Phase One Engagement Materials

Stage 2 Develop and Assess

MAG East Midlands Airport

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

Contents

EAST MIDLANDS AIRPORT FUTURE AIRSPACE

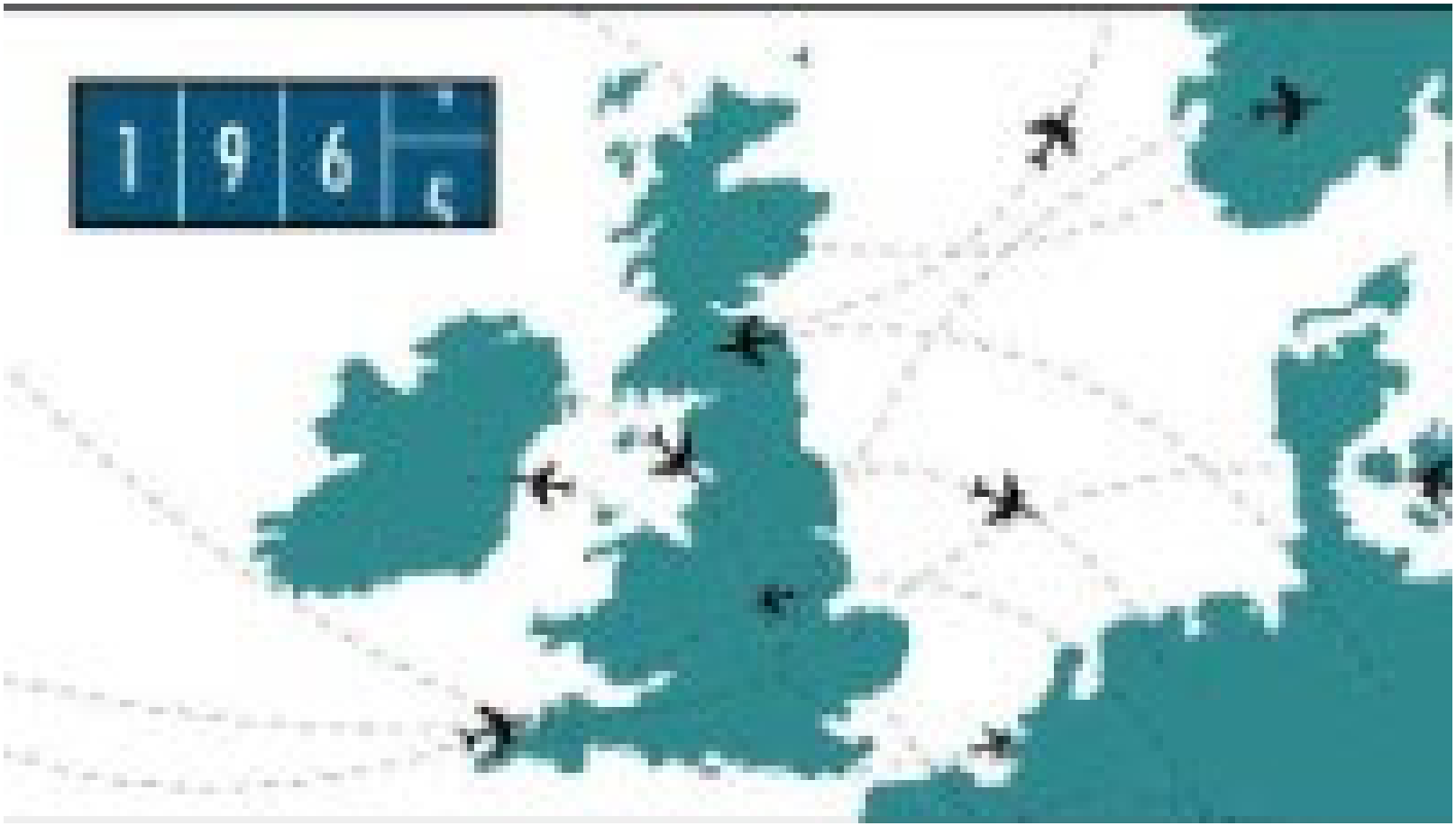
Stage 2 – Develop and Assess
Design envelopes discussion

June 2022

MAG East Midlands Airport

Contents

Welcome – Stage 2 video



East Midlands Airport – airspace change timeline

We are here

2019/2020	2022/2023	2023/2024	2024	2025	2026	2027 onwards
Stage 1 **Define**	Stage 2 **Develop and assess**	Stage 3 **Full public consultation**	Stage 4 **Update and submit proposals**	Stage 5 **Decision**	Stage 6 **Implementation**	Stage 7 **Post-implementation review**
Step 1A In May 2019 we sent the CAA our Statement of Need, which was approved and provisionally classed as a Level 1 change. **Step 1B** We gathered views on Design Principles during 2019. Our Stage 1 work was approved by the CAA in January 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 2023.	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 late 2023/2024.	We will update our airspace change proposal, taking stakeholders' feedback into account, before sending it to the CAA in 2024.	We expect the CAA's decision on whether to approve any airspace change in 2025.	If approved, any airspace changes could be put in place in 2026.	The CAP1616 process gives the CAA and airports 12 months to review any change that has been made to airspace.

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

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

MAG East Midlands Airport

Step 1B – Our Design Principles

Keeping the Skies Safe	Safety must take precedence over all other factors. Flight paths must be safe for airspace users, the airport and communities on the ground.
A joined-up approach	Any changes must align with the broader national airspace modernisation strategy, comply with national, international and industry regulations and legislation, and align with current and future Airspace Change Programme in the north of the UK through involvement in the Future Airspace Strategy Implementation group.
Meeting Demand	New flight paths must ensure the continuation of services offered today and meet any future demand, in keeping with local and national planning policy, and the Government's policy on 'making best use' of existing runway capacity.
Limiting Our Footprint	Flight paths that limit and, where possible, reduce emissions should be implemented.
Sharing the Load	Flight paths should, where practical, be spread out to avoid concentration of aircraft activity to share any noise impacts.

Responsive Flight Paths	Where flight paths have to overfly communities, we will consider existing noise in the local area, and will select flight paths to mitigate effects on areas with relatively low levels of ambient noise.
Limiting Disturbance	Flight paths should seek to limit and, where possible, reduce noise disturbance to communities – especially at night.
Noise Sensitive Locations	Flight paths should, where practical, avoid locations that are especially sensitive to noise.
Fit for the Future	Flight paths should be designed to futureproof our airspace and should not be constrained by existing arrangements.
Airspace for All	Our controlled airspace should be open to all authorised users; however, priority will be given to airport air traffic over other airspace users, except for emergency aircraft.
Embracing Technology	Flight paths should be designed using the latest, widely available navigational technology and flying techniques.

Stage 2 process – gathering views

We are here

Step 2A

Step 2B

Engagement one - Sharing the design envelopes

Feedback considered, routes developed

Engagement two – sharing route designs

Feedback considered, options further developed. Design Principles Evaluation (DPE)

Initial Options Appraisal (IOA)

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.

November

Potential route options will be shared at another round of discussion sessions in Autumn 2022.

December

Taking account of feedback, options will be refined further. Route options will then be evaluated against the design principles to see which merit further assessment.

January - February

The route options taken forward from the DPE 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

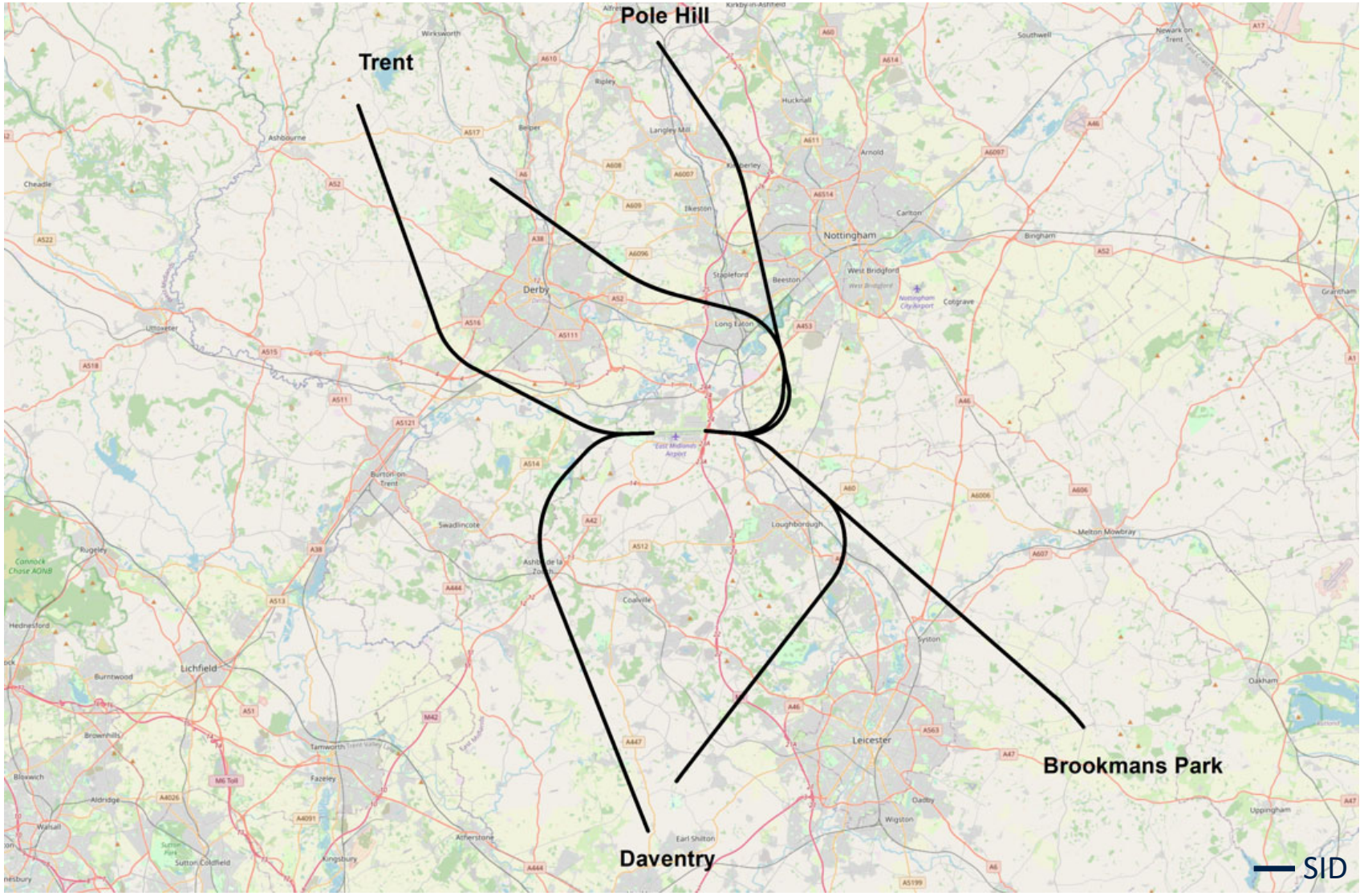
MAG East Midlands Airport

East Midlands Airport operations today

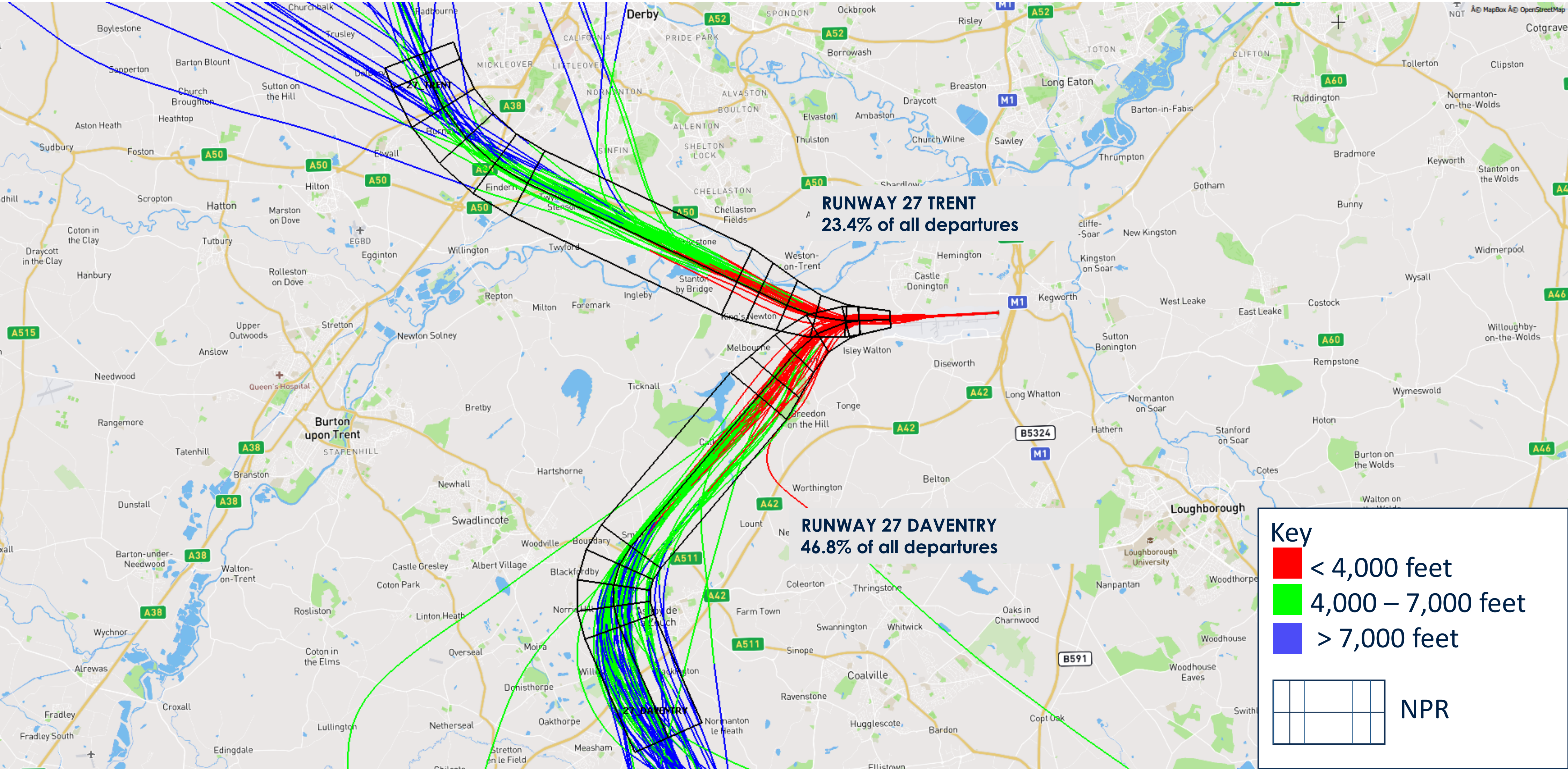
Westerly Operations

Easterly Operations

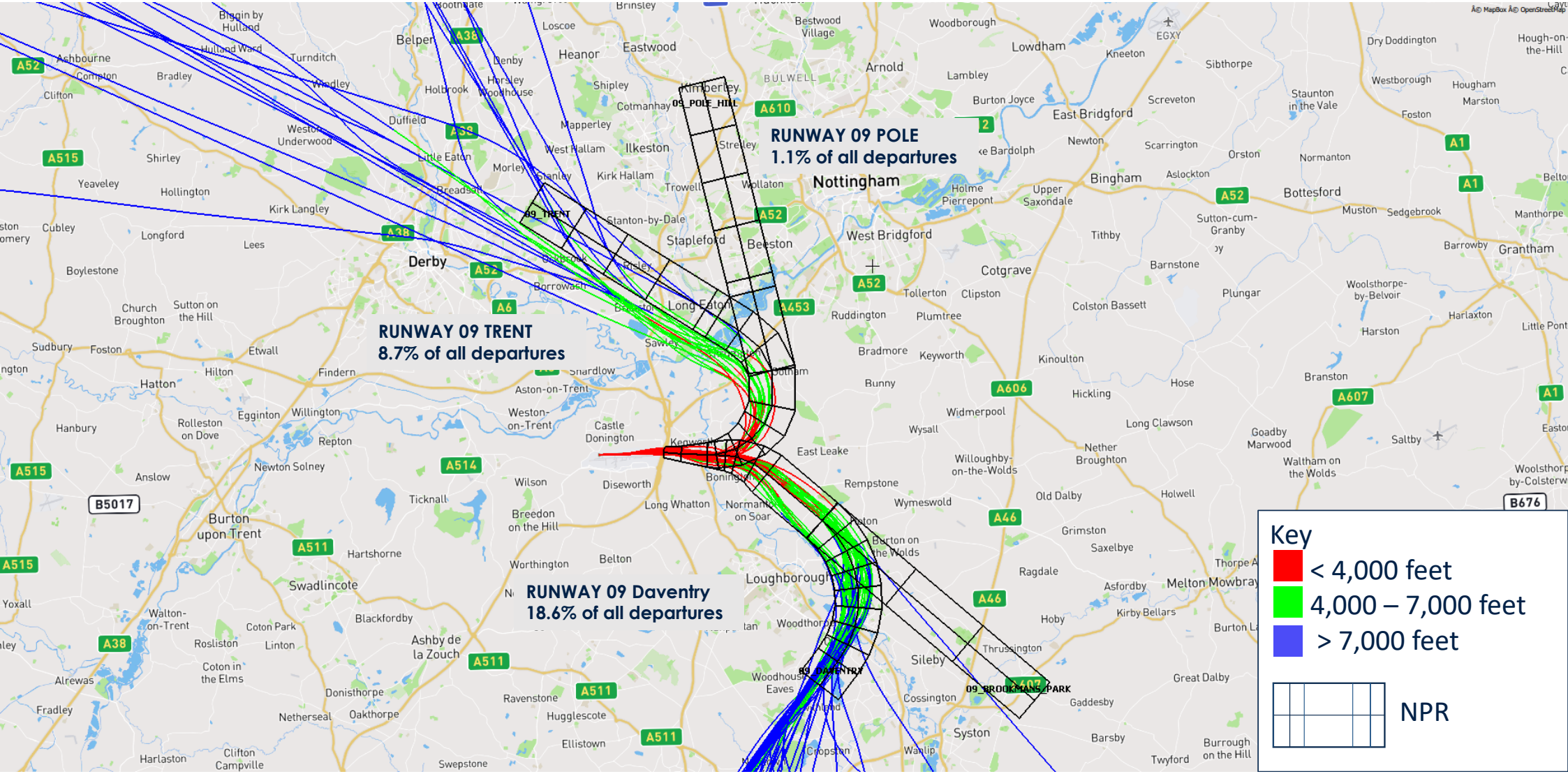
Departures – SIDs (Standard Instrument Departures)



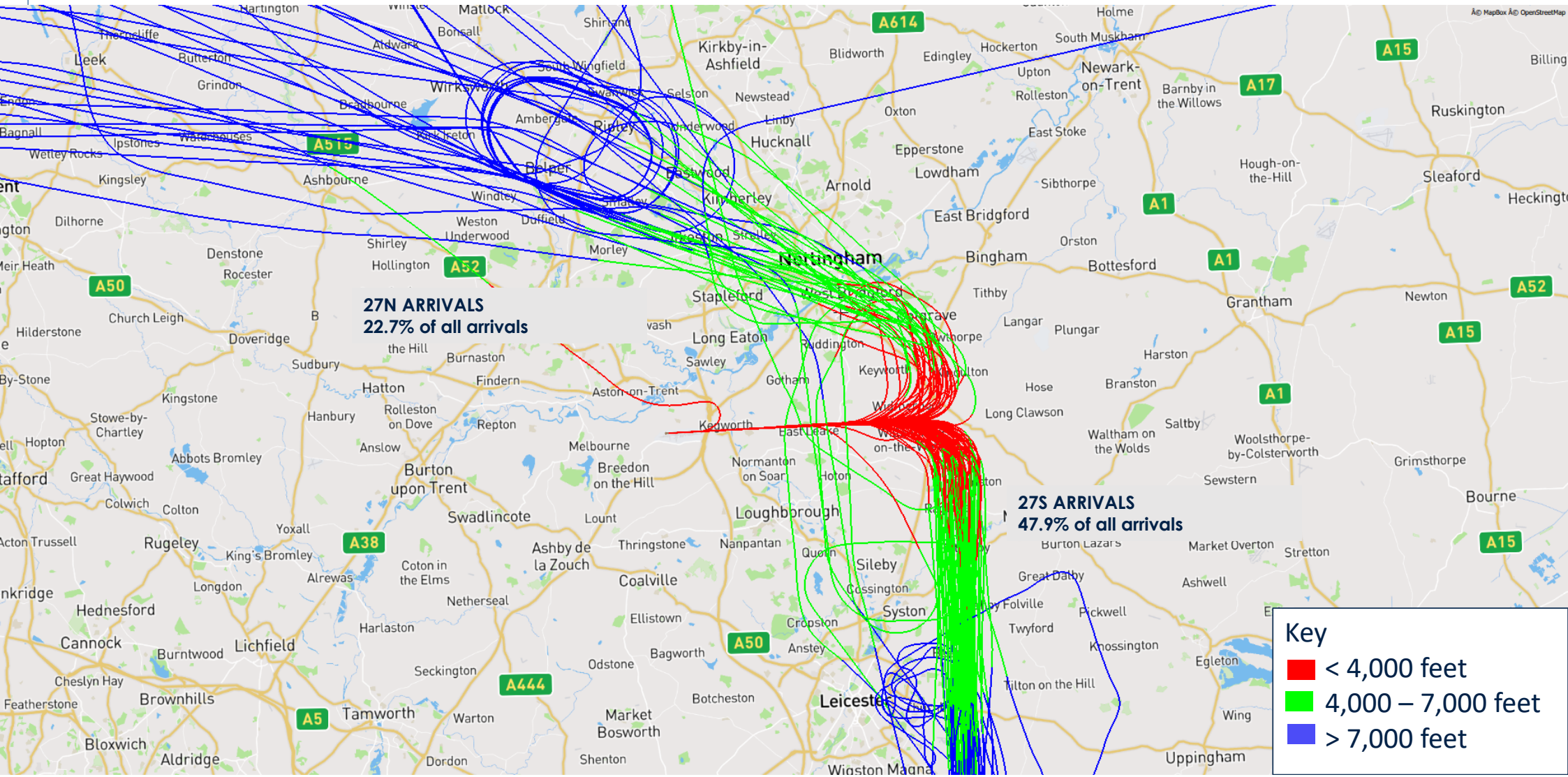
Current operations – typical departures on Runway 27



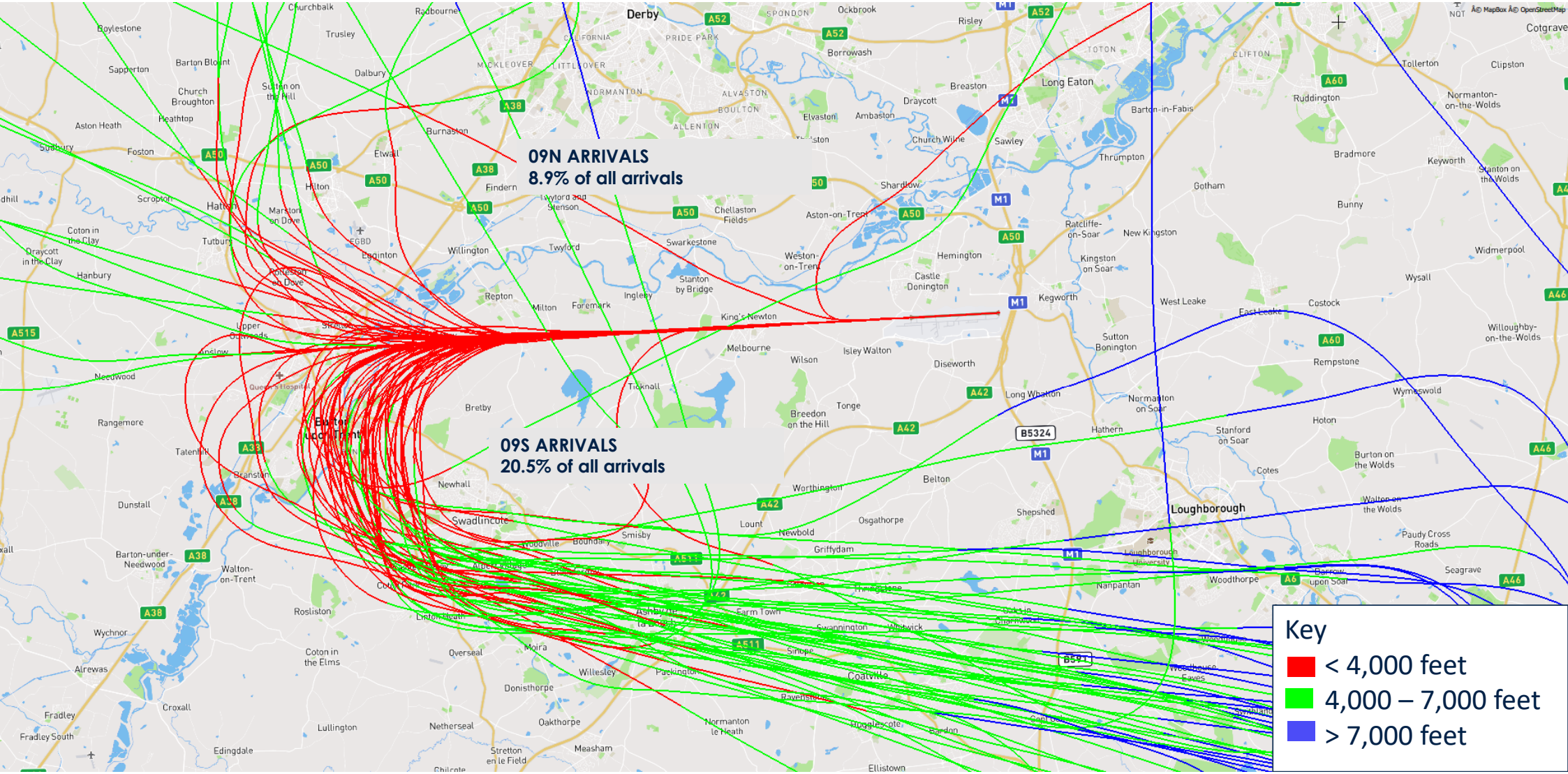
Current operations – typical departures on Runway 09



Current operations – typical arrivals on Runway 27



Current operations – typical arrivals on Runway 09



DEVELOPING A COMPREHENSIVE LIST OF OPTIONS

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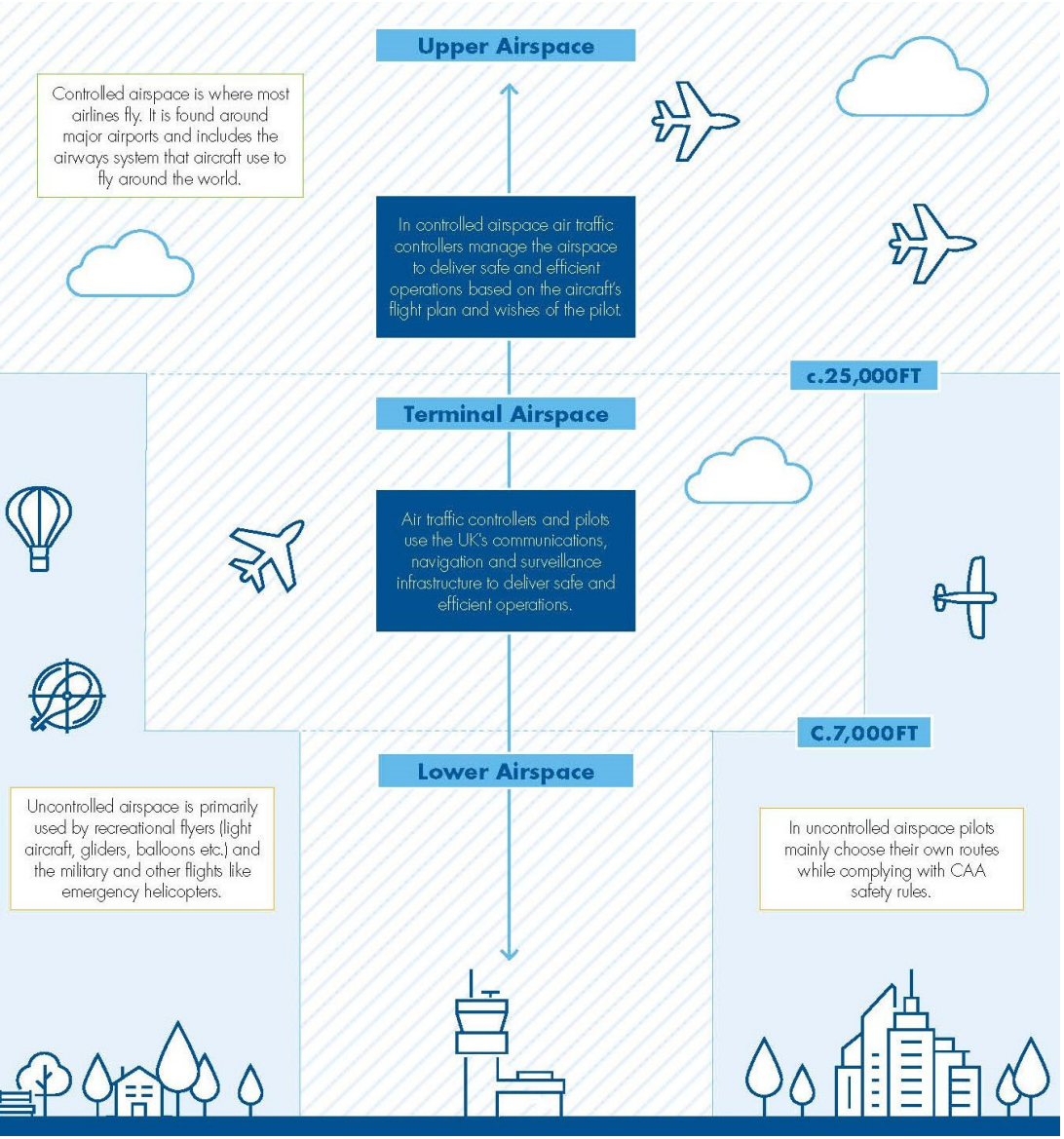
What is airspace?



- Three dimensional volumes of air in which different rules apply to aircraft and operators flying within them
- Basically divided into controlled airspace (all flight activity is known to ATC) and uncontrolled airspace (flying can take place without reference to ATC)
- Used by commercial flights, general aviation and the military.
- Divided into a number of vertical layers
- EMA has its own controlled lower airspace called a control zone which extends up from ground level.
- Above this is terminal and upper airspace which is the responsibility of NATS

The foundation of our route design

CAP 1616 sets out the rules for airspace change

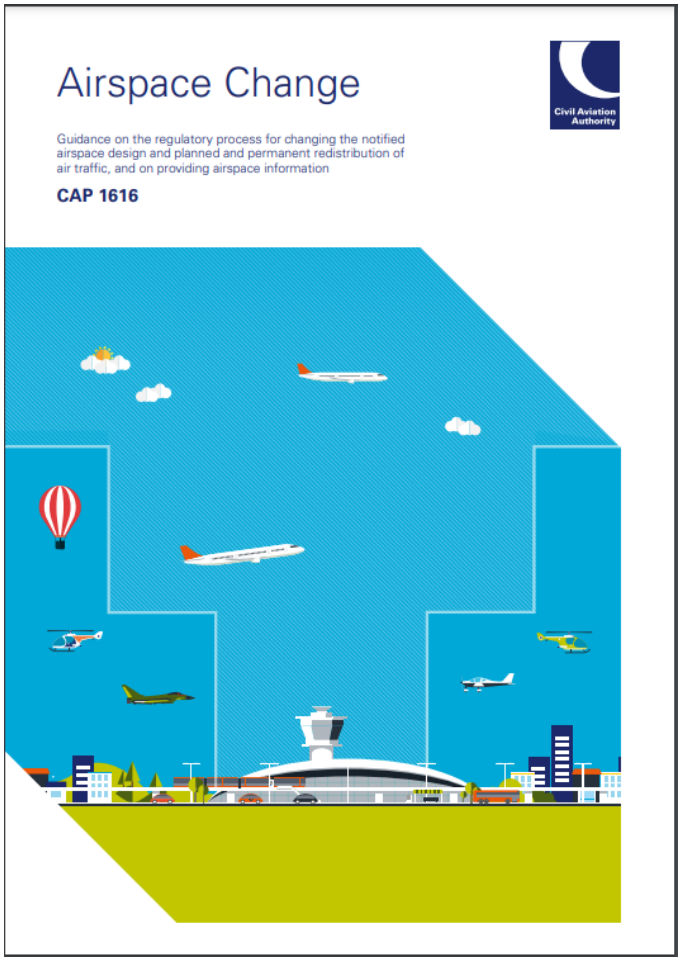
Our responsibility is from the ground to 7,000ft. Above that it is the responsibility of NATS

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

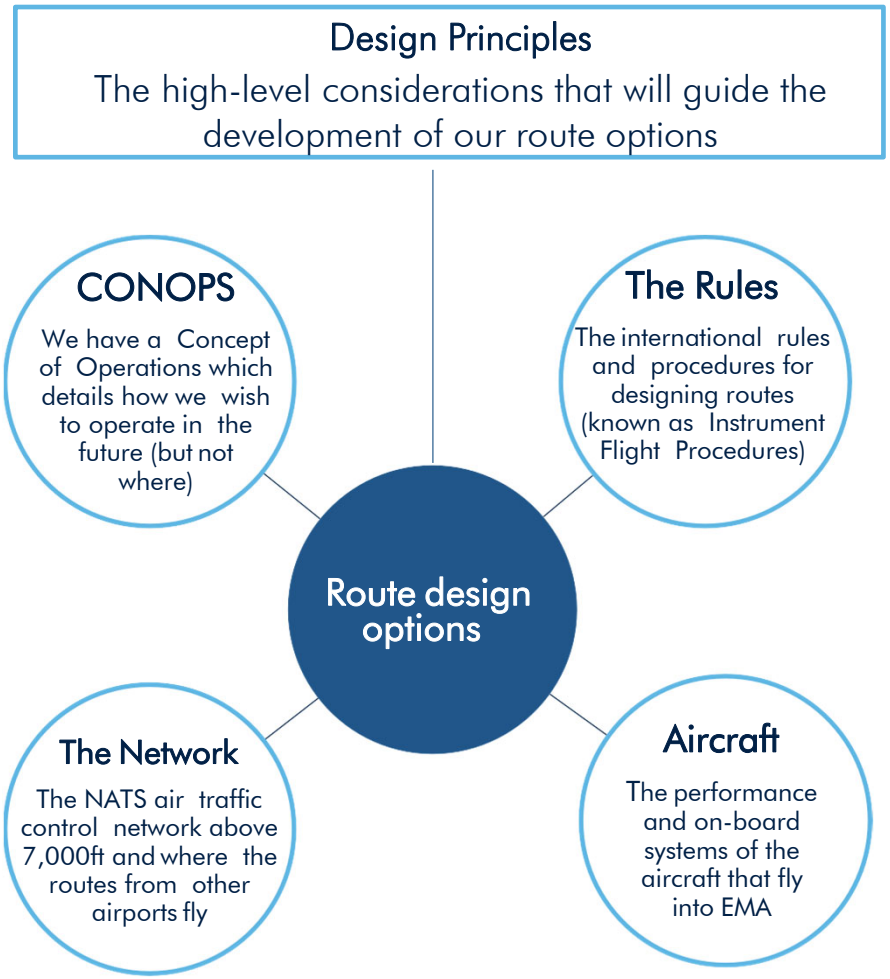


Route design considerations

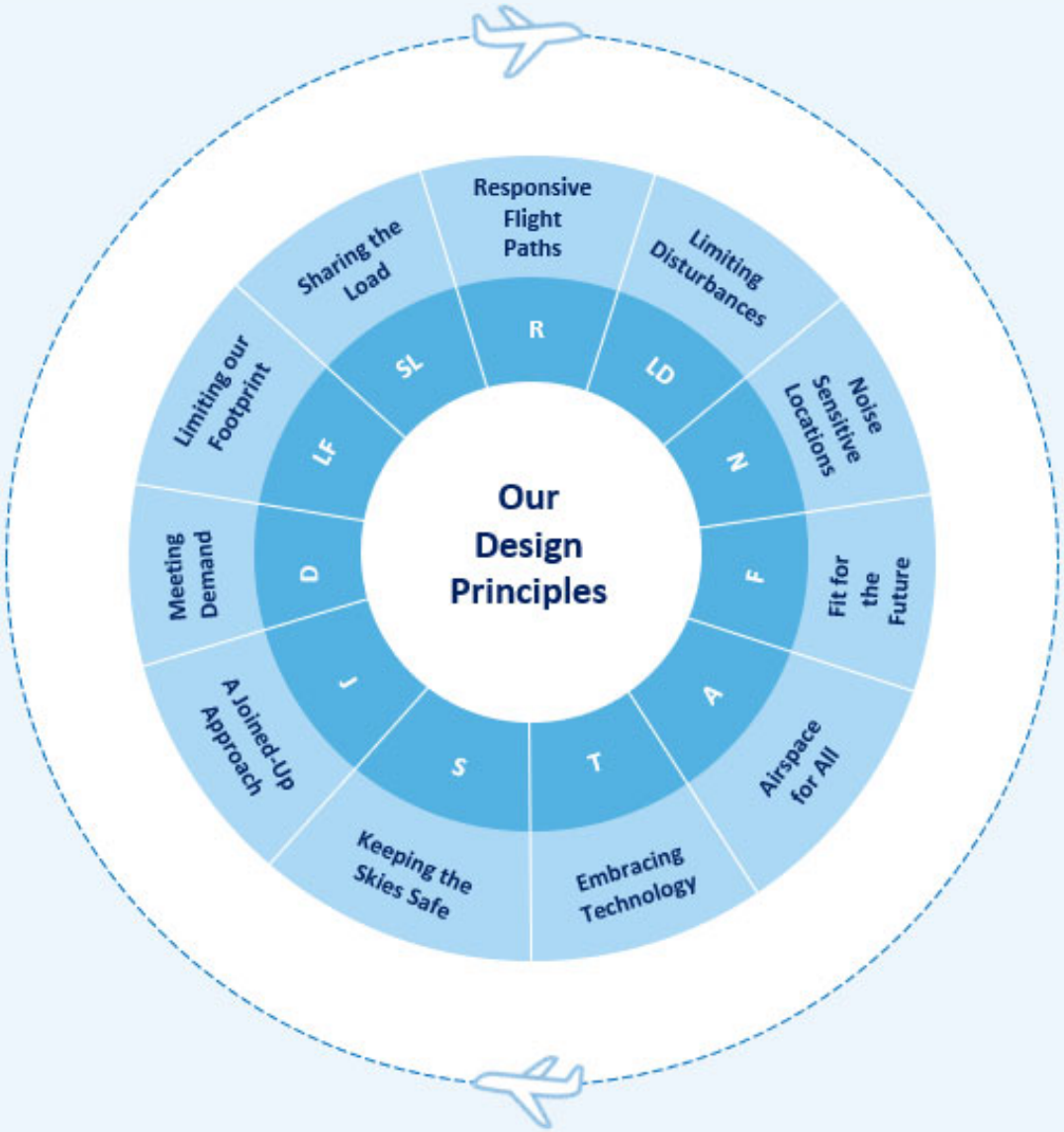
Our route design needs to take several things into consideration. Each of the considerations listed here affect aspects of our agreed design principles and contribute to our designs in a different way;

- Some provide an opportunity
- Others create a constraint

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



Design principles – guide the development of the route options



Design consideration – The rules

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)
- 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 'Joined-up Approach' design principle requires us to be consistent with.

Design consideration – Aircraft

Our Embracing Technology Design Principle states that our routes should be designed to use the latest widely available aircraft technology.

To make sure we know what technology airlines have, we conducted a fleet technology survey which asked questions about current and future aircraft fleets.

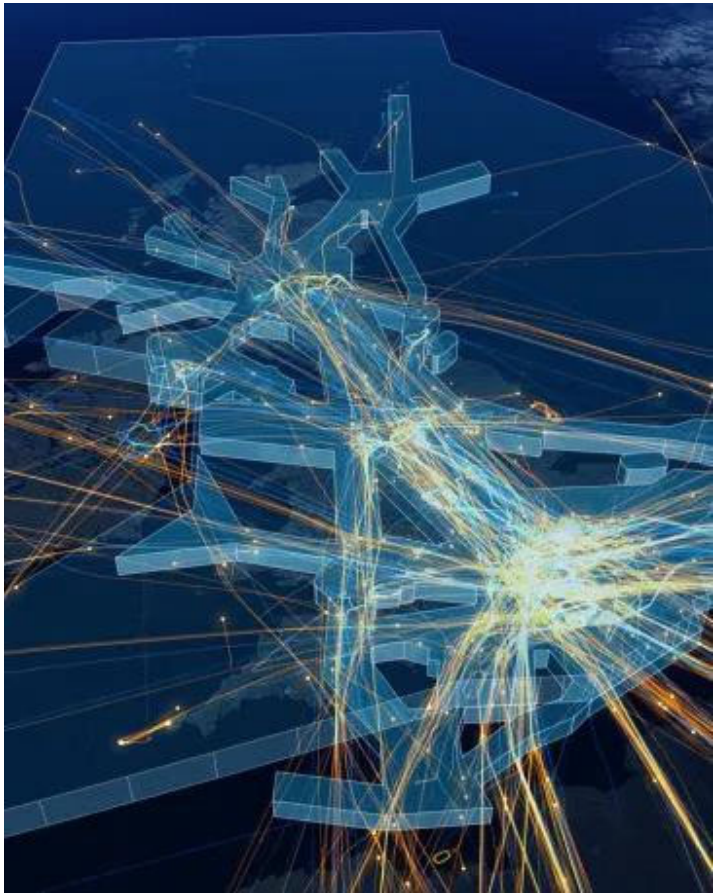
This gave us information on:

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

Design consideration – The NATS Network

The airspace network is a little like motorways in the sky.

- When designing our routes, we must consider the airspace network and how other airports access this structure.
- This aligns with our A Joined-up Approach Design Principle.
- This creates some constraints on our designs, based on where the NATS network can connect to us or where we expect other airports to have routes.
- As the designs mature, we'll share our options with other airports and work together to resolve any interactions.



Design consideration – The CONOPS

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:

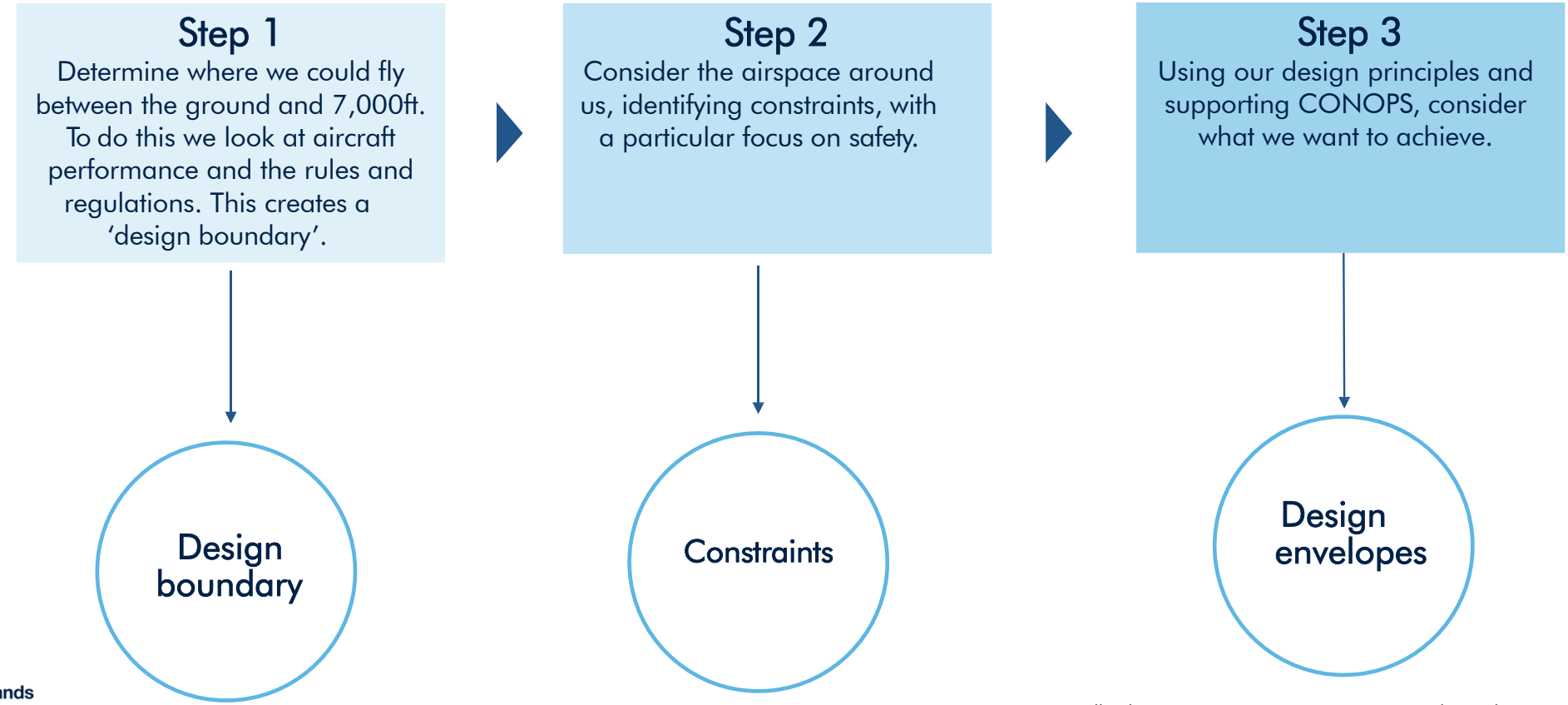
- The fleet technology survey
- Operational plans for East Midlands Airport
- Our Design Principles (Including community impact)
- The CAA's Airspace Modernisation Strategy

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 6%
- Instrument Landing System (ILS) to be used for final approach
- Remove the reliance on ground based navigation aids (DVORs)
- Design routes to ensure minimum ATC intervention with Continuous Climb or Continuous Decent Approach (CCO/CDA)
- Deconflict our routes from other airports

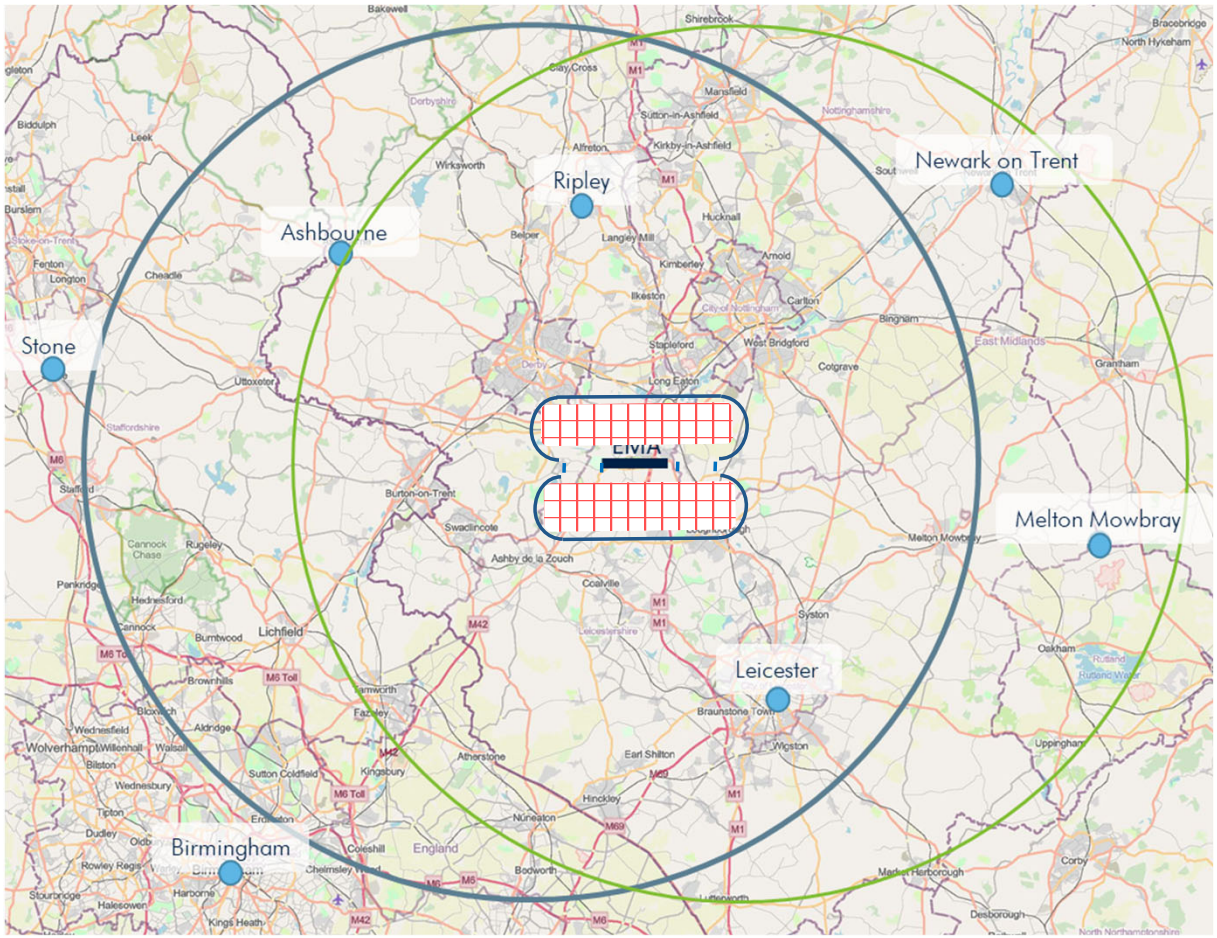
So how have these factors contributed to the development of the design envelopes?



DEPARTURES

MAG East Midlands Airport

Step 1– The design boundary for departures



Runway 09 Runway 27 Departure routes not possible

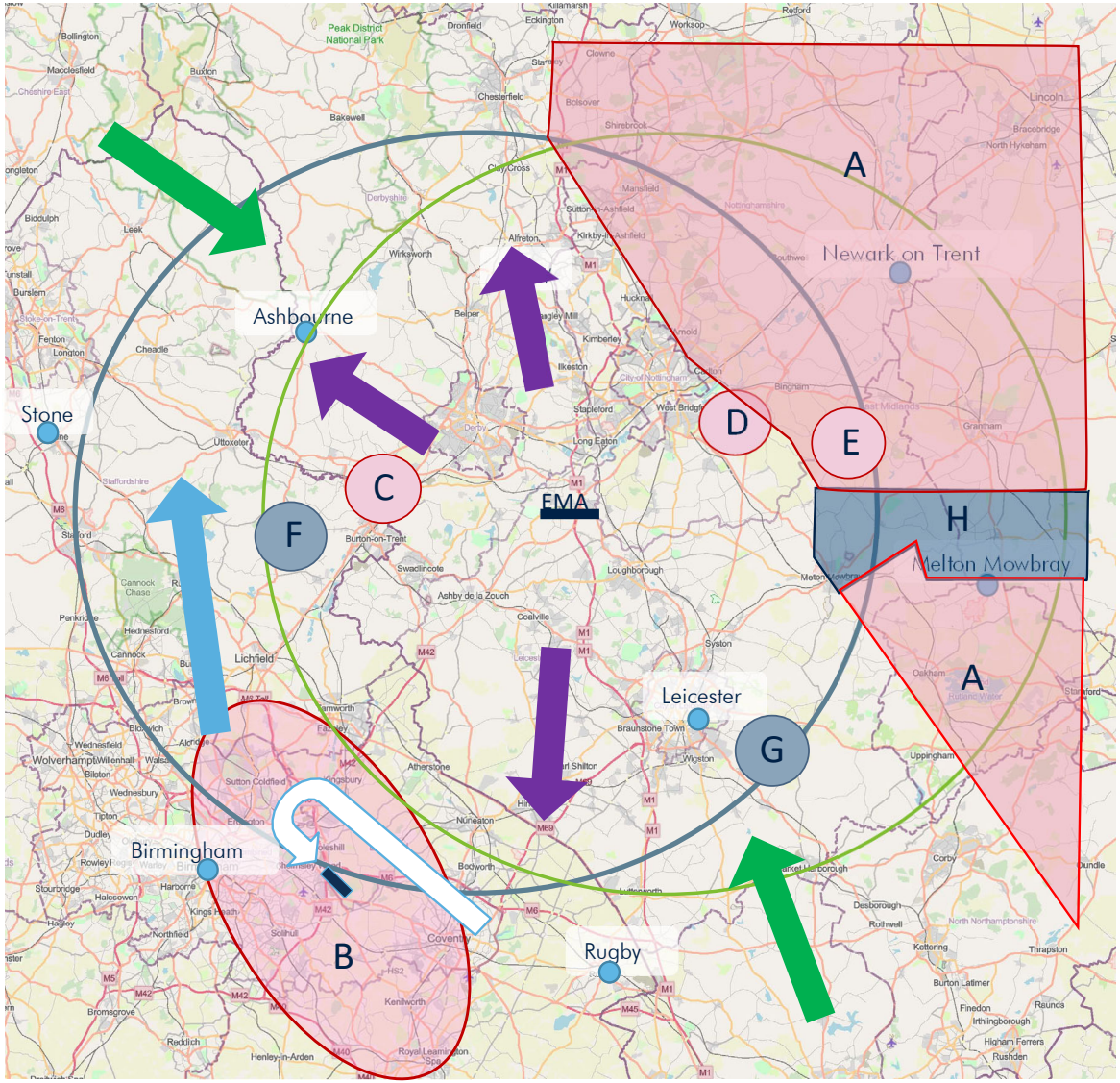
The first step is understanding where departures could fly.

- 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 and green lines and aligns with our Fit for the Future Design Principle.

- Next we apply the ICAO rules on procedure design
- This stipulates the rules regarding the radius of turns for departing aircraft, which creates a more realistic design area
- It also describes where we cannot design departures

Step 2 - Constraints and considerations



Runway 27 boundary

Runway 09 boundary

Constraints

- Area A – Uncontrolled Airspace
- Area B – Birmingham Airport
- Area C – Derby Airport (surface to 2,000ft)
- Area D – Nottingham Airport (surface to 2,000ft)
- Area E – Parachute Site

Considerations

- Area F - Tatenhill (surface -2,000ft)
- Area G – Leicester Airport (surface to 2,000ft)
- Area H – Uncontrolled Airspace but potentially viable subject to NATS airspace reclassification

Birmingham Airport

- Arrival
- Departure

East Midlands Airport

- Arrival
- Departure

Step 3 – Applying our design principles

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

Design options- requirements

We are required by the CAA to look at:

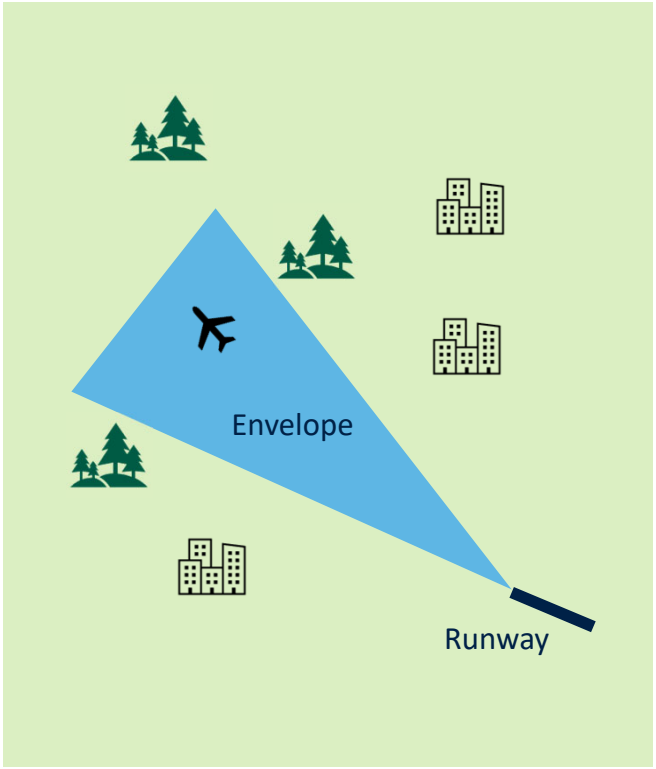
- The 'do nothing'
- The 'do minimum'
- A range of options to address the Statement of Need and align with the design principles

Our envelopes are based on aligning with our design principles and:

- Updating to Performance Based Navigation (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

Design envelopes – What are they?

- An area where we can design route options
- A wide area of airspace that goes from the runway to 7,000 feet above sea level
  - Our baseline envelopes are based on a 6% climb gradient which all aircraft can fly
- Some are based around existing routes - which creates our 'do nothing' options
  - New envelopes have been created where there may be a benefit
- Based around aircraft flying Continuous Climb Departures
  - Less noise and improved fuel efficiency
- At least 4.5 nautical miles wide at 7,000 feet
- Some envelopes have been created as options to design in respite and these are shown as alternative design envelopes.



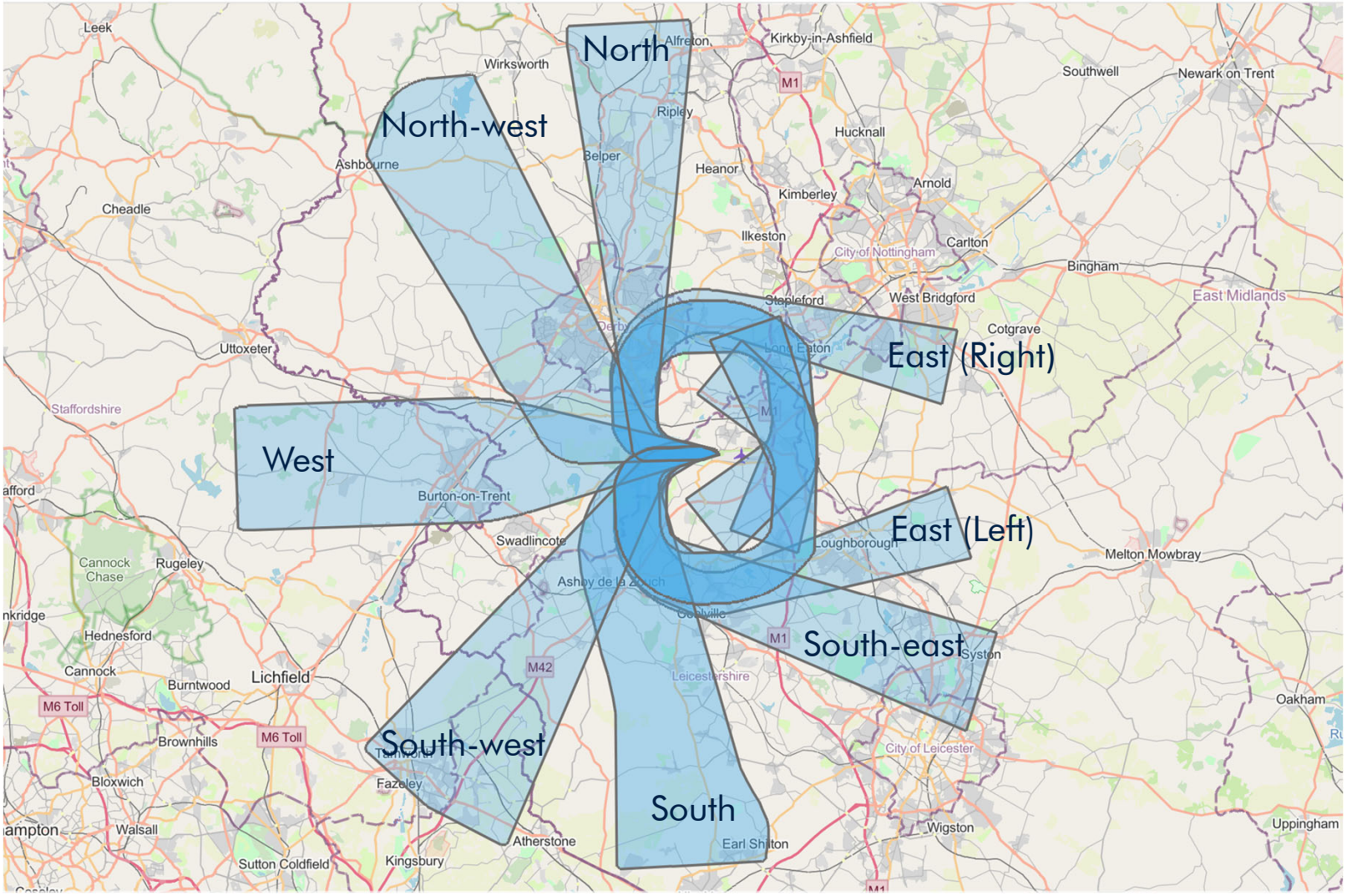
RUNWAY 27

MAG East Midlands Airport

Runway 27 departure envelopes

Based around existing departure routes or areas we believe could improve the way we operate

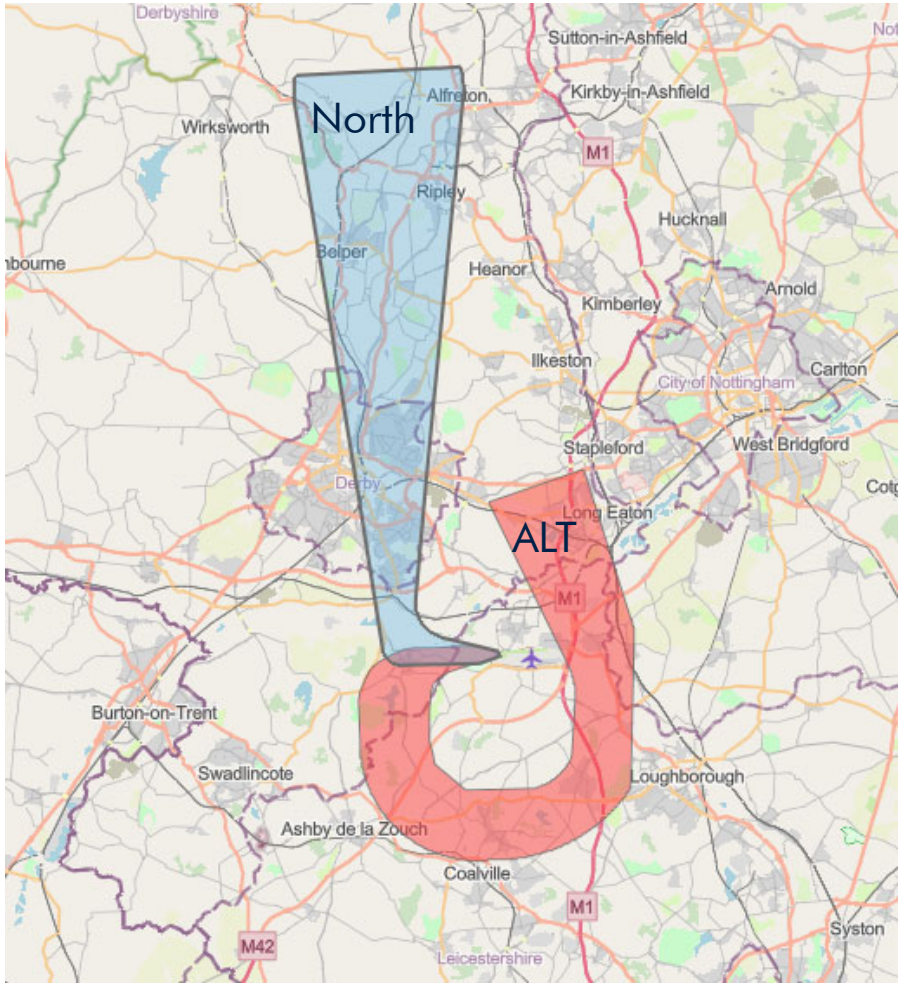
Includes wrap around alternative envelopes to potentially create predictable respite



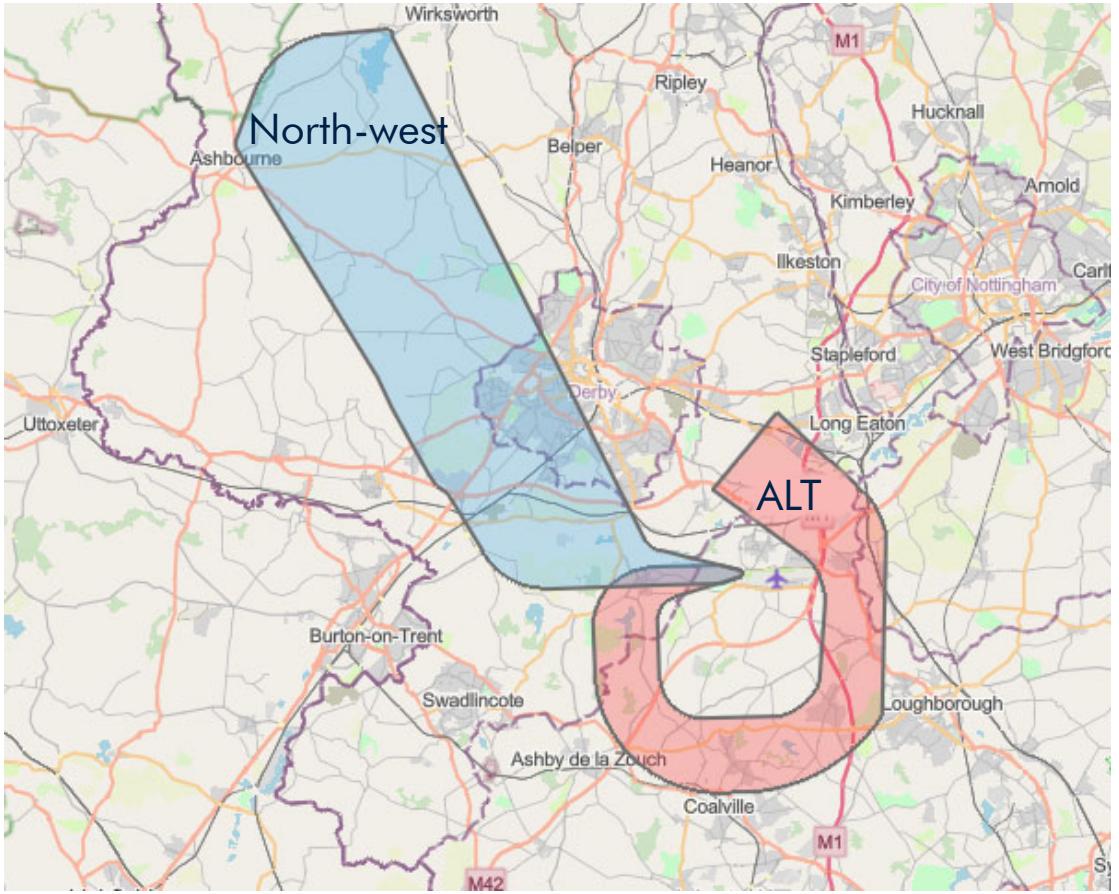
These maps shows initial options envelopes not routes. These are for discussion only and do not represent final options.

Runway 27 – North and north-west envelopes

North envelopes



North-west envelopes



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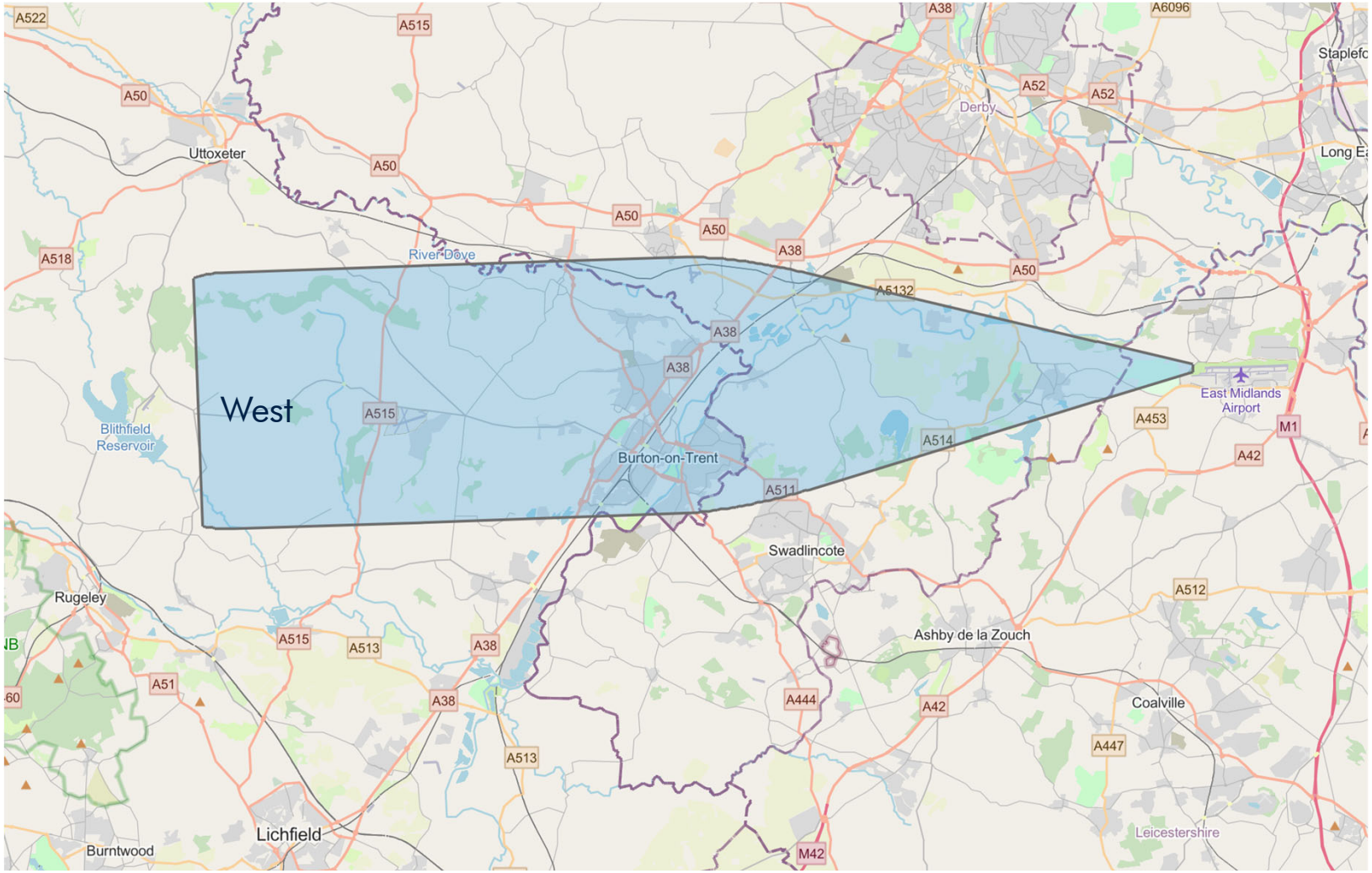
Runway 27 – West envelope



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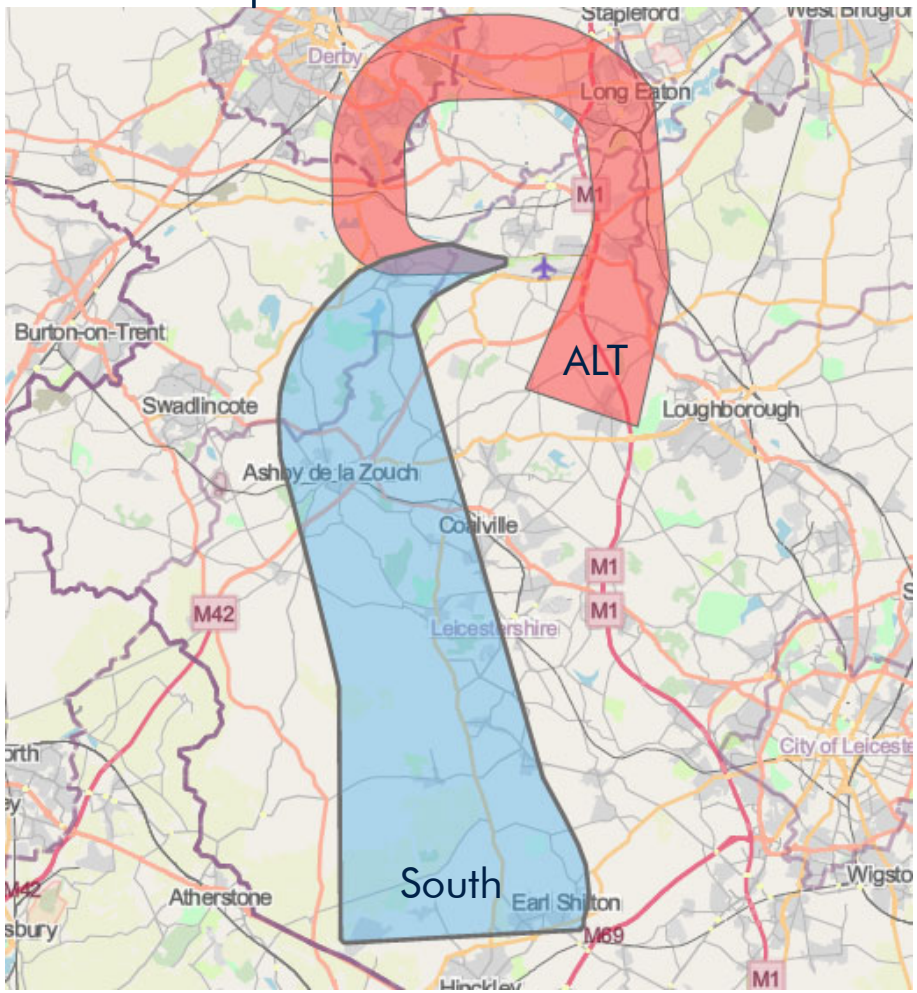
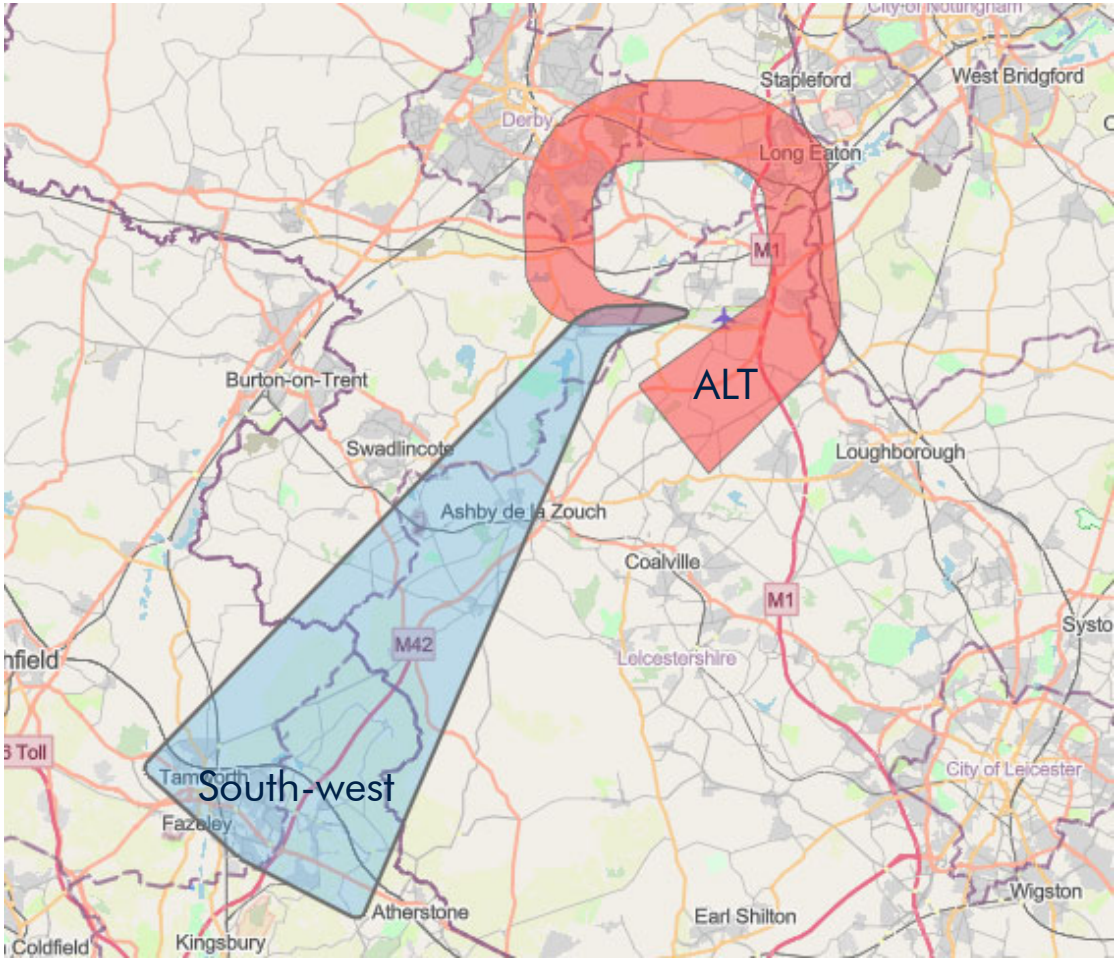
Runway 27 – South and south-west envelopes

South envelopes



South-west envelopes



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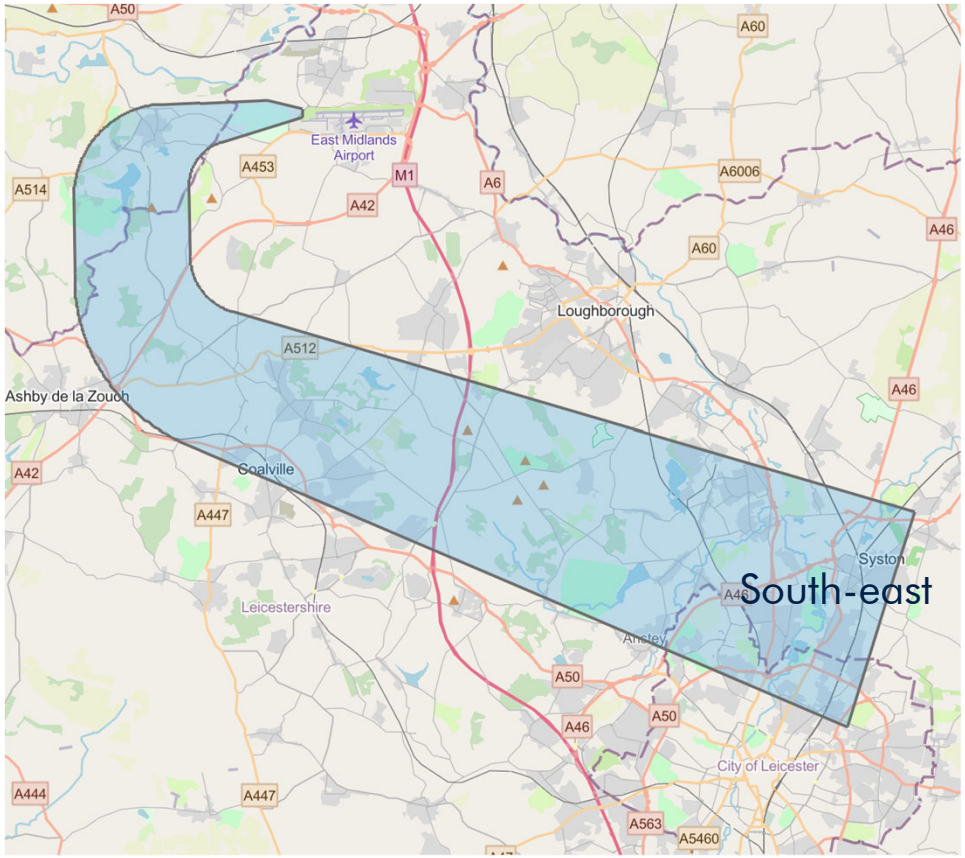
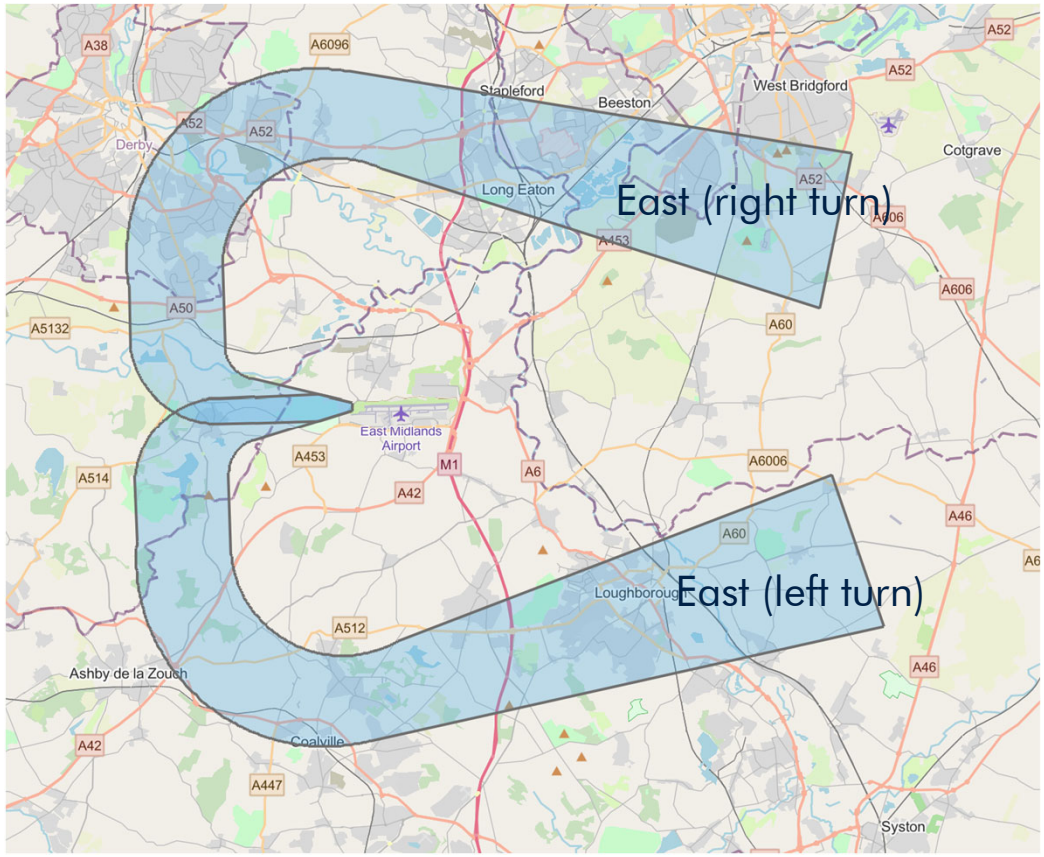
Runway 27 – East and south-east envelopes

South-east envelope



East envelopes



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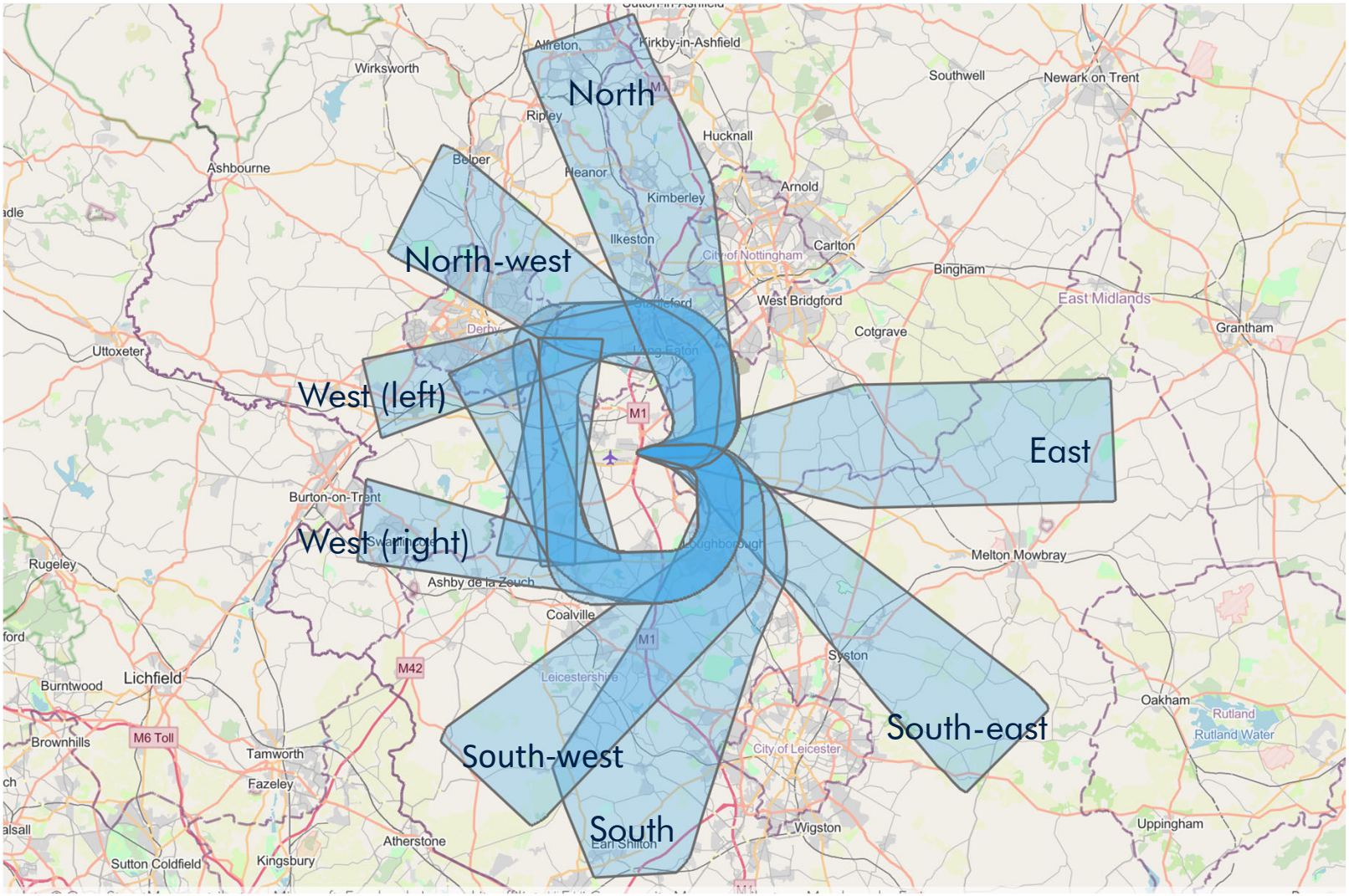
RUNWAY 09

MAG East Midlands Airport

Runway 09 departure envelopes

Based around existing departure routes or areas we believe could improve the way we operate

Includes wrap around alternative envelopes to potentially create predictable respite



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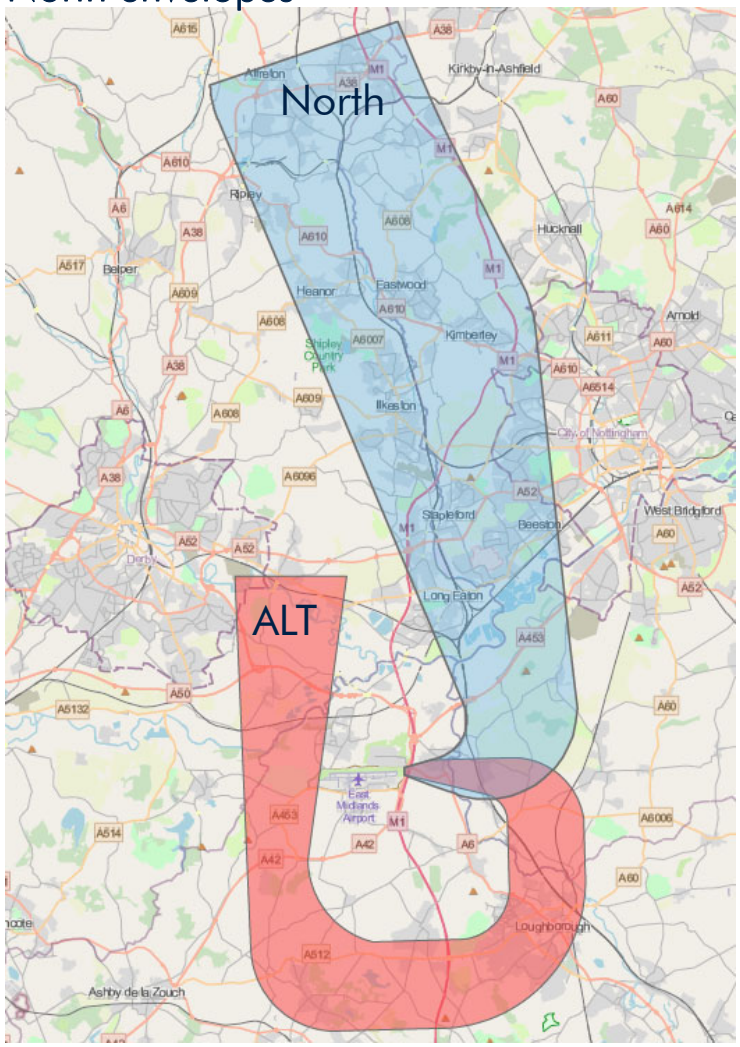
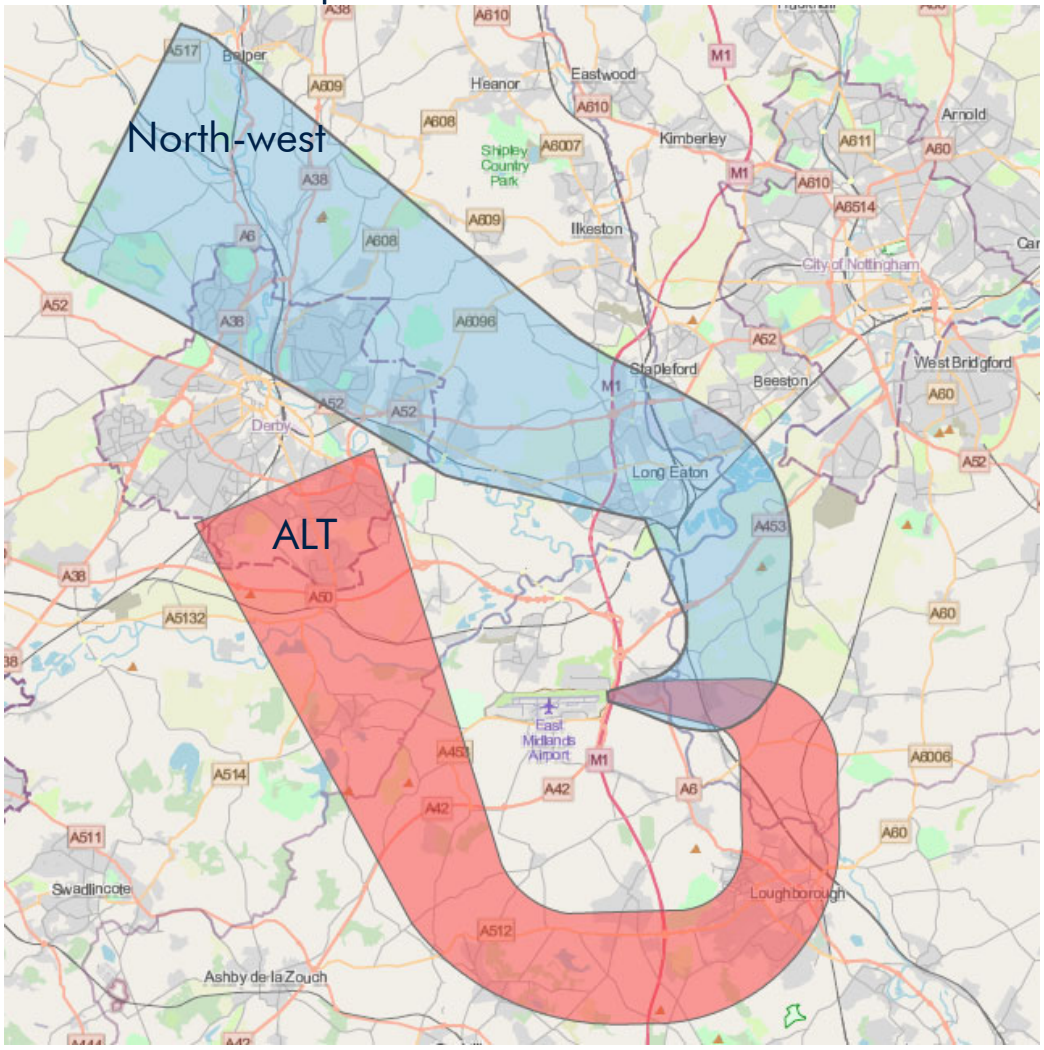
Runway 09 – North and north-west envelopes

North envelopes



North-west envelopes



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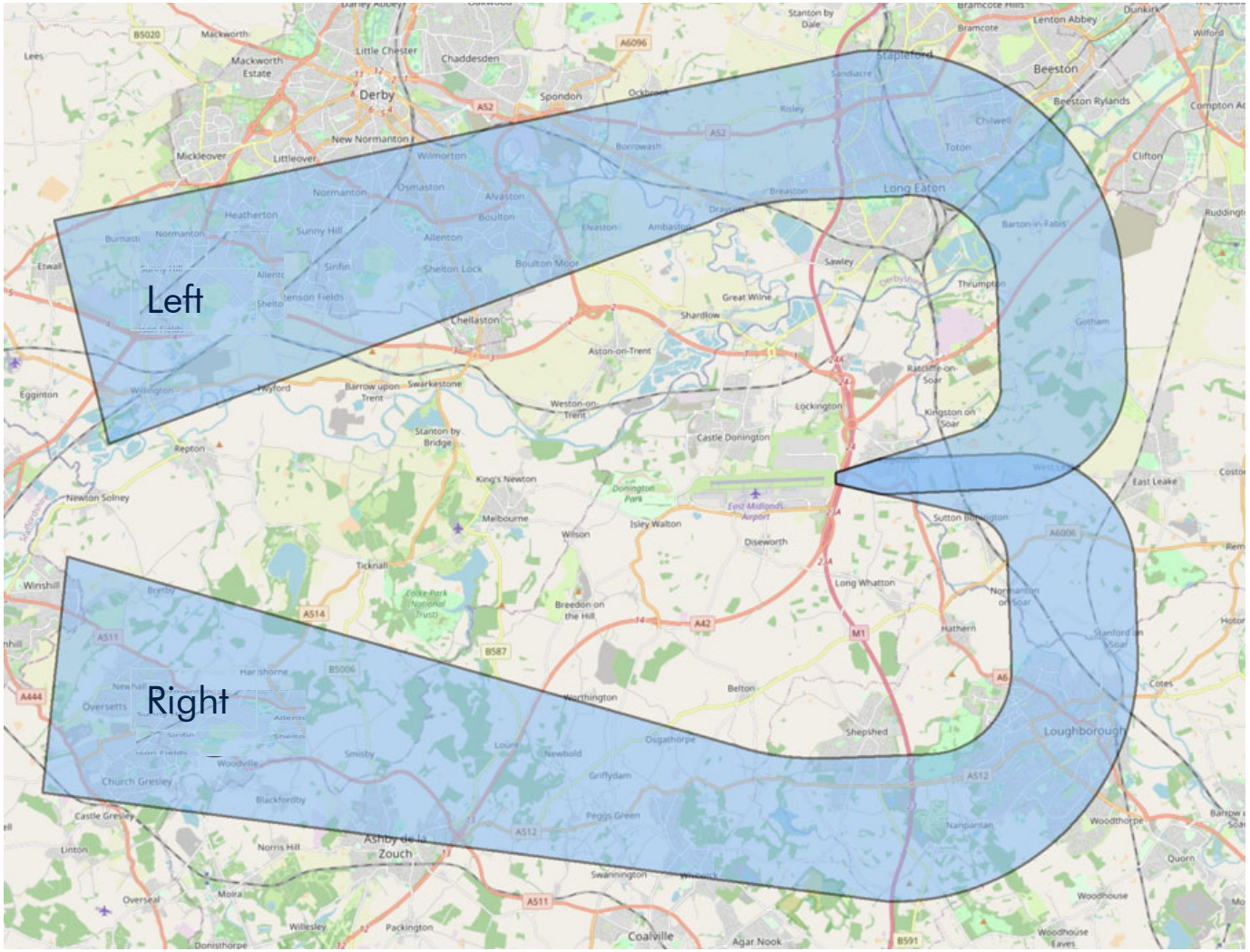
Runway 09 – West envelopes



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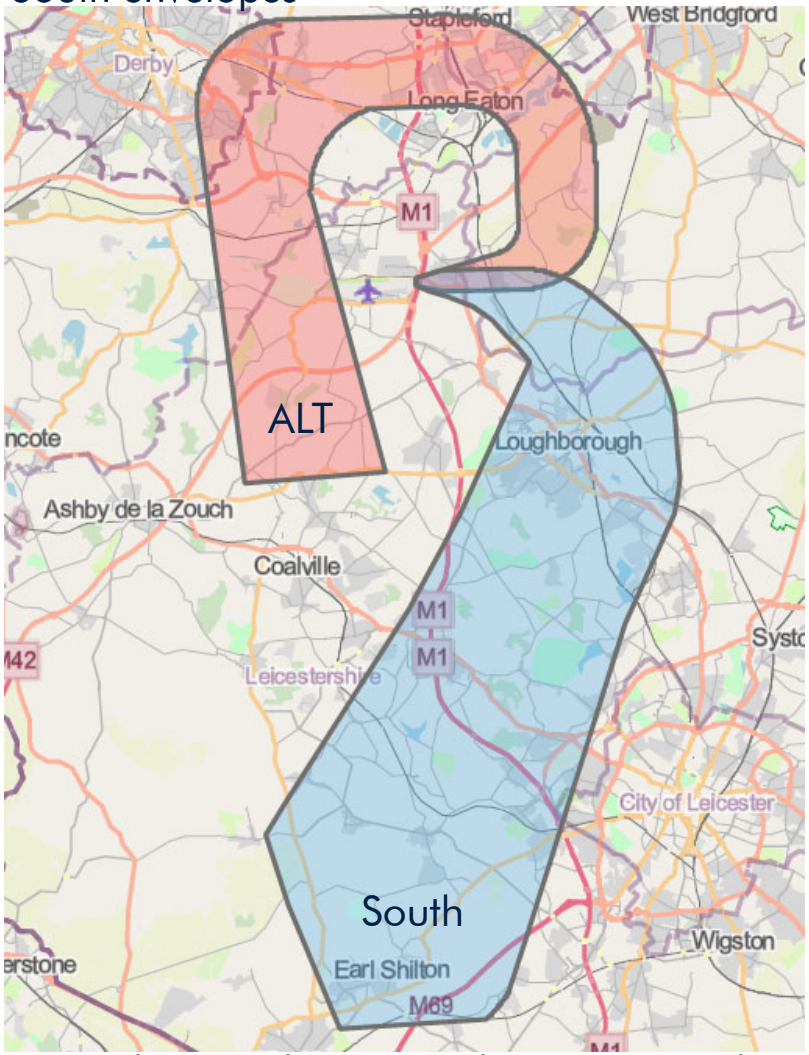
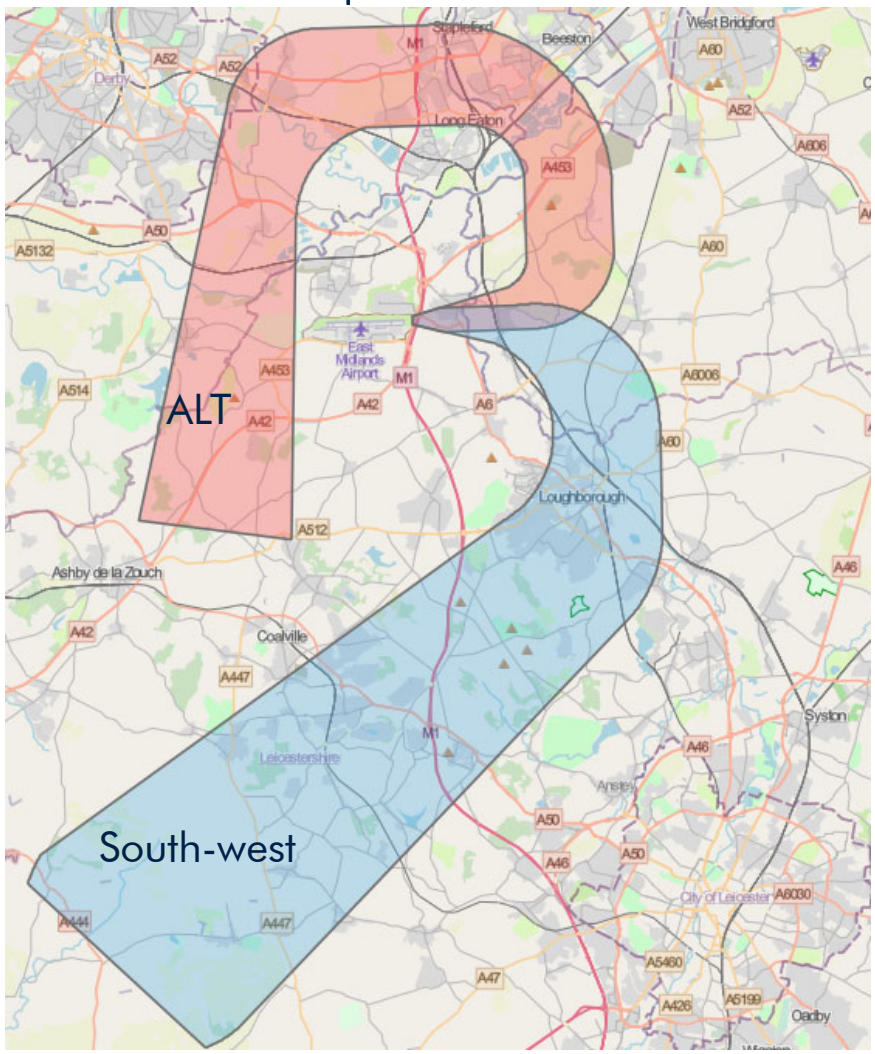
Runway 09 – South and south-west envelopes

South envelopes



South-west envelopes



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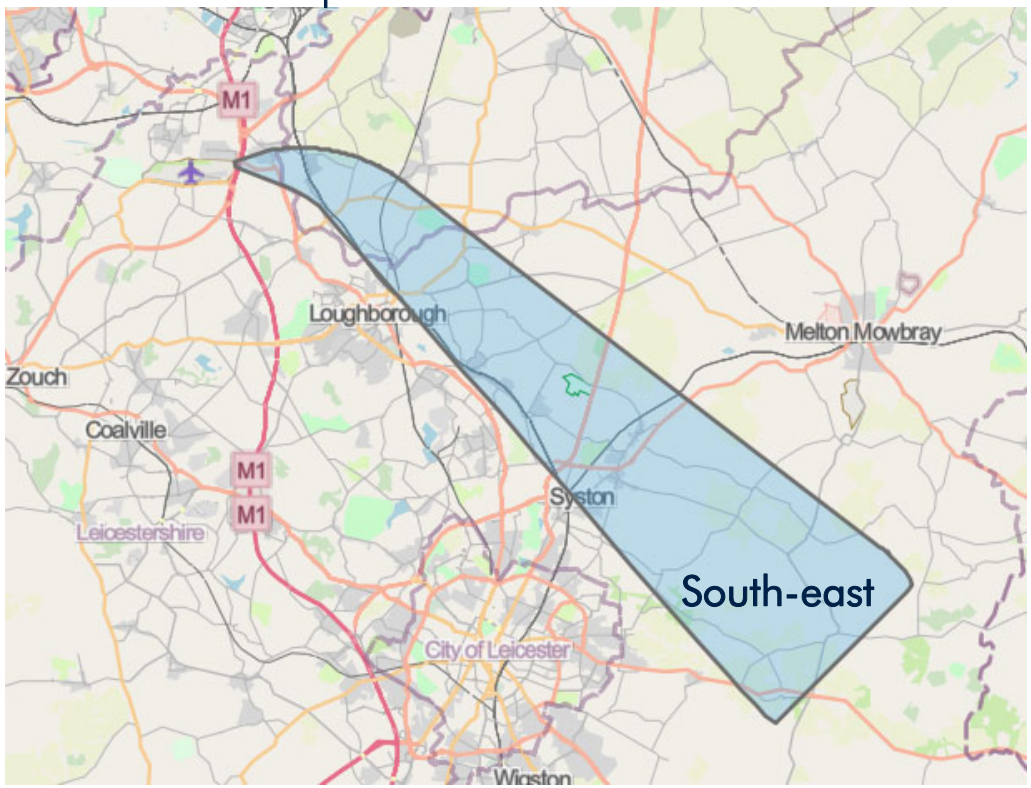
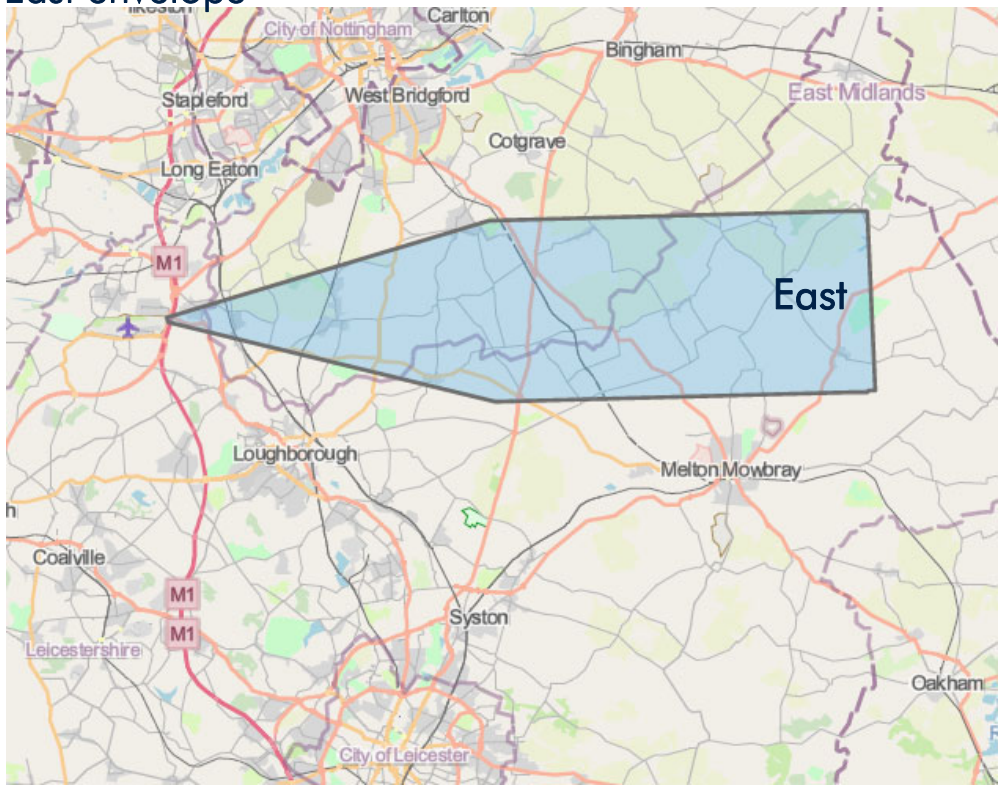
Runway 09 – East and south-east envelopes

South-east envelope



East envelope



These maps 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 departures 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 departure route?

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

Q4. We have to consider a 'do nothing' and a 'do minimum' option. However, if we were to replicate our current routes closely, how could we improve them?

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ARRIVALS

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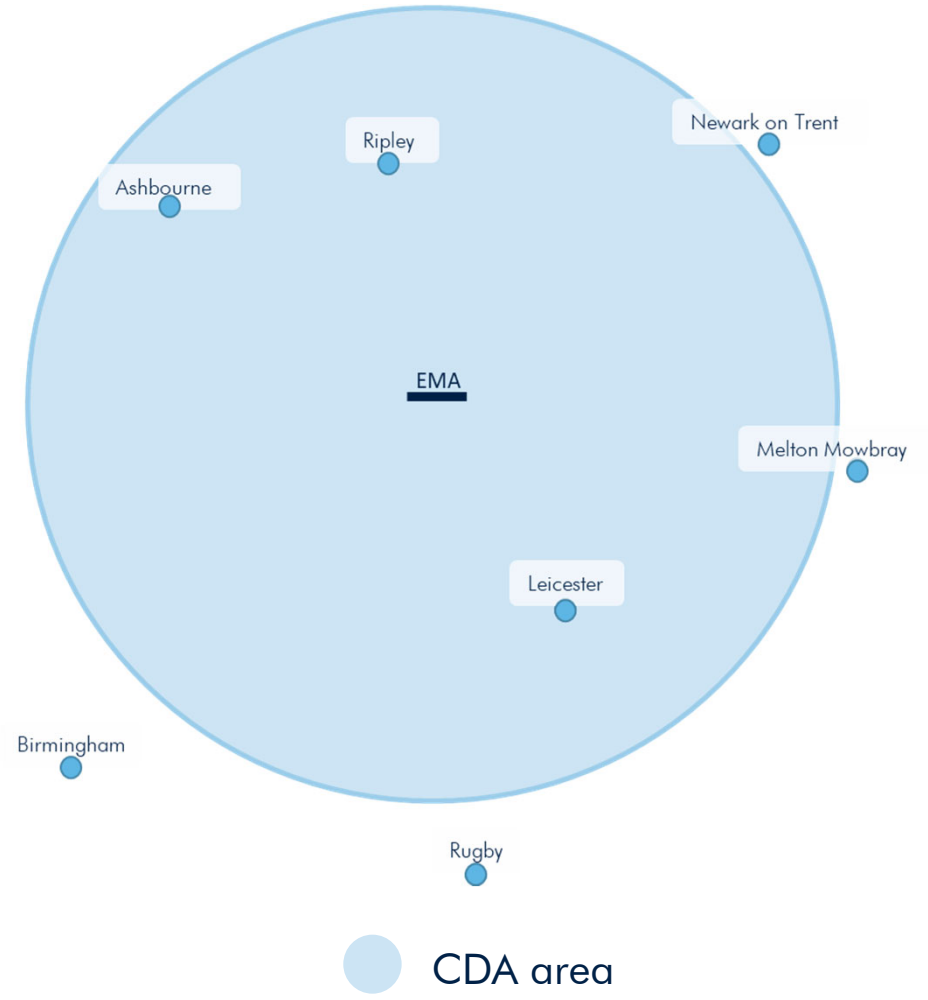
Step 1 – The design boundary for arrivals

- Our starting points for arrivals is at 7,000 feet above sea level (asl), and we've looked at two main criteria for the position of these:
  - The ability to provide a Continuous Descent Approach (CDA) in line with our Joined-up Approach, Limiting our Footprint and Embracing Technology Design Principles
  - The flow of traffic that interfaces with the NATS network in line with the, Joined-up Approach Design Principle
- The Embracing Technology design principle also requires us to use the latest technology
  - Our arrivals will therefore be based on Performance Based Navigation (PBN)
  - These remove the need for significant tactical intervention by air traffic control
  - PBN routes would result in less dispersed aircraft tracks than currently
- The theoretical area where arrivals could descend from 7,000 feet is shown here



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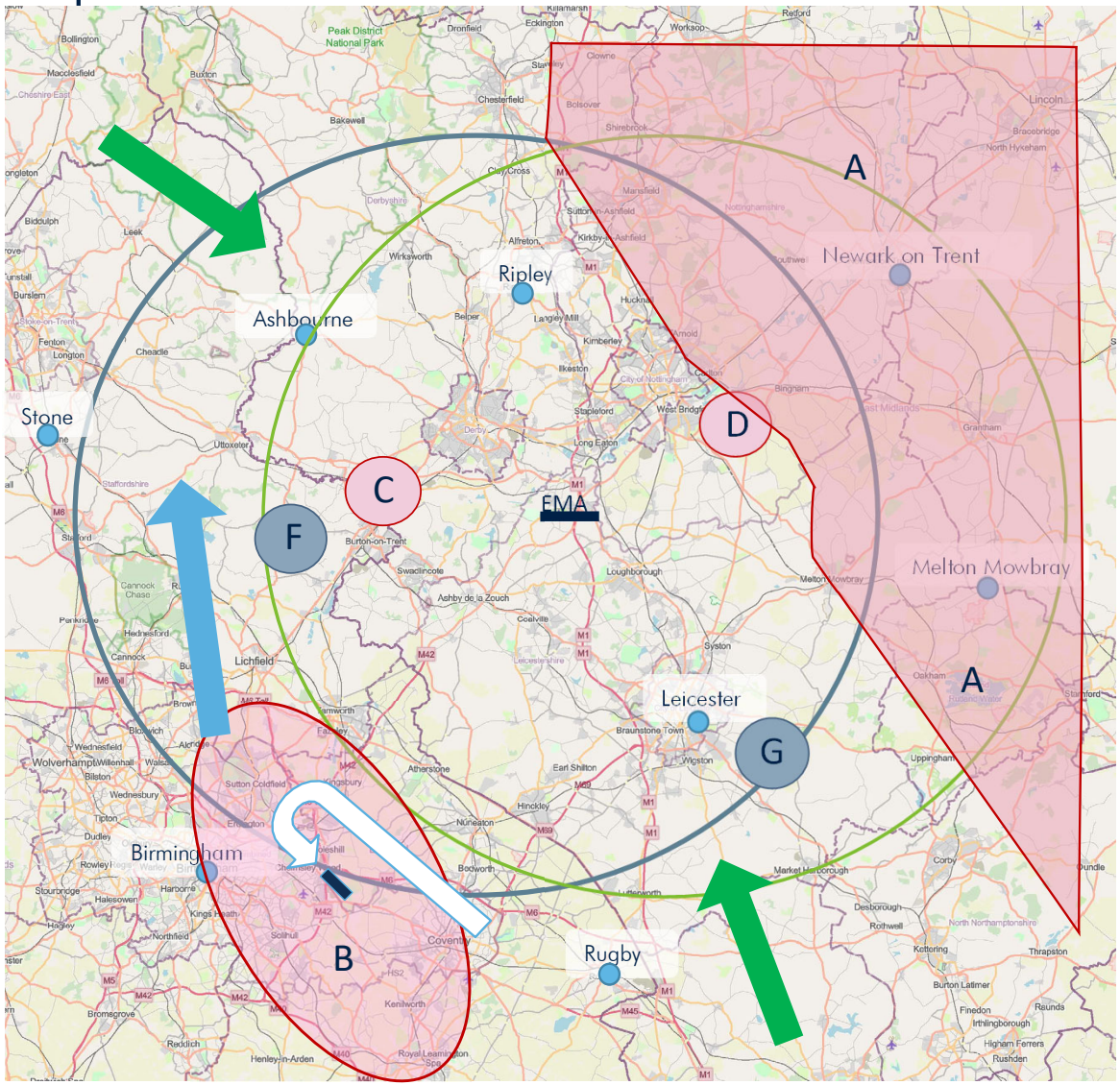
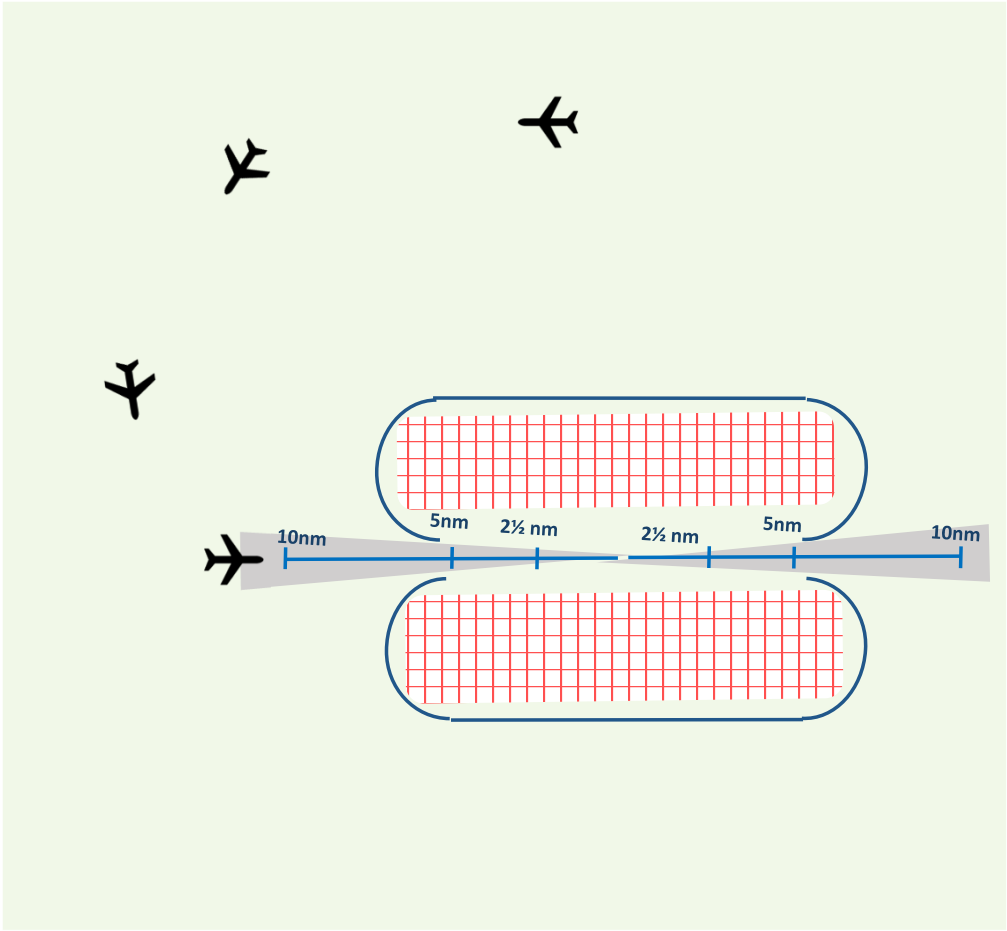
Step 2 – Arrivals constraints and considerations



- Runway 27 boundary
- Runway 09 boundary
- Constraints
  - Area A – Uncontrolled Airspace
  - Area B – Birmingham Airport
  - Area C – Derby Airport (surface to 2,000ft)
  - Area D – Nottingham Airport (surface to 2,000ft)
- Considerations
  - Area F - Tatenhill (surface -2,000ft)
  - Area G – Leicester Airport (surface to 2,000ft)
- Birmingham Airport
  - Arrival
  - Departure
- East Midlands Airport
  - Arrival

Step 3 – Applying design principles

- The **Keeping Our Skies Safe** Design Principle requires us to design to industry standards and regulations
- These provide guidance on the joining point onto final approach and create an area within which we can't design an arrival procedure
  - This is because of safety rules on turn radius, speed and the minimum height for final approach
- Similarly the **A Joined-up Approach** Design Principle requires us to consider 2 documents:
  - The Air Navigation Guidance 2017 and the CAA Airspace Modernisation Strategy (AMS)
- Both highlight the use of Continuous Descent Approaches (CDA) as a means to reduce the environmental impact of arriving aircraft
  - Our arrivals designs will therefore provide continuous descents to both runway ends to meet this design principle



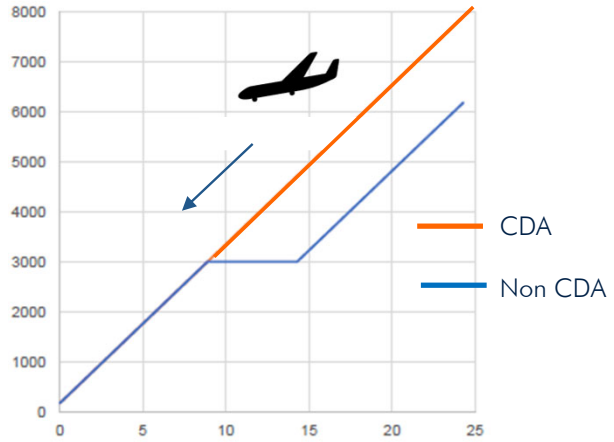
What are Continuous Descent Approaches?

- Continuous Descent Approaches (CDA) involve arriving aircraft using minimum thrust and avoiding prolonged level flight

- The objective of a CDA is to reduce the environmental impact of the arrival by:
  - Reducing noise
  - Minimising CO_2

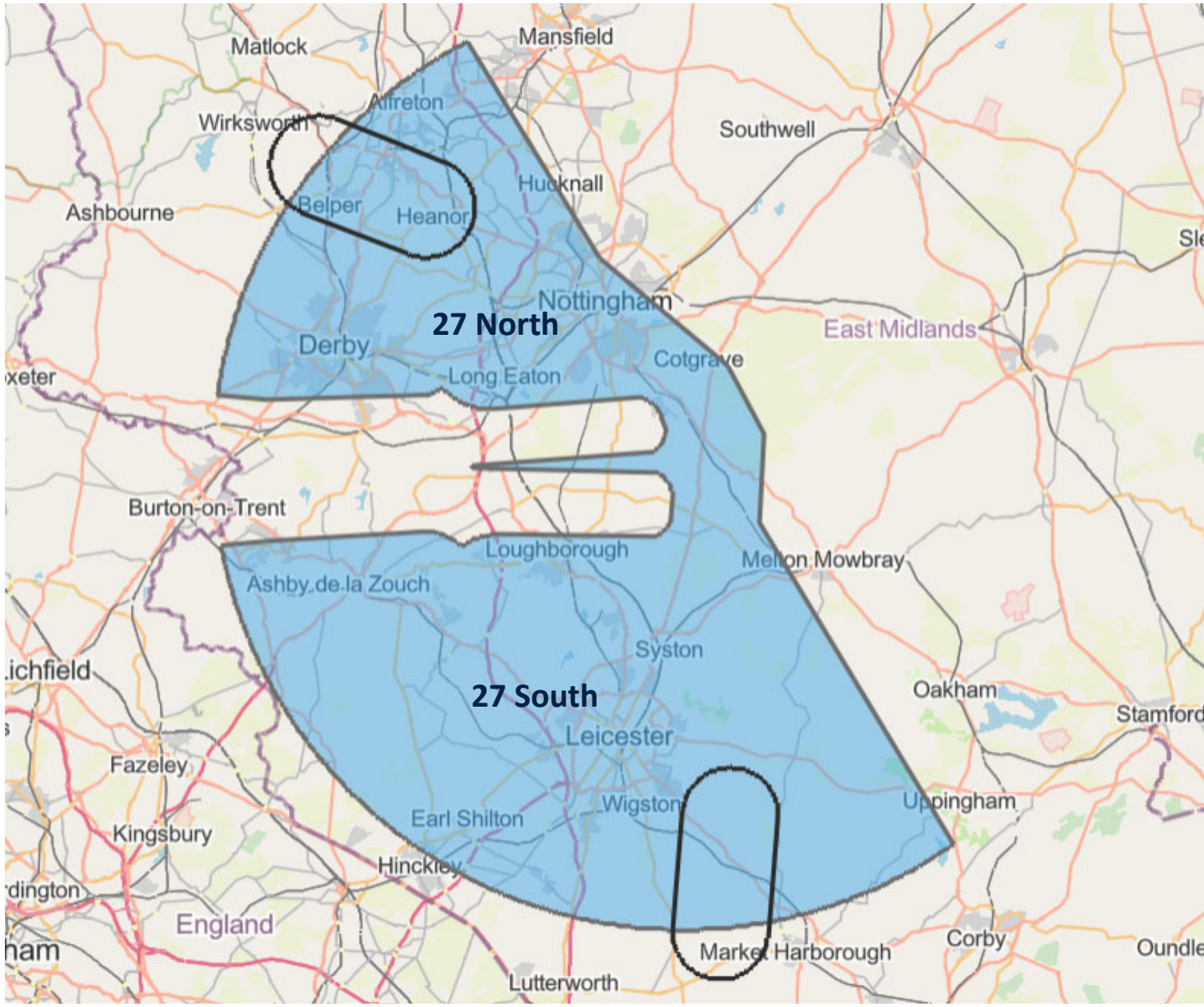
- There is a range of descent gradients for a CDA which will provide benefits
  - The optimal is between around 3.5% and 5.25%
  - Below this may require engine power, creating noise
  - Above this may result in air brakes being needed, which also create noise

- We've therefore created a design area for arrivals that provides a CDA within this optimal range
  - This equates to an arrival track of between 25-32 miles from 7,000 feet



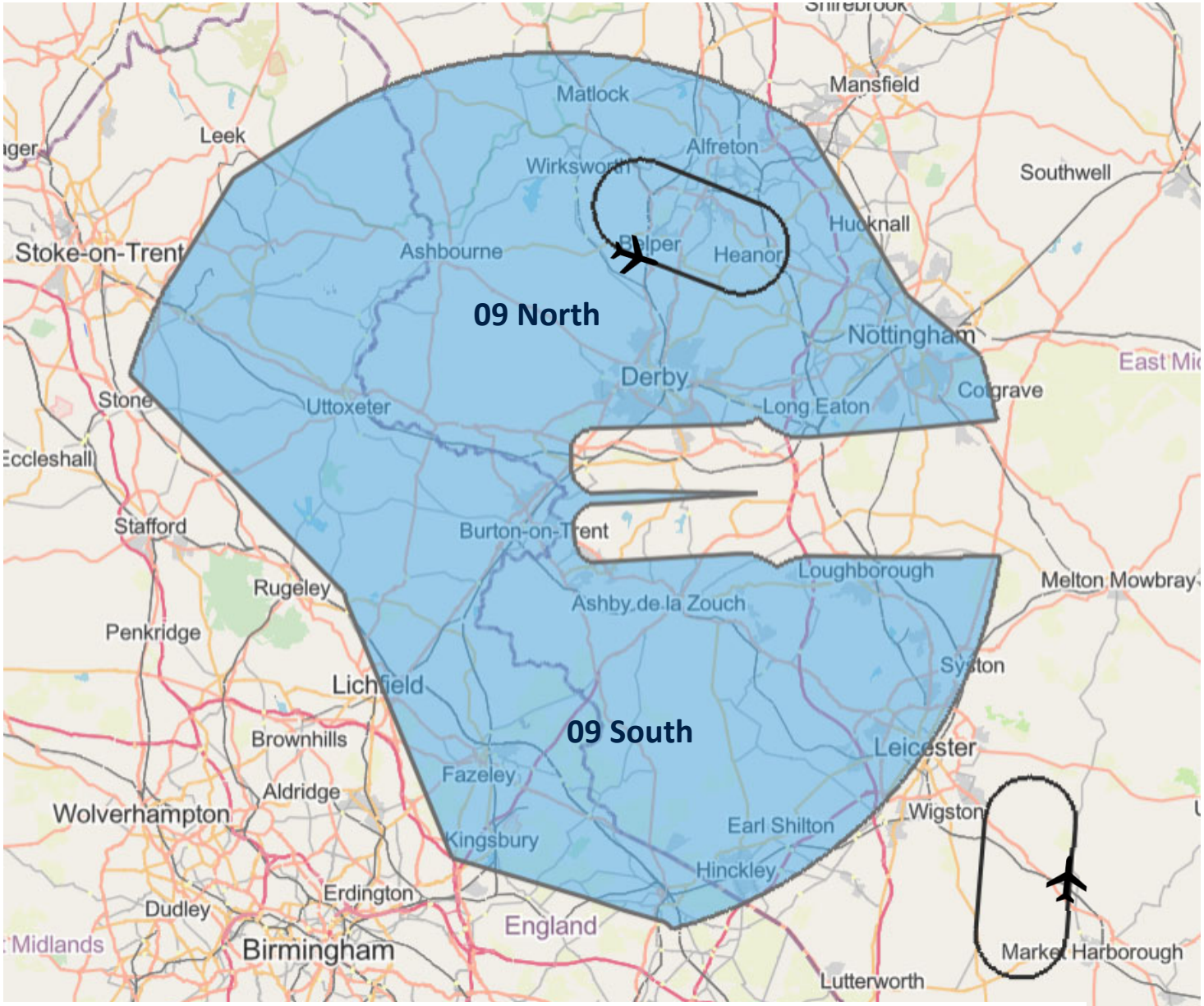
Runway 27 arrival design envelopes

Current holding area



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

Runway 09 arrival design envelopes

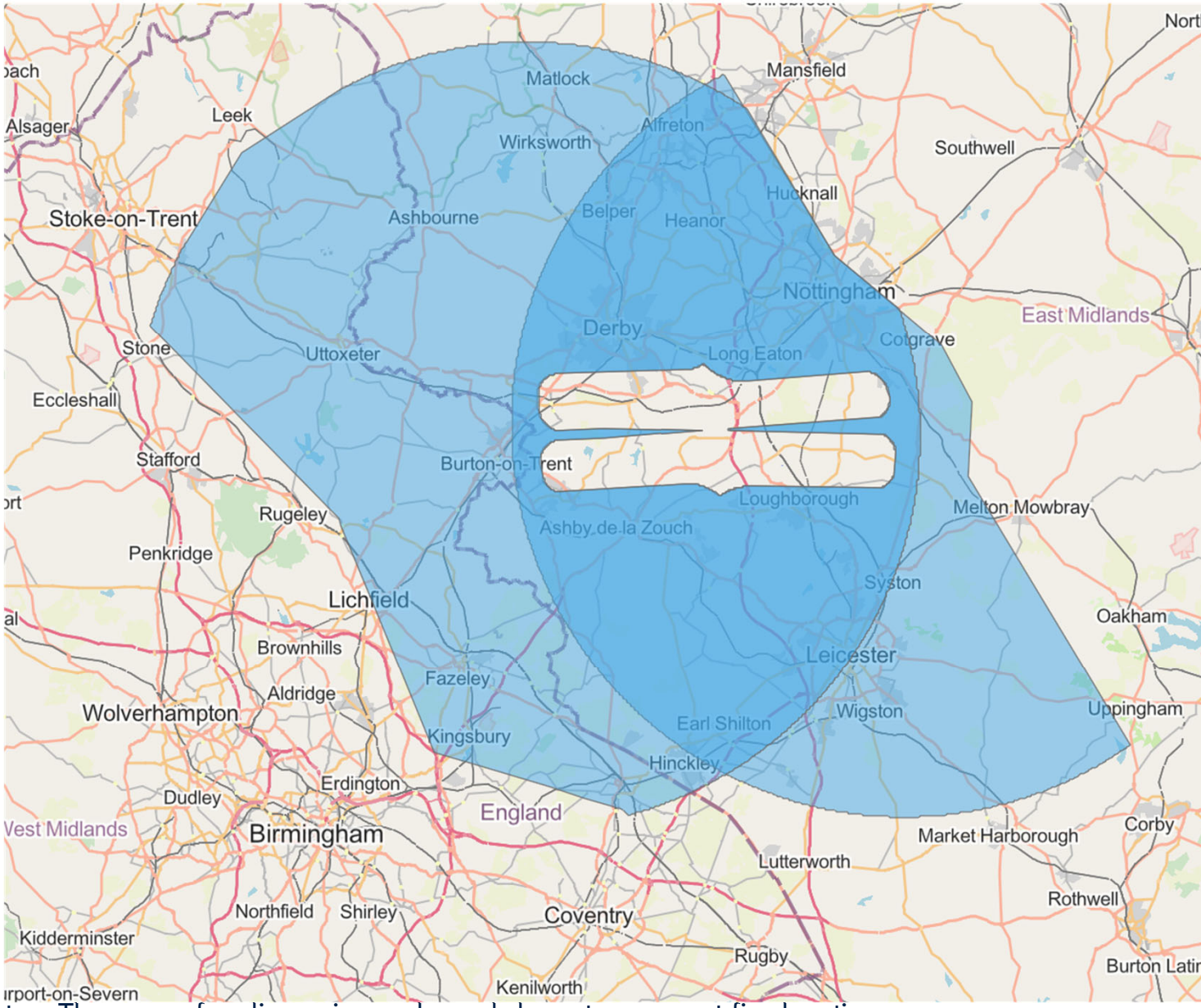


Current holding area

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

Arrival design envelopes

Areas where arrivals to Runway 27 or Runway 09 could achieve a Continuous Descent Approach (CDA) from 7,000 feet



CDA possible to both runway ends

CDA possible to one runway end only

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. We have to consider a 'do nothing' and a 'do minimum' option. However, if we were to replicate our current routes closely, how could we improve them?

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RESPITE

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Design principles – Sharing the Load

To aid the development and evaluation of our options, we'd like to hear your views on your perception of respite.

Respite can reduce the impact of noise in different ways, including

- **Varying** the routes used on different days, or depending on the time of day. This creates predictable periods of no or reduced overflight
- Using **multiple** routes to reduce the frequency and number of flights using each individual route by spreading them out
- The use of preferential runway mode (when weather conditions allow)

The extent to which these options can be used will become clearer as we progress through the process

Are there any times of the day or days of the week where it would be preferable to have a period of respite?

Is it important to you that periods of lower noise are scheduled and predictable? Or, do you just wish to see a sharing of noise?

When considering the use of multiple routes to provide respite, what might constitute a sufficient period of respite?

NEXT STEPS

This presentation and a Q&A document will be provided to you before the end of the day.

Please email any additional feedback to futureairspace@eastmidlandsairport.com by 5pm Thursday 21st July 2022

Thank you for your time and input

MAG East Midlands Airport

East Midlands Airport Future Airspace

Stage 2, Develop and Assess
Phase One Pre Read

June 2022

MAG East Midlands Airport

East Midlands Airport Future Airspace

STAGE 2 – DEVELOP AND ASSESS

Thank you for taking part in our discussions about the future of airspace at East Midlands Airport (EMA). 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 we modernise the way that we use our airspace.

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 it 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 EAST MIDLANDS AIRPORT

EMA sits at the very heart of the country and serves just under five million passengers a year. In addition to the important role as a regional passenger airport, EMA is the UK's largest dedicated air-cargo airport, and the 7th largest air-cargo hub in Europe. Processing and transporting over 442,000 tonnes of cargo a year with an economic value of around £40bn, EMA is a key strategic asset for the national economy and is a significant source of jobs and economic activity in the Midlands region. Currently, arrival and departure routes at EMA do not fully utilise the capability of modern aircraft navigation technology and techniques. Airspace modernisation at EMA could potentially increase efficiency, reduce fuel burn and CO_2 emissions, and reduce impact of aircraft noise.

It is important that any changes to airspace at EMA 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 (FASI) group of airports. Each airport is required to modernise airspace in its local area at heights of up to 7,000 feet above mean sea level (amsl). In addition, NATS, (the UK's air traffic control provider) will be re-designing routes in upper airspace above 7,000ft, 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.

2019/2020	2022/2023	2023/2024	2024	2025	2026	2027 onwards
Stage 1 **Define**	Stage 2 **Develop and assess**	Stage 3 **Full public consultation**	Stage 4 **Update and submit proposals**	Stage 5 **Decision**	Stage 6 **Implementation**	Stage 7 **Post-implementation review**
Step 1A In May 2019 we sent the CAA our Statement of Need, which was approved and provisionally classed as a Level 1 change. **Step 1B** We gathered views on Design Principles during 2019. Our Stage 1 work was approved by the CAA in January 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 2023.	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 late 2023/2024.	We will update our airspace change proposal, taking stakeholders' feedback into account, before sending it to the CAA in 2024.	We expect the CAA's decision on whether to approve any airspace change in 2025.	If approved, any airspace changes could be put in place in 2026.	The CAP1616 process gives the CAA and airports 12 months to review any change that has been made to airspace.

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

PROGRESS SO FAR

EMA 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 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 EMA. The design principles that were developed are set out below.

Keeping the Skies Safe	Safety must take precedence over all other factors. Flight paths must be safe for airspace users,the airport and communities on the ground.
A joined-up approach	Any changes must align with the broader national airspace modernisation strategy, comply with national, international and industry regulations and legislation, and align with current and future Airspace Change Programmes in the north and south of the UK through involvement in the Future Airspace Strategy Implementation groups.
Meeting Demand	New flight paths must ensure the continuation of services offered today and meet any future demand, in keeping with local and national planning policy, and the Government's policy on 'making best use' of existing runway capacity.[1]
Limiting Our Footprint	Flight paths that limit and, where possible, reduce emissions should be implemented.

1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/714069/making-best-use-of-existing-runways.pdf

Sharing the Load	Flight paths should, where practical, be spread out to avoid concentration of aircraft activity to share any noise impacts.
Responsive Flight Paths	Where flight paths have to overfly communities, we will consider existing noise in the local area, and will select flight paths to mitigate effects on areas with relatively low levels of ambient noise.
Limiting Disturbance	Flight paths should seek to limit and, where possible, reduce noise disturbance to communities – especially at night.
Noise Sensitive Locations	Flight paths should, where practical, avoid locations that are especially sensitive to noise.
Fit for the Future	Flight paths should be designed to futureproof our airspace and should not be constrained by existing arrangements.
Airspace for All	Our controlled airspace should be open to all authorised users; however, priority will be given to airport air traffic over other airspace users, except for emergency aircraft.
Embracing Technology	Flight paths should be designed using the latest, widely available navigational technology and flying techniques.

In December 2019, the CAA assessed and approved the work carried out at Stage 1, allowing the airport to proceed to Stage 2, develop and assess. The COVID-19 pandemic meant that we paused the process, until now, but we are now progressing with Stage 2.

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 evaluated 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, and you will also be invited to take part in a second phase in Autumn 2022.

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. This work will then be shared for feedback at the next phase of discussion sessions, planned for Autumn 2022.

Taking on board feedback from these discussions, the list of route options will then be taken forward for evaluation to see how well they meet the design principles. The route options will then be assessed to understand their likely effects.

Once we have completed the evaluation and assessment, details of the work carried out at Stage 2 will be submitted to the CAA for assessment at the end of February 2023. Subject to the CAA's approval, EMA will then proceed to Stage 3 of the airspace change process where the refined options will be subject to full public consultation.

WHAT TO EXPECT FROM THE DISCUSSION SESSION

Each online discussion session will be held as a virtual meeting using Microsoft Teams and is expected to run for one and a half hours. You will be sent a link to the session in advance. The session will consist of a presentation from the airport team. There will be opportunity to ask questions and offer comments on the information shown throughout.

Please note that the sessions will be recorded so feedback can be analysed. It will not be used for any other purpose.

If you have any questions or concerns before the session, or if there is anything we can do to help you take part, please let us know by contacting future.airspace@eastmidlandsairport.com

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.

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. In the UK, the wind usually comes from a westerly direction. For this reason, at EMA aircraft arrive and depart in a westerly direction around 70% of the time, although this can vary from month to month and year to year.

EMA has one runway which runs in an east to west direction. One end of the runway, where aircraft arrive and depart in a westerly direction, is referred to as runway 27. The other end, where aircraft arrive and depart in an easterly direction, is known as runway 09. The runway name relates to the compass bearing the pilot will see when lined up to arrive or depart: 270 degrees for runway 27, and 090 degrees for runway 09.

DEPARTURES

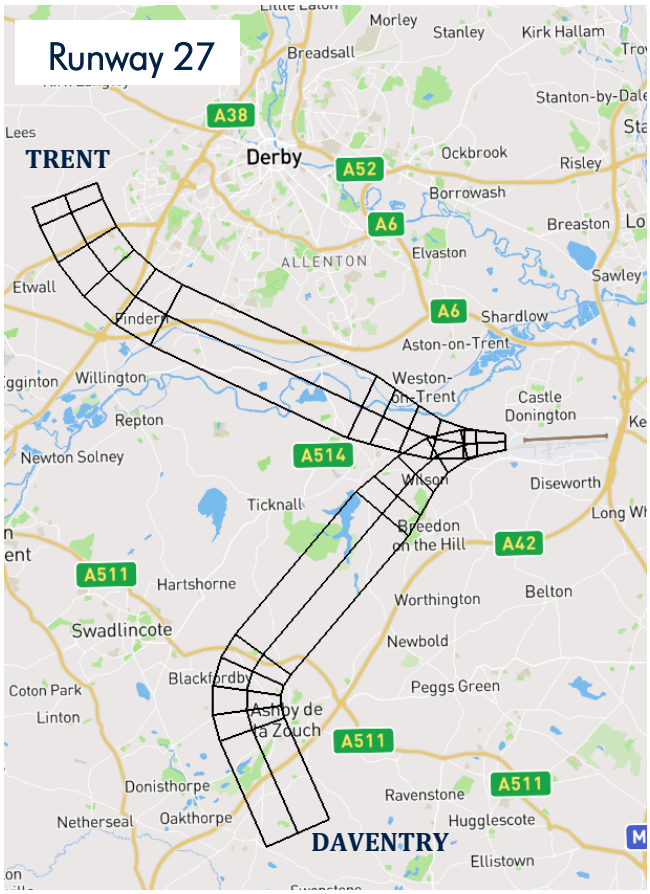
All jet and most propeller aircraft departing from the airport follow set routes called standard instrument departures (SIDs). These simplify the departure process by providing the aircraft's computer system with several waypoints and a climb profile (the rate at which to increase height by distance travelled) it needs to follow to make sure it accurately follows the SID and remains safe. At

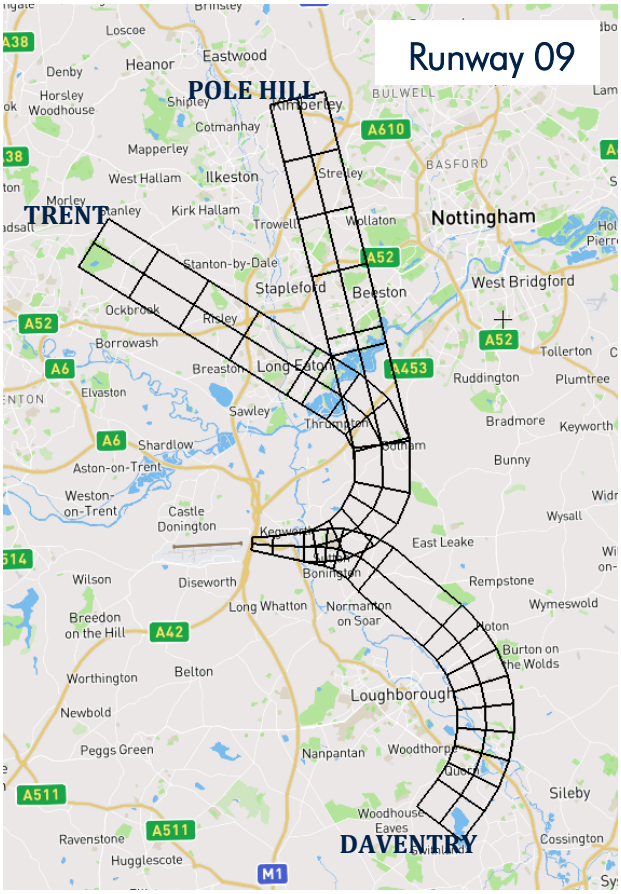
the end of the SID, which is typically between 5,000 feet and 7,000 feet, the aircraft join the upper airspace network. At present, the SIDs at EMA rely upon ground-based navigation aids (a marker, signal or device that guides and navigates an aircraft). These ground-based navigation aids are being withdrawn from service on a national basis in the coming years and this is one of the reasons why we are working to modernise EMA's airspace.

The SIDs have been carefully designed to minimise the effect of aircraft noise close to the airport by avoiding larger urban areas. We monitor how each aircraft flies, and we expect aircraft to stay within a 'corridor' that extends up to 1,200 metres either side of the centreline of the SID (in total 2.4 kilometres wide). 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 5,000ft amsl.

There are currently five NPRs– two for Runway 27 and three for Runway 09.

The below maps show where the current NPRs are located.



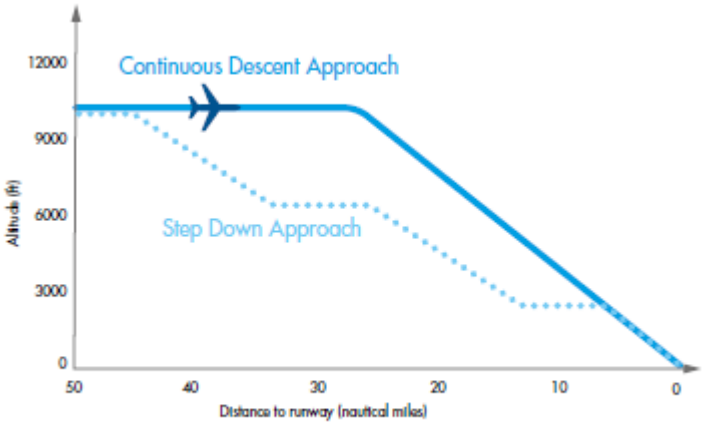


ARRIVALS

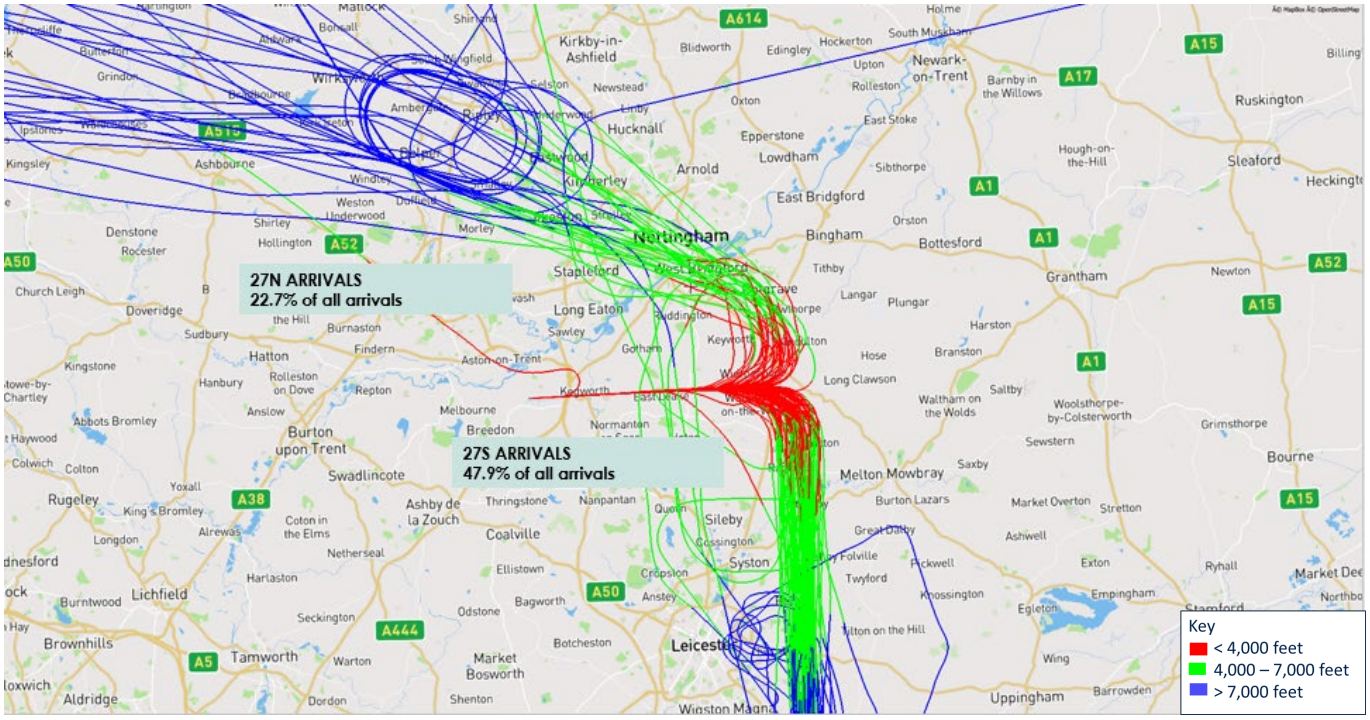
Unlike departures, there are currently no set routes for arriving aircraft. Although they do tend to concentrate within a similar area, Air Traffic Control has to be able to direct arrivals anywhere within controlled airspace to maintain safety and efficiency.

Aircraft arrive at EMA from several different directions. 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

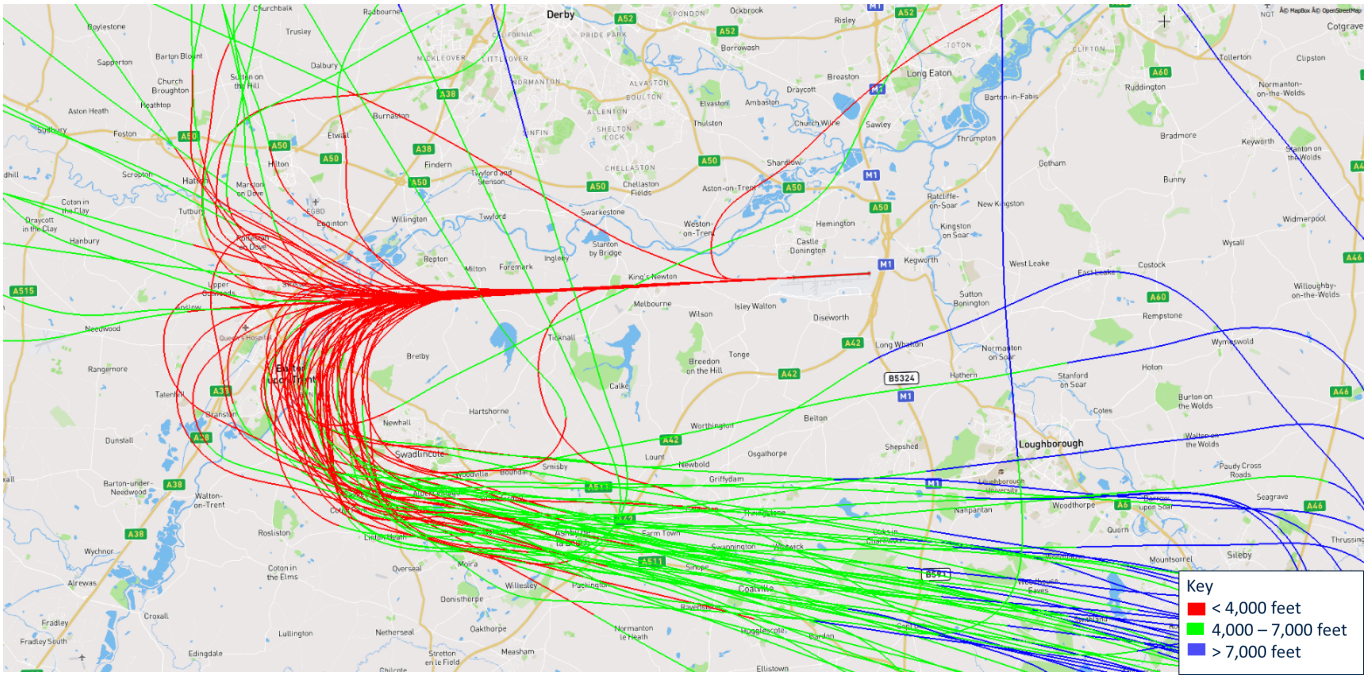
spread aircraft tracks across a relatively broad area. However, as aircraft get closer to the airport, they begin their final approach. At this point they converge along the extended runway centreline, and this dispersal narrows until all aircraft follow the same straight line on to the runway. The point 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 avoids the need for them to apply engine thrust to either level out or maintain a specific height. CDAs produce an environmental benefit by keeping aircraft higher for longer, reducing fuel burn and reducing noise on the ground. Currently around 90% of arrivals at EMA use a CDA.



The map above shows typical tracks of arriving aircraft when arriving to Runway 27.



The map above shows typical tracks of arriving aircraft when arriving to Runway 09

FUTURE AIRSPACE DESIGN

As explained at the start of this document, the changes that are being made at EMA are part of a national programme of change. As a result, our new airspace designs are required to be aligned with the CAA's Airspace Modernisation Strategy (AMS). This is one of the design principles we agreed at Stage 1 ("A Joined-up Approach"). The AMS requires us to use Performance Based Navigation (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 EMA.

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 East Midlands Airport completed at Stage 1

GLOSSARY

Term	Definition
Airspace Modernisation Strategy (AMS)	The CAA's strategy and plan for the use of UK airspace, including the modernisation of airspace.
Air Traffic Control (ATC)	Air traffic control make sure aircraft fly safely within airspace, often issuing commands to aircraft to climb, descend or turn.
CAA	Civil Aviation Authority, the industry's regulator.
CAP1616	The CAA's guidance document which sets out the regulatory process which all airspace change proposals must follow.
Continuous Descent Approach (CDA)	Method by which arriving aircraft descend on a smooth continuous glide path, therefore staying higher above the ground for longer and reducing the level of arrival noise heard on the ground.
Future Airspace Implementation (FASI)	Group accountable for delivering airspace changes (includes airports and NERL (NATS En Route) in the UK.
Instrument Landing System (ILS)	A precision runway approach aid based on two signals which provide vertical and horizontal guidance to aircraft on approach to land.
NATS	The UK's air traffic navigation service provider, formerly known as National Air Traffic Services.
Noise Preferential Route (NPR)	Locally agreed defined initial flight paths that departing aircraft must remain within until they have reached a set minimum height.
Performance Based Navigation (PBN)	Satellite based navigation system designed to improved track keeping accuracy for aircraft.