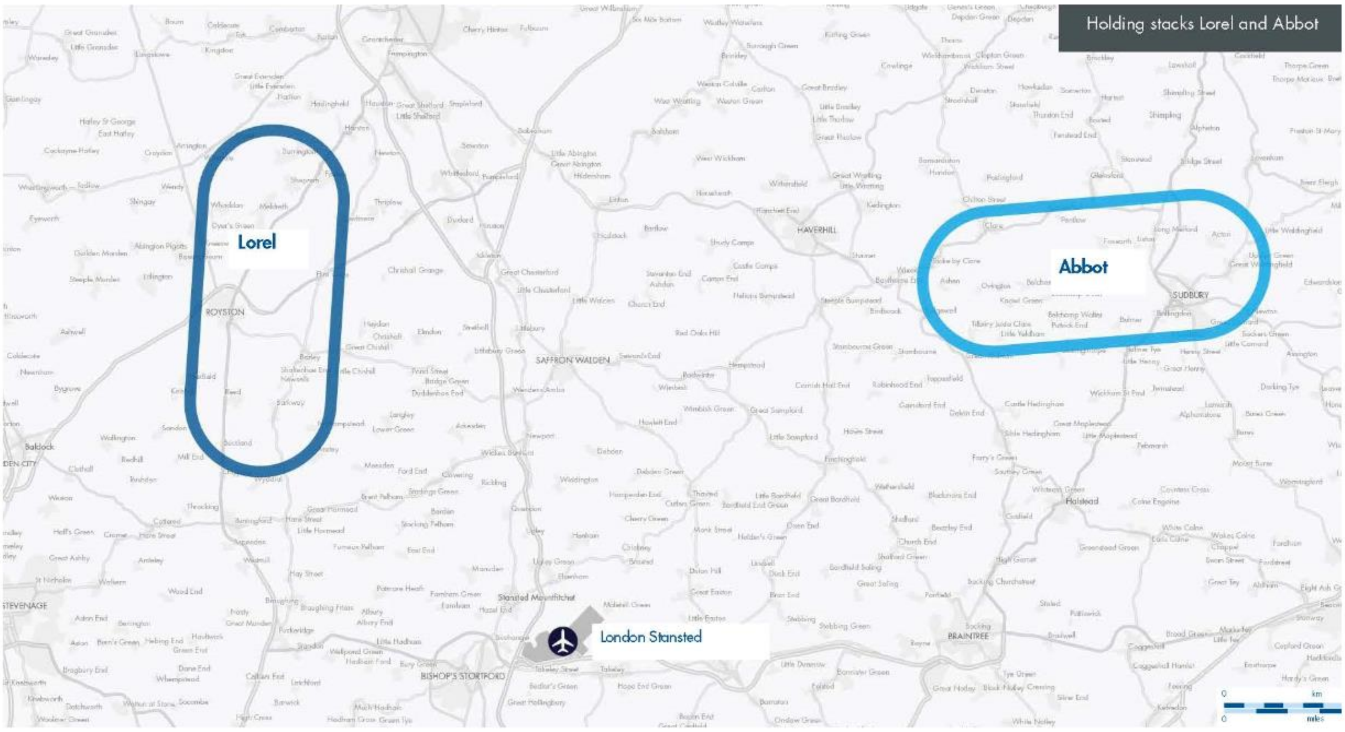


ARRIVALS

Aircraft arrive at Stansted from several different directions. To make sure that they land in the correct sequence and remain safely apart at all times, air traffic control can route an aircraft into a holding area. There are two high level holding areas, which are commonly referred to as 'stacks'. One of the stacks, called LOREL, is to the north west of the airport (near Royston) and one, called ABBOT, is to the north east (near Sudbury).

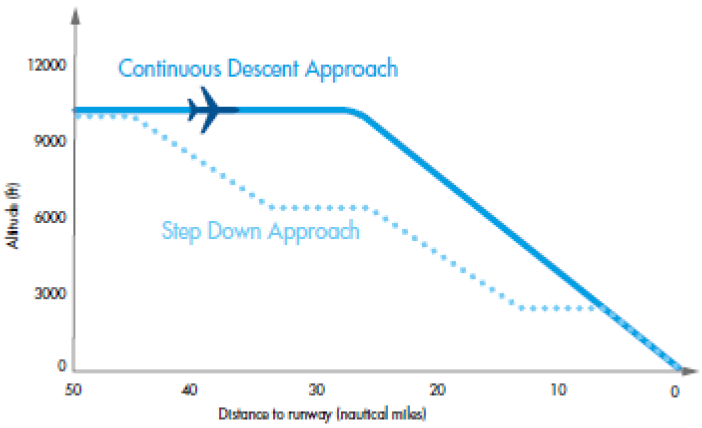
If the airport is busy, there can be a build-up of aircraft instructed to hold at one of these areas. This means aircraft will fly in an oval pattern, with each aircraft separated by air traffic control. Typically this holding will take place at above 8,000 feet.

The map overleaf shows when the holding stacks are located.

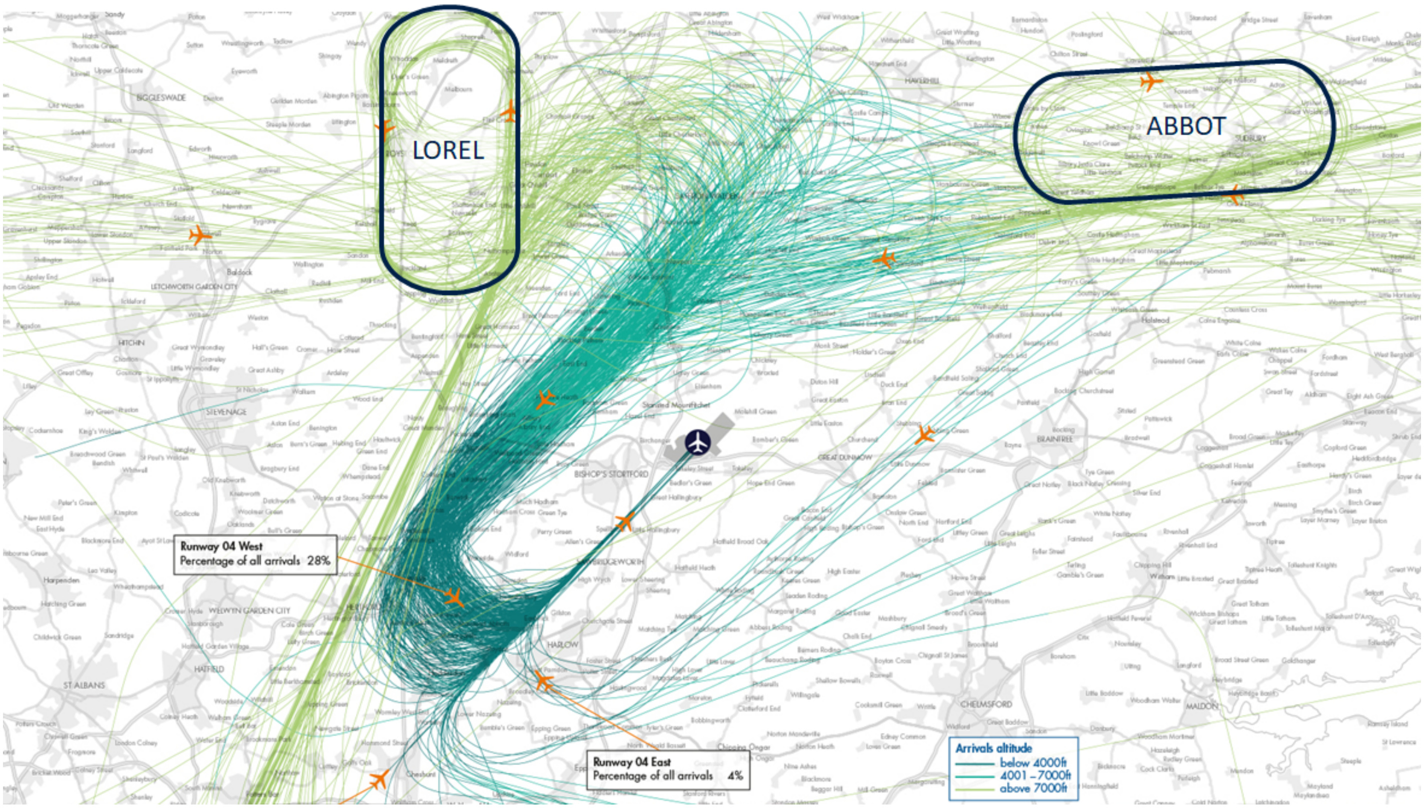


When an aircraft can land, air traffic control will instruct the pilot to leave the holding area. Air traffic control will then use a process called vectoring to direct the aircraft to the final approach. Vectoring involves air traffic controllers giving instructions to the pilot to change their height, their speed or to turn left or right. This process is necessary to guide aircraft and make sure there is a safe distance between arrivals, so it tends to spread aircraft tracks across a relatively broad area.

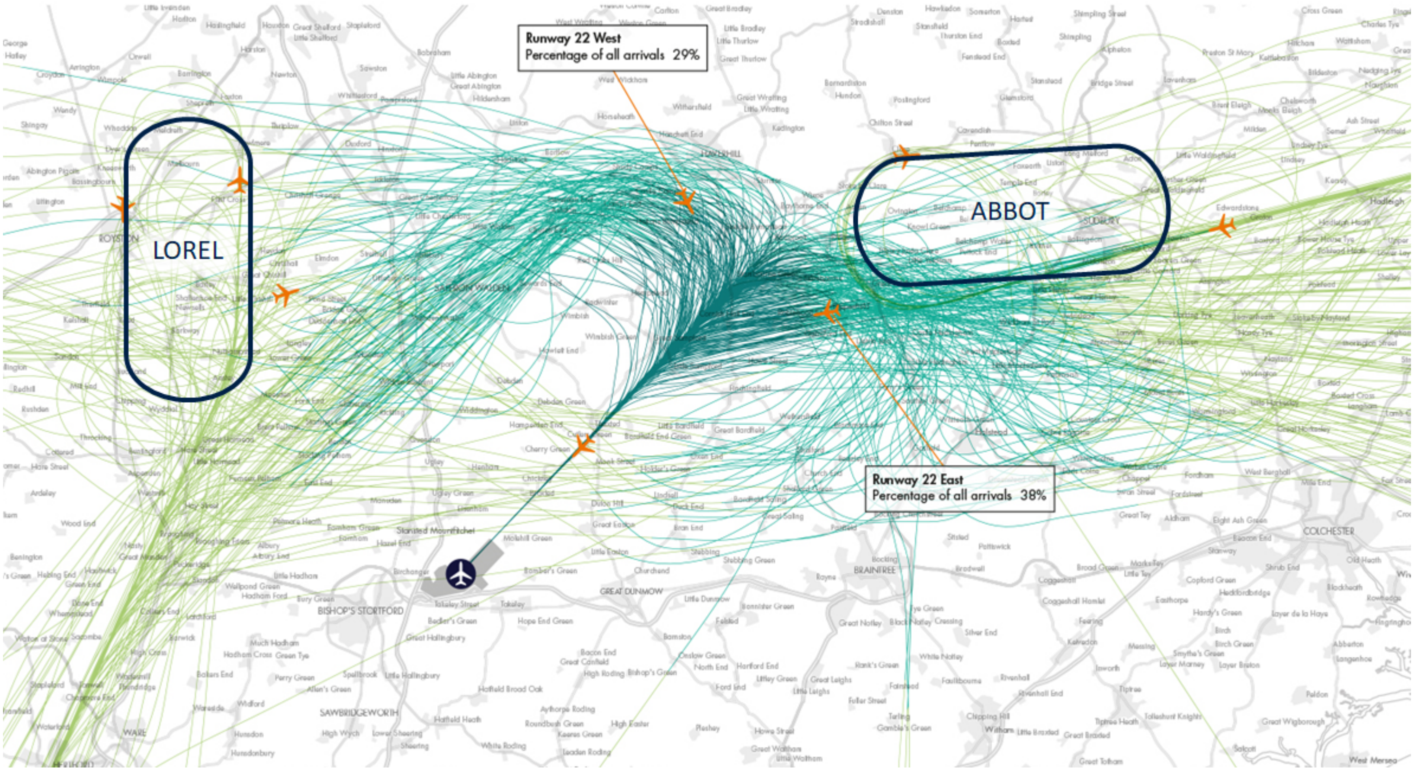
As aircraft get closer to the airport, they begin their final approach. At this point they converge along the extended runway centreline, and this dispersal narrows until all aircraft follow the same straight line on to the runway. The point at which aircraft join this centreline is determined by noise regulations and varies depending on the time of day.



Wherever possible air traffic control will provide the aircraft with a 'continuous descent approach' (CDA). This is a technique where arriving aircraft descend on a smooth, continuous path from the holding patterns, which allows them to glide without the need for them to apply engine thrust to either level out or maintain a specific height. CDAs therefore produce an environmental benefit by keeping aircraft higher for longer, reducing fuel burn and reducing noise. Over 90% of arrivals to runway 22 use a CDA. However, CDAs are often not possible for arrivals to runway 04 because of both airspace constraints and the distance of the LOREL and ABBOT stacks from the runway. One of our design principles, technology (T) is to design options that will facilitate CDAs in both runway directions.



The map above shows typical tracks of arriving aircraft when arriving to runway 04 and the map below shows typical tracks of aircraft arriving to runway 22.



FUTURE AIRSPACE DESIGN

As explained at the start of this document, the changes that are being made at Stansted Airport are part of a national programme of change. Our new airspace designs are required therefore to be consistent with the CAA's Airspace Modernisation Strategy. This is one of the design principles we agreed at Stage 1 (policy (P)). The CAA's national strategy requires us to use PBN. This means that aircraft utilise a form of satellite based navigation rather than relying on calculating their position based on navigational aids on the ground. It is planned that these ground based aids will be withdrawn and so finding an alternative to their use is a fundamental part of modernising airspace. PBN technology enables aircraft to fly along flightpaths more accurately and results in less dispersed tracks than those based on ground-based systems.

The route options we will be designing through Stage 2 will consider several factors including the use of this PBN technology together with UK and international aviation rules, our agreed design principles, and interactions with other airports in the vicinity of Stansted Airport.

FURTHER INFORMATION

The links below provide more information on the topics covered in this document.

Full details on the Airspace Modernisation Strategy (AMS)

The CAA's CAP1616 guidance on the regulatory process for airspace change

Further details on the work London Stansted completed at Stage 1

Further details on current operations at Stansted Airport