

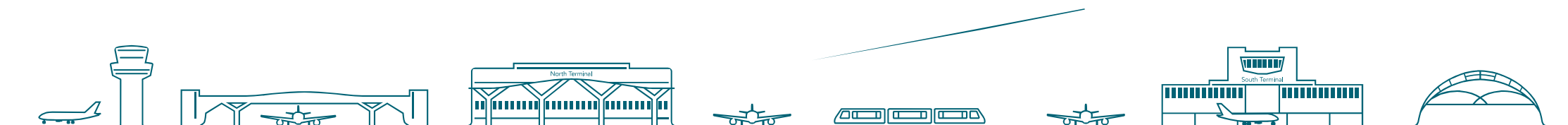
## Gatwick Airport FASI South Airspace Change Proposal

# Stakeholder briefing on the comprehensive list of airspace design options for Stage 2 of the CAP1616 process

Virtual meeting

February 15<sup>th</sup> / 17<sup>th</sup> / 23<sup>rd</sup> 2022

Version 2 - Final



## GLOSSARY

|           |                                                      |                                                                                                                                                                                                                                                                                                                       |
|-----------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACP       | Airspace Change Proposal                             | A request (usually from an airport or air navigation service provider) for a permanent change to the design of UK airspace. An airspace change sponsor must follow a 7-stage process explained in the CAA's document CAP 1616 Airspace Design Guidance.                                                               |
| ANG       | <a href="#">Air Navigation Guidance</a>              | Guidance to the CAA on its environmental objectives when carrying out its air navigation functions, and to the CAA and wider industry on airspace and noise management.                                                                                                                                               |
| AMS       | <a href="#">Airspace Modernisation Strategy</a>      | A coordinated strategy and plan for the use of UK airspace for air navigation up to 2040, including for the modernisation of the use of such airspace, prepared and maintained by the CAA.                                                                                                                            |
| ATC       | Air Traffic Control                                  | Responsible for the safe separation of traffic in controlled airspace                                                                                                                                                                                                                                                 |
| CAA       | Civil Aviation Authority                             | Independent aviation regulator and responsible for the adjudication of airspace change proposals                                                                                                                                                                                                                      |
| CCO / CDO | Continuous climb operations / Continuous descent ops | Allow arriving or departing aircraft to descend or climb continuously, to the greatest extent possible.                                                                                                                                                                                                               |
|           | Comprehensive List of Options                        | A list of viable options an airspace change sponsor develops as part of Stage 2 of the CAP1616 process. The list aims to address the statement of need and align with the Design Principles developed at Stage 1.                                                                                                     |
| DfT       | Department for Transport                             | Department for Transport. Co-sponsors with the CAA of the Airspace Modernisation Strategy                                                                                                                                                                                                                             |
| DP        | Design Principle                                     | Developed as part of Stage 1 of the airspace change process                                                                                                                                                                                                                                                           |
| FAI-S     | Future Airspace Strategy Implementation – South      | The coordinated programme of airspace modernisation in southern England,                                                                                                                                                                                                                                              |
| NATS      | Formerly known as 'National Air Traffic Services     | Provide air traffic services across the UK. NATS NERL (NATS (En Route) plc) are responsible for the upper airspace change (airspace network above 7000ft)                                                                                                                                                             |
|           | Notional Flight Path                                 | A path based on the basic principles of Instrument Flight Procedure (IFP) design that is used to flood sections of airspace. Notional flight paths are not airspace change options, but assessment of the paths provides a core set of environmental information that can be used when developing routes and options. |
|           | Option                                               | At this stage, an option is one complete system of either arrival or departure routes from the same runway end.                                                                                                                                                                                                       |
| PBN       | Performance Based Navigation                         | A concept that moves aviation away from the traditional use of aircraft navigating by ground-based beacons to a system more reliant on airborne technologies, utilising satellite systems and improving navigation accuracy and performance.                                                                          |
|           | System                                               | A workable group of arrival or departure routes from the same runway end                                                                                                                                                                                                                                              |
|           | Vectoring                                            | Provision of navigational guidance to aircraft in the form of specific headings, based on the use of an Air Traffic Services surveillance system.                                                                                                                                                                     |

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## 1. WELCOME & INTRODUCTIONS

**Thank you for participating in Gatwick's Airspace Change Proposal (ACP) to redesign the airport's arrival and departure routes.**

### **Presenters for today's briefing**

- Goran Jovanovic – Airspace Change Manager, Gatwick Airport Limited
- Andy Sinclair – Head of Airspace Strategy and Engagement, Gatwick Airport Limited
- Chris Barnes – Director, Trax International Limited
- Dave Jones – Head of Airspace and Procedure Design, Trax International Limited
- Nichola Shaw – Airspace Change Specialist, Trax International Limited

The slides will be circulated following the workshops

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## 1. WELCOME & INTRODUCTIONS

1. Welcome and introductions
2. Background to the GAL FASI ACP
3. Purpose of engagement on the comprehensive list of options.
4. Approach to developing the comprehensive list of options
5. Comprehensive list of options overview
6. Focus of this engagement exercise
7. Next steps



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## 1. WELCOME & INTRODUCTIONS

- The slides and our full comprehensive list of options will be circulated following the meetings.
- We will pause regularly during today's presentation to take feedback and questions.
- Please raise your hand using the functionality in MS Teams if you would like to contribute, rather than putting questions in the chat.

Thank you.

## 2. BACKGROUND TO THE GAL FASI ACP

**The UK's Airspace Modernisation Strategy identifies the need to fundamentally redesign the UK's airspace system to meet the demand for air transport in a sustainable and resilient way.**

- Airspace modernisation in Southern England is being delivered as a single coordinated programme known as FASI (Future Airspace Strategy Implementation) South.
- The DfT asked all affected airports, and NATS, to develop Airspace Change Proposals (ACPs) as part of the FASI-South Programme.
- All ACPs are required to follow the UK Civil Aviation Authority's (CAA's) seven-stage process for changing the airspace design (known as CAP1616).
- The Gatwick Airport Limited (GAL) FASI-South ACP is currently in Stage 2 of 7.
- The interdependencies between FASI-South ACPs must be coordinated to optimise the overall design. The Airspace Change Organising Group (ACOG) was established to deliver this coordination through the development of an Airspace Change Masterplan.

## 2. BACKGROUND: STAGE 1 AIRSPACE DESIGN PRINCIPLES

At Stage 1 of the CAP1616 process, Gatwick submitted a Statement of Need, and then developed the following Design Principles through engagement with stakeholders. In July 2019 Gatwick passed the Stage 1 Define Gateway.

| # | Design Principle*                       | Description                                                                                                                                                                                      |
|---|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Safety by Design                        | Must at least maintain, and ideally enhance, aviation safety, by reducing or removing safety risk factors, provided enhancement does not have a detrimental impact on other benefits. (CORE)     |
| 2 | Enhanced Navigation Standards           | Should adopt the most beneficial enhanced navigation standards for new routes. (CORE)                                                                                                            |
| 3 | Limit Adverse Noise Effects             | Shall aim to limit and where possible reduce the adverse impacts of aircraft noise. (CORE)                                                                                                       |
| 4 | Time Based Arrival Operations           | Should be compatible with the adoption of time-based arrival operations.                                                                                                                         |
| 5 | Resilience Built In                     | Should be materially unaffected by most disruptions, including poor weather and technical failures, through the provision of adequate contingencies.                                             |
| 6 | Optimise Use of Aircraft Capabilities   | Should enable aircraft operators to optimise the use of their fleet capabilities to improve operational efficiency and environmental performance.                                                |
| 7 | Long Term Predictability & Adaptability | Should offer long term predictability of flight paths and respite and offer adaptation for the future airport development scenarios outlined in our draft Masterplan.                            |
| 8 | Deconfliction by Design                 | Should seek, where possible, to deconflict routes by design below 7000ft, and the prevalence of overflight of a community by flights on different routes and/or by neighbouring airport traffic. |
| 9 | Locally Tailored Designs                | Should enable decisions which affect how aircraft noise is best distributed to be informed by local circumstances and consideration of different options.                                        |

\*More detail on the background and application of the GAL FASI ACP Airspace Design Principles can be found [here](#)

## 2. BACKGROUND: STAGE 2 DEVELOP AND ASSESS OPTIONS

In the 1<sup>st</sup> round of engagement to support the Stage 2 activities (Q3/Q4-2021), we sought feedback on the methodology that we proposed to follow to develop and assess airspace design options for the GAL FASI ACP.

The methodology addresses the requirements laid out in Stage 2 of CAP1616

**Step 2A:** Develop a first Comprehensive List of Options and evaluate them against the Design Principles to narrow down to a shortlist.

**Step 2B:** Conduct an Initial Appraisal of the options on the shortlist.

The Initial Options Appraisal is the 1 of 3 phases of appraisal required to refine the options and introduce progressively more detail to the analysis of costs and benefits:

### *Stage 2: Develop and Assess*

#### **Initial Options Appraisal**

Largely qualitative assessment of the shortlisted options to highlight the relative impacts, both positive and negative

### *Stage 3: Consult*

#### **Full Options Appraisal**

A more detailed quantitative assessment, including all costs and benefits evaluated in monetary terms where possible

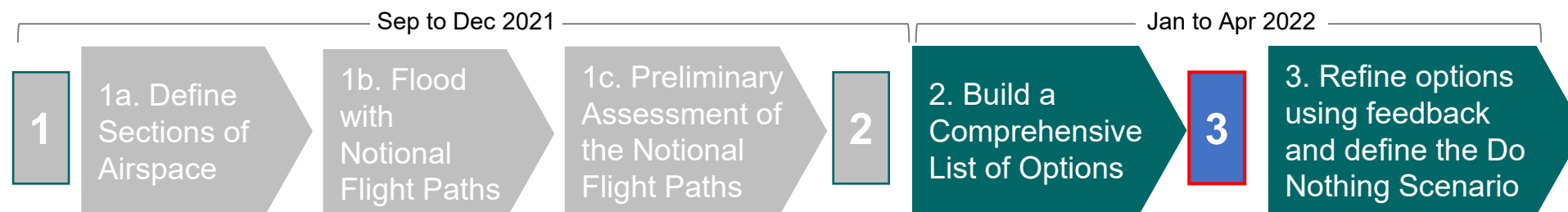
### *Stage 4: Update and Submit*

#### **Final Options Appraisal**

The full appraisal updated and refined based on the output of the Stage 3 formal consultation with stakeholders

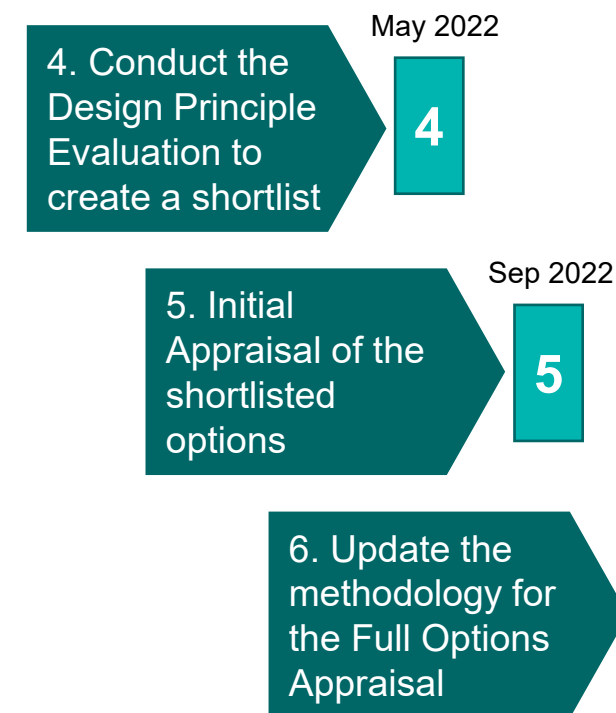
## 2. BACKGROUND: STAGE 2 TIMELINE EXTENSION AND ENGAGEMENT EXPANSION

We have extended our timeline to facilitate greater engagement with NATS, Airports and other stakeholders:



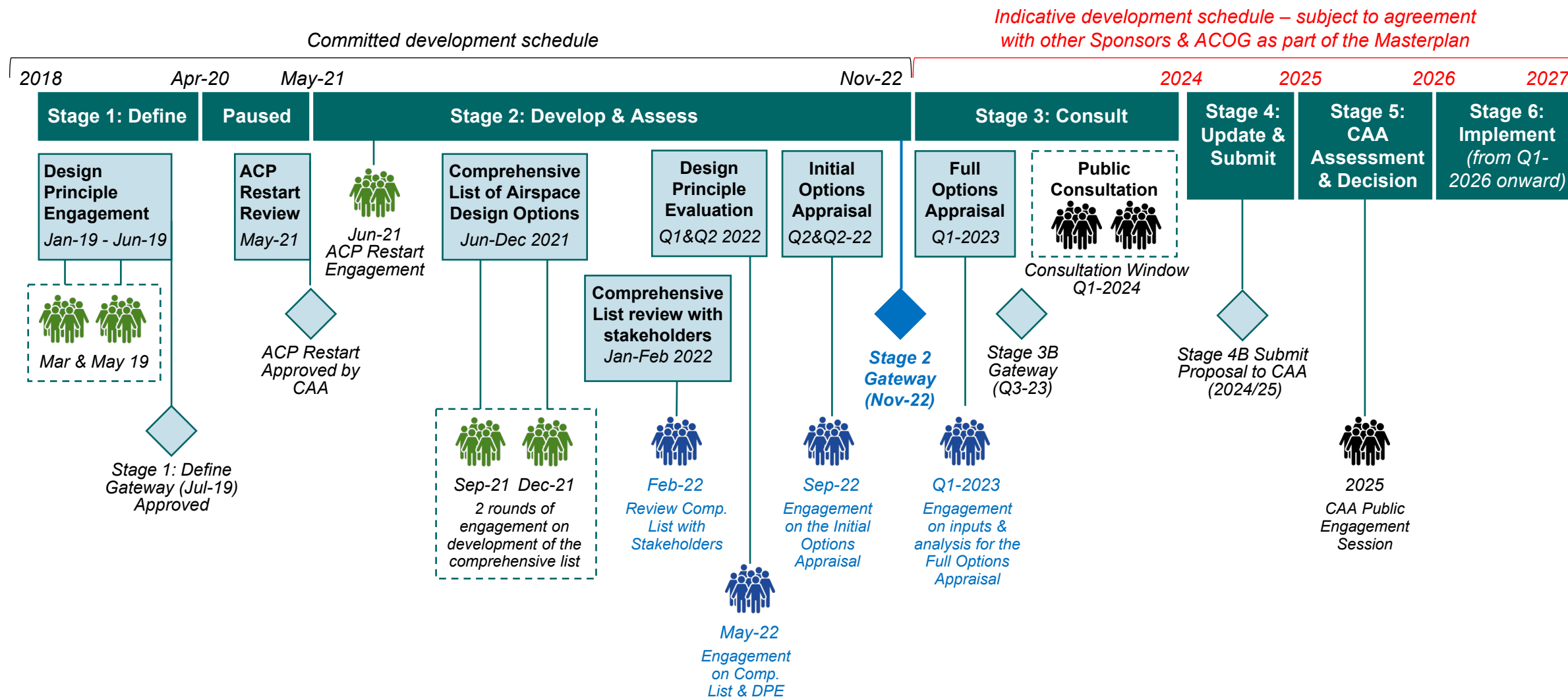
### Three to five rounds of engagement during stage 2

- 1 Engagement to gather feedback on the methodology that we intend to follow to develop and assess airspace change design options during Stage 2.
- 2 Stakeholder update on the progress towards building a Comprehensive List of Options, integration with the Masterplan and technology / operational concepts.
- 3 Engagement to gather feedback on the development of a first Comprehensive List of Options for the ACP.
- 4 Engagement on how the outputs the engagement so far have shaped the options on the comprehensive list and the approach to the Design Principle Evaluation.
- 5 Engagement to present the outputs of the Initial Options Appraisal and gather feedback on how we should refine the appraisal further and consult on the options in Stage 3.



## 2. BACKGROUND: OVERALL ACP TIMELINE UPDATE

The following diagram shows the extended Stage 2A timeline within the overall ACP timeline:



### 3. PURPOSE OF THE COMP. LIST OF OPTIONS ENGAGEMENT

**We believe we have produced a comprehensive list of all viable airspace design options for the ACP that align with the design principles and address the issues set out in the Statement of Need.**

The purpose of this engagement is to test the comprehensive list of options with the same group of representative stakeholders that have participated in the development of the ACP so far:

- Local community, environmental and special interest groups
- Councils and public officials
- Airspace users and other aviation stakeholders

### 3. PURPOSE OF THE COMP. LIST OF OPTIONS ENGAGEMENT

**We believe we have produced a comprehensive list of all viable airspace design options for the ACP that align with the design principles and address the issues set out in the Statement of Need.**

#### **We are seeking feedback on the following:**

1. Is the list of options sufficiently comprehensive (is anything missing)?
2. Is the list of options developed in line with the design principles?
3. Are there any other considerations that we should take into account regarding the development of a comprehensive list of options for the ACP?

#### **The feedback will be used to:**

- Refine options
- Develop new options where appropriate.

We are not seeking feedback on the position of each individual flight path included in the options. That will happen later in the process as we conduct the Initial and Full Options Appraisals, and ultimately during the Public Consultation on the ACP.



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## FEEDBACK & QUESTIONS

## 4. APPROACH TO DEVELOPING THE COMPREHENSIVE LIST OF OPTIONS

**Our methodology is organised into six parts aligned to the CAP1616 requirements for developing & assessing options**

|   |                                                       |                                                                                                                                        |
|---|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <b>Develop an Airspace Design Database</b>            | Define sections of airspace where a flight path could conceivably be positioned within the scope of the ACP.                           |
| 2 | <b>Define Do Nothing and Do Minimum Options</b>       | Describe the Do-Nothing Scenario as a baseline and a 'Do Minimum' option if the 'Do Nothing' is not viable.                            |
| 3 | <b>Build the Comprehensive List of Options</b>        | Set out all viable options that address the Design Principles and the scope of the ACP as described in the Statement of Need           |
| 4 | <b>Conduct the Design Principle Evaluation</b>        | Examine how well each option aligns with the Design Principles and shortlist the options to progress to the Initial Options Appraisal. |
| 5 | <b>Produce the Initial Options Appraisal</b>          | Conduct a largely qualitative assessment of the impacts, both positive and negative, of the shortlisted options.                       |
| 6 | <b>Set out the Full Options Appraisal Methodology</b> | Describe the methodology for producing a quantitative appraisal with monetized costs and benefits in Stage 3.                          |

#### 4. APPROACH TO DEVELOPING THE COMPREHENSIVE LIST OF OPTIONS

**Our Airspace Design Database collates a core set of information needed to clearly demonstrate how each option has been identified and why the first list is considered sufficiently comprehensive.**

##### **Sections of Airspace**

The database will cover all geographical sections of airspace where a flight path may conceivably be positioned within the scope of the ACP.



##### **Notional Flight Paths**

We will define the broad range of notional flight paths that are technically possible within each section of airspace – an approach known as flooding.



##### **Preliminary Assessment**

A core set of information will be produced through a preliminary assessment of the performance of each individual notional flight path using a variety of noise and overflight measurements.

Example Flooding –  
Not Final ACP Option

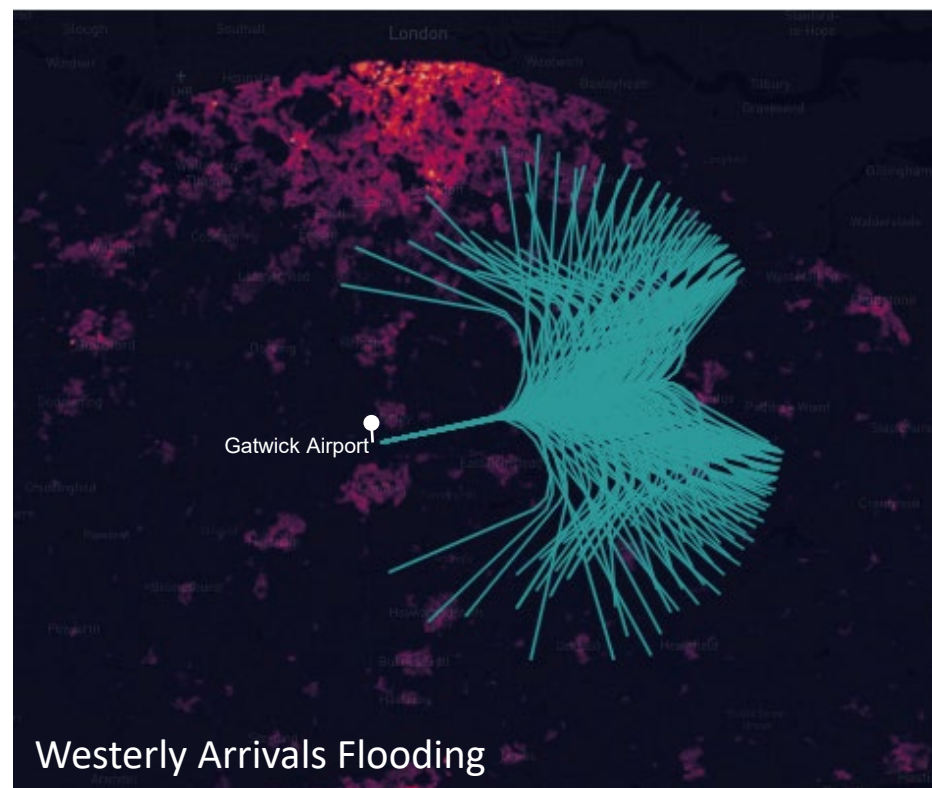
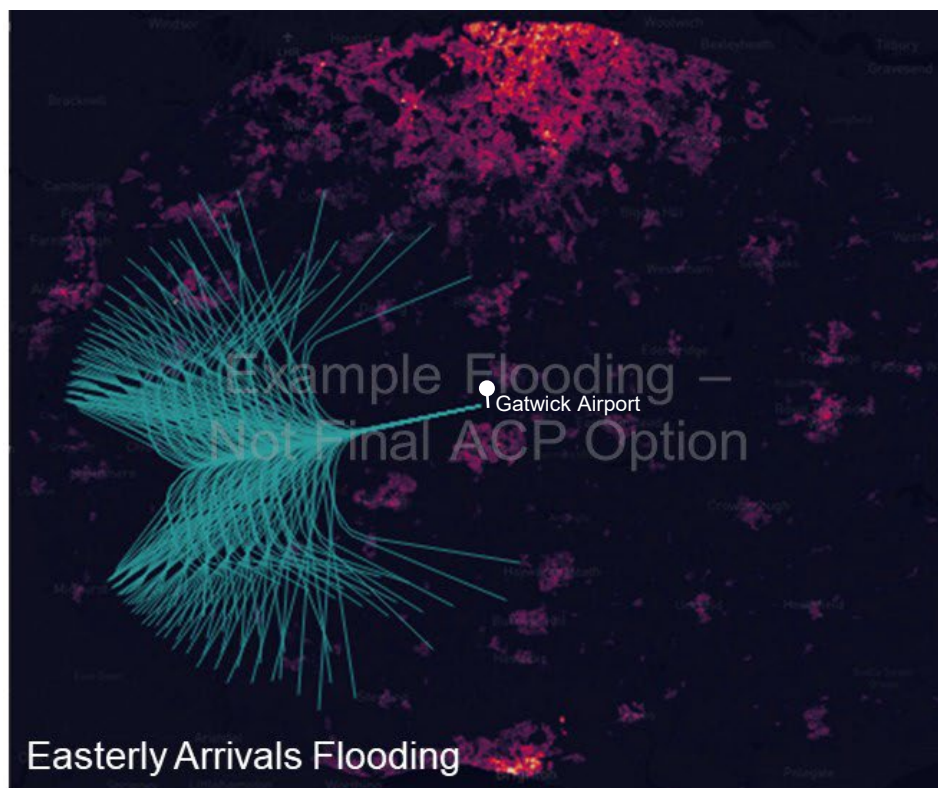
Gatwick Airport

Westerly Departures Flooding



## 4. APPROACH TO DEVELOPING THE COMPREHENSIVE LIST OF OPTIONS

The options are built from a core set of information about all the sections of airspace where a flight path may conceivably be positioned within the scope of the ACP.



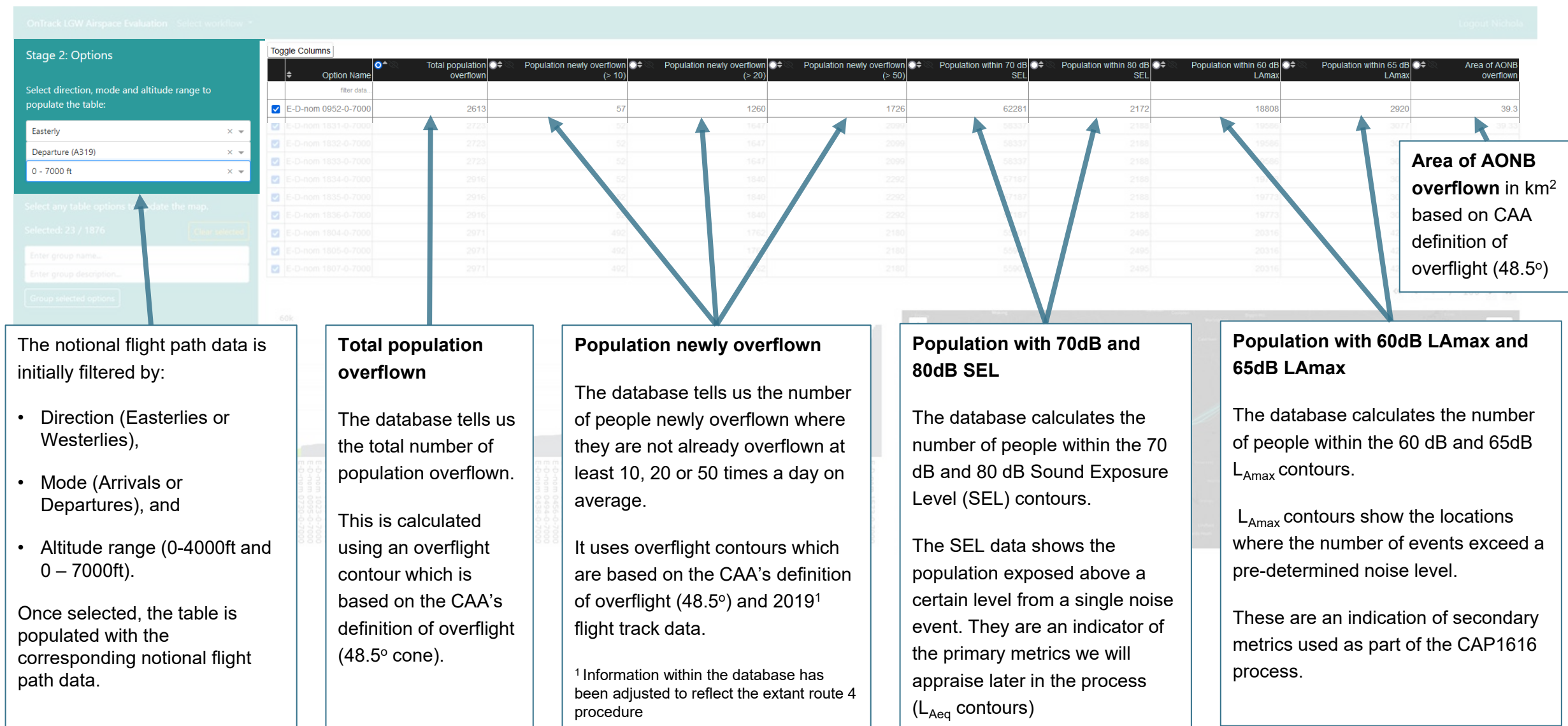
All notional flight paths assume continuous descent from 7000ft



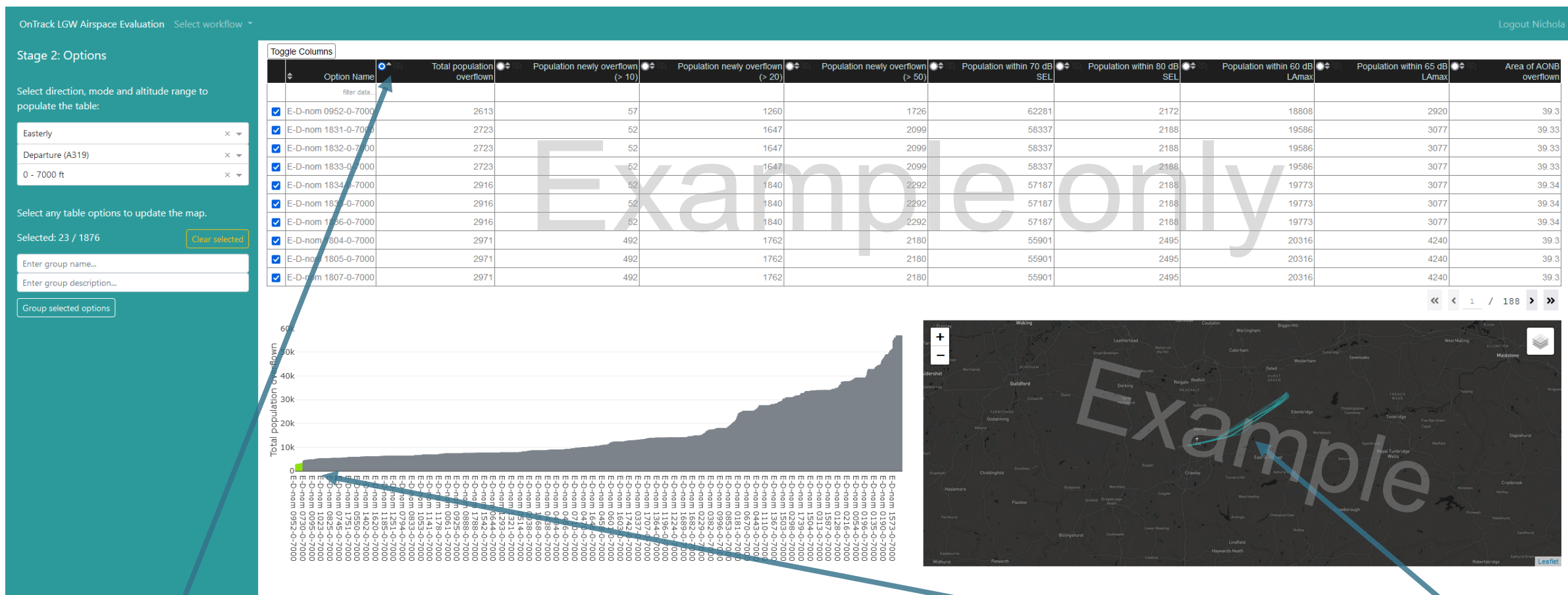
The preliminary assessment gave us noise data on each of the notional flight paths and using our database we were able to identify the comparatively higher performing paths:

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## 4. APPROACH TO DEVELOPING THE COMPREHENSIVE LIST OF OPTIONS



## 4. APPROACH TO DEVELOPING THE COMPREHENSIVE LIST OF OPTIONS



**Metrics are sorted to identify high performing notional flight paths.** This updates the table and the graph. Here we have ordered the data from low to high to identify the paths that overfly the lowest number of population.

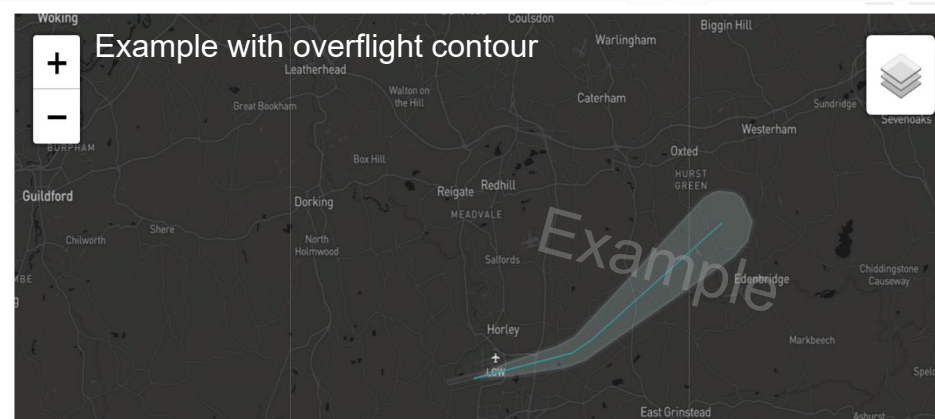
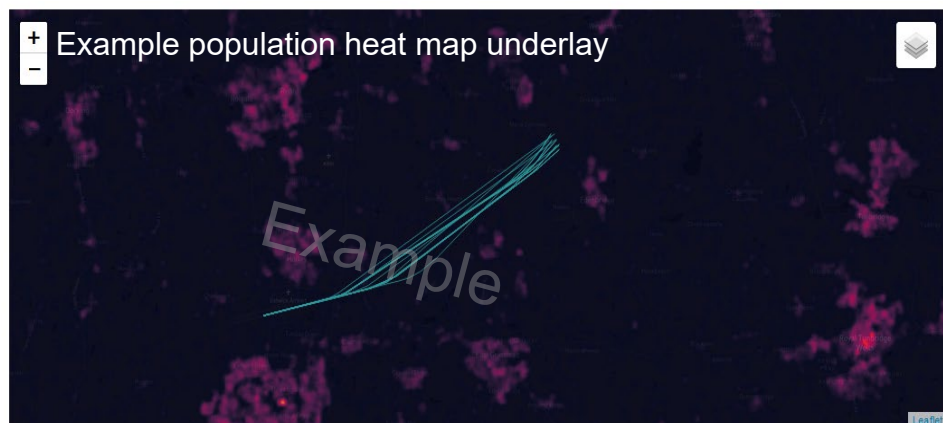
**Trends in performance are identified using the graph.** Groups of notional flight paths can be selected to examine in further detail.

Selected notional flight paths are displayed on the map.

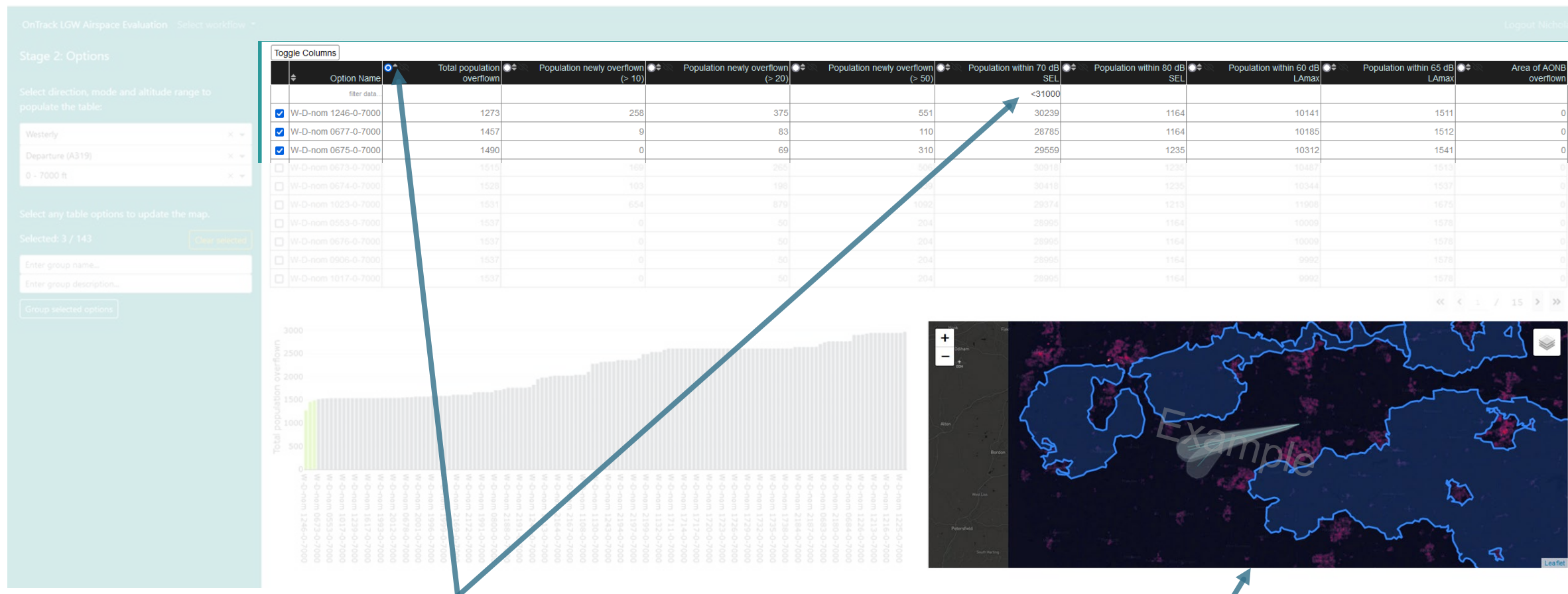


## 4. APPROACH TO DEVELOPING THE COMPREHENSIVE LIST OF OPTIONS

Map underlays aid analysis by displaying different information such as population heat maps, 2019 overflight and AONB locations. Flight path centerlines can also be selected to show the overflight contour. We have used these background maps to help develop the Comprehensive List of Options.



## 4. APPROACH TO DEVELOPING THE COMPREHENSIVE LIST OF OPTIONS



Multiple metrics can be used to filter the data in order to identify high performing notional flight paths that best meet our design principles. In this example the top ~150 paths for the 70dB SEL metric all have a population count of under 31,000 and the data has been filtered to only show these paths. They have then been sorted from low to high against the total population overflow metric, and the top three paths selected.

Maps and other data columns can be interrogated to test the overall performance of the notional flight paths. In this example we can see that the top three paths previously selected do not overfly the AONB shown in blue on the map.

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## FEEDBACK & QUESTIONS

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## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW

We used the information in the database to identify the comparatively higher performing notional flight paths that align with the design principles and can be combined together into operationally feasible 'systems' of arrival and departure routes.

Each 'option' is one complete system of either arrival or departure routes from the same runway end. The comprehensive list of options is made up of:

- 10 easterly departure systems;
- 9 westerly departure systems;
- 10 easterly arrival systems; and
- 10 westerly arrival systems.

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## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW

### **Developing options that align with our Design Principles**

- Some design principles are inherent in all the notional flight paths, e.g. safety, enhanced navigational performance.
- Others can be evaluated when the systems are developed, e.g. resilience, deconfliction by design and locally tailored designs.
- We must look at the performance of the individual notional flight paths in the database to maintain alignment with the principles for noise and flight efficiency

## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW

We therefore needed to use the Airspace Design Database to identify high performing notional flight paths that best meet DP3, DP6 and DP7.

| # | Design Principle                        | Outcome                                                                           |
|---|-----------------------------------------|-----------------------------------------------------------------------------------|
| 1 | Safety by Design – Core                 | Inherent in all options developed                                                 |
| 2 | Enhanced Navigation Standards – Core    | Inherent in all options developed                                                 |
| 3 | Limit Adverse Noise Effects – Core      | Specific flight paths need to be identified in order to meet the design principle |
| 4 | Time Based Arrival Operations           | Inherent in all arrival options developed                                         |
| 5 | Resilience Built In                     | The design principle can be considered as part of system development              |
| 6 | Optimise Use of Aircraft Capabilities   | Specific flight paths need to be identified in order to meet the design principle |
| 7 | Long Term Predictability & Adaptability | Specific flight paths need to be identified in order to meet the design principle |
| 8 | Deconfliction by Design                 | The design principle can be considered as part of system development              |
| 9 | Locally Tailored Designs                | The design principle can be considered as part of system development              |

## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW

There are several other important considerations that we must take into account when developing the options.

| Consideration                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Noise                        | Our Airspace Design database contains metrics to create options that minimise the total population overflown, and options that minimise the population newly overflown as per our commitment to stakeholders.                                                                                                                                                                                                                                            |
| Climb profiles               | We've combined the outputs of the database, which uses the most common continuous climb profiles operated at Gatwick, with other map data on population and overflight, to consider the impacts of lower slower aircraft when developing options.                                                                                                                                                                                                        |
| Capacity                     | To meet our Statement of Need and the AMS, we need a minimum of 3 departure paths that are sufficiently separated, to meet capacity and efficiency in the airspace. We may have to revisit this in future once further information is known about the upper airspace.                                                                                                                                                                                    |
| Departure Separation         | In order to achieve safety, capacity and efficiency, we need to ensure that departure routes are sufficiently laterally separated. An example of departure separation, and further details, are shown later in the presentation.                                                                                                                                                                                                                         |
| Efficiency and Track Mileage | To develop efficient routes that minimise track miles, we need to know where aircraft are routing above 7000ft. This forms part of a NATS NERL ACP. At this stage, we don't yet have any details around the upper airspace network in order to understand how we can develop efficient routes so as a starting point when developing options, we've used the existing Flight Information Region (FIR) entry/exit points as these are unlikely to change. |
| Northern Runway              | All notional flight paths developed and all the departure options presented today are applicable to both the northern and southern runways.                                                                                                                                                                                                                                                                                                              |



## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW

In summary, we needed to develop systems that use the outputs of the airspace design database to meet DP3, DP6 and DP7. These systems also needed to meet our other Design Principles and offer a minimum of 3 departure paths that are sufficiently separated, to meet capacity and efficiency in the airspace.

To ensure we used the database outputs to build options that meet of the design principles and our statement of need, we followed the following matrix. As part of our comprehensive list of options pack, we will provide a more detailed version of this matrix which outlines the metrics used when building each option.

| Options Development Matrix                 | Limit Adverse Noise Effects (DP3)                           | Optimise Use of Aircraft Capabilities (DP6)                 | Long Term Predictability & Adaptability (DP7)                   |
|--------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------|
| <b>Minimise total population overflown</b> | ✓<br>Options developed aim to also meet DP1 DP5 and DP8 DP9 | ✓<br>Options developed aim to also meet DP1 DP3 DP5 and DP8 | ✓<br>Options developed aim to also meet DP1 DP3 DP5 DP8 and DP9 |
| <b>Minimise population newly overflown</b> | ✓<br>Options developed aim to also meet DP1 DP5 and DP8 DP9 | ✓<br>Options developed aim to also meet DP1 DP3 DP5 and DP8 | ✓<br>Options developed aim to also meet DP1 DP3 DP5 DP8 and DP9 |

(DP2 is inherent in all options and DP4 is inherent to all arrivals options)

Over the next slides we'll show you a working example of how we have developed our first option: Easterly Departure option A (EDA). Using the matrix, this means we're going to focus on minimising total population overflown, and DP3 Limit Adverse Noise Effects.

## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW

### Identify High Performing Notional Flight Paths

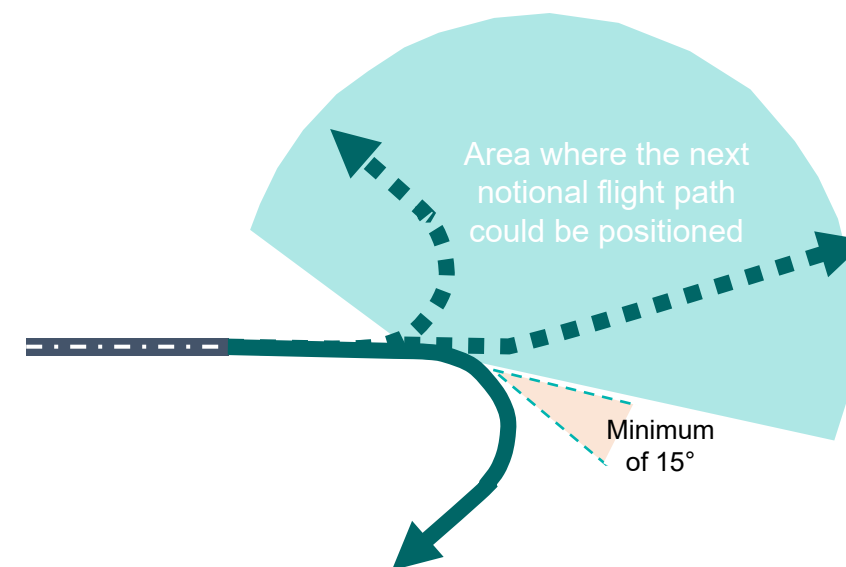
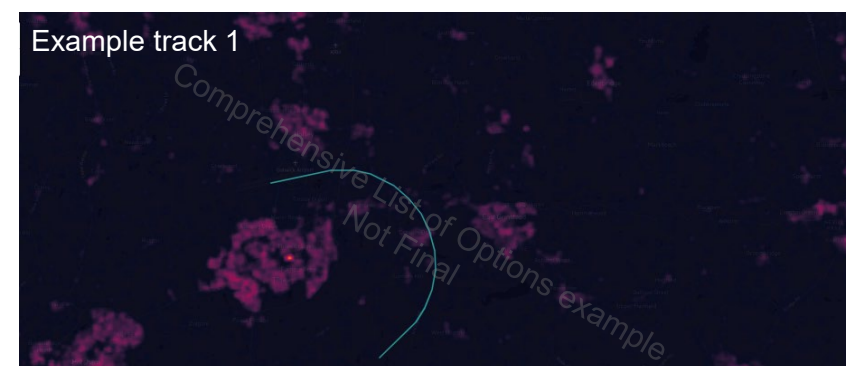
As we're focusing on minimising total population overflow and limiting adverse noise effects, we've looked at the following metrics in the database:

- Population within the 70dB SEL contour
- Total population overflow

Once we've established a group of high performing flight paths, we then check these against other noise metrics, e.g. impact on AONBs, to find the paths that performs well overall. This gives us our first track.

Next we need to find other high performing notional flight paths that provide sufficient separation from track 1. This ensures that the system we develop is safe and can meet current and future capacity and therefore meet our Statement of Need and the Airspace Modernisation Strategy (AMS).

The illustration shows a simplified diagram of departure separation.



## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW

### 1. Identify High Performing Notional Flight Paths

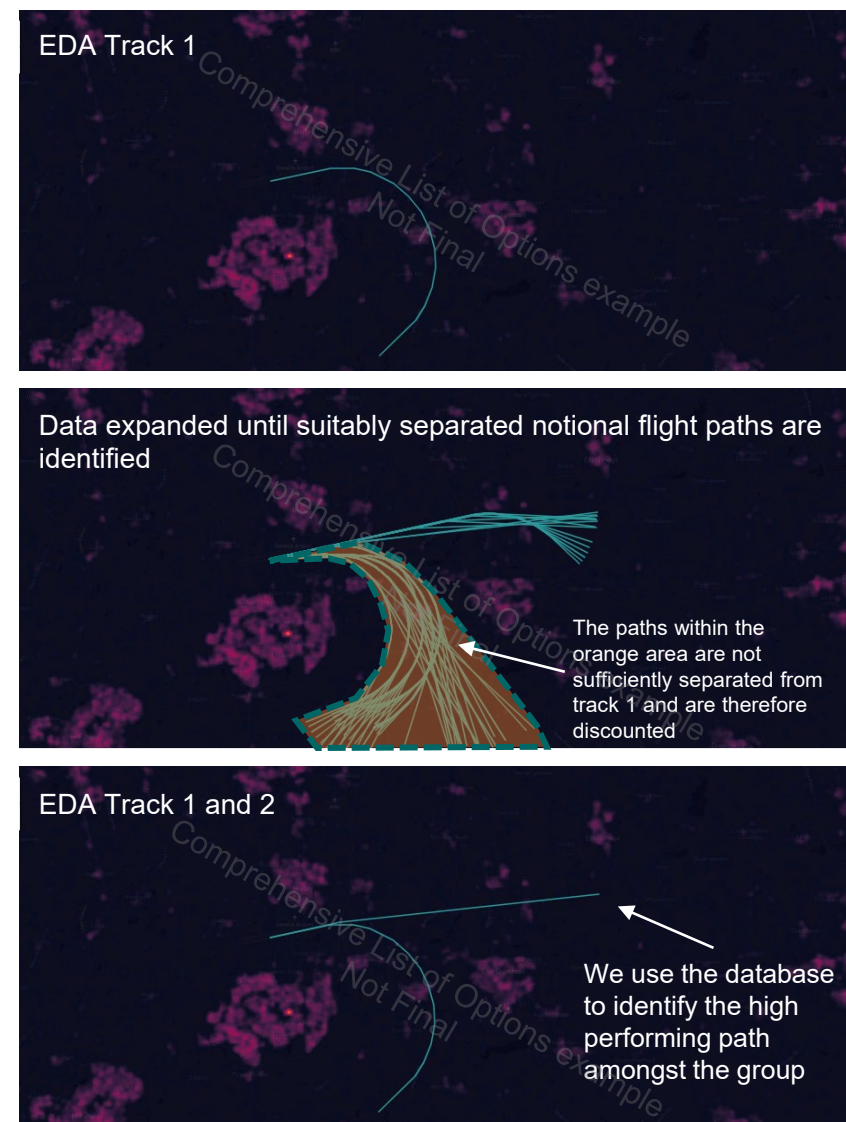
To find the second track that is sufficiently separated, we use the same metrics as track 1 however we open the data up to find a wider group of high performing notional flight paths.

We continue to open up the data until we identify paths that have greater than 15° separation from the first track.

As before, we then take the group and check these against some of the other noise metrics to find a path that performs well overall. This gives us our second track.

The process is then repeated to identify the third track.

Where the data has led us to develop options with less than 30° separation between departure tracks, we have also developed alternative options with greater than 30° separation



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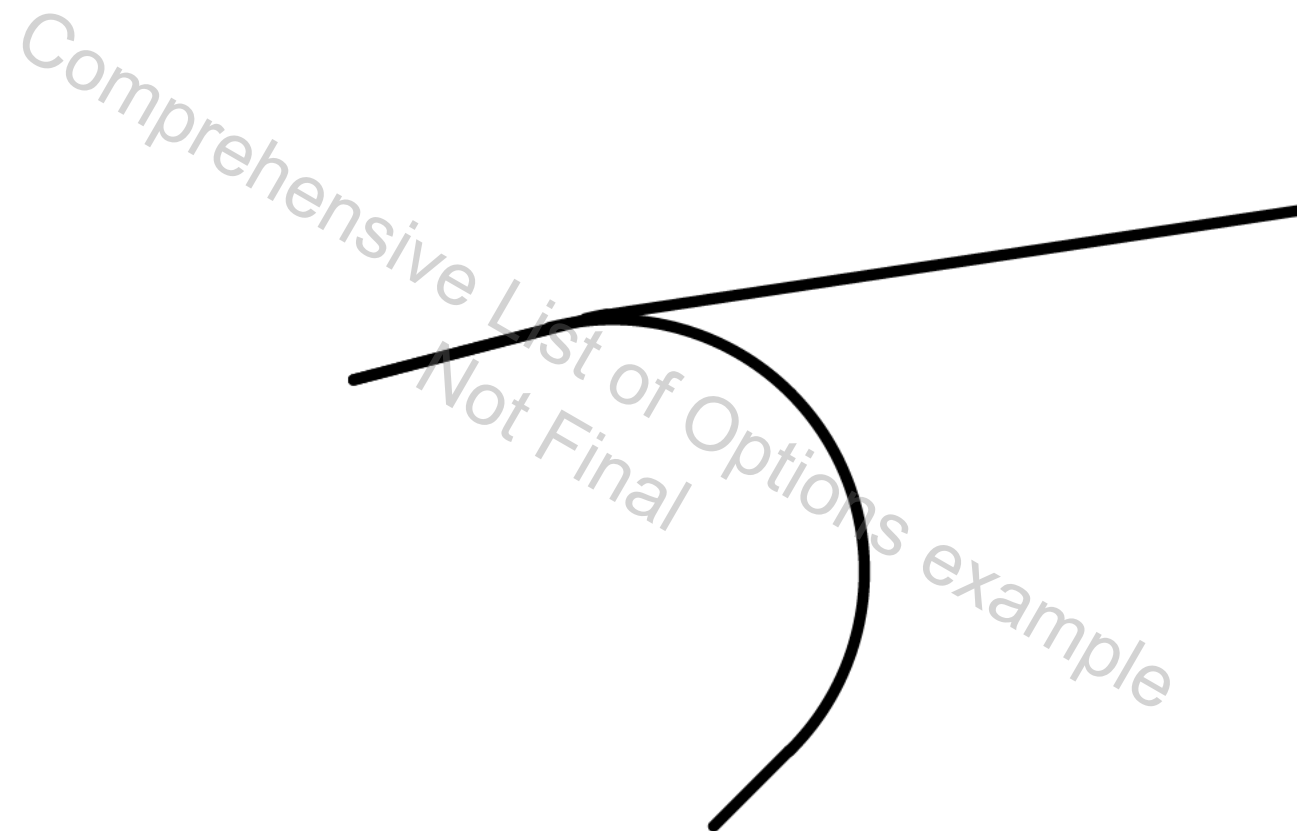
## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW – EXAMPLE 1

Comprehensive List of Options example  
Not Final



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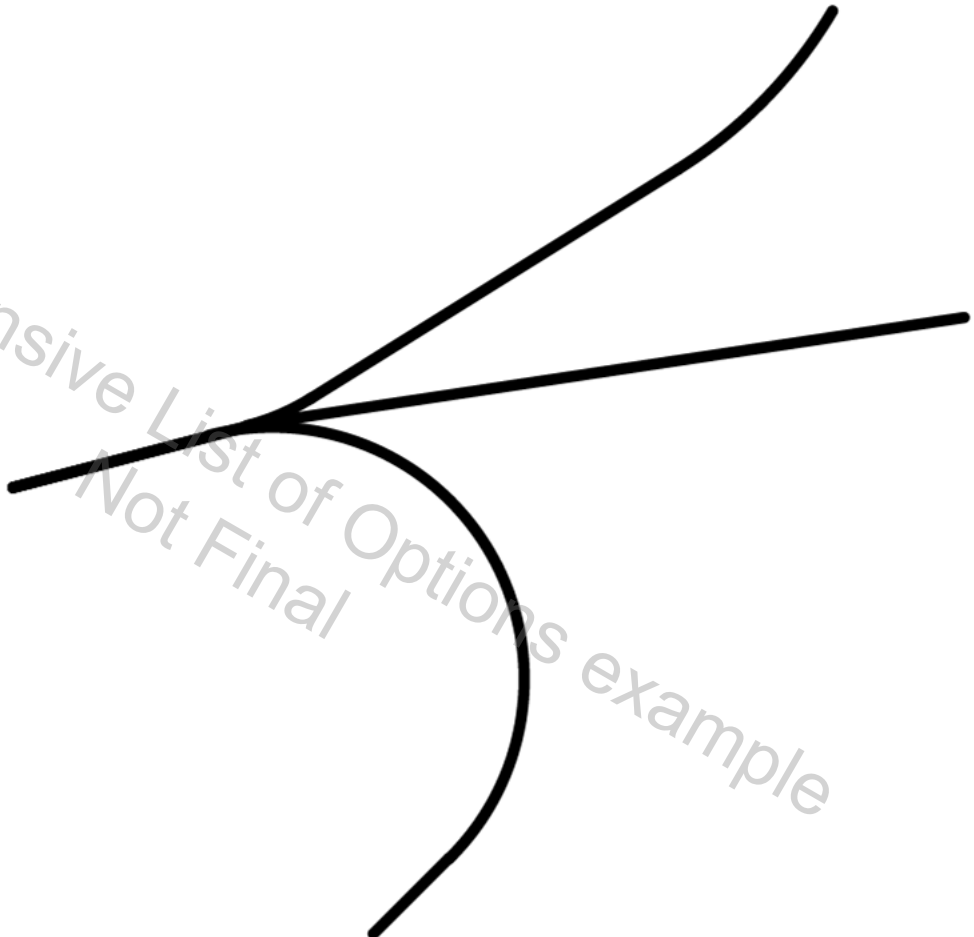
## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW – EXAMPLE 1



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## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW – EXAMPLE 1

Comprehensive List of Options example  
Not Final



## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW

Now that we have the output of the database, we finalise the option by considering lower climb profiles and possible network exit points, using population, overflight and AONB map data. We also check whether the option meets our other Design Principles we're aiming to achieve.

We then go back to our options development matrix to build the next option:

| Options Development Matrix         | Limit Adverse Noise Effects (DP3)                    | Optimise Use of Aircraft Capabilities (DP6)          | Long Term Predictability & Adaptability (DP7)            |
|------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------|
| Minimise total population overflow | Options developed aim to also meet DP1 DP5 and DP8 ✓ | Options developed aim to also meet DP1 DP5 and DP8 ✓ | Options developed aim to also meet DP1 DP5 DP8 and DP9 ✓ |
| Minimise population newly overflow | Options developed aim to also meet DP1 DP5 and DP8 ✓ | Options developed aim to also meet DP1 DP5 and DP8 ✓ | Options developed aim to also meet DP1 DP5 DP8 and DP9 ✓ |

This is repeated until we have our comprehensive list.

- Options that aim to meet DP6 apply noise metrics from the database between 0-4000ft and then route directly to the network exit points to minimise track miles; we will use map data to make small adjustments to the tracks between 4-7000ft to consider noise impacts.
- Options that aim to meet DP7 use the database outputs to identify potential respite alternatives.



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## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW

- The system options we are presenting have been developed with a focus on noise and environmental data. We haven't considered connectivity with the upper airspace network, other airports, and how the departure options and arrival options might interact (this is dependent on the airspace above 7000ft).
- As part of this round of engagement, we will be engaging with airspace users, NATS and our neighbouring airports to understand how we will need to develop and refine the options in order to integrate with the wider airspace arrangements in London and the Southeast.
- **It's therefore important to note that these options will evolve as we progress through the process as more information becomes available.**
- We will carefully document the evolution of the options from the information presented in this round of engagement onwards to track what information has influenced which changes in a transparent way.



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## FEEDBACK AND QUESTIONS

## 5. COMPREHENSIVE LIST OF OPTIONS OVERVIEW

### Understanding our Comprehensive List of Options

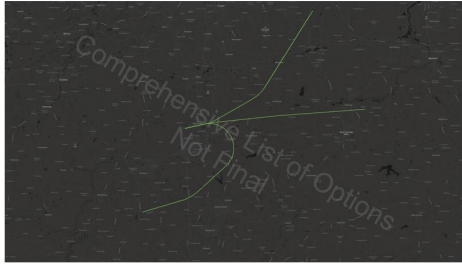
The comprehensive list is split into four sections; easterly departures, westerly departures, easterly arrivals and westerly arrivals.

Each section starts with an overview of the matrix used to develop the options. This details what each option aims to achieve, and the metrics from the Airspace Design Database used to help develop the option:

| Options Development Matrix                                                                                                                                   | Limit Adverse Noise Effects (DP3)                                                                                                                                                                                                                        | Optimise Use of Aircraft Capabilities (DP6)                                                                                                                                                                                                                                                             | Long Term Predictability & Adaptability (DP7)                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Airspace Design Database Outputs                                                                                                                             | The airspace design shall aim to <b>limit and where possible reduce the adverse impacts of aircraft noise</b>                                                                                                                                            | The airspace design should enable aircraft operators to optimise the use of their fleet capabilities to improve operational efficiency and environmental performance                                                                                                                                    | Airspace design should offer long term predictability of flight paths and respite and offer adaptation for the future airport development scenarios outlined in our draft Masterplan                                                                                                                                                                                                                                                          |
| <b>Minimise total population overflow</b><br>70dB SEL and total population overflow.<br>Checked against 80dB SEL, 60dB and 65dB $L_{A_{Max}}$ , Area of AONB | System options developed using database outputs for 0-7000ft. Options developed aim to also meet DP1 DP5 and DP8<br><br><b>Easterly Departure Option A (EDA)</b><br><b>Easterly Departure Option B (EDB)</b><br><b>Easterly Departure Option G (EDG)</b> | System options developed using database outputs for DP3 between 0-4000ft, and track mileage outputs (balanced with noise metrics) between 4000 – 7000ft. Options developed aim to also meet DP1 DP5 and DP8<br><br><b>Easterly Departure Option C (EDC)</b><br><b>Easterly Departure Option D (EDD)</b> | System options developed within respite options using database outputs and the systems already developed for DP3. Respite options include SIDs for different periods (e.g. alternative days using different groups) or different periods of the day (e.g. a set of SIDs for day and night) Options developed aim to also meet DP1 DP5 DP8 and DP9<br><br><b>Easterly Departure Option E (EDE)</b><br><b>Easterly Departure Option F (EDF)</b> |
| <b>Minimise population newly overflow</b><br>Population newly overflow >10,<br>Population newly overflow >20,<br>Population newly overflow >50.              | System options developed using database outputs for 0-7000ft. Options developed aim to also meet DP1 DP5 and DP8<br><br><b>Easterly Departure Option H (EDH)</b>                                                                                         | System options developed using existing NPRs and database outputs for DP3 between 0-4000ft, and track mileage outputs (balanced with noise metrics) between 4000 – 7000ft. Options developed aim to also meet DP1 DP5 and DP8<br><br><b>Easterly Departure Option I (EDI)</b>                           | System options developed with respite options using database outputs. Respite options include SIDs for different periods (e.g. alternative days using different groups) Options developed aim to also meet DP1 DP5 DP8 and DP9<br><br><b>Easterly Departure Option J (EDJ)</b>                                                                                                                                                                |

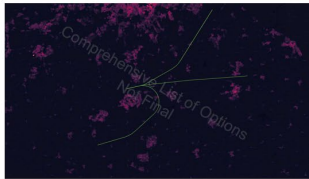
DP2 and DP4 are inherent in all notional flight paths developed

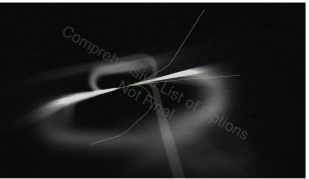
## 8. COMPREHENSIVE LIST OF OPTIONS



**Easterly Departure Option A (EDA)**

| Aims to meet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | DP1 DP2 DP3 DP4 DP5 DP8 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| This system option focuses on meeting DP3 and minimising total population overflow. The primary metrics used to identify the high performing notional flight paths are '70dB SEL' and 'total population overflow'. A secondary check of the 80dB SEL, 60dB and 65dB $L_{A_{Max}}$ and Area of AONB metrics was also undertaken.<br><br>This system provides a 23.45° split for the departure tracks which would require additional safety assurance work to be undertaken. We've therefore used the database to identify a separate system that gives greater separation (EDB). Depending on the arrivals option, there may be some conflict with arrivals for the wrap around turn to the right; this will be explored in further detail as options are refined and our shortlist of options is known. |                         |





Each option is then shown on a page with various background maps to aid with answering our engagement questions. The final page of each section includes a map which shows all off the options overlaid together. The options are shown up to 7000ft.

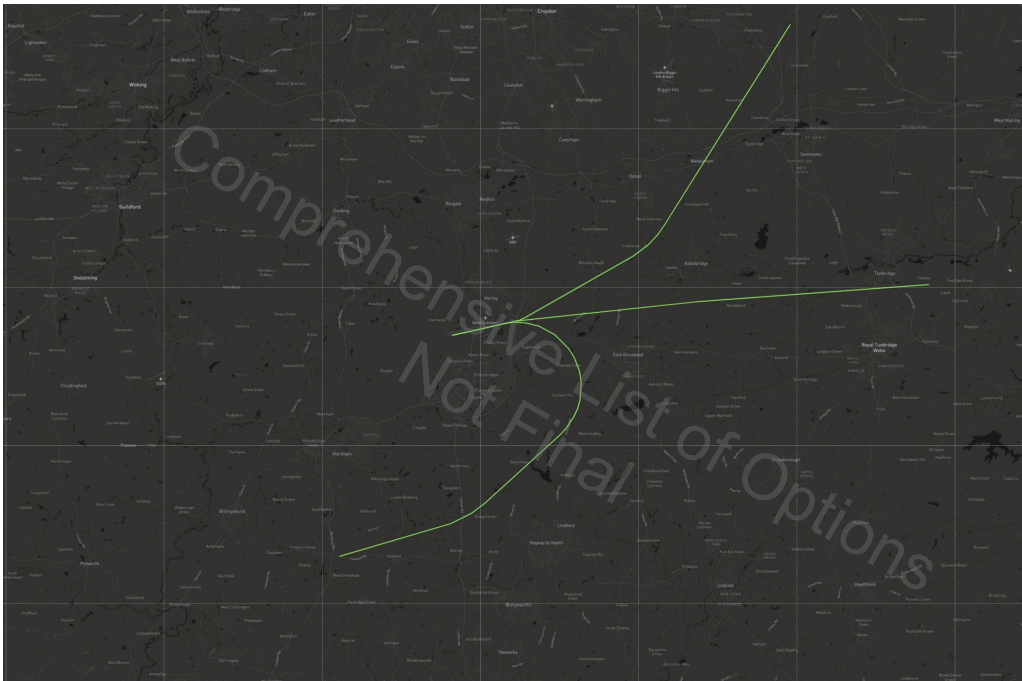
# Easterly Departures

## Options Development: Design Principles (Departures)

| Options Development Matrix                                                                                                                                         | Limit Adverse Noise Effects (DP3)                                                                                                 | Optimise Use of Aircraft Capabilities (DP6)                                                                                                                                                                                   | Long Term Predictability & Adaptability (DP7)                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Airspace Design Database Outputs                                                                                                                                   | The airspace design shall aim to <b>limit and where possible reduce the adverse impacts of aircraft noise</b>                     | The airspace design should enable aircraft operators to optimise the use of their fleet capabilities to improve operational efficiency and environmental performance                                                          | Airspace design should offer long term predictability of flight paths and respite and offer adaptation for the future airport development scenarios outlined in our draft Masterplan                                                                                                                                                             |
| <b>Minimise total population overflown</b><br>70dB SEL and total population overflown.<br>Checked against 80dB SEL, 60dB and 65dB L <sub>AMax</sub> , Area of AONB | System options developed using database outputs for 0-7000ft. Options developed aim to also meet DP1 DP5 and DP8                  | System options developed using database outputs for DP3 between 0-4000ft, and track mileage outputs (balanced with noise metrics) between 4000 – 7000ft. Options developed aim to also meet DP1 DP5 and DP8                   | System options developed within respite options using database outputs and the systems already developed for DP3. Respite options include SIDs for different periods (e.g. alternative days using different groups) or different periods of the day (e.g a set of SIDs for day and night) Options developed aim to also meet DP1 DP5 DP8 and DP9 |
|                                                                                                                                                                    | <b>Easterly Departure Option A (EDA)</b><br><b>Easterly Departure Option B (EDB)</b><br><b>Easterly Departure Option G (EDG)</b>  | <b>Easterly Departure Option C (EDC)</b><br><b>Easterly Departure Option D (EDD)</b>                                                                                                                                          | <b>Easterly Departure Option E (EDE)</b><br><b>Easterly Departure Option F (EDF)</b>                                                                                                                                                                                                                                                             |
| <b>Minimise population newly overflown</b><br>Population newly overflown >10,<br>Population newly overflown >20,<br>Population newly overflown >50.                | System options developed using existing NPRs and SID centrelines for 0-7000ft. Options developed aim to also meet DP1 DP5 and DP8 | System options developed using existing NPRs and database outputs for DP3 between 0-4000ft, and track mileage outputs (balanced with noise metrics) between 4000 – 7000ft. Options developed aim to also meet DP1 DP5 and DP8 | System options developed with respite options using database outputs. Respite options include SIDs for different periods (e.g. alternative days using different groups) Options developed aim to also meet DP1 DP5 DP8 and DP9                                                                                                                   |
|                                                                                                                                                                    | <b>Easterly Departure Option H (EDH)</b>                                                                                          | <b>Easterly Departure Option I (EDI)</b>                                                                                                                                                                                      | <b>Easterly Departure Option J (EDJ)</b>                                                                                                                                                                                                                                                                                                         |

DP2 and DP4 are inherent in all notional flight paths developed

## 8. COMPREHENSIVE LIST OF OPTIONS

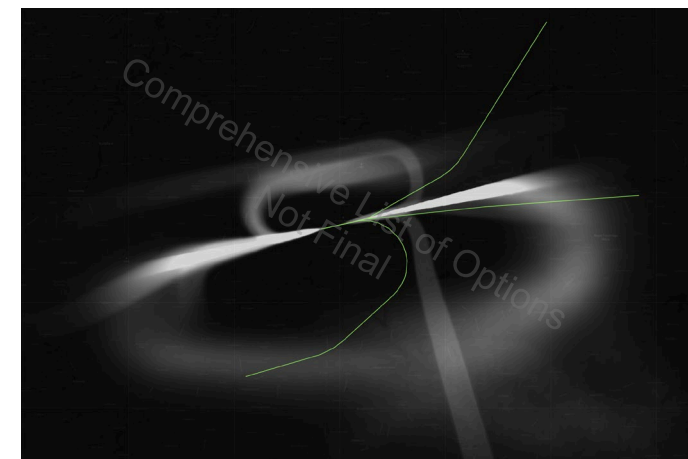


## Easterly Departure Option A (EDA)

DP1 DP2 DP3 DP5 DP8 DP9

This system option focuses on meeting DP3 (limit adverse noise effects) and minimising total population overflow. The primary metrics used to identify the high performing notional flight paths are '70dB SEL' and 'total population overflow'. A secondary check of the 80dB SEL, 60dB and 65dB LAMax and Area of AONB metrics was also undertaken.

This system provides a 23.45° split for the departure tracks which would require additional safety assurance work to be undertaken. We've therefore used the database to identify a separate system using the same metrics that gives greater separation (EDB). Depending on the arrivals option, there may be some conflict with arrivals for the wrap around turn to the right; this will be explored in further detail as options are refined and our shortlist of options is known.



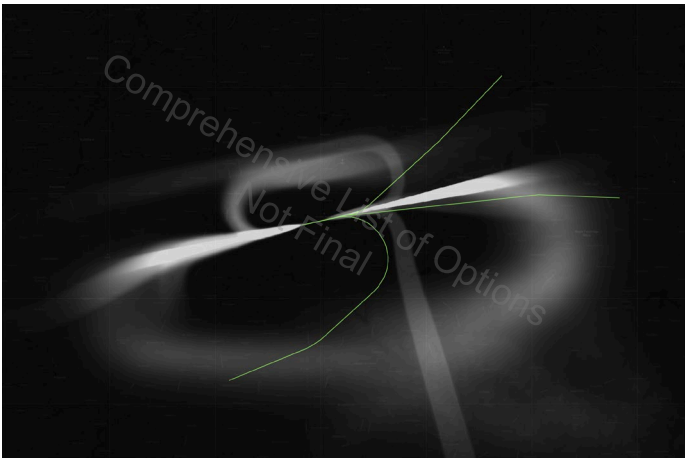
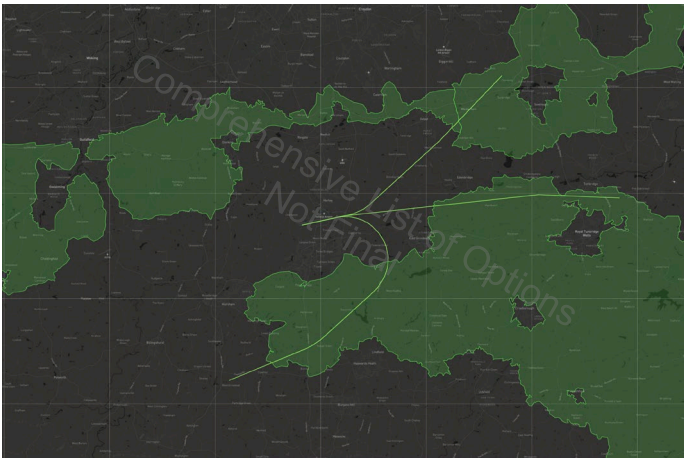


## 8. COMPREHENSIVE LIST OF OPTIONS

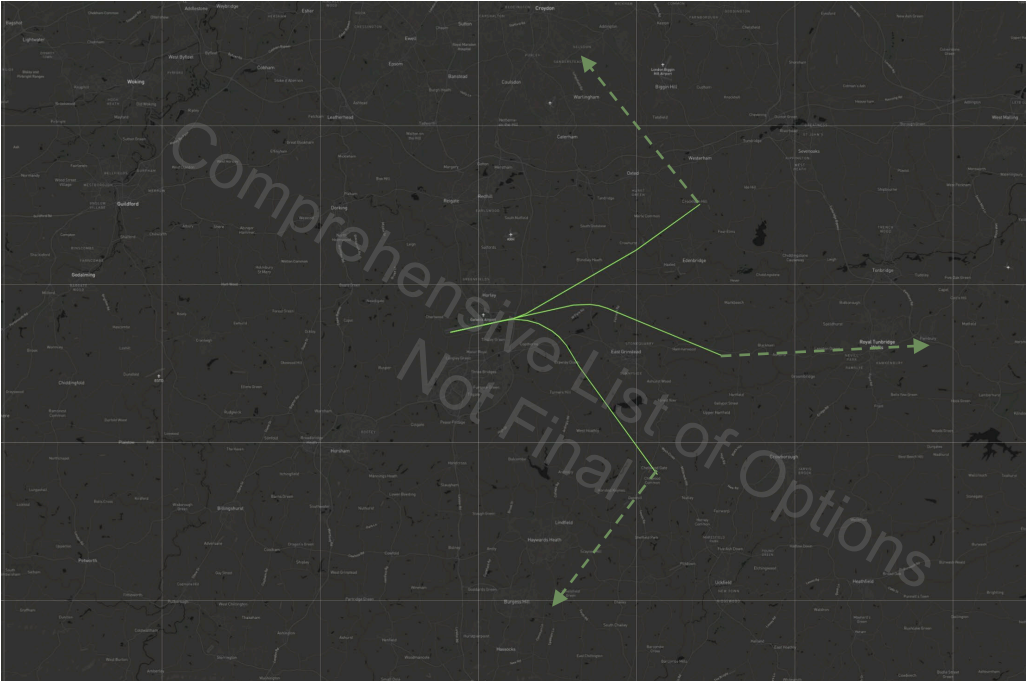


### Easterly Departure Option B (EDB)

| Aims to meet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | DP1 DP2 DP3 DP5 DP8 DP9 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <p>This option focuses on meeting DP3 (limit adverse noise effects) and minimising total population overflown, whilst providing a greater level of departure separation than EDA. The primary metrics used to identify the high performing notional flight paths are ‘70dB SEL’ and ‘total population overflown’. A secondary check of the 80dB SEL, 60dB and 65dB <math>L_{A_{Max}}</math> and Area of AONB metrics was also undertaken.</p> <p>The paths turning right and straight ahead are identical to EDA as there is sufficient separation between these. We have then identified a high performing path that has greater than 30° separation from the straight ahead track.</p> <p>Depending on the arrivals option, there may be some conflict with arrivals for the wrap around turn to the right; this will be explored in further detail as options are refined and our shortlist of options is known.</p> |                         |



## 8. COMPREHENSIVE LIST OF OPTIONS



### Easterly Departure Option C (EDC)

Aims to meet Design Principles

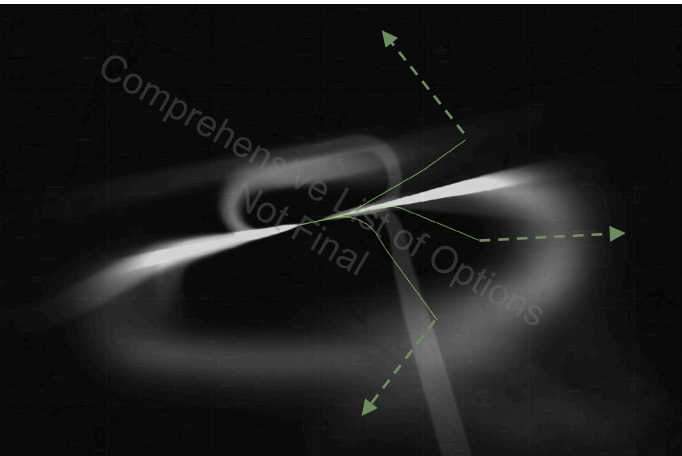
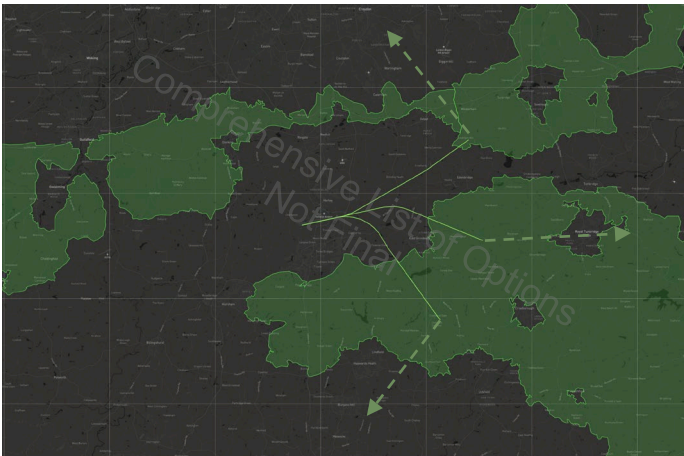
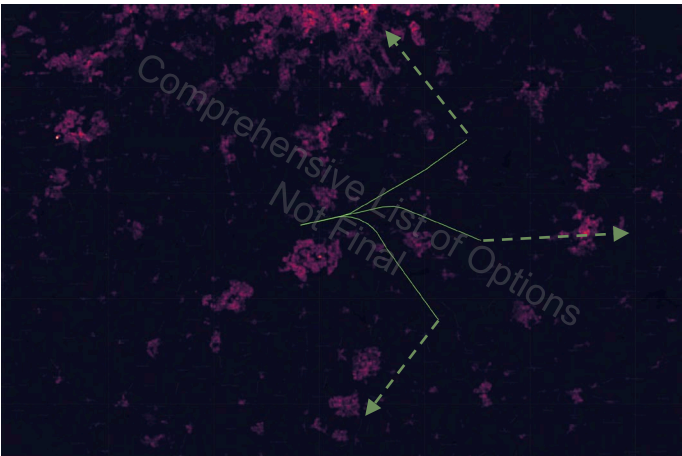
DP1 DP2 DP3 DP5 DP6 DP8 DP9

This system option focuses on meeting DP3 (limit adverse noise effects), DP6 (optimise use of aircraft capabilities) and minimising total population overflown.

To first meet DP3, we have identified the high performing notional flight paths using the '70dB SEL' and 'total population overflown' metrics for the paths between 0-4000ft. A secondary check of the 80dB SEL, 60dB and 65dB LAMax and Area of AONB metrics was also undertaken.

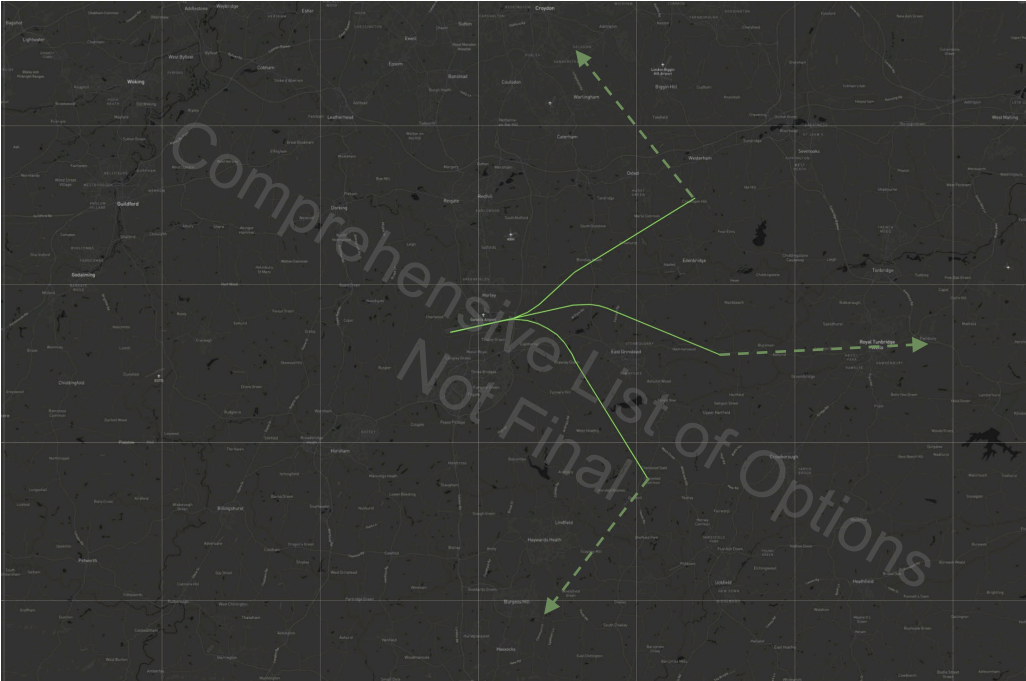
To achieve the aims of DP6, from 4000ft the option will then route directly to the network exit point (green dashed lines). This will evolve as more information around the airspace above 7000ft is shared from NERL.

This system provides a 17.43° split for the departure tracks which would require additional safety assurance work to be undertaken. We've therefore used the database to identify a separate system that gives greater separation (EDD).





## 8. COMPREHENSIVE LIST OF OPTIONS



### Easterly Departure Option D (EDD)

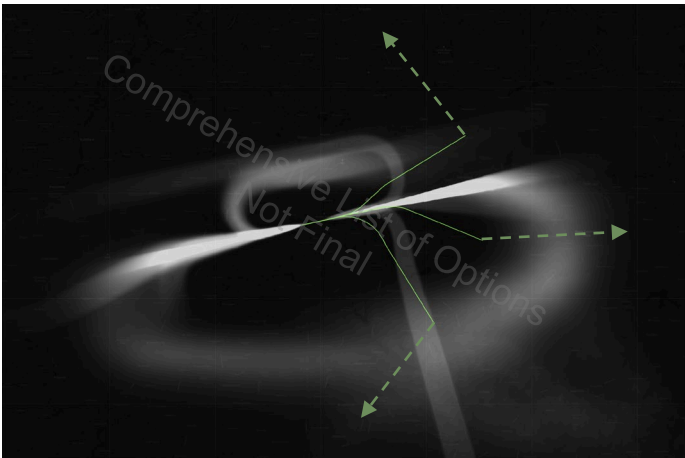
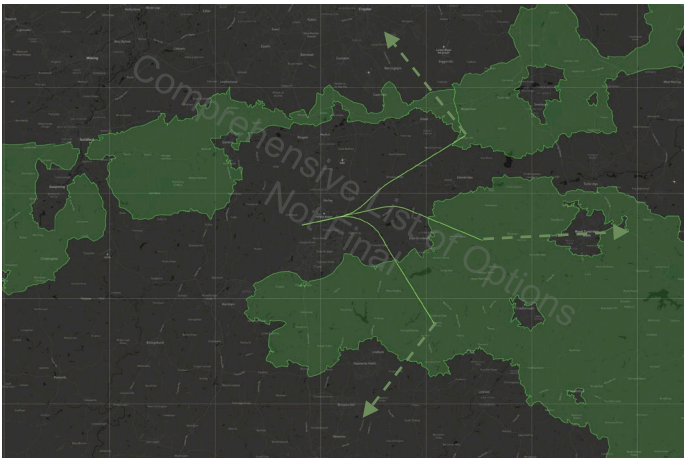
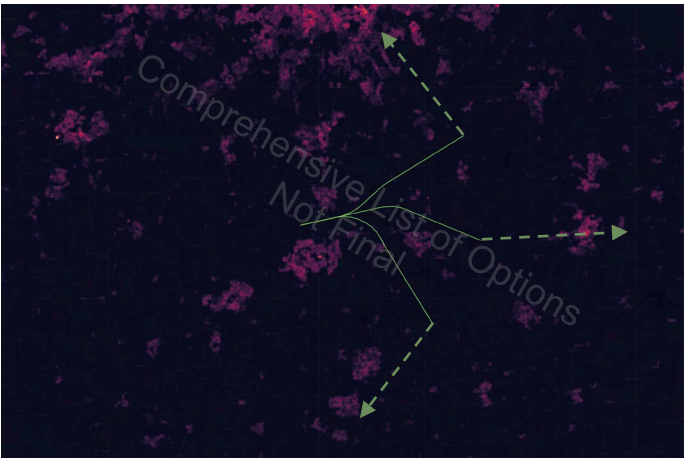
Aims to meet

DP1 DP2 DP3 DP4 DP5 DP6 DP8

This system option focuses on meeting DP3 (limit adverse noise effects), DP6 (optimise use of aircraft capabilities) and minimising total population overflown whilst providing a greater level of departure separation than EDC.

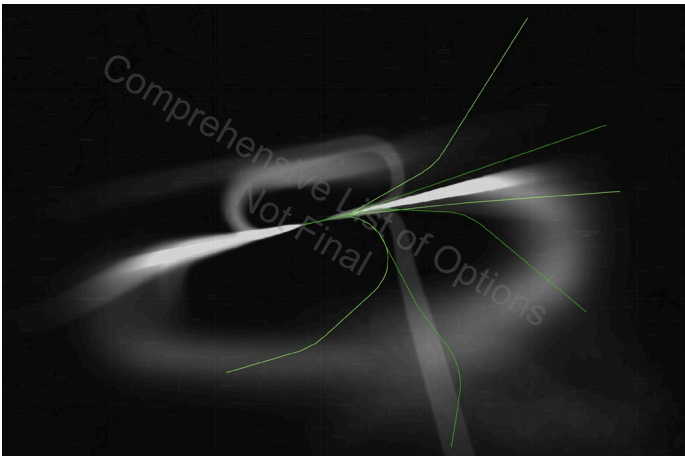
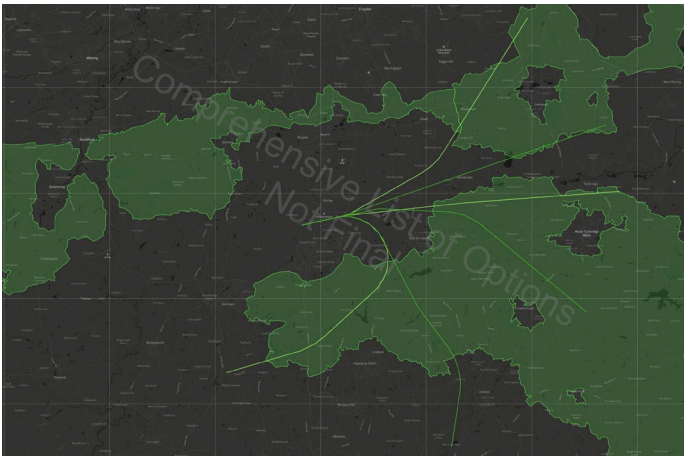
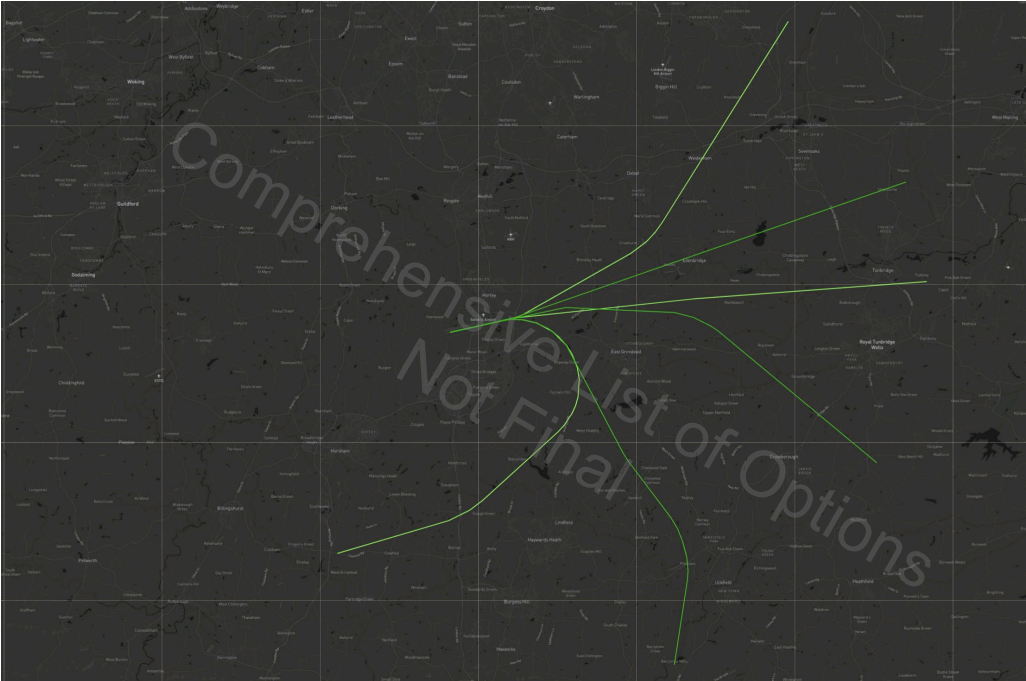
From 0-4000ft, the same metrics as EDC have been used to identify high performing notional flight paths that have greater than 30° separation.

To achieve the aims of DP6, from 4000ft the option will then route directly to the network exit point (green dashed lines). This will evolve as more information around the airspace above 7000ft is shared from NERL.





## 8. COMPREHENSIVE LIST OF OPTIONS



| Easterly Departure Option E (EDE)                                                                                                                                                                                                                                                                                              |     |     |     |     |     |     |     |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|--|
| Aims to meet                                                                                                                                                                                                                                                                                                                   | DP1 | DP2 | DP3 | DP5 | DP7 | DP8 | DP9 |  |
| This system option aims to met DP3 (limit adverse noise effects), DP7 (Long term predictability and adaptability) and minimising total population overflown.                                                                                                                                                                   |     |     |     |     |     |     |     |  |
| We've built upon EDA (Light green) and identified tracks that offer respite (dark green). The primary metrics used to identify the high performing notional flight paths are '70dB SEL' and 'total population overflown'. A secondary check of the 80dB SEL, 60dB and 65dB LAMax and Area of AONB metrics was also undertaken. |     |     |     |     |     |     |     |  |
| The set of light green tracks would be used for respite period 1, and the dark green tracks would be use for respite period 2.                                                                                                                                                                                                 |     |     |     |     |     |     |     |  |
| Depending on the arrivals option, there may be some conflict with arrivals for the wrap around turn to the right; this will be explored in further detail as options are refined and our shortlist of options is known.                                                                                                        |     |     |     |     |     |     |     |  |

## 8. COMPREHENSIVE LIST OF OPTIONS



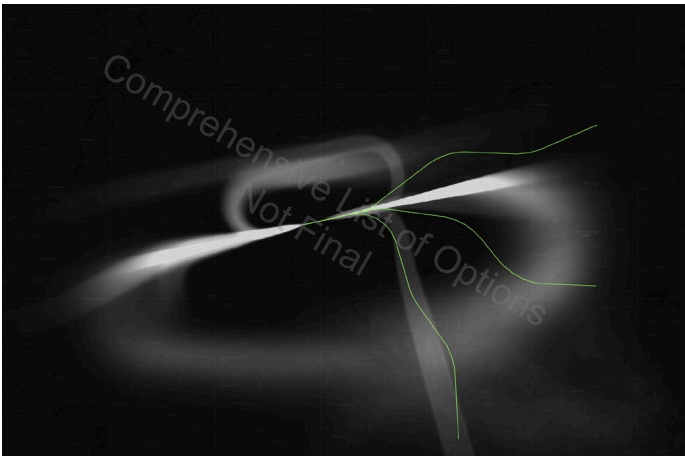
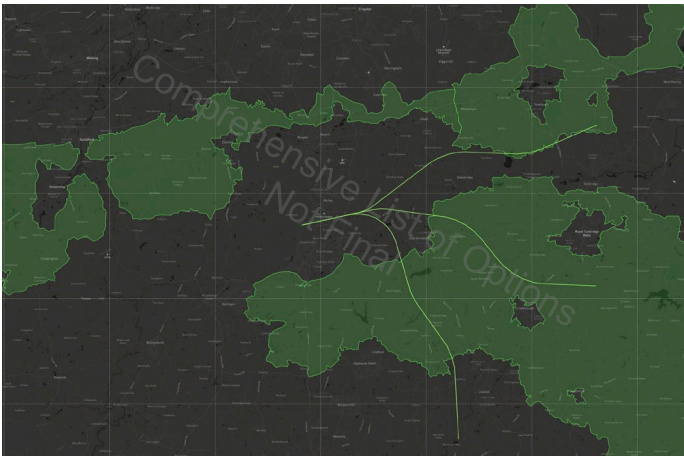
### Easterly Departure Option F (EDF)

Aims to meet

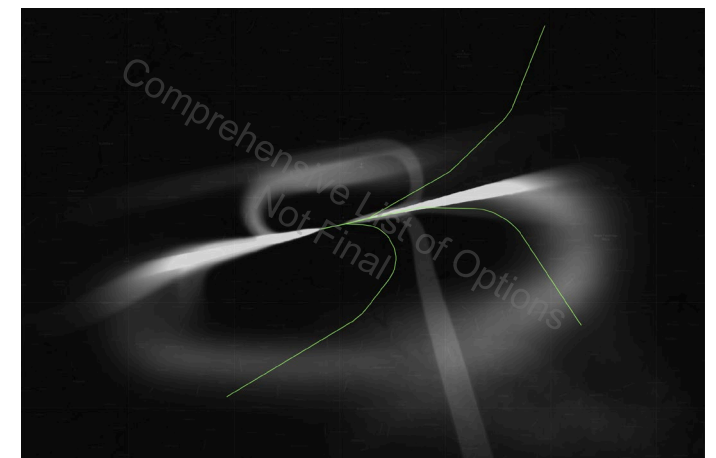
DP1 DP2 DP3 DP5 DP7 DP8 DP9

This system has been developed as a respite option that could be operated during the night. It could be combined with any EDA, EDB, EDC, EDD. Depending on its overall performance which we'll explore later in the process, this system could also be used during the day although the metrics used to develop it are targeted at the night time period.

The primary metrics used to identify the high performing notional flight paths are '80dB SEL' and 'total population overflown'. A secondary check of the 65dB LAMax was also undertaken.







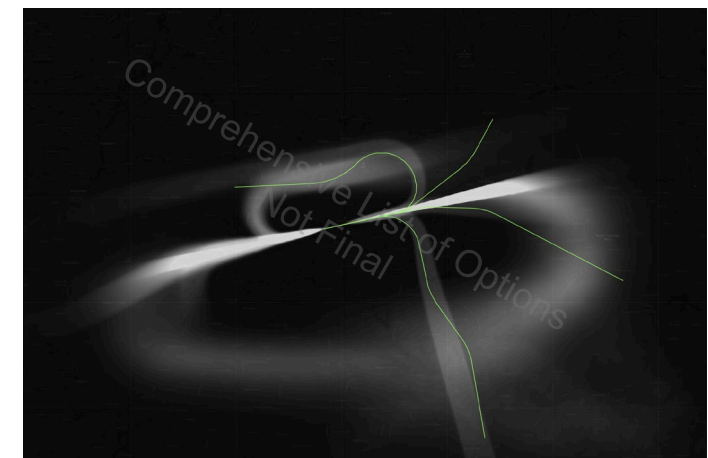
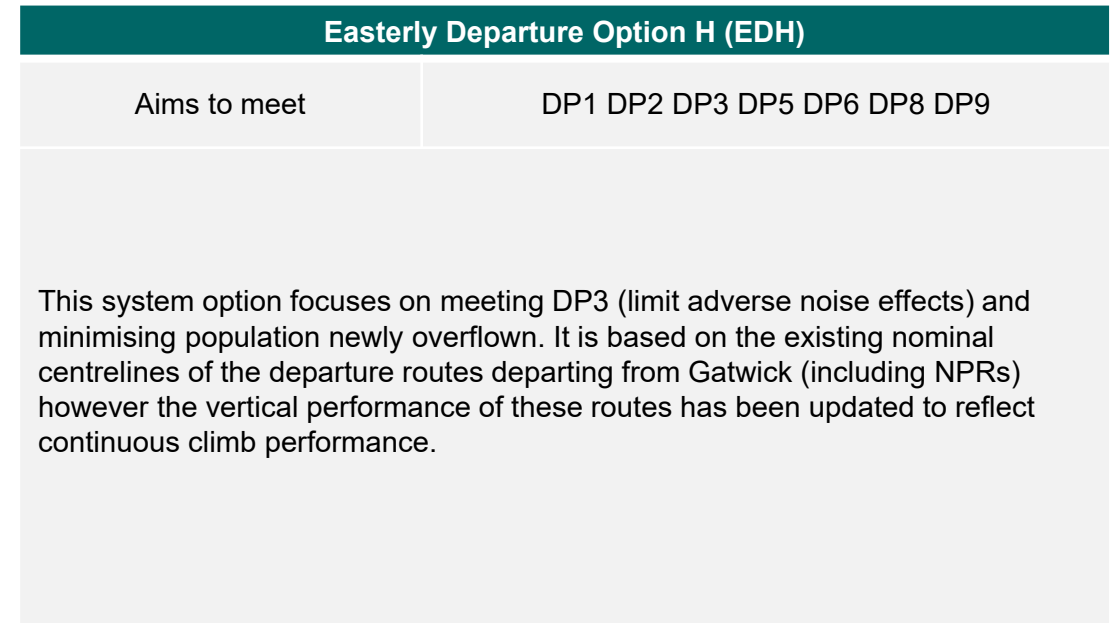
Aims to meet

DP1 DP2 DP3 DP5 DP6 DP7 DP8 DP9

This system option focuses on meeting DP3 (limit adverse noise effects) and minimising total population overflown. Although this system option complies with current regulations and conforms to current technological capability, it includes offset departures and turns shortly after take-off, both of which sit close to the defined regulatory limits. Therefore, this system so will only be taken forward if a considerable benefit can be determined.

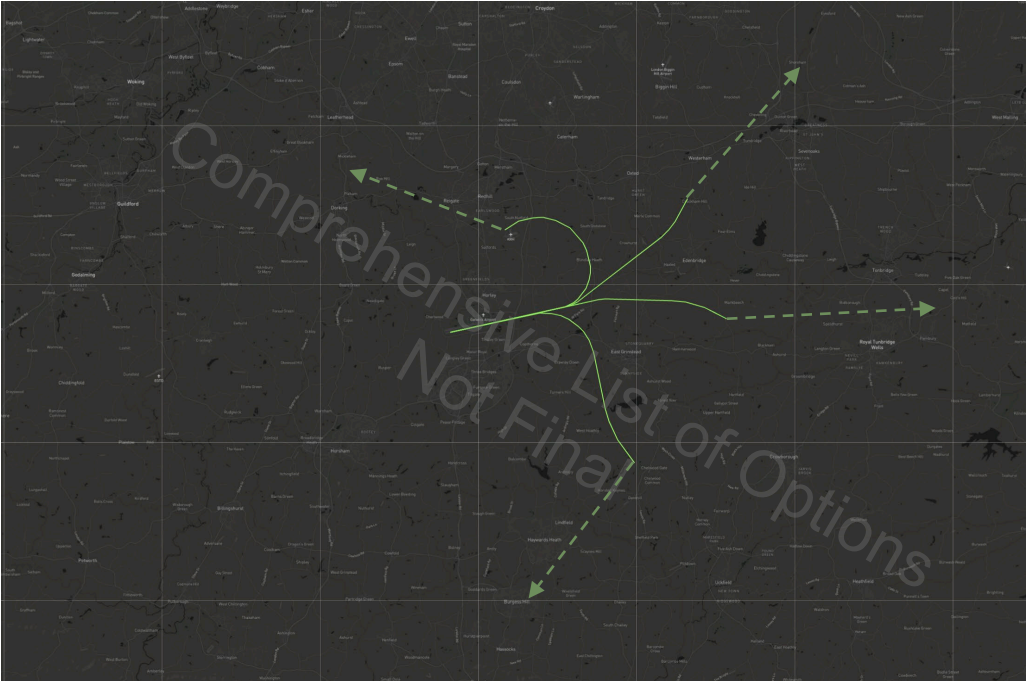
The primary metrics used to identify the high performing notional flight paths are '70dB SEL' and 'total population overflown'. A secondary check of the 80dB SEL, 60dB and 65dB LAMax and Area of AONB metrics was also undertaken.

Depending on the arrivals option, there may be some conflict with arrivals for the wrap around turn to the right; this will be explored in further detail as options are refined and our shortlist of options is known.





## 8. COMPREHENSIVE LIST OF OPTIONS



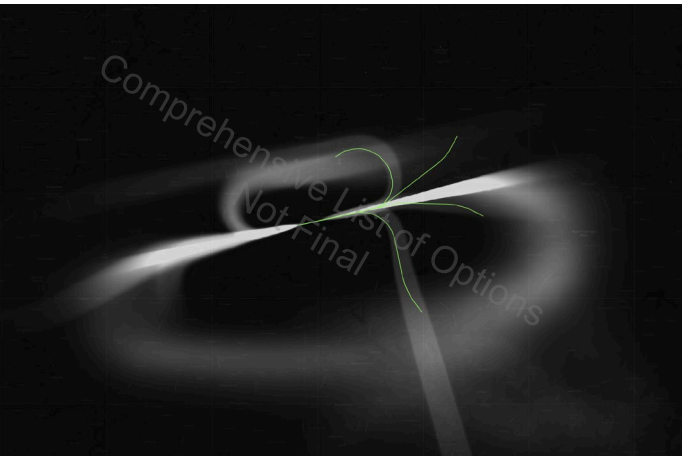
### Easterly Departure Option I (EDI)

Aims to meet

DP1 DP2 DP4 DP5 DP6 DP8

This system option focuses on meeting DP3 (limit adverse noise effects), DP6 (optimise use of aircraft capabilities) and minimising population newly overflown. It is based on the existing nominal centrelines of the departure routes departing from Gatwick (including NPRs) up to 4000ft.

To achieve the aims of DP6 and maximise environmental efficiency, from 4000ft the option will then route directly to the network exit point (green dashed lines). This will evolve as more information around the airspace above 7000ft is shared from NERL.



## 8. COMPREHENSIVE LIST OF OPTIONS



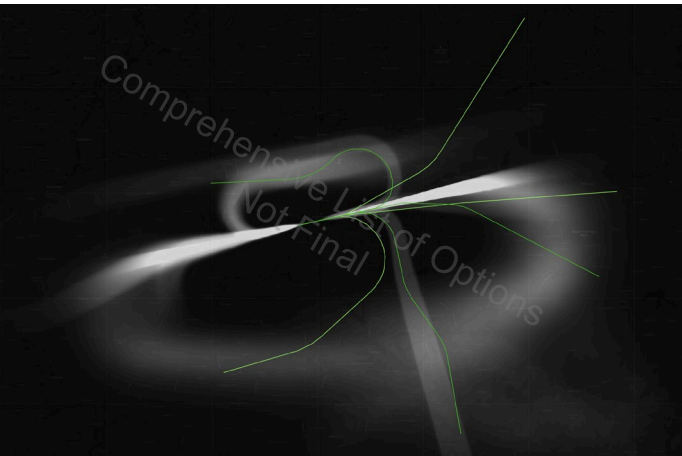
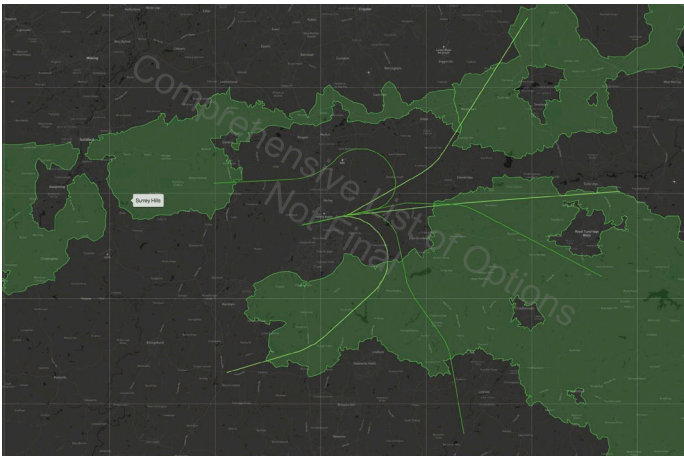
### Easterly Departure Option J (EDJ)

Aims to meet

DP1 DP2 DP3 DP4 DP5 DP6 DP7 DP8 DP9

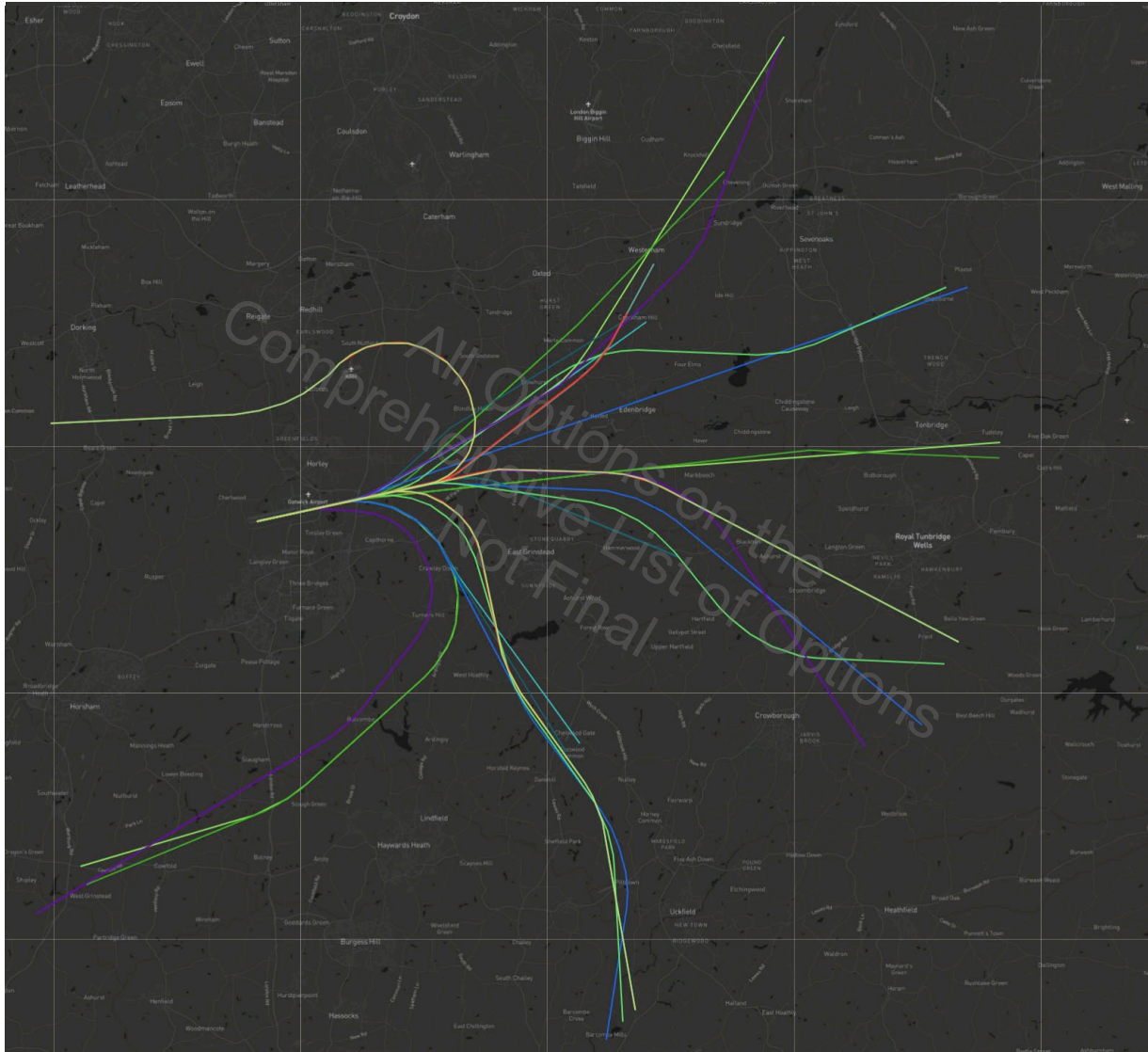
This system option aims to met DP3 (limit adverse noise effects), DP7 (Long term predictability and adaptability) and minimising population newly overflown.

As a starting point, we've used system EDH (Light green). When looking to achieve respite, in order to create sufficient separation, it typically meant that paths would have to be positioned over areas where there would be a high level of population newly overflown. We've therefore created a respite option that combines a period where we minimise population newly overflown (EDH) and a period where we minimise total population overflown (EDA). In order to achieve this, we have removed one path from option EDH which closely replicated EDA. Therefore each respite option has three departure paths.





## 8. COMPREHENSIVE LIST OF OPTIONS



### All Easterly Departure Options

The following image shows all the Easterly Departure Options (EDA – EDJ) shown on the previous slides on one image for comparison purposes.

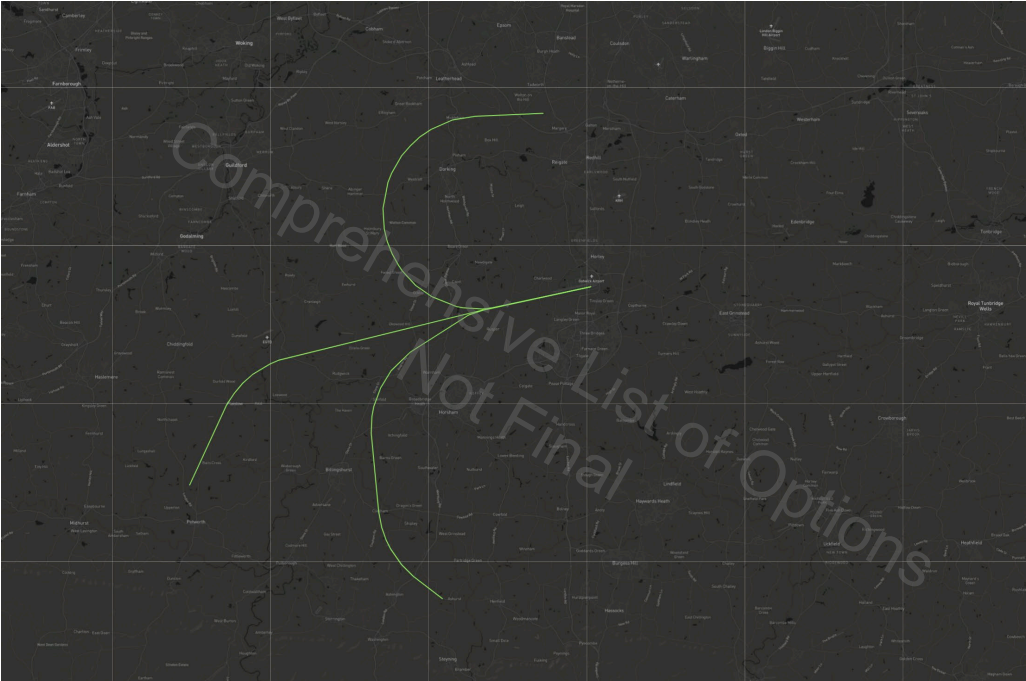
# Westerly Departures

## Options Development: Design Principles (Departures)

| Options Development Matrix                                                                                                                                         | Limit Adverse Noise Effects (DP3)                                                                                                 | Optimise Use of Aircraft Capabilities (DP6)                                                                                                                                                                                   | Long Term Predictability & Adaptability (DP7)                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Airspace Design Database Outputs                                                                                                                                   | The airspace design shall aim to <b>limit and where possible reduce the adverse impacts of aircraft noise</b>                     | The airspace design should enable aircraft operators to optimise the use of their fleet capabilities to improve operational efficiency and environmental performance                                                          | Airspace design should offer long term predictability of flight paths and respite and offer adaptation for the future airport development scenarios outlined in our draft Masterplan                                                                                                                                                             |
| <b>Minimise total population overflown</b><br>70dB SEL and total population overflown.<br>Checked against 80dB SEL, 60dB and 65dB L <sub>AMax</sub> , Area of AONB | System options developed using database outputs for 0-7000ft. Options developed aim to also meet DP1 DP5 and DP8                  | System options developed using database outputs for DP3 between 0-4000ft, and track mileage outputs (balanced with noise metrics) between 4000 – 7000ft. Options developed aim to also meet DP1 DP5 and DP8                   | System options developed within respite options using database outputs and the systems already developed for DP3. Respite options include SIDs for different periods (e.g. alternative days using different groups) or different periods of the day (e.g a set of SIDs for day and night) Options developed aim to also meet DP1 DP5 DP8 and DP9 |
|                                                                                                                                                                    | <b>Westerly Departure Option A (WDA)</b><br><b>Westerly Departure Option B (WDB)</b>                                              | <b>Westerly Departure Option C (WDC)</b><br><b>Westerly Departure Option D (WDD)</b>                                                                                                                                          | <b>Westerly Departure Option E (WDE)</b><br><b>Westerly Departure Option F (WDF)</b>                                                                                                                                                                                                                                                             |
| <b>Minimise population newly overflown</b><br>Population newly overflown >10,<br>Population newly overflown >20,<br>Population newly overflown >50.                | System options developed using existing NPRs and SID centrelines for 0-7000ft. Options developed aim to also meet DP1 DP5 and DP8 | System options developed using existing NPRs and database outputs for DP3 between 0-4000ft, and track mileage outputs (balanced with noise metrics) between 4000 – 7000ft. Options developed aim to also meet DP1 DP5 and DP8 | System options developed with respite options using database outputs. Respite options include SIDs for different periods (e.g. alternative days using different groups) Options developed aim to also meet DP1 DP5 DP8 and DP9                                                                                                                   |
|                                                                                                                                                                    | <b>Westerly Departure Option G (WDG)</b>                                                                                          | <b>Westerly Departure Option H (WDH)</b>                                                                                                                                                                                      | <b>Westerly Departure Option I (WDI)</b>                                                                                                                                                                                                                                                                                                         |

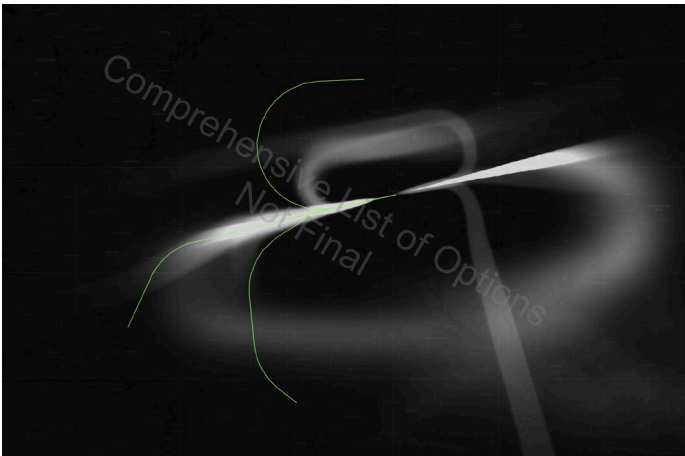
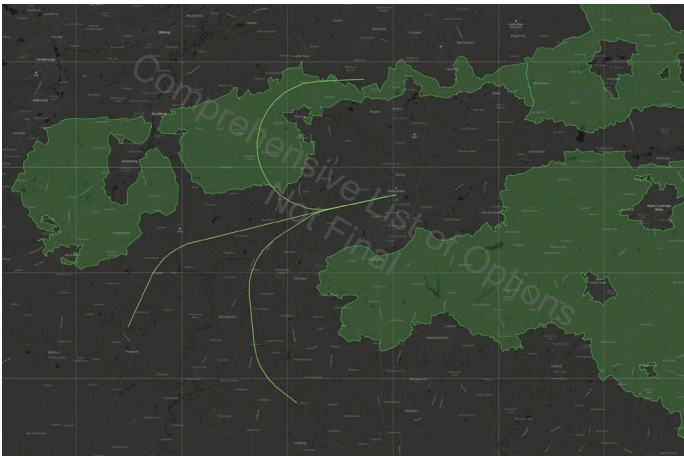
DP2 and DP4 are inherent in all notional flight paths developed

## 8. COMPREHENSIVE LIST OF OPTIONS



### Westerly Departure Option A (WDA)

| Aims to meet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DP1 DP2 DP3 DP5 DP8 DP9 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <p>This system option focuses on meeting DP3 (limit adverse noise effects) and minimising total population overflown. The primary metrics used to identify the high performing notional flight paths are ‘70dB SEL’ and ‘total population overflown’. A secondary check of the 80dB SEL, 60dB and 65dB LAMax and Area of AONB metrics was also undertaken.</p> <p>This system provides a 15° split for the departure tracks which would require additional safety assurance work to be undertaken. We’ve therefore used the database to identify a separate system that gives greater separation (WDB). Depending on the arrivals option, there may be some conflict with arrivals for the wrap around turn; this will be explored in further detail as options are refined and our shortlist of options is known.</p> |                         |





## 8. COMPREHENSIVE LIST OF OPTIONS



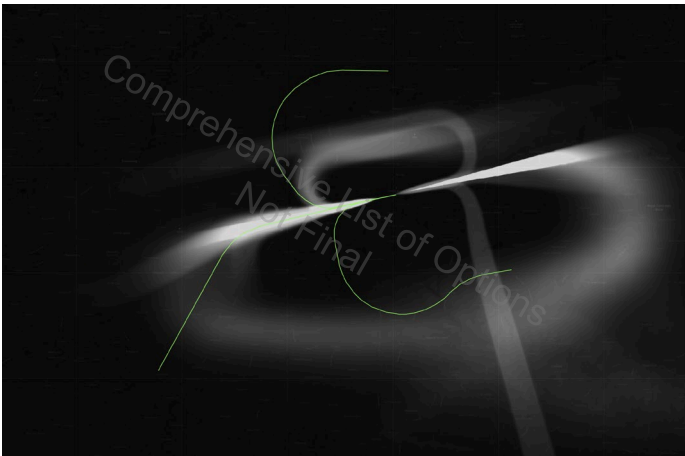
### Westerly Departure Option B (WDB)

Aims to meet

DP1 DP2 DP3 DP5 DP8 DP9

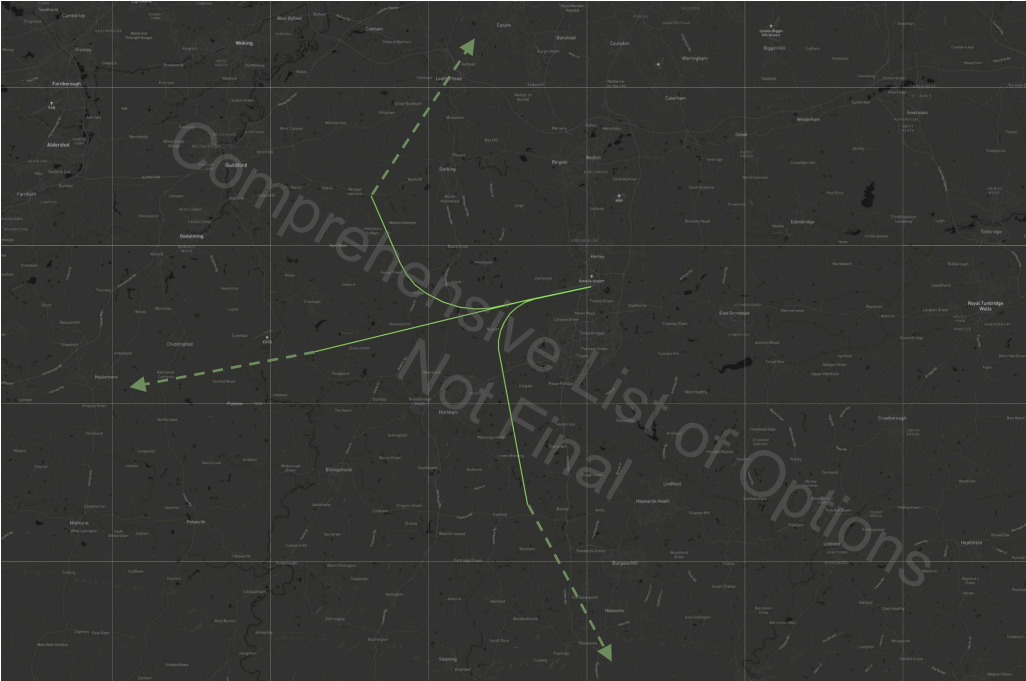
This system option focuses on meeting DP3 (limit adverse noise effects) and minimising total population overflow whilst providing a greater level of departure separation than WDA. The primary metrics used to identify the high performing notional flight paths are ‘70dB SEL’ and ‘total population overflow’. A secondary check of the 80dB SEL, 60dB and 65dB  $L_{A_{Max}}$  and Area of AONB metrics was also undertaken.

Depending on the arrivals option, there may be some conflict with arrivals for the turn to the left; this will be explored in further detail as options are refined and our shortlist of options is known.





## 8. COMPREHENSIVE LIST OF OPTIONS



### Westerly Departure Option C (WDC)

Aims to meet

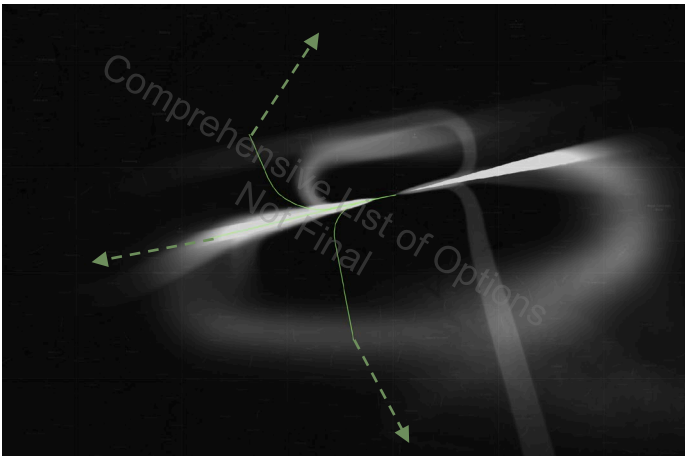
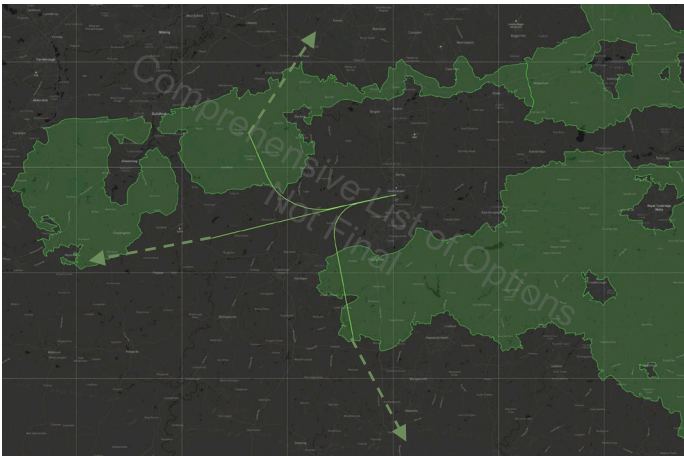
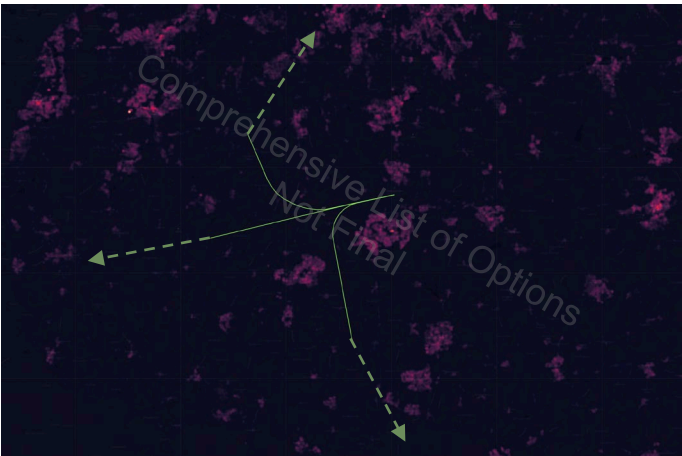
DP1 DP2 DP3 DP5 DP6 DP8 DP9

This system option focuses on meeting DP3 (limit adverse noise effects), DP6 (optimise use of aircraft capabilities) and minimising total population overflown.

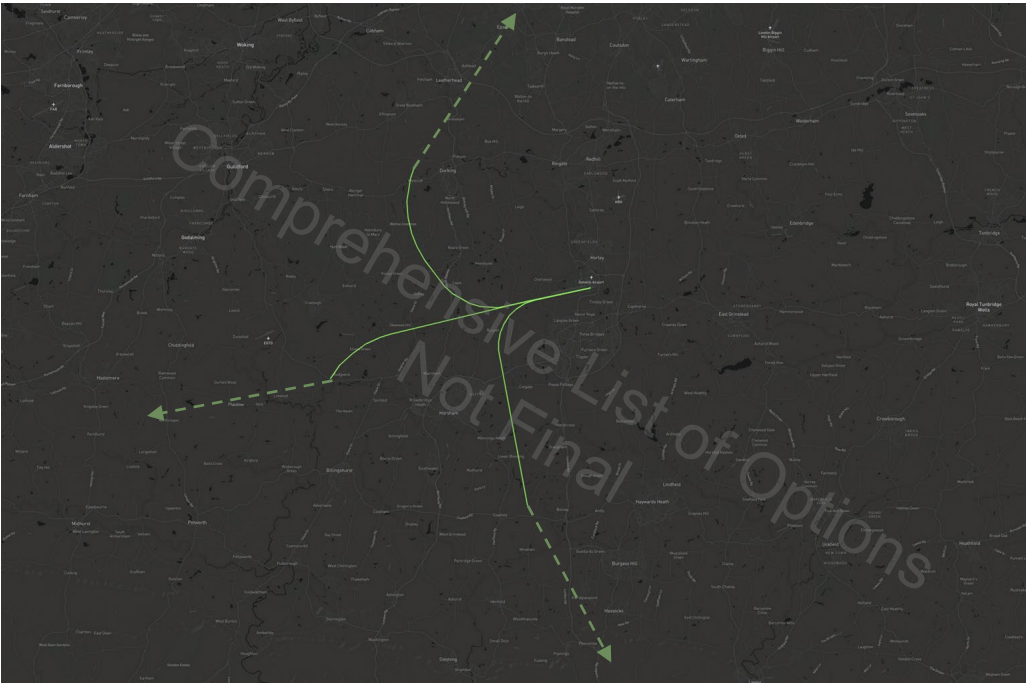
To first meet DP3, we have identified the high performing notional flight paths using the ‘70dB SEL’ and ‘total population overflown’ metrics for the paths between 0-4000ft. A secondary check of the 80dB SEL, 60dB and 65dB LAMax and Area of AONB metrics was also undertaken.

To achieve the aims of DP6, from 4000ft the option will then route directly to the network exit point (green dashed lines). We will use map underlays to make minor adjustments to the path with regards to noise. This option will evolve as more information around the airspace above 7000ft is shared from NERL.

This system would require additional safety assurance work to be undertaken. We’ve therefore used the database to identify a separate system that gives greater separation (EDD).



## 8. COMPREHENSIVE LIST OF OPTIONS



### Westerly Departure Option D (WDD)

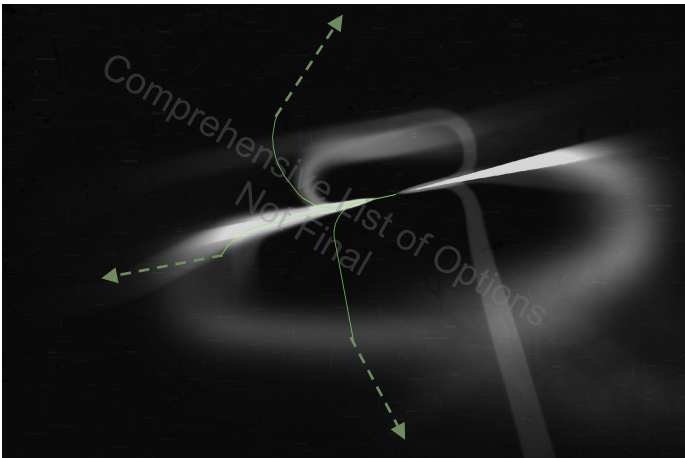
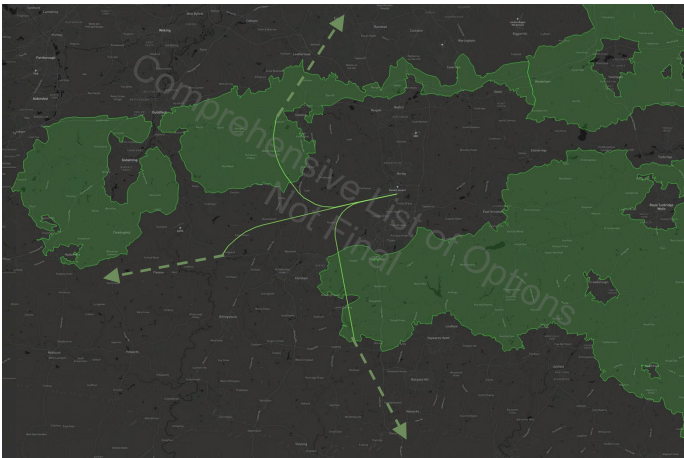
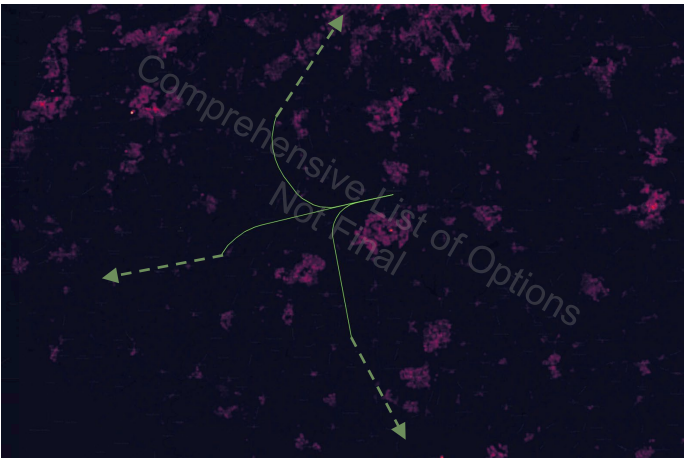
Aims to meet

DP1 DP2 DP3 DP5 DP6 DP8 DP9

This system option focuses on meeting DP3 (limit adverse noise effects), DP6 (optimise use of aircraft capabilities) and minimising total population overflown, whilst providing a greater level of departure separation than WDC.

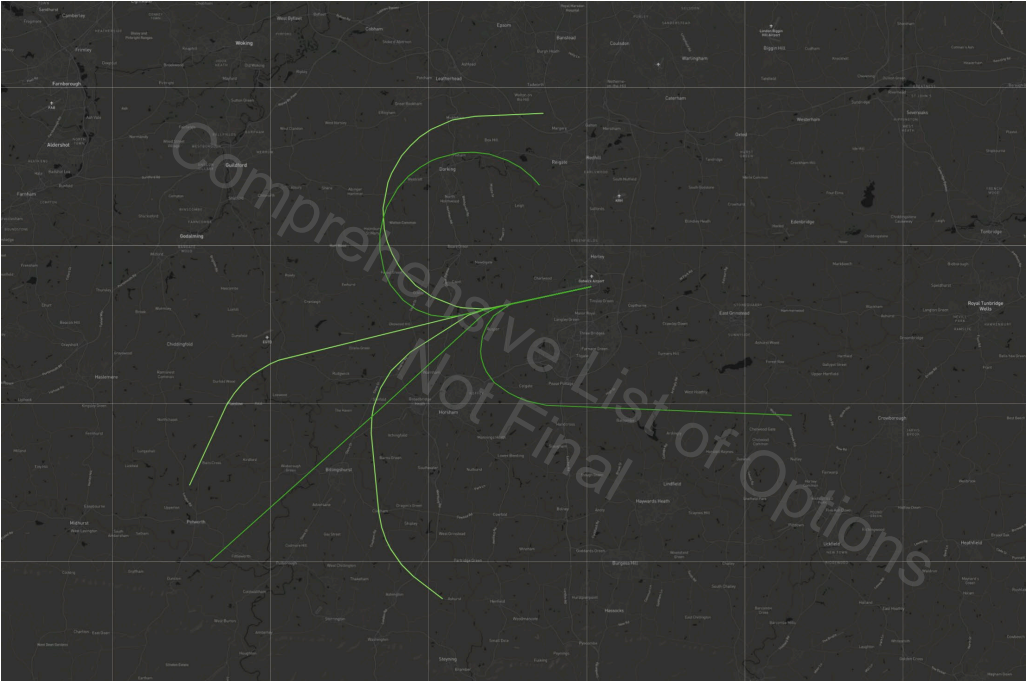
From 0-4000ft, the same metrics as WDC have been used to identify high performing notional flight paths that have greater than 30° separation.

To achieve the aims of DP6, from 4000ft the option will then route directly to the network exit point (green dashed lines). This will evolve as more information around the airspace above 7000ft is shared from NERL.





## 8. COMPREHENSIVE LIST OF OPTIONS



### Westerly Departure Option E (WDE)

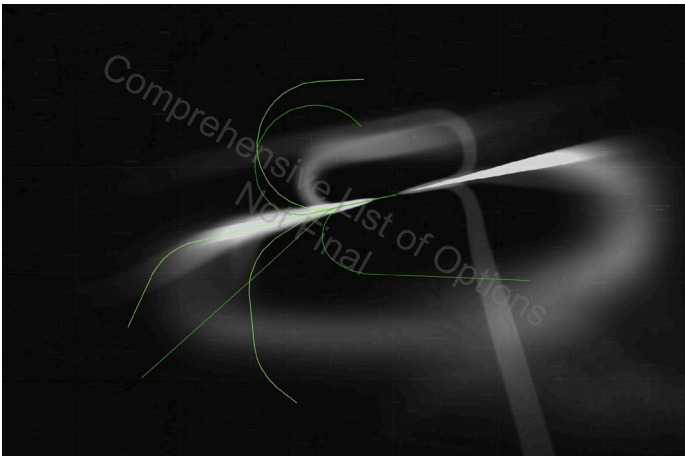
Aims to meet

DP1 DP2 DP3 DP4 DP5 DP8

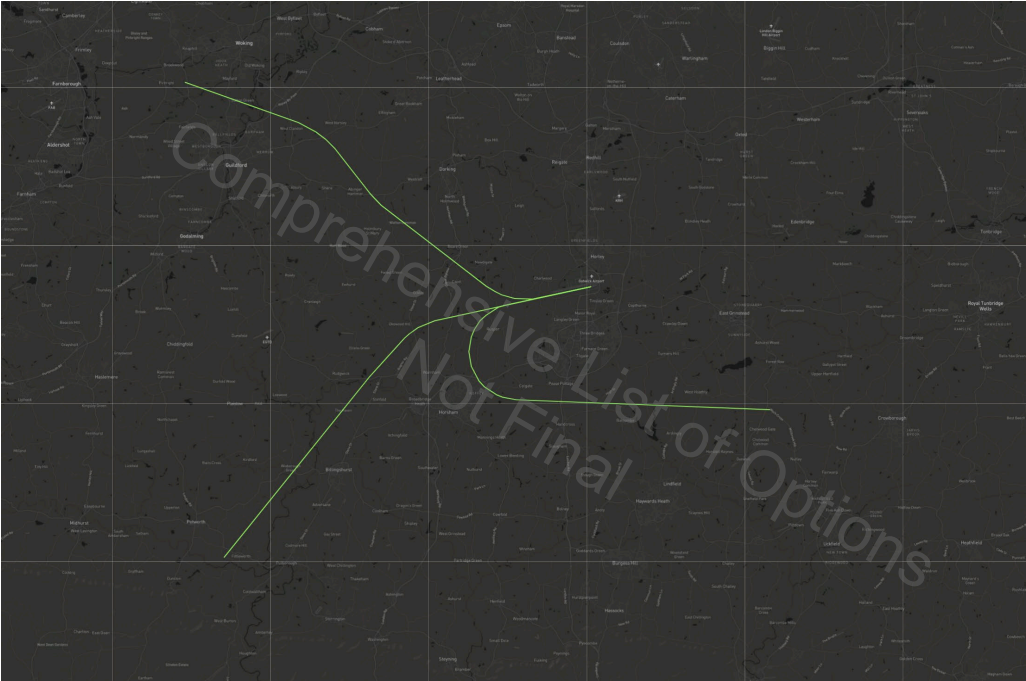
This system option aims to offer respite (DP7). We’ve built upon WDA (light green) and identified tracks that offer respite (dark green).

The primary metrics used to identify the high performing notional flight paths are ‘70dB SEL’ and ‘total population overflown’. A secondary check of the 80dB SEL, 60dB and 65dB LAMax and Area of AONB metrics was also undertaken.

Depending on the arrivals option, there may be some conflict with arrivals for the wrap around turns; this will be explored in further detail as options are refined and our shortlist of options is known.



## 8. COMPREHENSIVE LIST OF OPTIONS



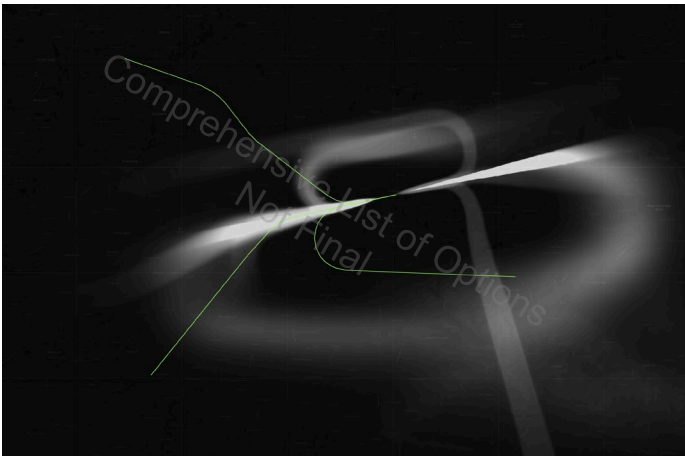
### Westerly Departure Option F (WDF)

Aims to meet

DP1 DP2 DP3 DP4 DP5 DP8

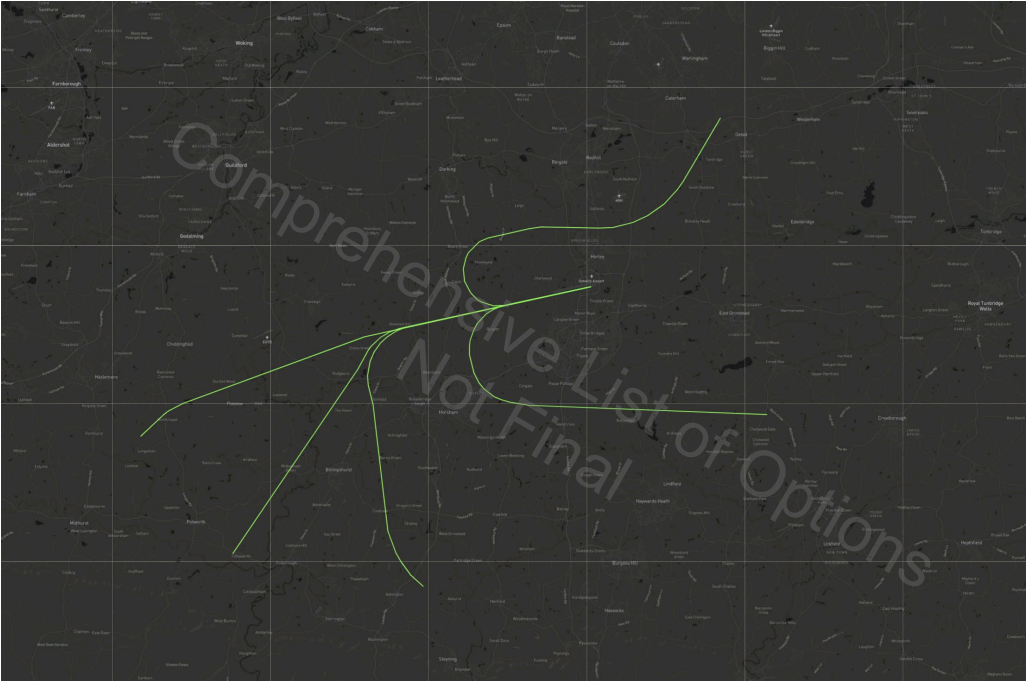
This system has been developed as a respite option that could be operated during the night. It could be combined with any WDA, WDB, WDC, WDD. Depending on its overall performance which we'll explore later in the process, this system could also be used during the day although the metrics used to develop it are targeted at the night time period.

The primary metrics used to identify the high performing notional flight paths focus on minimising total adverse noise effects at night and are '80dB SEL' and 'total population overflown'. A secondary check of the 65dB LAMax was also undertaken.





## 8. COMPREHENSIVE LIST OF OPTIONS

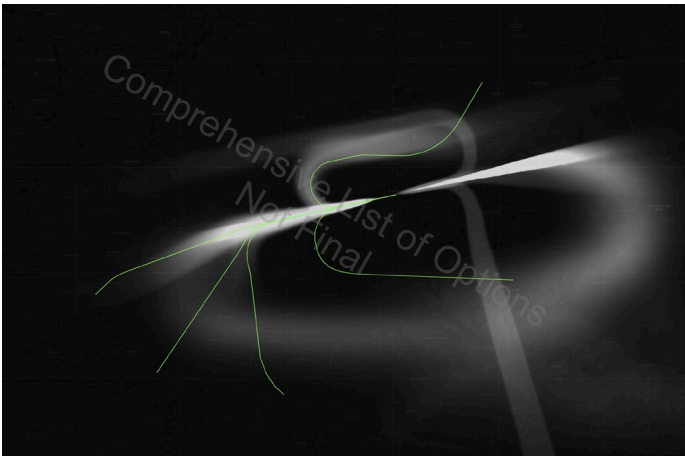
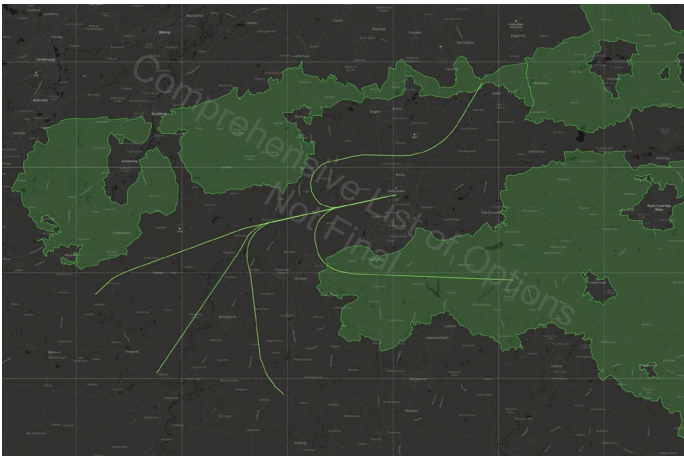


### Westerly Departure Option G (WDG)

Aims to meet

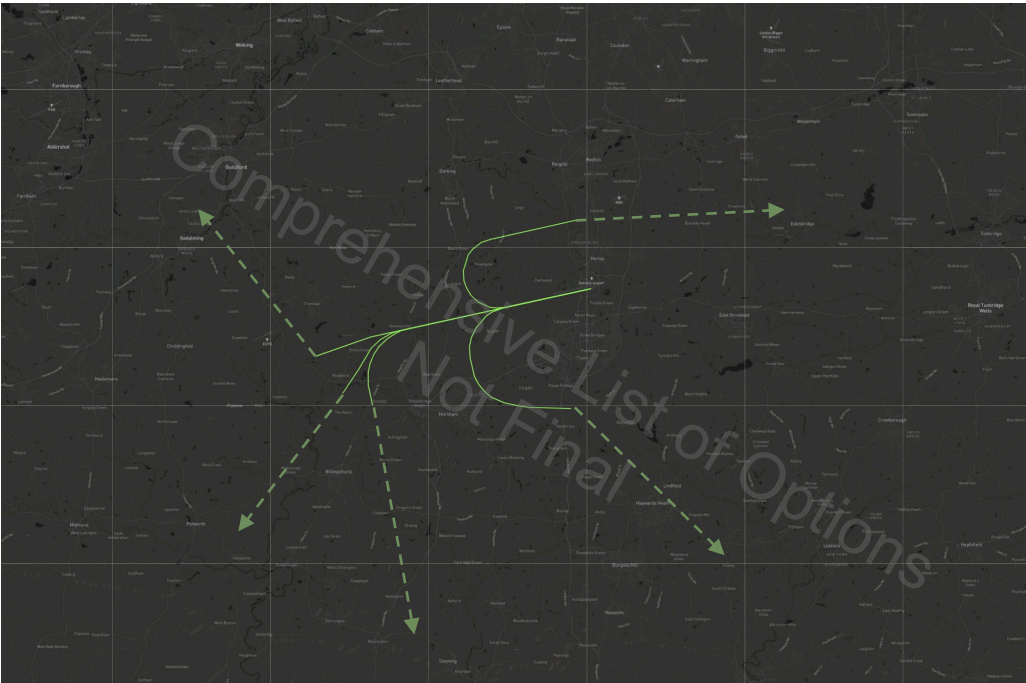
DP1 DP2 DP3 DP5 DP8 DP9

This system option focuses on meeting DP3 (limit adverse noise effects) and minimising population newly overflown. It is based on the existing nominal centrelines of the departure routes departing from Gatwick (including NPRs) however the vertical performance of these routes has been updated to reflect continuous climb performance.





## 8. COMPREHENSIVE LIST OF OPTIONS



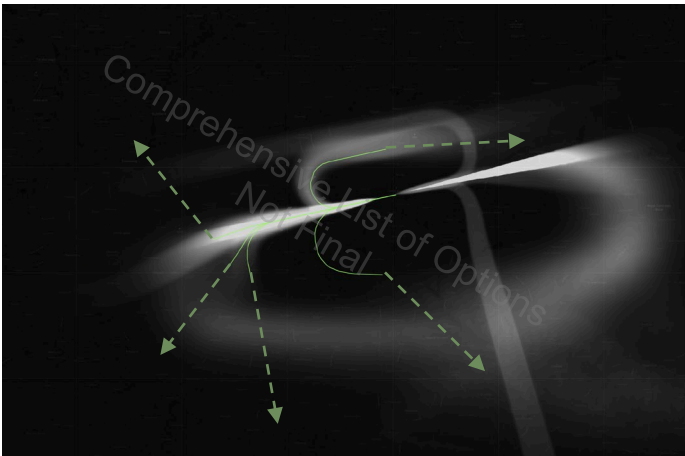
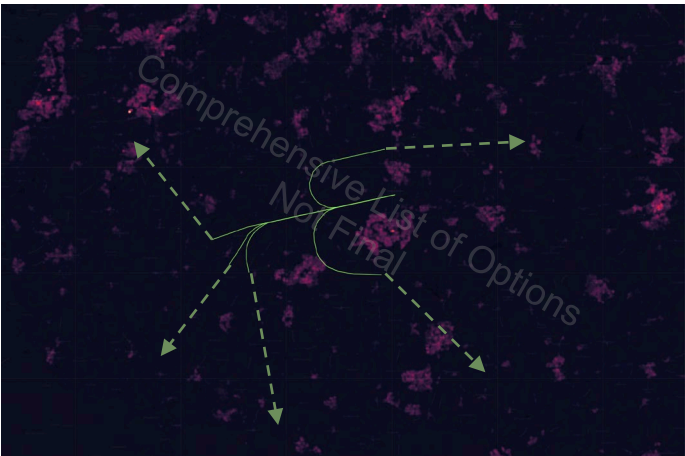
### Westerly Departure Option H (WDH)

Aims to meet

DP1 DP2 DP3 DP5 DP6 DP8 DP9

This system option focuses on meeting DP3 (limit adverse noise effects), DP6 (optimise use of aircraft capabilities) and minimising population newly overflown. It is based on the existing nominal centrelines of the departure routes departing from Gatwick (including NPRs) up to 4000ft.

To achieve the aims of DP6 and maximise environmental efficiency, from 4000ft the option will route directly to the network exit point (green dashed lines). This will evolve as more information around the airspace above 7000ft is shared from NERL.

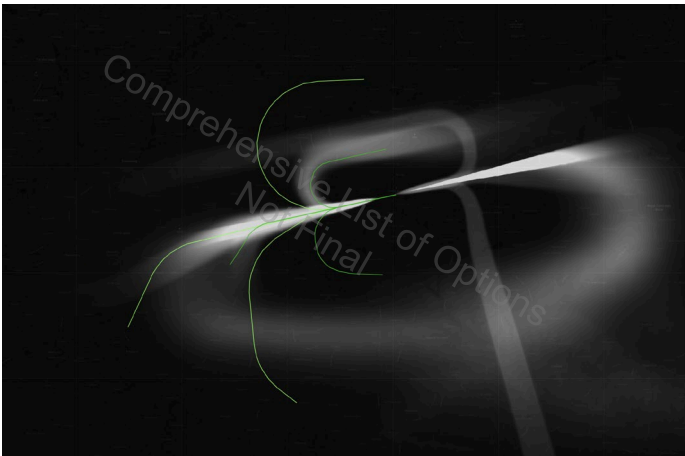


## 8. COMPREHENSIVE LIST OF OPTIONS



Westerly Departure Option I (WDI)

| Aims to meet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DP1 DP2 DP3 DP4 DP5 DP6 DP7 DP8 DP9 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <p>This system option aims to met DP3 (limit adverse noise effects), DP7 (Long term predictability and adaptability) and minimising population newly overflown.</p> <p>As a starting point, we've used system WDG (dark green). When looking to achieve respite, in order to create sufficient separation, it typically meant that paths would have to be positioned over areas where there would be a high level of population newly overflown. We've therefore created a respite option that combines a period where we minimise population newly overflown by taking some of the paths used in option (WDG) and a period where we minimise total population overflown (WDA).</p> <p>In order to achieve this, we have removed two of the paths from option WDG which closely replicated WDA. In the resulting respite option, WDG and EDA both have three departure paths.</p> |                                     |

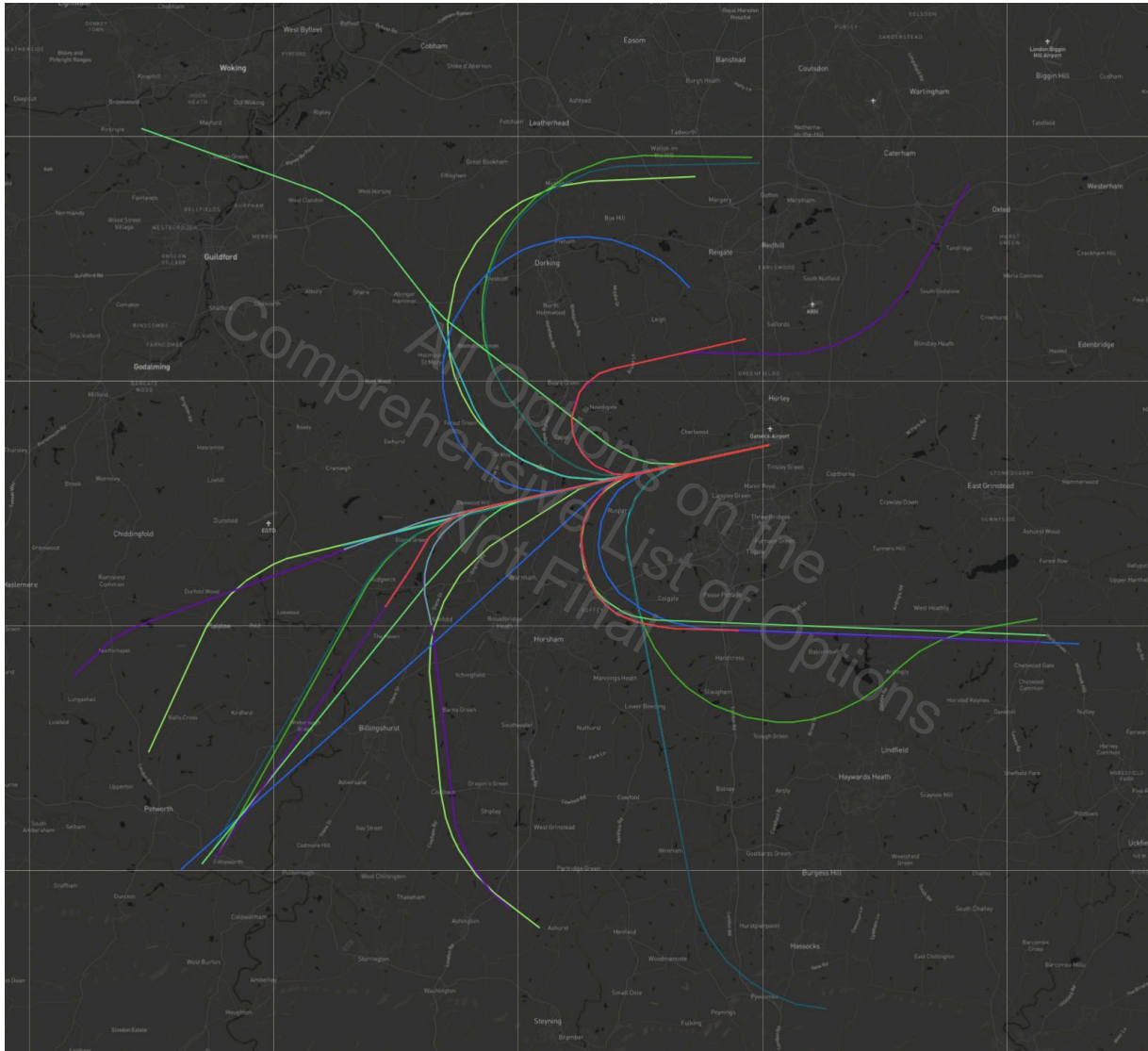




## 8. COMPREHENSIVE LIST OF OPTIONS

### All Westerly Departure Options

The following image shows all the Westerly Departure Options (WDA – WDI) shown on the previous slides on one image for comparison purposes.



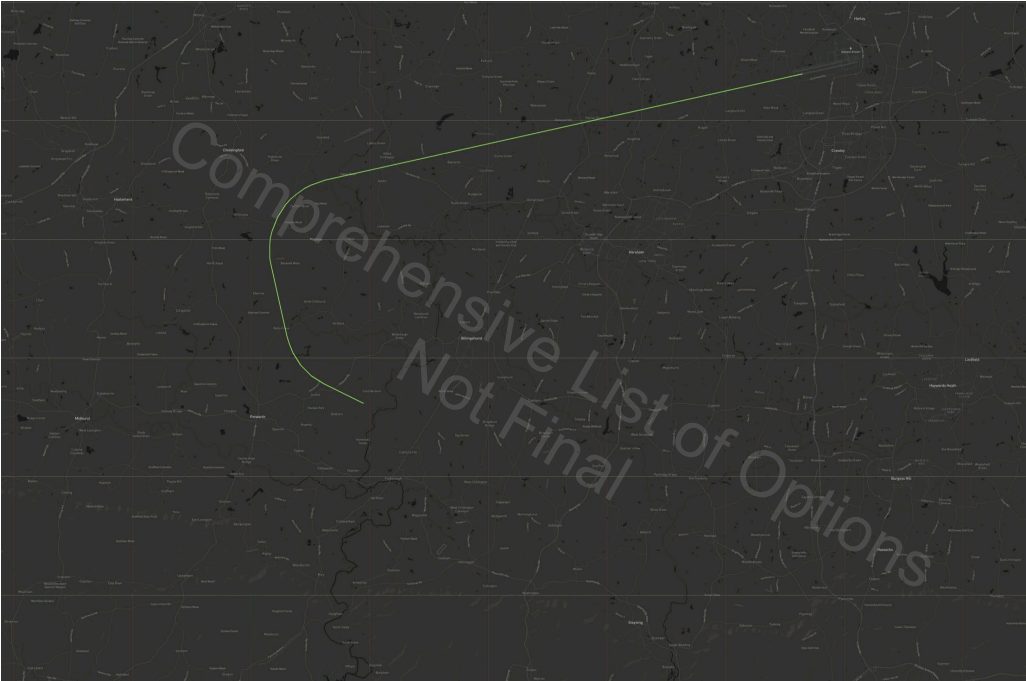
# Easterly Arrivals

## Options Development: Design Principles (Arrivals)

| Options Development Matrix                                                                                                                                         | Limit Adverse Noise Effects (DP3)                                                                                | Optimise Use of Aircraft Capabilities (DP6)                                                                                                                                                                                   | Long Term Predictability & Adaptability (DP7)                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Airspace Design Database Outputs                                                                                                                                   | The airspace design shall aim to <b>limit and where possible reduce the adverse impacts of aircraft noise</b>    | The airspace design should enable aircraft operators to optimise the use of their fleet capabilities to improve operational efficiency and environmental performance                                                          | Airspace design should offer long term predictability of flight paths and respite and offer adaptation for the future airport development scenarios outlined in our draft Masterplan                                                                                                                                                             |
| <b>Minimise total population overflown</b><br>70dB SEL and total population overflown.<br>Checked against 80dB SEL, 60dB and 65dB L <sub>AMax</sub> , Area of AONB | System options developed using database outputs for 0-7000ft. Options developed aim to also meet DP1 DP5 and DP8 | System options developed using database outputs for DP3 between 0-4000ft, and track mileage outputs (balanced with noise metrics) between 4000 – 7000ft. Options developed aim to also meet DP1 DP5 and DP8                   | System options developed within respite options using database outputs and the systems already developed for DP3. Respite options include SIDs for different periods (e.g. alternative days using different groups) or different periods of the day (e.g a set of SIDs for day and night) Options developed aim to also meet DP1 DP5 DP8 and DP9 |
|                                                                                                                                                                    | <b>Easterly Arrival Option A (EAA)</b><br><b>Easterly Arrival Option B (EAB)</b>                                 | <b>Easterly Arrival Option C (EAC)</b>                                                                                                                                                                                        | <b>Easterly Arrival Option D (EAD)</b><br><b>Easterly Arrival Option E (EAE)</b><br><b>Easterly Arrival Option F (EAF)</b>                                                                                                                                                                                                                       |
| <b>Minimise population newly overflown</b><br>Population newly overflown >10,<br>Population newly overflown >20,<br>Population newly overflown >50.                | System options developed using database outputs for 0-7000ft. Options developed aim to also meet DP1 DP5 and DP8 | System options developed using existing NPRs and database outputs for DP3 between 0-4000ft, and track mileage outputs (balanced with noise metrics) between 4000 – 7000ft. Options developed aim to also meet DP1 DP5 and DP8 | System options developed with respite options using database outputs. Respite options include SIDs for different periods (e.g. alternative days using different groups) Options developed aim to also meet DP1 DP5 DP8 and DP9                                                                                                                   |
|                                                                                                                                                                    | <b>Easterly Arrival Option G (EAG)</b><br><b>Easterly Arrival Option H (EAH)</b><br><b>(vectoring)</b>           | <b>Easterly Arrival Option I (EAI)</b>                                                                                                                                                                                        | <b>Easterly Arrival Option J (EAJ)</b>                                                                                                                                                                                                                                                                                                           |



## 8. COMPREHENSIVE LIST OF OPTIONS



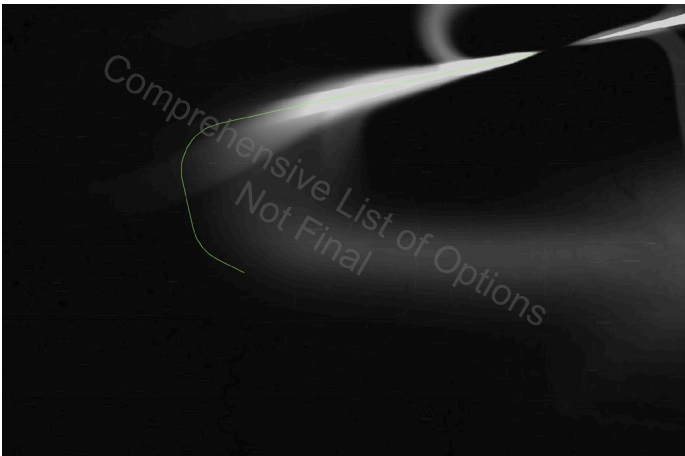
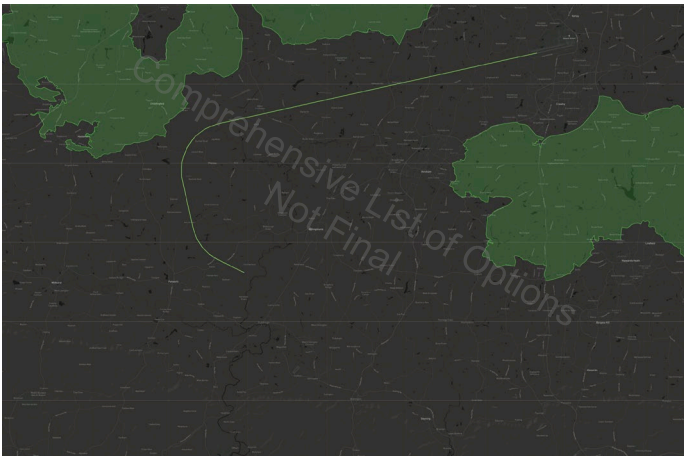
### Easterly Arrival Option A (EAA)

Aims to meet

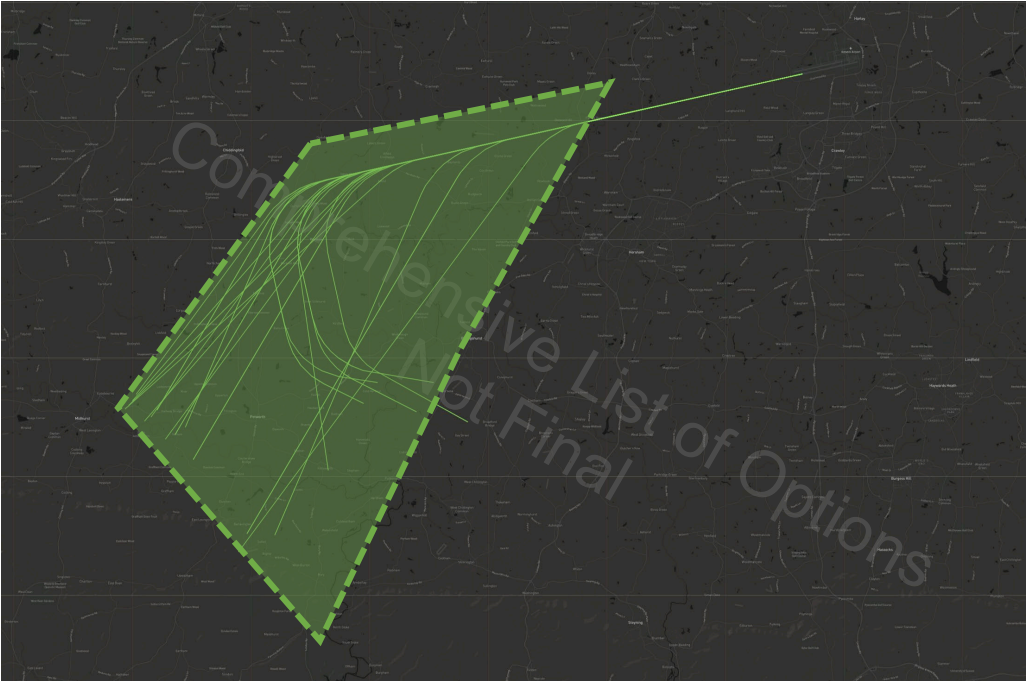
DP1 DP2 DP3 DP4 DP5 DP6 DP8 DP9

This system option focuses on meeting DP3 (limit adverse noise effects) and minimising total population overflown. As the SEL data sits along the final approach track, the primary metric used to identify the high performing notional flight path is the ‘total population overflown’. A secondary check of Area of AONB metrics was also undertaken.

We anticipate that at the point of implementation, the technology required from the upper network to facilitate single track PBN arrivals during periods of high traffic will not be available. We have therefore used the data around the highest performing notional flight paths to identify a vectoring area that would be used by controllers in certain traffic scenarios (EAB).



## 8. COMPREHENSIVE LIST OF OPTIONS



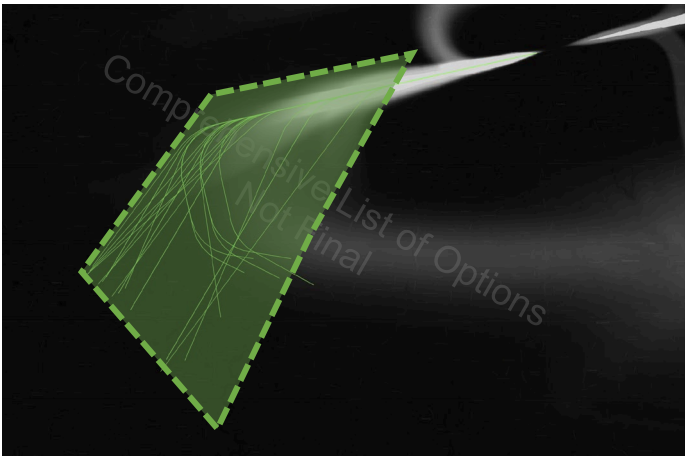
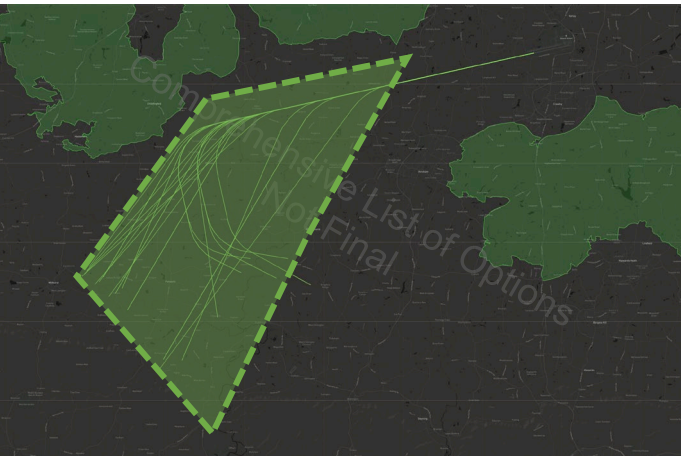
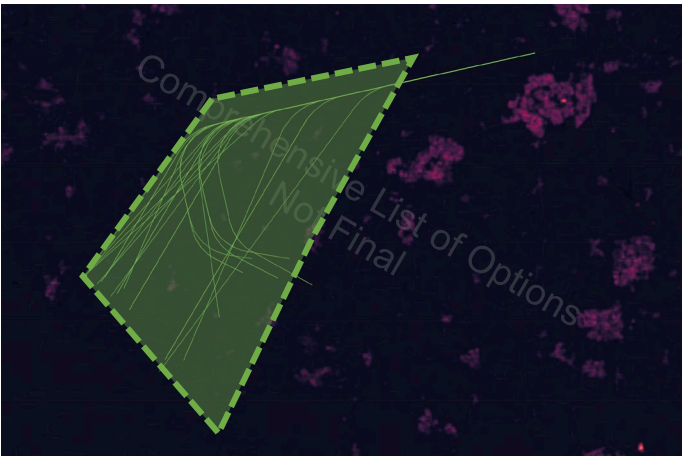
### Easterly Arrival Option B (EAB)

Aims to meet

DP1 DP2 DP3 DP4 DP5 DP9

This arrival option focuses on meeting DP3 (limit adverse noise effects) and minimising total population overflown. It is intended it would be used in combination with a PBN option.

The primary ‘total population overflown’ metric was used to identify the high performing notional flight paths that could be used to define a vectoring area. This is an initial indicative vectoring area subject to change as we engage with ATC and the upper network as the ACP progresses.





## 8. COMPREHENSIVE LIST OF OPTIONS



### Easterly Arrival Option C (EAC)

Aims to meet

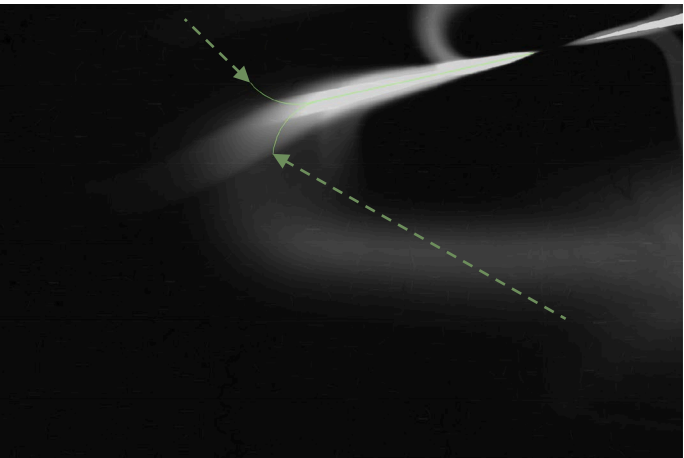
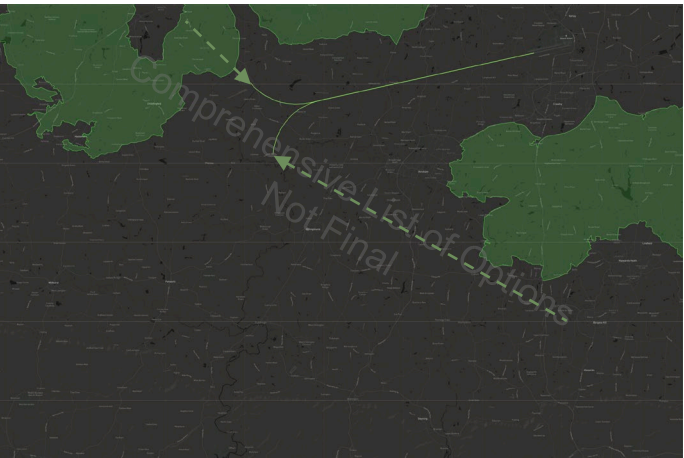
DP1 DP2 DP3 DP4 DP5 DP8

This arrival option focuses on meeting DP3 (limit adverse noise effects), DP6 (optimise use of aircraft capabilities) and minimising total population overflown.

To first meet DP3, we have identified high performing notional flight paths using the ‘total population overflown metric for paths between 0-4000ft. A check against areas of AONB was also undertaken.

To achieve the aims of DP6, from 4000ft the option will then route directly from the network entry point (green dashed lines). We will use map population and other map underlays to make minor adjustments to the path with regards to noise. This option will evolve as more information around the airspace above 7000ft is shared from NERL.

We anticipate that at the point of implementation, the technology required from the upper network to facilitate PBN arrivals during periods of high traffic will not be available. This option may therefore have to be used in combination with a vectoring area (EAB) in certain traffic scenarios.



## 8. COMPREHENSIVE LIST OF OPTIONS



### Easterly Arrival Option D (EAD)

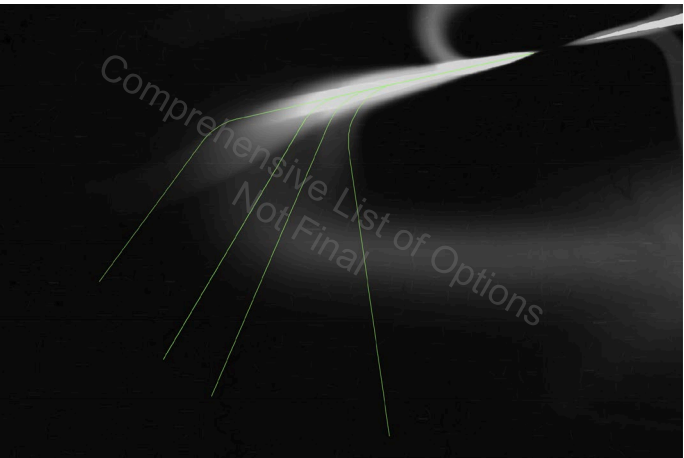
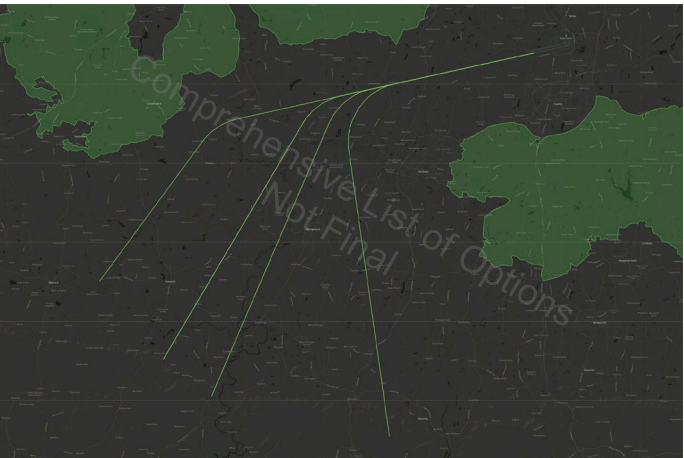
Aims to meet

DP1 DP2 DP3 DP4 DP5 DP8 DP9

This arrival option aims to meet DP3 (limit adverse noise effects), DP7 (Long term predictability and adaptability) and minimise total population overflown.

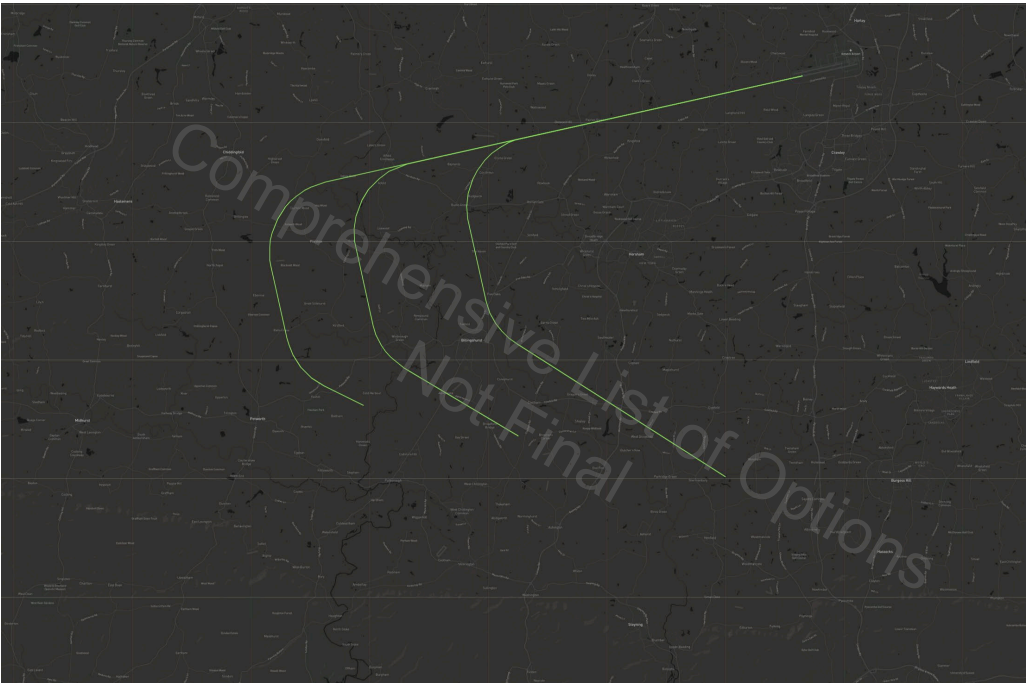
We've used the total population overflown metric as the primary metric to identify notional flight paths that could be used in combination to provide respite. This arrival option avoids AONBs. The three paths selected could be operated in various combinations to offer respite and we will explore this more once the outcome of the Fair and Equitable Distribution of noise (FED) study is completed.

We anticipate that at the point of implementation, the technology required from the upper network to facilitate PBN arrivals during periods of high traffic will not be available. This option may therefore have to be used in combination with a vectoring area (EAB) in certain traffic scenarios.



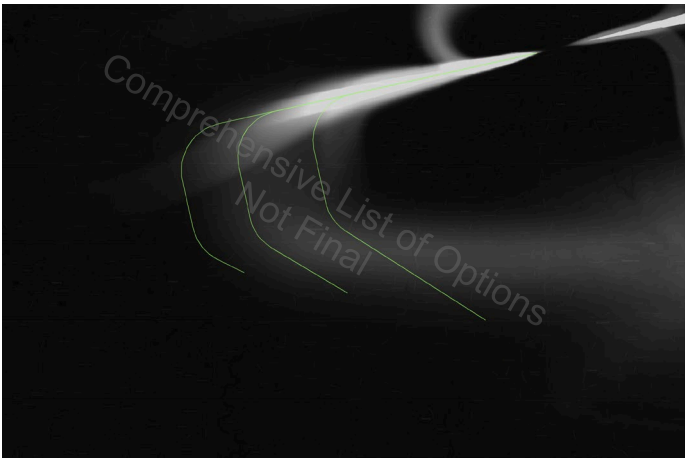
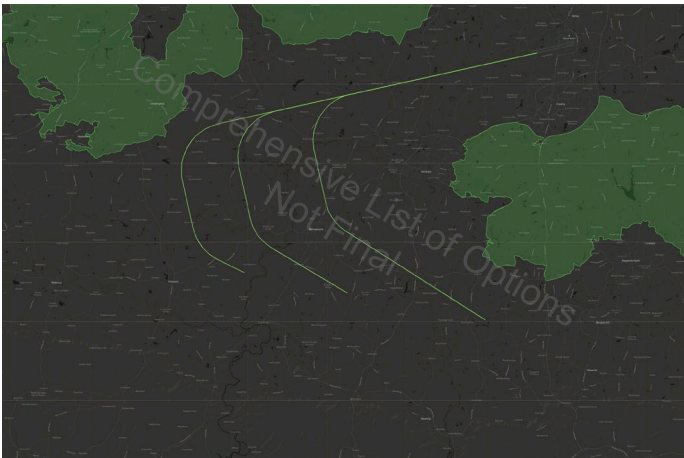


## 8. COMPREHENSIVE LIST OF OPTIONS (SPLIT INTO TWO)

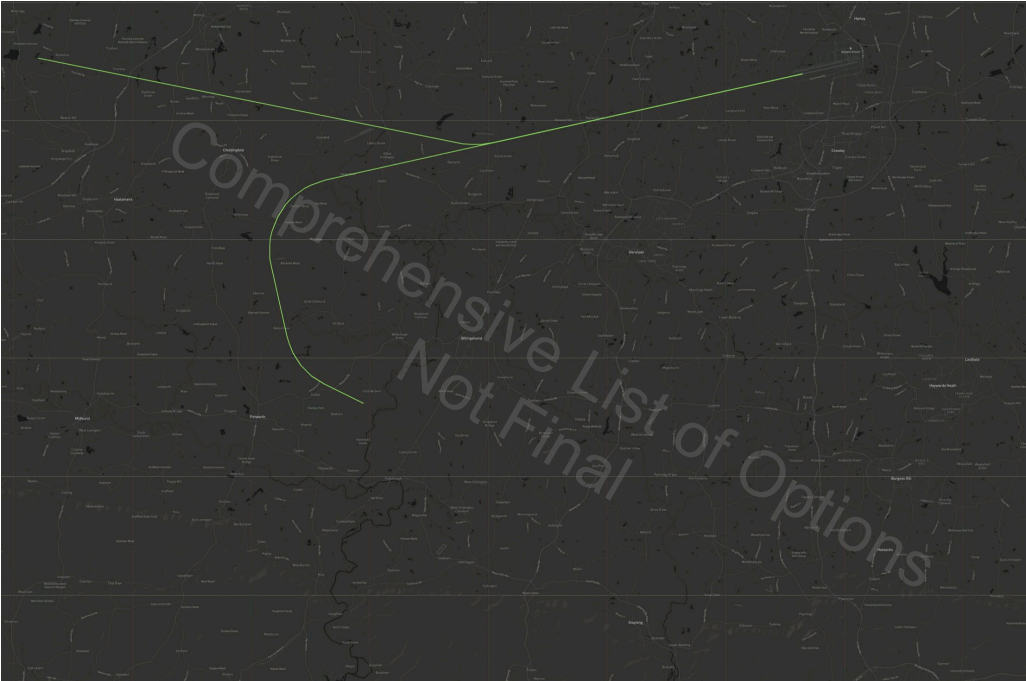


### Easterly Arrival Option E (EAE)

| Aims to meet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | DP1 DP2 DP3 DP4 DP5 DP8 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <p>This arrival option focuses on DP3 (limit adverse noise effects), DP7 (Long term predictability and adaptability) and minimising total population overflown.</p> <p>We've used the total population overflown metric as the primary metric to identify notional flight paths that could be used in combination to provide respite. When we've looked at the data, two sets of path performed comparatively well and therefore we have split them into two respite groups EAD and EAE.</p> <p>The three paths could be operated in various combinations to offer respite and we will explore this more once the outcome of the Fair and Equitable Distribution of noise (FED) study is completed.</p> <p>We anticipate that at the point of implementation, the technology required from the upper airspace network to facilitate PBN arrivals during periods of high traffic will not be available. This option may therefore have to be used in combination with a vectoring area (EAB) in certain traffic scenarios.</p> |                         |



## 8. COMPREHENSIVE LIST OF OPTIONS



### Easterly Arrival Option G (EAF)

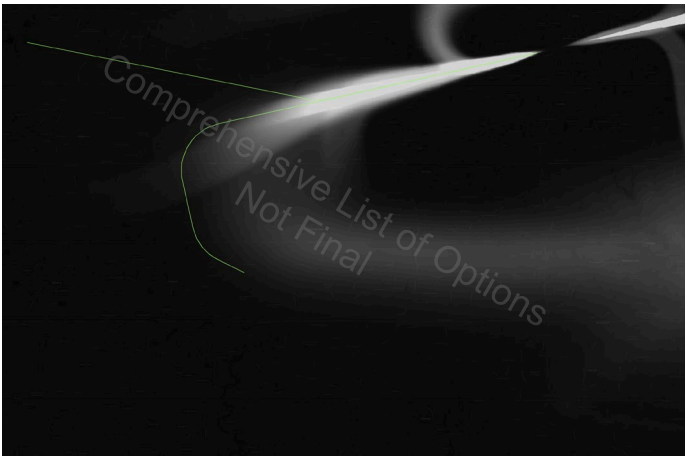
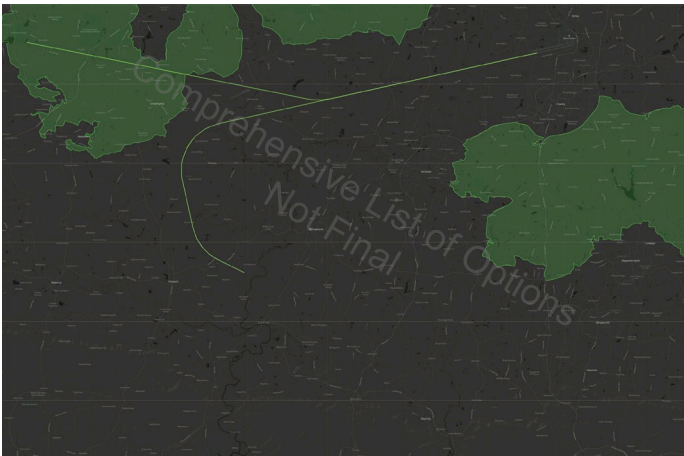
Aims to meet

DP1 DP2 DP3 DP4 DP5 DP6 DP8

This night time arrival option focuses on meeting DP3 (limit adverse noise effects), DP6 (optimise use of aircraft capabilities), DP7 and minimising total population overflown.

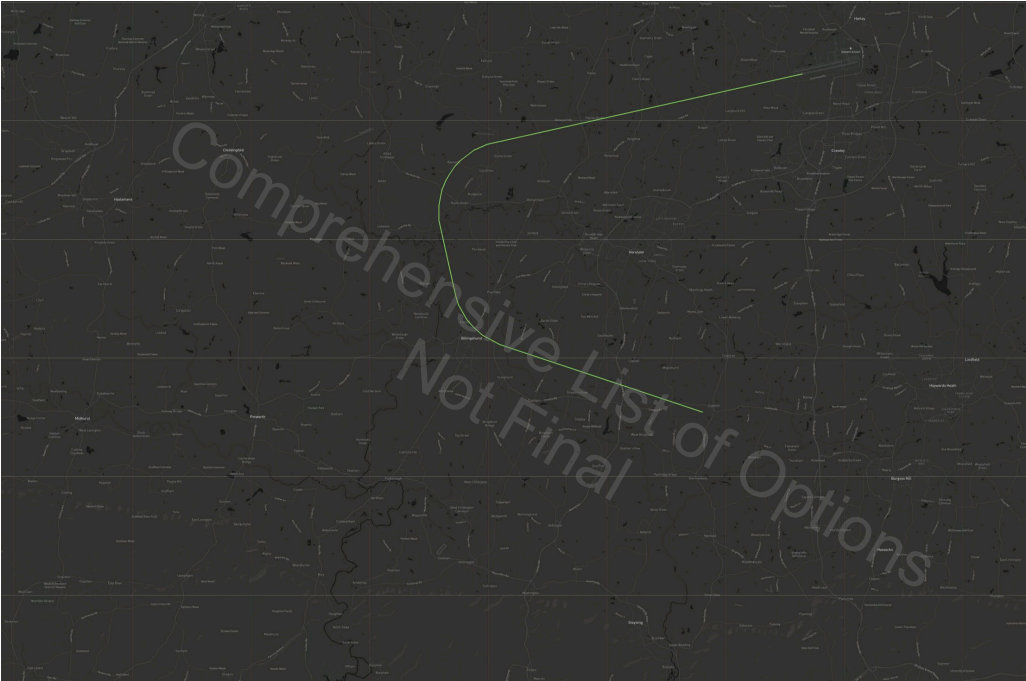
The northern path of this option has been selected using the total population overflown metric. It would offer a 'short cut' to operators at night when traffic conditions may be able to facilitate an arrival directly from the north.

This could be used alongside EAA EAB EAC EAD and EAE. Due to interdependencies with Heathrow we anticipate this only being available at night – this is something we will explore further as we progress through the masterplan process.





## 8. COMPREHENSIVE LIST OF OPTIONS



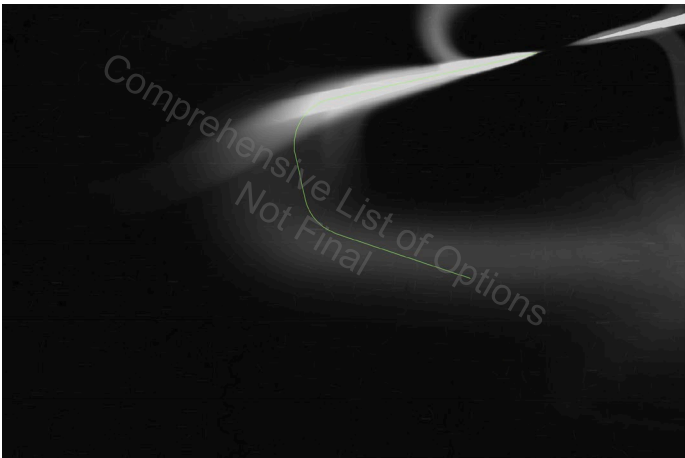
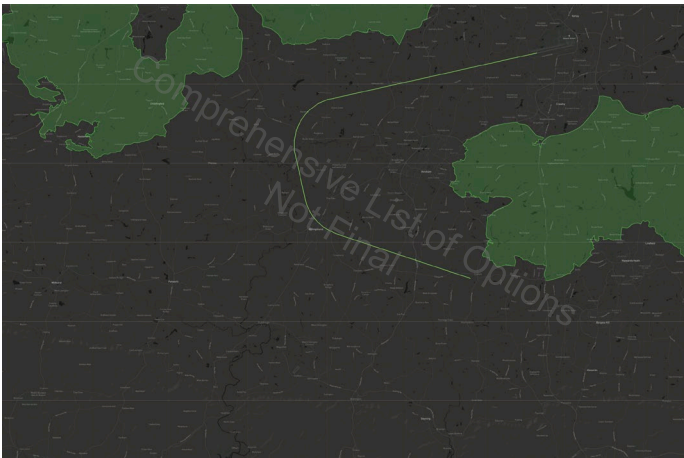
### Easterly Arrival Option G (EAG)

Aims to meet

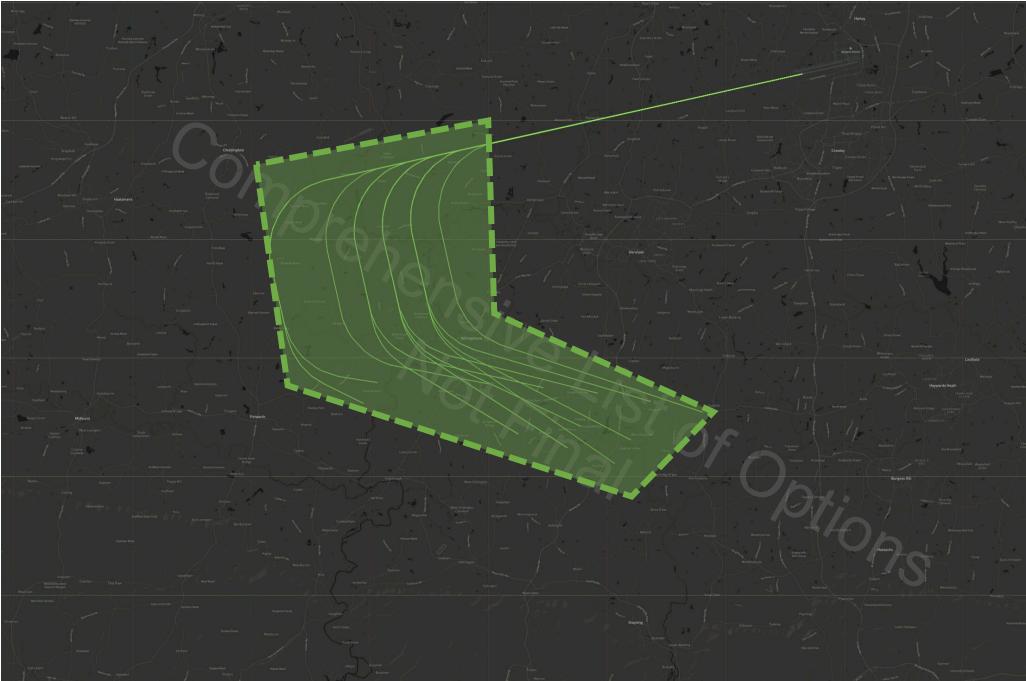
DP1 DP2 DP3 DP4 DP5 DP8

This system option focuses on meeting DP3 (limit adverse noise effects) and minimising population newly overflown. As the SEL data sits along the final approach track, the primary metric used to identify the high performing notional flight path is based on population newly overflown overflight contours and data around existing arrival flight paths.

We anticipate that at the point of implementation, the technology required from the upper network to facilitate single track PBN arrivals during periods of high traffic will not be available. We have therefore used the data around the highest performing notional flight paths to identify a vectoring area that would be used by controllers in certain traffic scenarios (EAG).



## 8. COMPREHENSIVE LIST OF OPTIONS



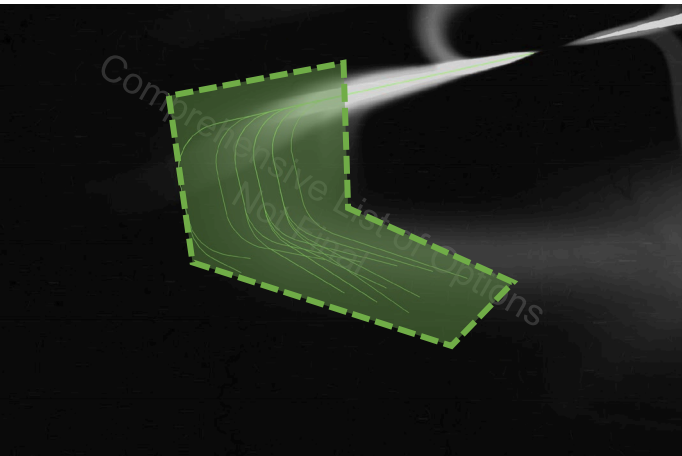
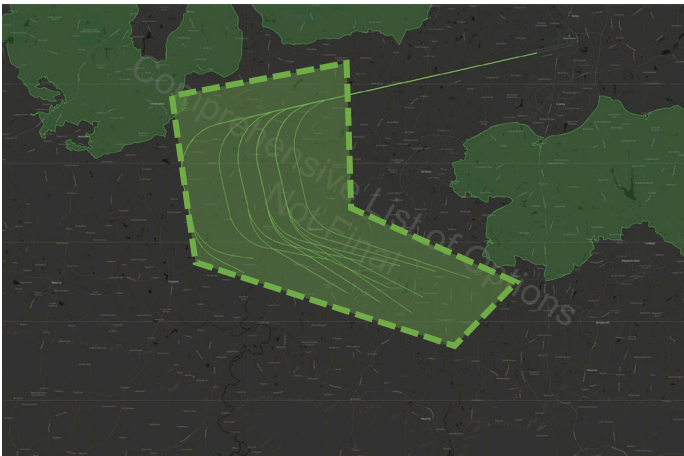
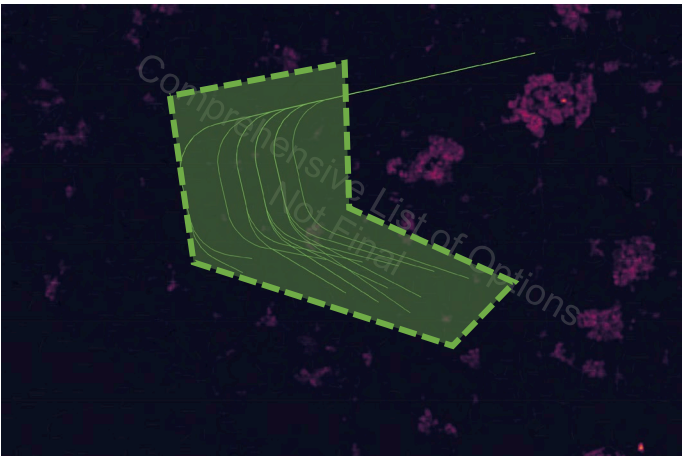
### Easterly Arrival Option H (EAH)

Aims to meet

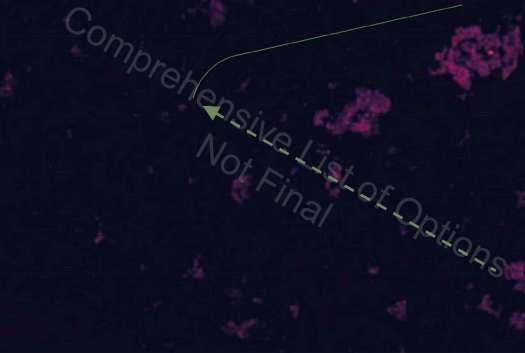
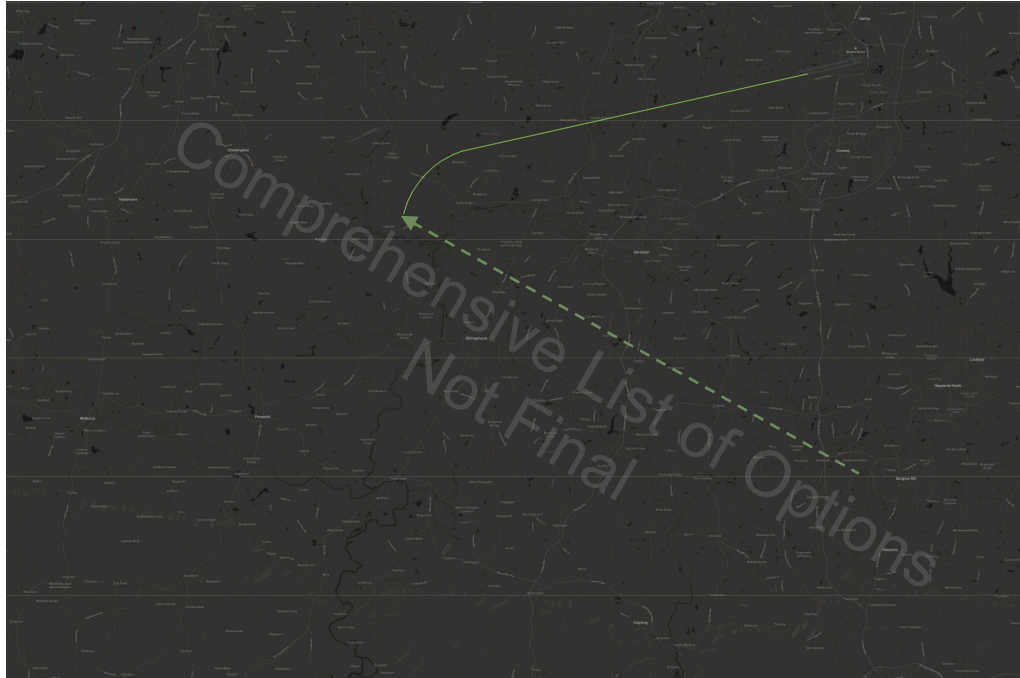
DP1 DP2 DP3 DP4 DP5 DP8

This arrival option focuses on meeting DP3 (limit adverse noise effects) and minimising population newly overflown. It is intended it would be used in combination with a PBN option.

The population newly overflown overflight contours were used to identify the high performing notional flight paths that could be used to define a vectoring area. This is an initial indicative vectoring area subject to change as we engage with ATC and the upper network as the ACP progresses.

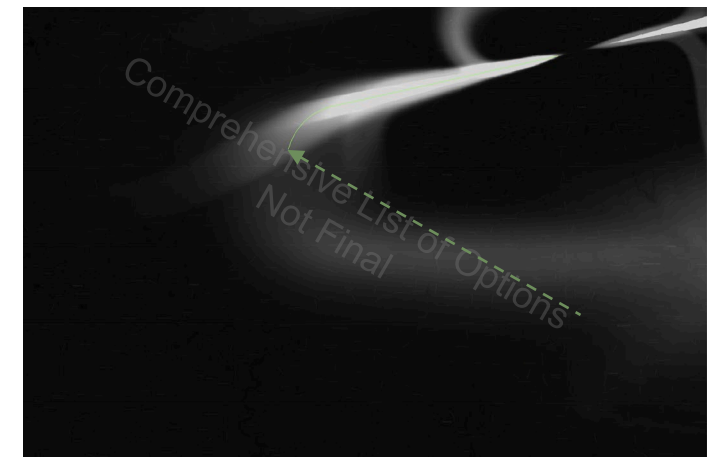
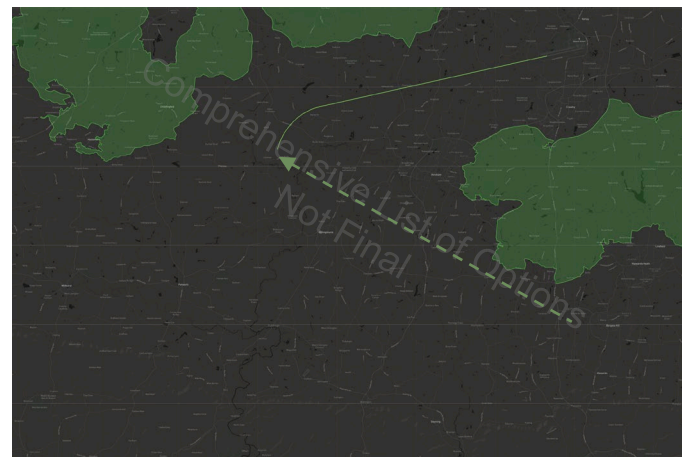






Comprehensive List of Options

Not Final

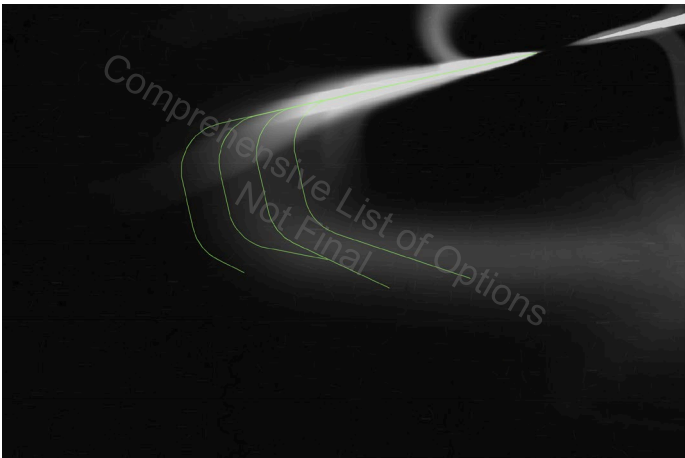


## 8. COMPREHENSIVE LIST OF OPTIONS

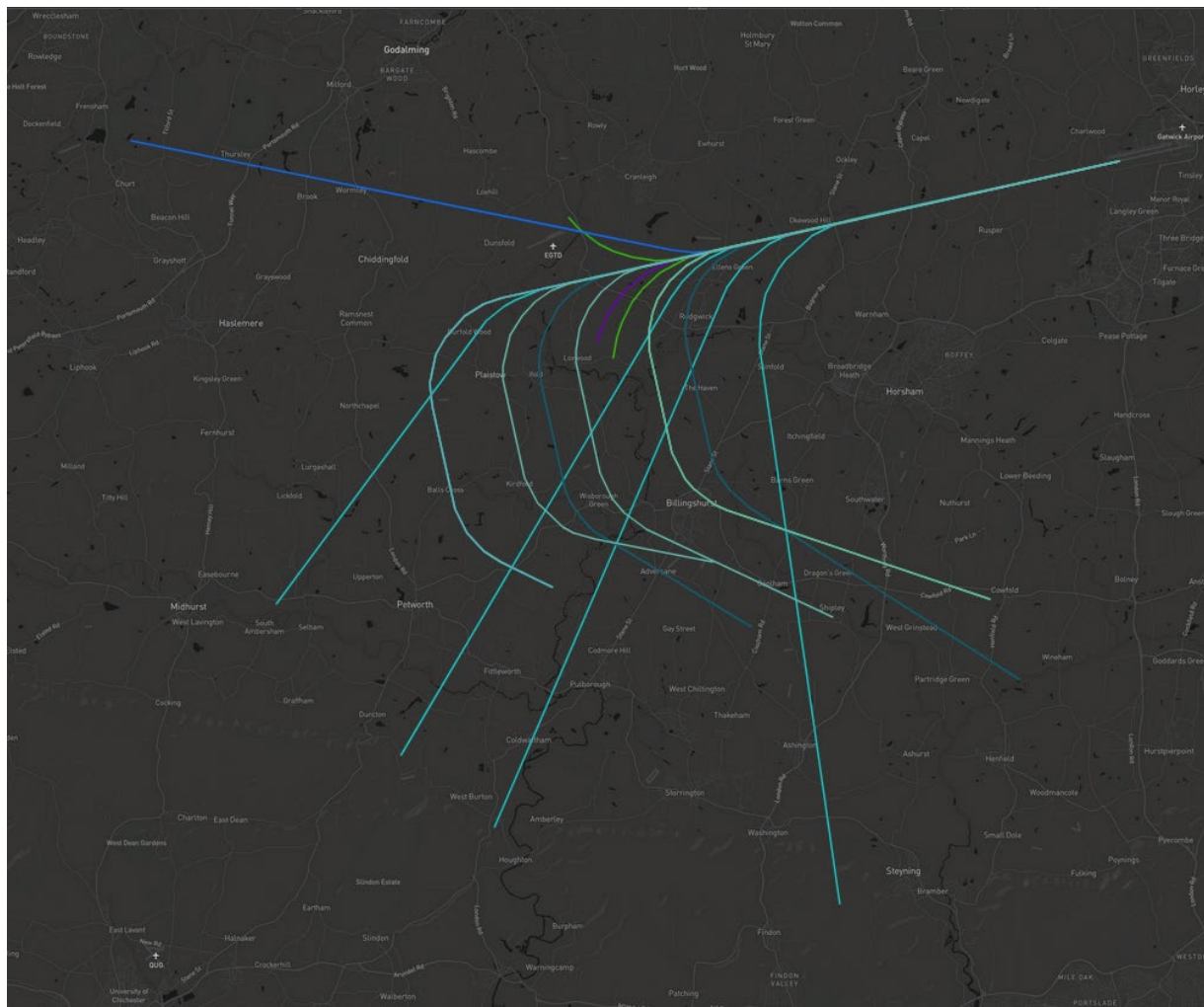


### Easterly Arrival Option J (EAJ)

| Aims to meet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DP1 DP2 DP3 DP4 DP5 DP8 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <p>This arrival option aims to meet DP3 (limit adverse noise effects), DP7 (Long term predictability and adaptability) and minimise population newly overflown.</p> <p>We've used the population newly overflown contours as the primary metric to identify notional flight paths that could be used in combination to provide respite. This arrival option avoids AONBs. The four paths selected could be operated in various combinations to offer respite and we will explore this more once the outcome of the Fair and Equitable Distribution of noise (FED) study is completed.</p> <p>We anticipate that at the point of implementation, the technology required from the upper network to facilitate PBN arrivals during periods of high traffic will not be available. This option may therefore have to be used in combination with a vectoring area (EAG) in certain traffic scenarios.</p> |                         |



## 8. COMPREHENSIVE LIST OF OPTIONS



### All Easterly Arrival Options

The following image shows all the **PBN** Easterly Arrival Options shown on the previous slides on one image for comparison purposes.

# Westerly Arrivals



## Options Development: Design Principles (Arrivals)

| Options Development Matrix                                                                                                                                         | Limit Adverse Noise Effects (DP3)                                                                                | Optimise Use of Aircraft Capabilities (DP6)                                                                                                                                                                                   | Long Term Predictability & Adaptability (DP7)                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Airspace Design Database Outputs                                                                                                                                   | The airspace design shall aim to <b>limit and where possible reduce the adverse impacts of aircraft noise</b>    | The airspace design should enable aircraft operators to optimise the use of their fleet capabilities to improve operational efficiency and environmental performance                                                          | Airspace design should offer long term predictability of flight paths and respite and offer adaptation for the future airport development scenarios outlined in our draft Masterplan                                                                                                                                                             |
| <b>Minimise total population overflown</b><br>70dB SEL and total population overflown.<br>Checked against 80dB SEL, 60dB and 65dB L <sub>AMax</sub> , Area of AONB | System options developed using database outputs for 0-7000ft. Options developed aim to also meet DP1 DP5 and DP8 | System options developed using database outputs for DP3 between 0-4000ft, and track mileage outputs (balanced with noise metrics) between 4000 – 7000ft. Options developed aim to also meet DP1 DP5 and DP8                   | System options developed within respite options using database outputs and the systems already developed for DP3. Respite options include SIDs for different periods (e.g. alternative days using different groups) or different periods of the day (e.g a set of SIDs for day and night) Options developed aim to also meet DP1 DP5 DP8 and DP9 |
|                                                                                                                                                                    | <b>Westerly Arrival Option A (WAA)</b><br><b>Westerly Arrival Option B (WAB)</b>                                 | <b>Westerly Arrival Option C (WAC)</b>                                                                                                                                                                                        | <b>Westerly Arrival Option D (WAD)</b><br><b>Westerly Arrival Option E (WAE)</b>                                                                                                                                                                                                                                                                 |
| <b>Minimise population newly overflown</b><br>Population newly overflown >10,<br>Population newly overflown >20,<br>Population newly overflown >50.                | System options developed using database outputs for 0-7000ft. Options developed aim to also meet DP1 DP5 and DP8 | System options developed using existing NPRs and database outputs for DP3 between 0-4000ft, and track mileage outputs (balanced with noise metrics) between 4000 – 7000ft. Options developed aim to also meet DP1 DP5 and DP8 | System options developed with respite options using database outputs. Respite options include SIDs for different periods (e.g. alternative days using different groups) Options developed aim to also meet DP1 DP5 DP8 and DP9                                                                                                                   |
|                                                                                                                                                                    | <b>Westerly Arrival Option F (WAF)</b><br><b>Westerly Arrival Option G (WAG)</b>                                 | <b>Westerly Arrival Option H (WAH)</b>                                                                                                                                                                                        | <b>Westerly Arrival Option I (WAI)</b>                                                                                                                                                                                                                                                                                                           |

DP2 and DP4 are inherent in all notional flight paths developed

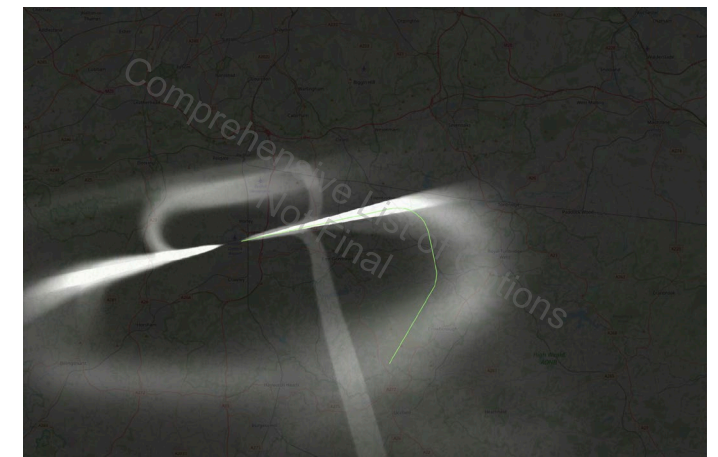


Aims to meet

DP1 DP2 DP3 DP4 DP5 DP8

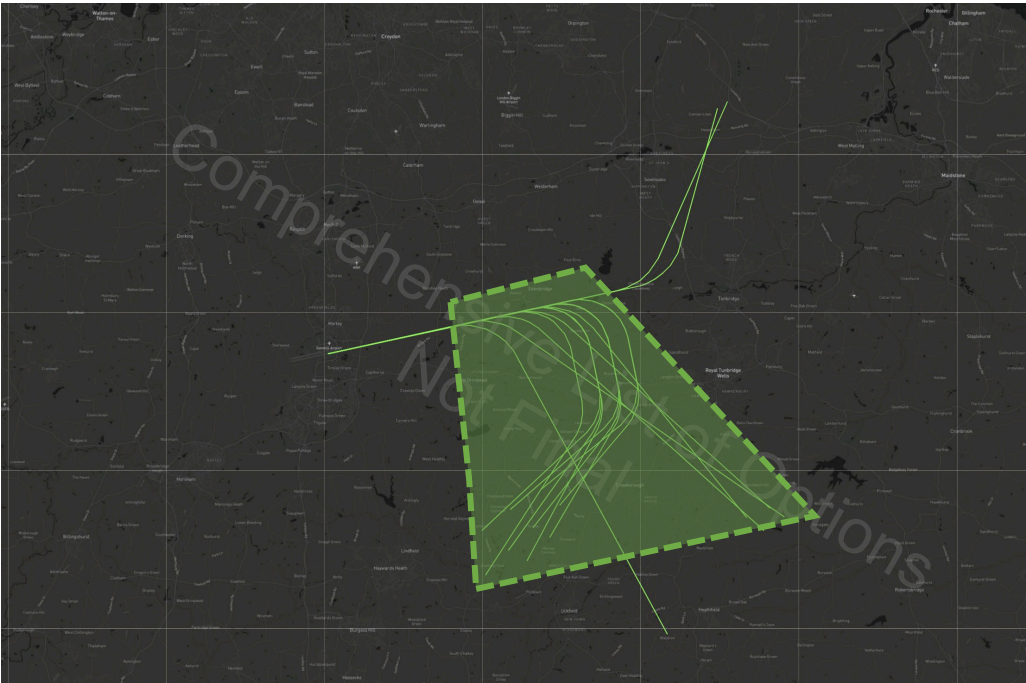
This system option focuses on meeting DP3 (limit adverse noise effects) and minimising total population overflow. As the SEL data sits along the final approach track, the primary metric used to identify the high performing notional flight path is the 'total population overflow'. A secondary check of Area of AONB metrics was also undertaken.

We anticipate that at the point of implementation, the technology required from the upper network to facilitate single track PBN arrivals during periods of high traffic will not be available. We have therefore used the data around the highest performing notional flight paths to identify a vectoring area that would be used by controllers in certain traffic scenarios (WAB).





## 8. COMPREHENSIVE LIST OF OPTIONS



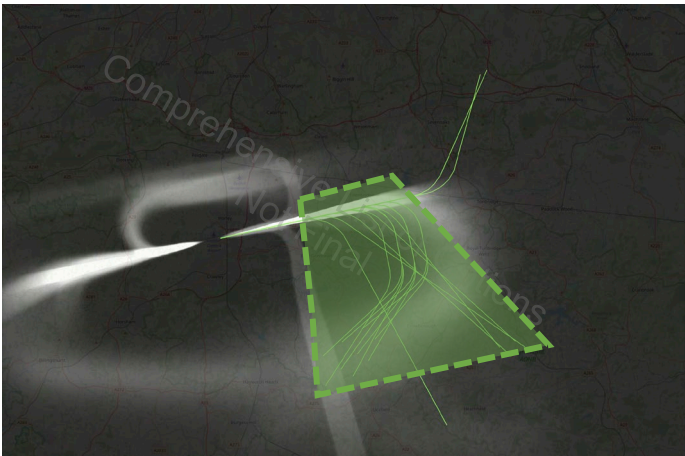
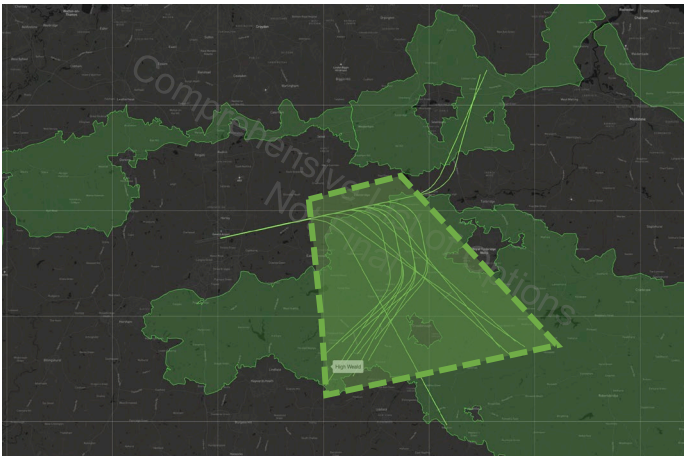
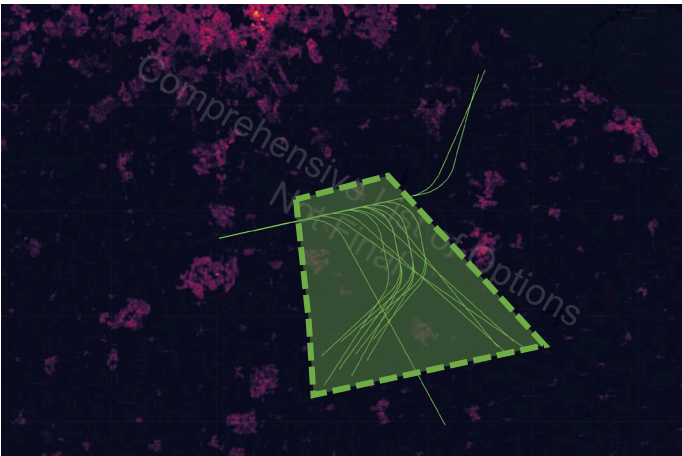
### Westerly Arrival Option B (WAB)

Aims to meet

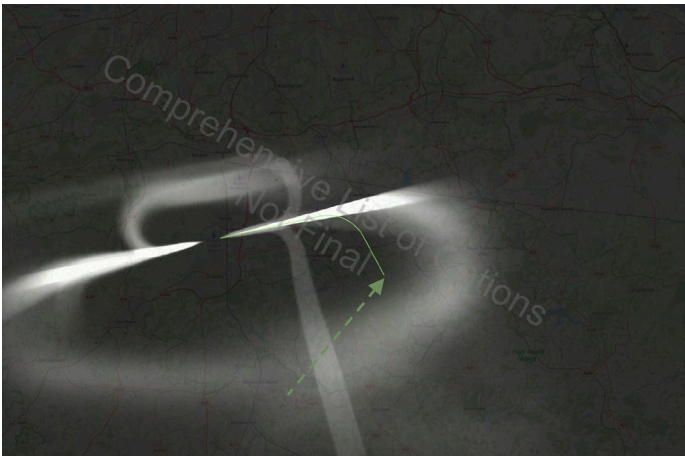
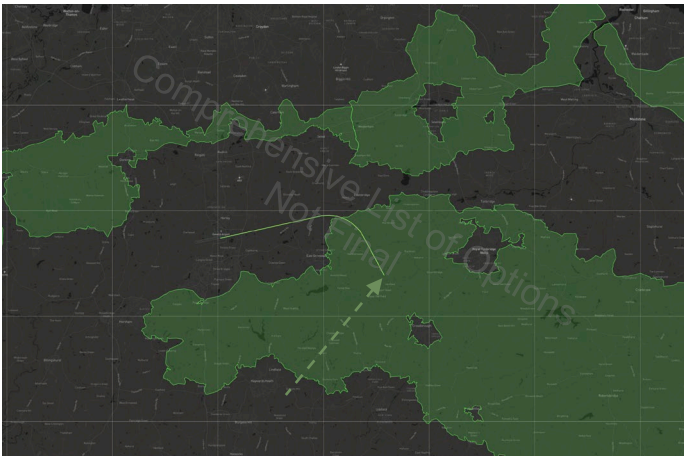
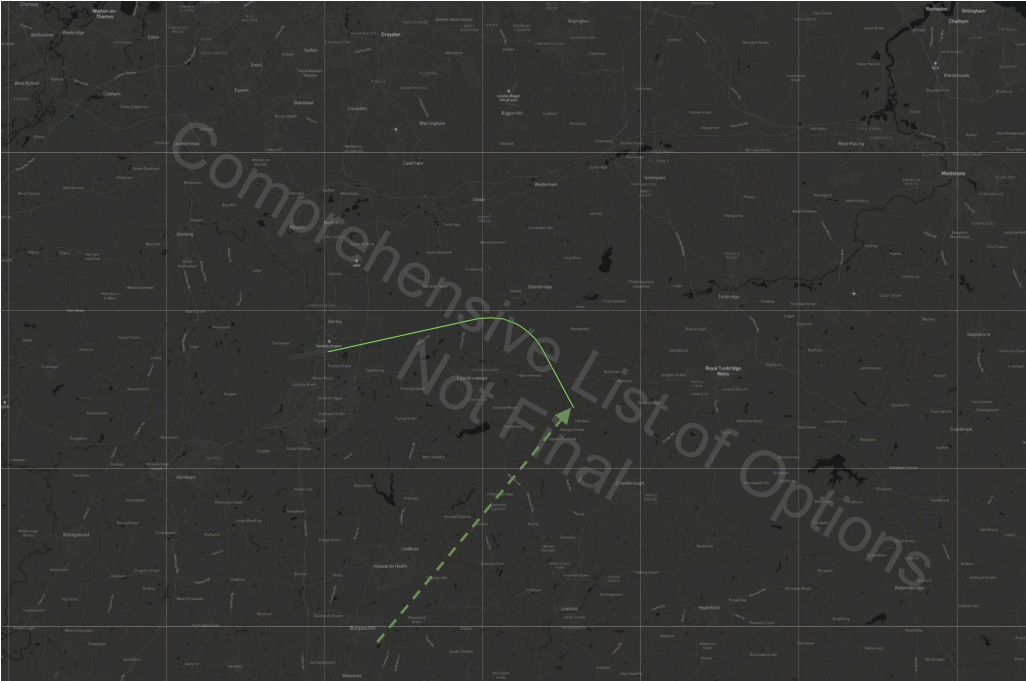
DP1 DP2 DP3 DP4 DP5 DP9

This arrival option focuses on meeting DP3 (limit adverse noise effects) and minimising total population overflown. It is intended it would be used in combination with a PBN option.

The population newly overflown overflight contours were used to identify the high performing notional flight paths that could be used to define a vectoring area. This is an initial indicative vectoring area subject to change as we engage with ATC and the upper network as the ACP progresses.

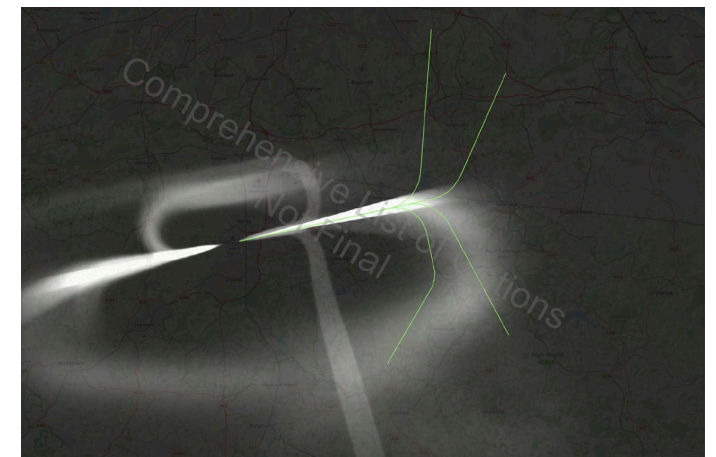
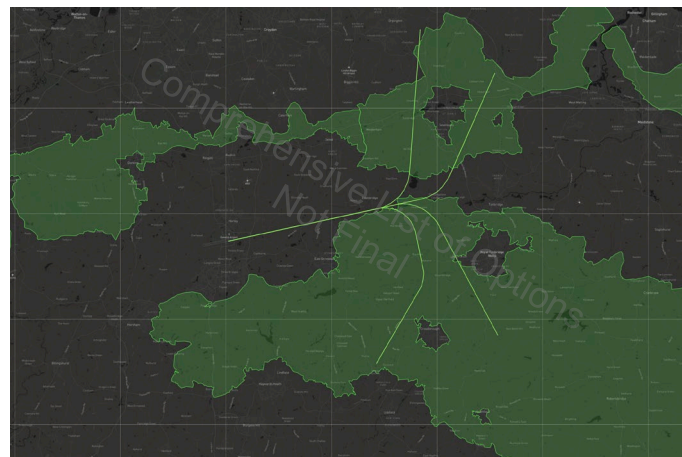


## 8. COMPREHENSIVE LIST OF OPTIONS



| Westerly Arrival Option C (WAC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Aims to meet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | DP1 DP2 DP3 DP4 DP5 DP6 DP8 |
| <p>This arrival option focuses on meeting DP3 (limit adverse noise effects), DP6 (optimise use of aircraft capabilities) and minimising total population overflown.</p> <p>To first meet DP3, we have identified high performing notional flight paths using the ‘total population overflown metric for paths between 0-4000ft. A check against areas of AONB was also undertaken.</p> <p>To achieve the aims of DP6, from 4000ft the option will then route directly from the network entry point (green dashed lines). We will use map population and other map underlays to make minor adjustments to the path with regards to noise. This option will evolve as more information around the airspace above 7000ft is shared from NERL.</p> <p>We anticipate that at the point of implementation, the technology required from the upper network to facilitate PBN arrivals during periods of high traffic will not be available. This option may therefore have to be used in combination with a vectoring area (WAB) in certain traffic scenarios.</p> |                             |





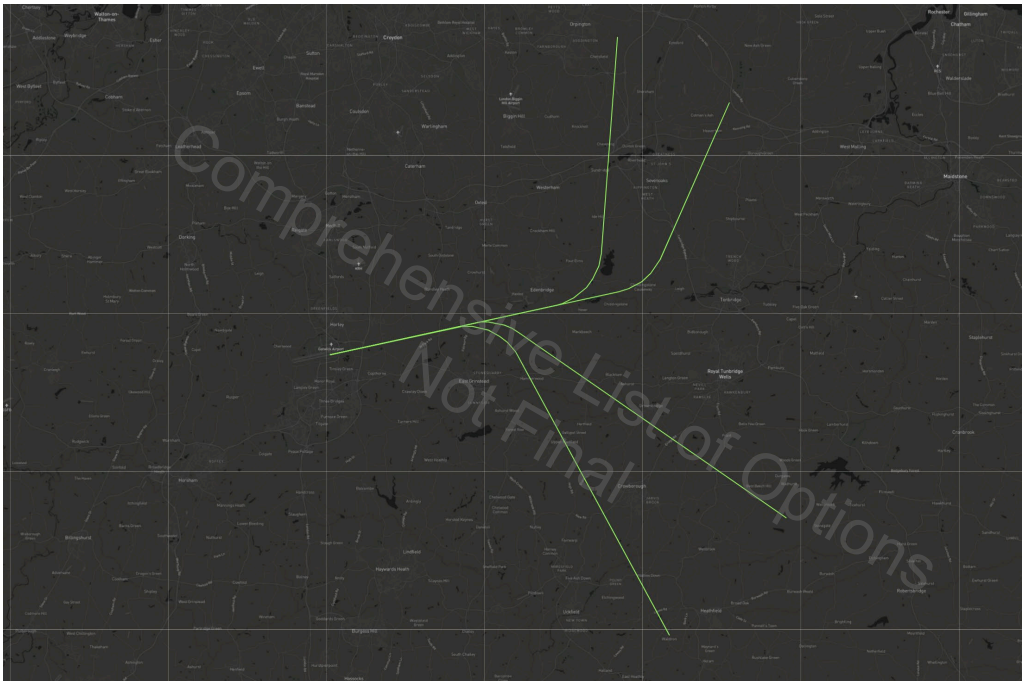
Aims to meet

DP1 DP2 DP3 DP4 DP5 DP8

We've used the total population overflow metric as the primary metric to identify notional flight paths that could be used in combination to provide respite. This arrival option avoids AONBs. The three paths selected could be operated in various combinations to offer respite and we will explore this more once the outcome of the Fair and Equitable Distribution of noise (FED) study is completed.

We anticipate that at the point of implementation, the technology required from the upper network to facilitate PBN arrivals during periods of high traffic will not be available. This option may therefore have to be used in combination with a vectoring area (EAB) in certain traffic scenarios.

## 8. COMPREHENSIVE LIST OF OPTIONS



## Westerly Arrival Option E (WAE)

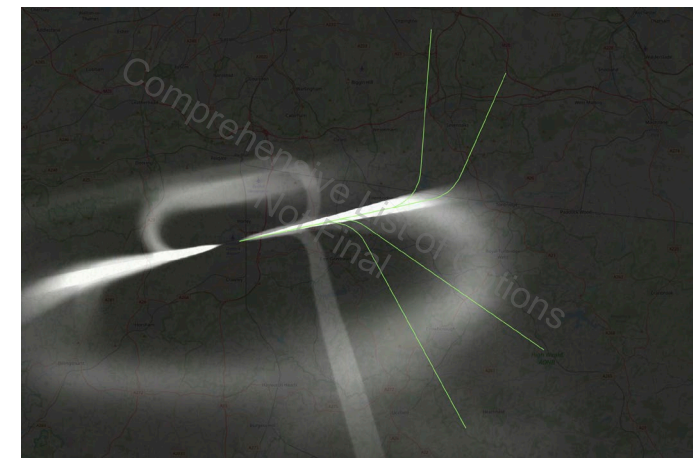
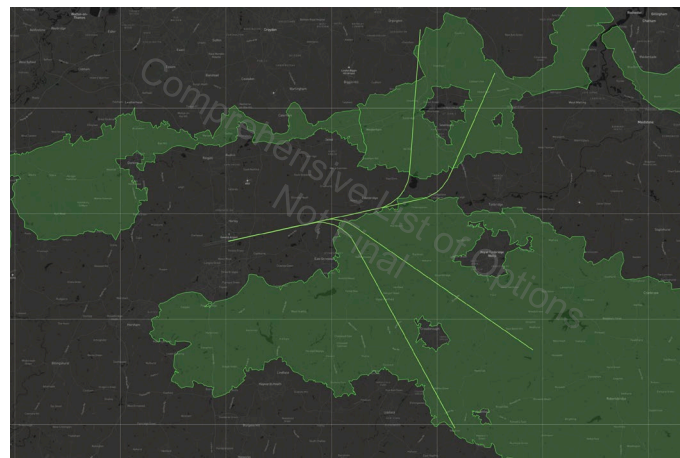
DP1 DP2 DP3 DP4 DP5 DP8

This arrival option aims to meet DP3 (limit adverse noise effects), DP7 (Long term predictability and adaptability) and minimising total population overflow.

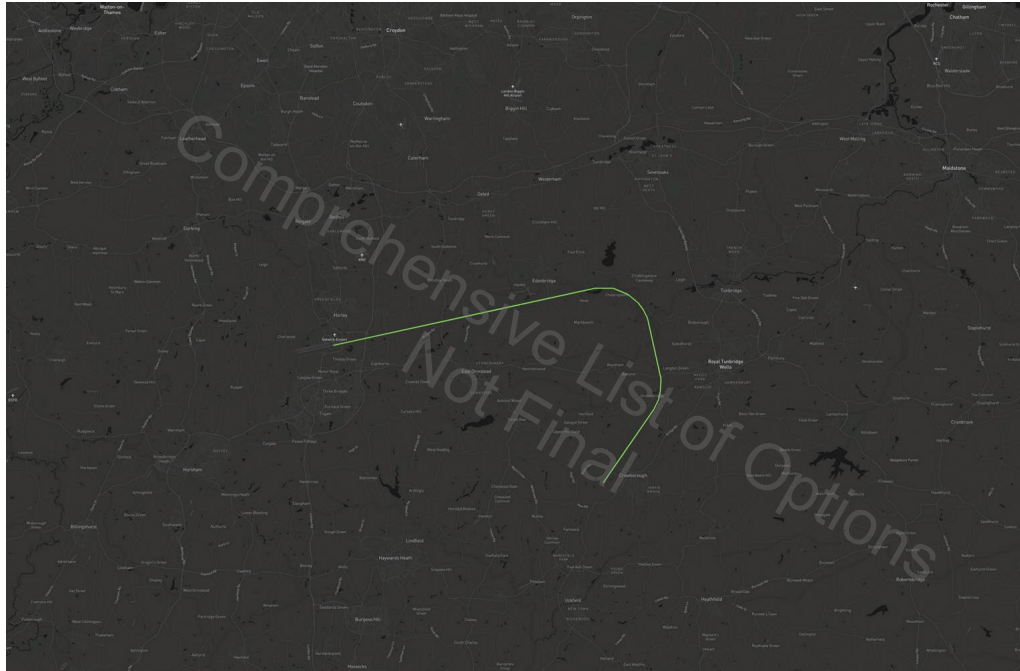
We've used the total population overflown metric as the primary metric to identify notional flight paths that could be used in combination to provide respite. When we've looked at the data, two sets of path performed comparatively well and therefore we have split them into two respite options WAD and WAE.

The four paths could be operated in various combinations to offer respite and we will explore this more once the outcome of the Fair and Equitable Distribution of noise (FED) study is completed.

We anticipate that at the point of implementation, the technology required from the upper airspace network to facilitate PBN arrivals during periods of high traffic will not be available. This option may therefore have to be used in combination with a vectoring area (WAB) in certain traffic scenarios.





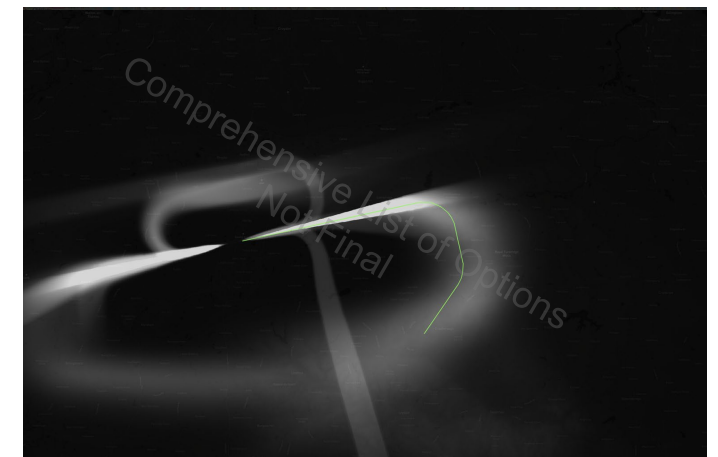
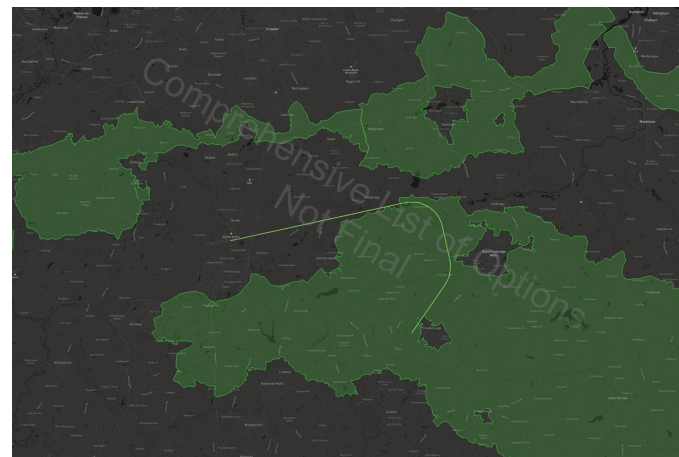
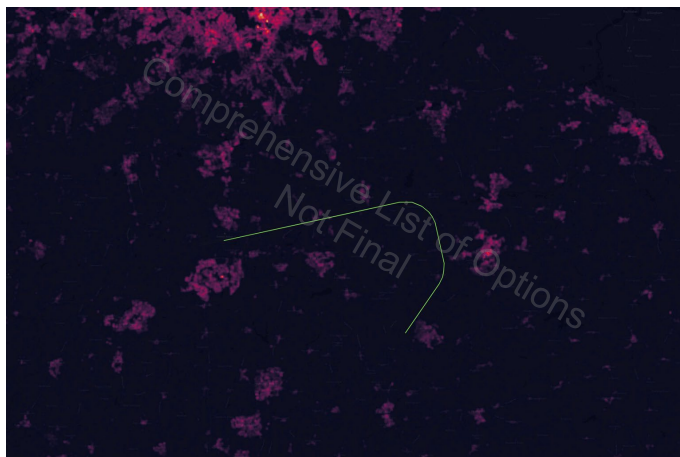


Aims to meet

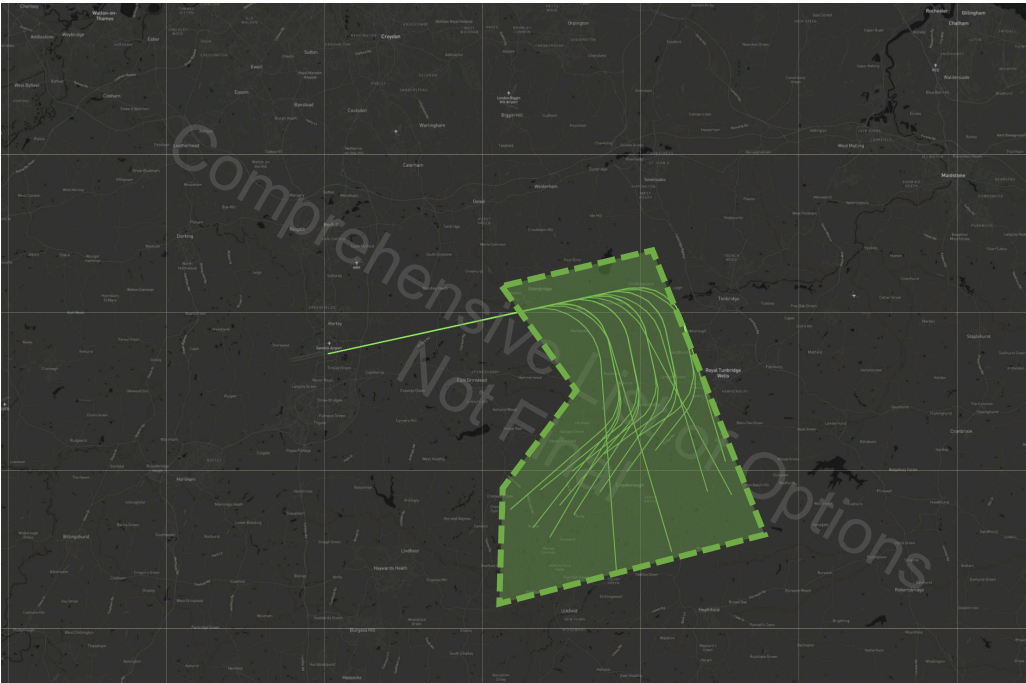
DP1 DP2 DP3 DP4 DP5 DP8

This system option focuses on meeting DP3 (limit adverse noise effects) and minimising population newly overflown. As the SEL data sits along the final approach track, the primary metric used to identify the high performing notional flight path is based on population newly overflown overflight contours and data around existing arrival flight paths.

We anticipate that at the point of implementation, the technology required from the upper network to facilitate single track PBN arrivals during periods of high traffic will not be available. We have therefore used the data around the highest performing notional flight paths to identify a vectoring area that would be used by controllers in certain traffic scenarios (WAG).



## 8. COMPREHENSIVE LIST OF OPTIONS



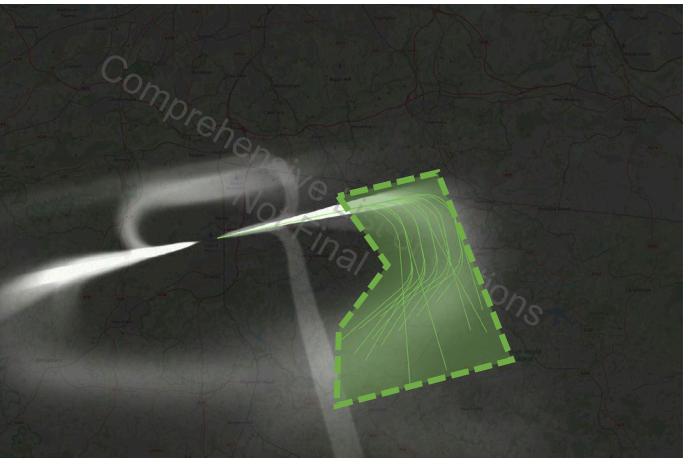
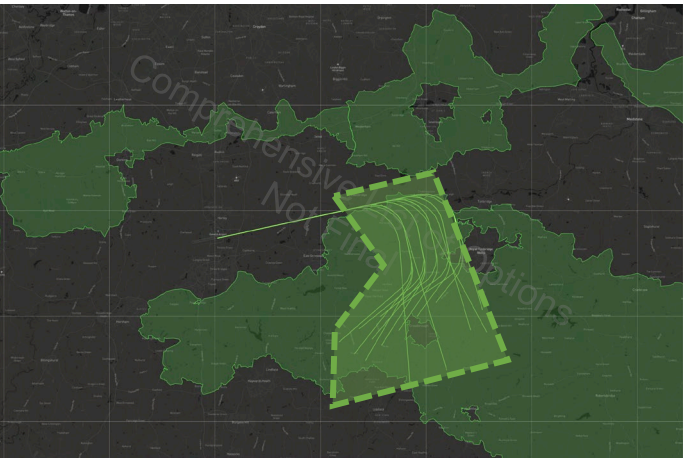
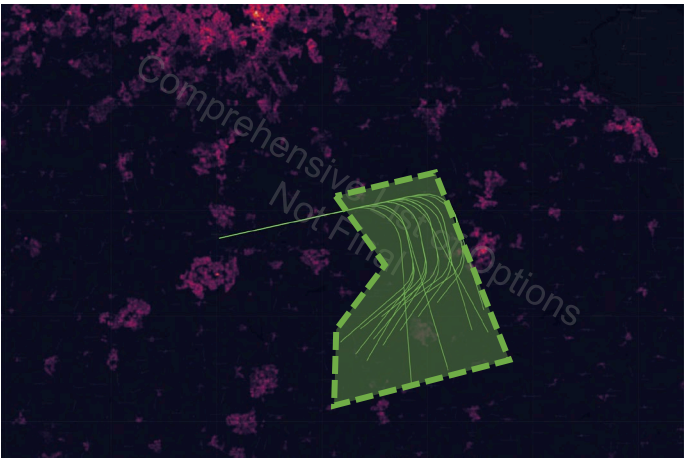
### Westerly Arrival Option G (WAG)

Aims to meet

DP1 DP2 DP3 DP4 DP5 DP8

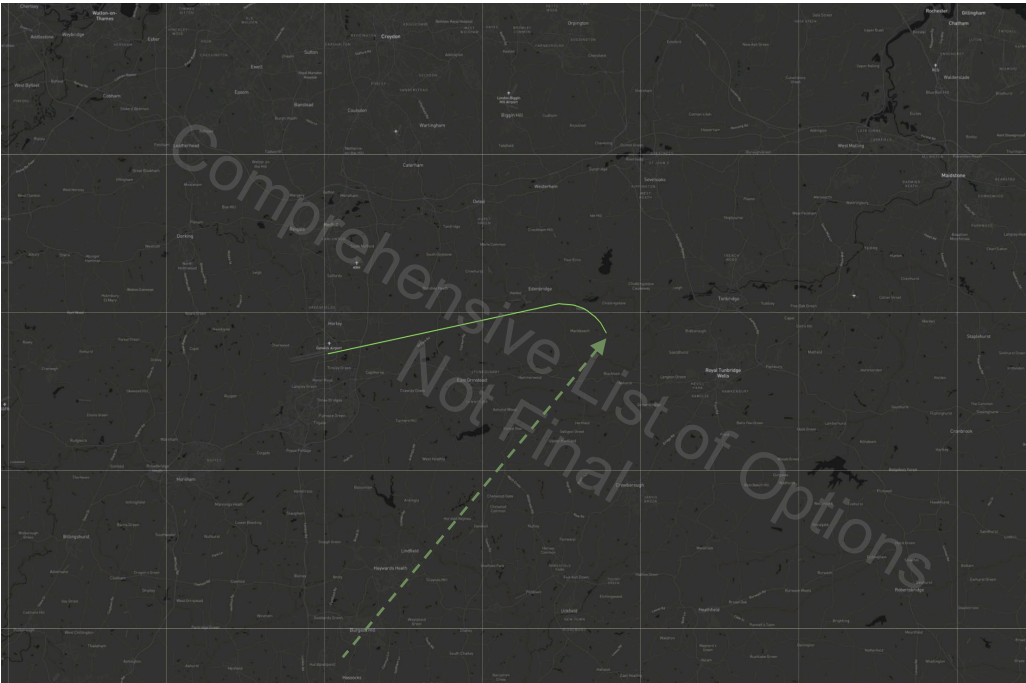
This arrival option focuses on meeting DP3 (limit adverse noise effects) and minimising population newly overflown. It is intended it would be used in combination with a PBN option.

The population newly overflown overflight contours were used to identify the high performing notional flight paths that could be used to define a vectoring area. This is an initial indicative vectoring area subject to change as we engage with ATC and the upper network as the ACP progresses.





## 8. COMPREHENSIVE LIST OF OPTIONS



### Westerly Arrival Option H (WAH)

Aims to meet

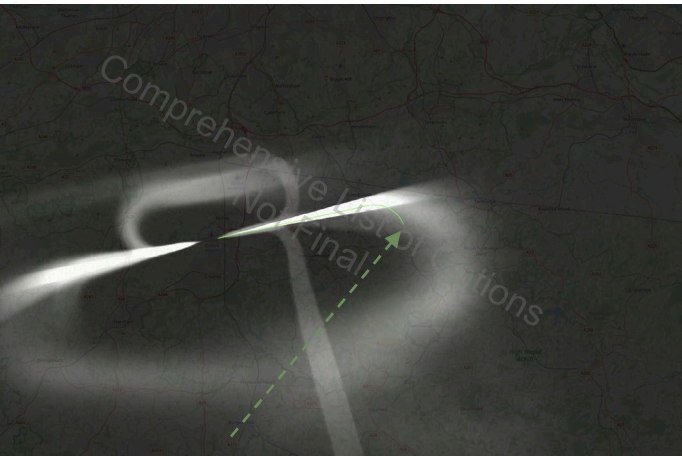
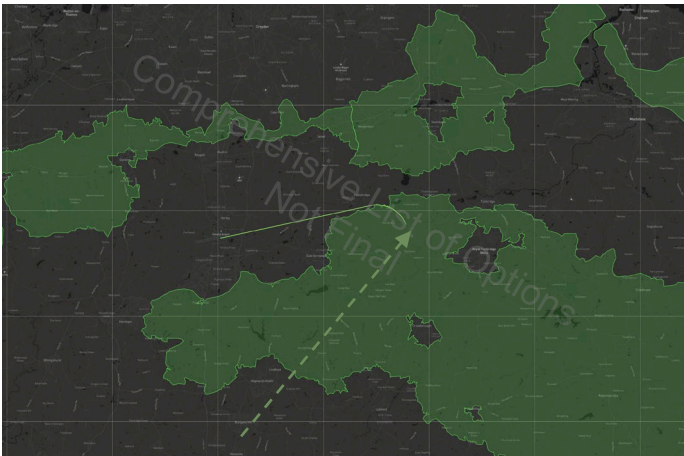
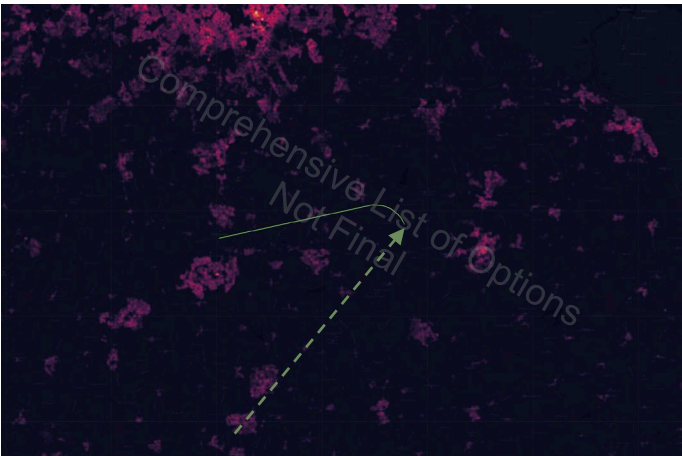
DP1 DP2 DP3 DP4 DP5 DP8

This arrival option focuses on meeting DP3 (limit adverse noise effects), DP6 (optimise use of aircraft capabilities) and minimising population newly overflown.

To first meet DP3, we have identified high performing notional flight paths using the population newly overflown contours between 0-4000ft. A check against areas of AONB was also undertaken.

To achieve the aims of DP6, from 4000ft the option will then route directly from the network entry point (green dashed lines). We will use existing overflight map underlays to make minor adjustments to the path. This option will evolve as more information around the airspace above 7000ft is shared from NERL.

We anticipate that at the point of implementation, the technology required from the upper network to facilitate PBN arrivals during periods of high traffic will not be available. This option may therefore have to be used in combination with a vectoring area (WAG) in certain traffic scenarios.



## 8. COMPREHENSIVE LIST OF OPTIONS



### Westerly Arrival Option I (WAI)

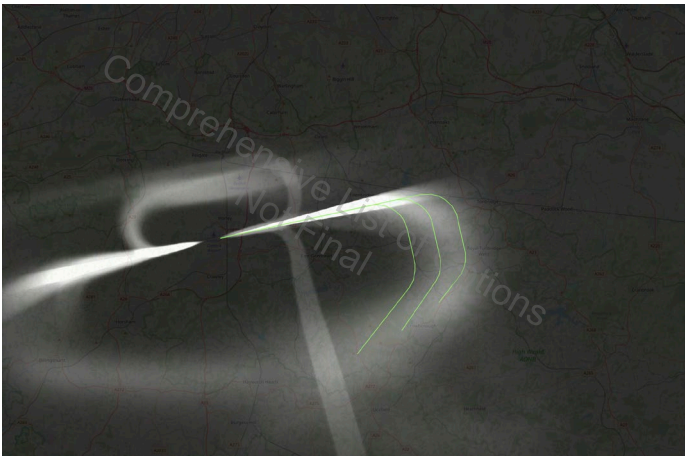
Aims to meet

DP1 DP2 DP3 DP4 DP5 DP8

This arrival option aims to meet DP3 (limit adverse noise effects), DP7 (Long term predictability and adaptability) and minimise population newly overflown.

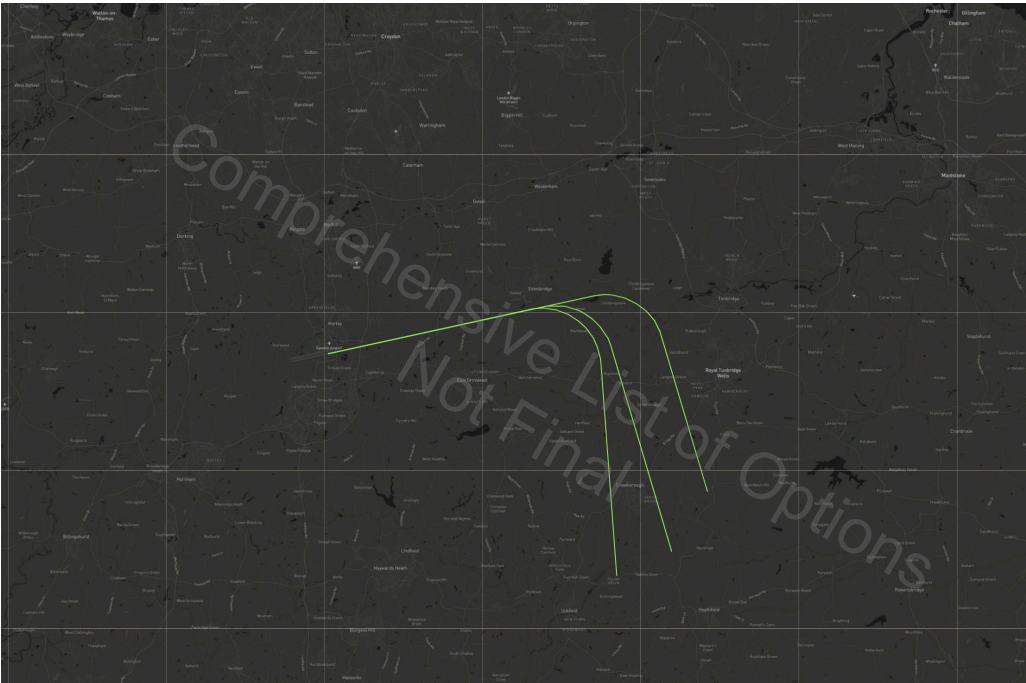
We've used the population newly overflown contours as the primary metric to identify notional flight paths that could be used in combination to provide respite. The paths selected could be operated in various combinations to offer respite and we will explore this more once the outcome of the Fair and Equitable Distribution of noise (FED) study is completed.

We anticipate that at the point of implementation, the technology required from the upper network to facilitate PBN arrivals during periods of high traffic will not be available. This option may therefore have to be used in combination with a vectoring area (WAG) in certain traffic scenarios.





## 8. COMPREHENSIVE LIST OF OPTIONS



### Westerly Arrival Option J (WAJ)

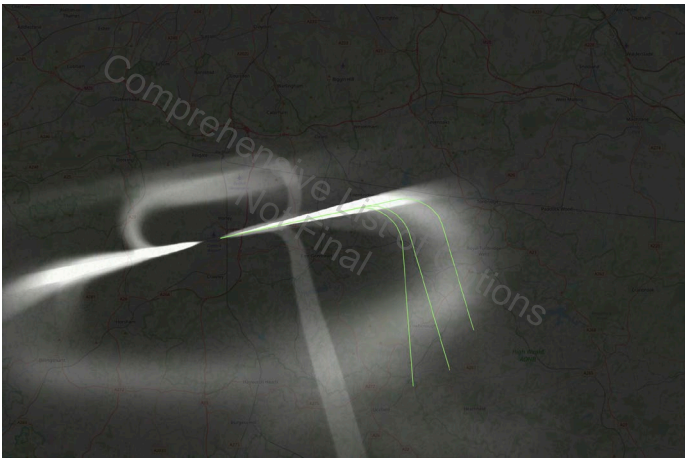
Aims to meet

DP1 DP2 DP3 DP4 DP5 DP8

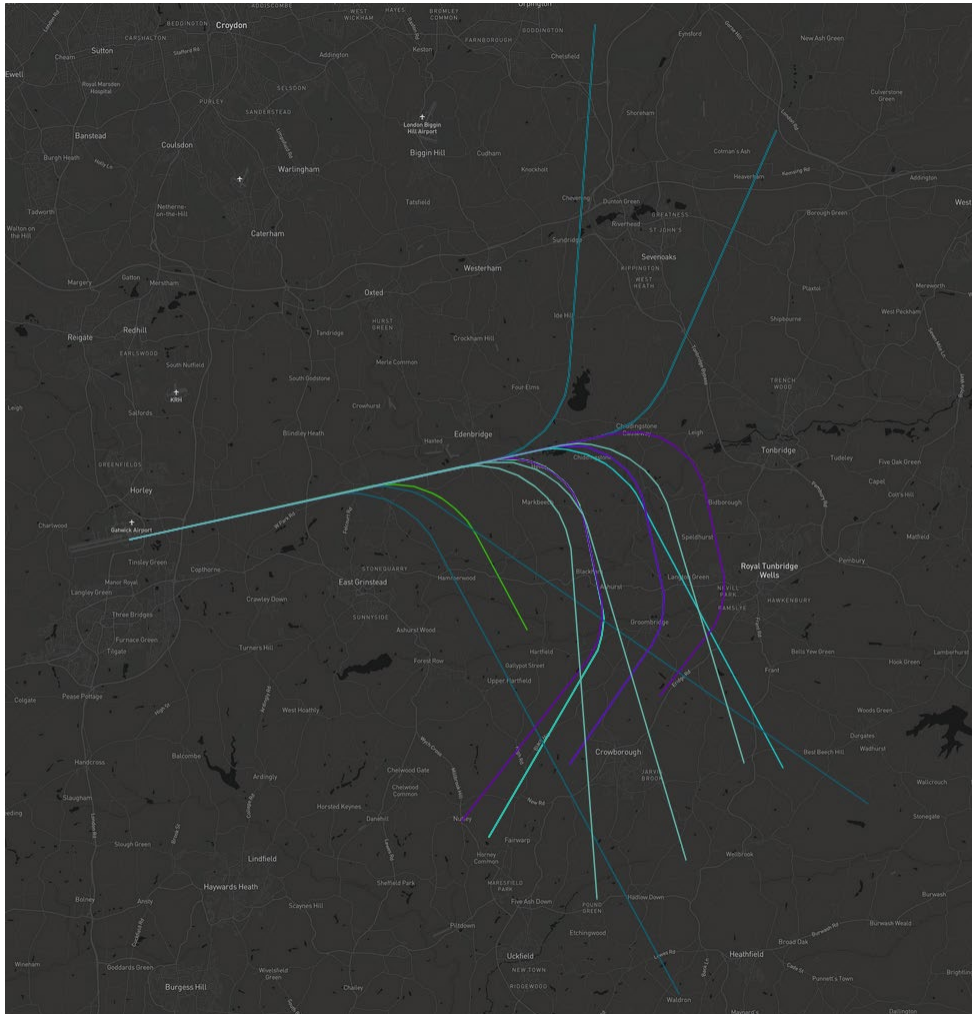
This arrival option aims to met DP3 (limit adverse noise effects), DP7 (Long term predictability and adaptability) and minimise population newly overflown.

We've used the population newly overflown contours as the primary metric to identify notional flight paths that could be used in combination to provide respite. The paths selected could be operated in various combinations to offer respite and we will explore this more once the outcome of the Fair and Equitable Distribution (FED) study is completed.

We anticipate that at the point of implementation, the technology required from the upper network to facilitate PBN arrivals during periods of high traffic will not be available. This option may therefore have to be used in combination with a vectoring area (WAG) in certain traffic scenarios.



## 8. COMPREHENSIVE LIST OF OPTIONS



### All Westerly Arrival Options

The following image shows all the **PBN** Westerly Arrival Options shown on the previous slides on one image for comparison purposes.



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## 6. THIS ENGAGEMENT (OUR QUESTIONS)

**We are seeking feedback on the following:**

1. Is the list of options sufficiently comprehensive (is anything missing)?
2. Is the list of options developed in line with the design principles?
3. Are there any other considerations that we should take into account regarding the development of a comprehensive list of options for the ACP?

A feedback form will be shared following the final workshop on the 23<sup>rd</sup> of February. We will use your feedback to refine, and where appropriate, develop further options.

Please submit your feedback form by Friday 25<sup>th</sup> March.

If you have any questions please contact us using [LGWairspace.FASIS@gatwickairport.com](mailto:LGWairspace.FASIS@gatwickairport.com)

Please note that feedback must be submitted via the form.

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## 7. NEXT STEPS

- Following the feedback period, we will collate and review all responses and refine or create new options as appropriate. We will then commence the Design Principle Evaluation (DPE) where we examine how well each option meets the Design Principles defined in Stage 1.
- The DPE will involve a qualitative evaluation of each option's performance against each individual Design Principle, when considered in isolation, which includes a description of how the option has either; Met, Partially Met, or Not Met each principle. An assessment of each option against the Design Principles, when considered as a set, and the rationale for taking forward an option for further appraisal will also be included in the DPE.
- The main output of the evaluation is a shortlist of viable options to be assessed in further detail as part of the Initial Options Appraisal.
- We will provide further details of the DPE as part of the next round of engagement sessions and it will also be documented as part of our Stage 2A submission documents which will be published on the CAA's Airspace Change Portal.

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## 7. NEXT STEPS

Thank you