London Luton Airport Operations Ltd
FASI-S Airspace Change Proposal
Stage 2

Appendix D - Evolution of Options Presentations - Part 2

V2.0

London Luton Airport

Presentation distributed to Industry Stakeholders

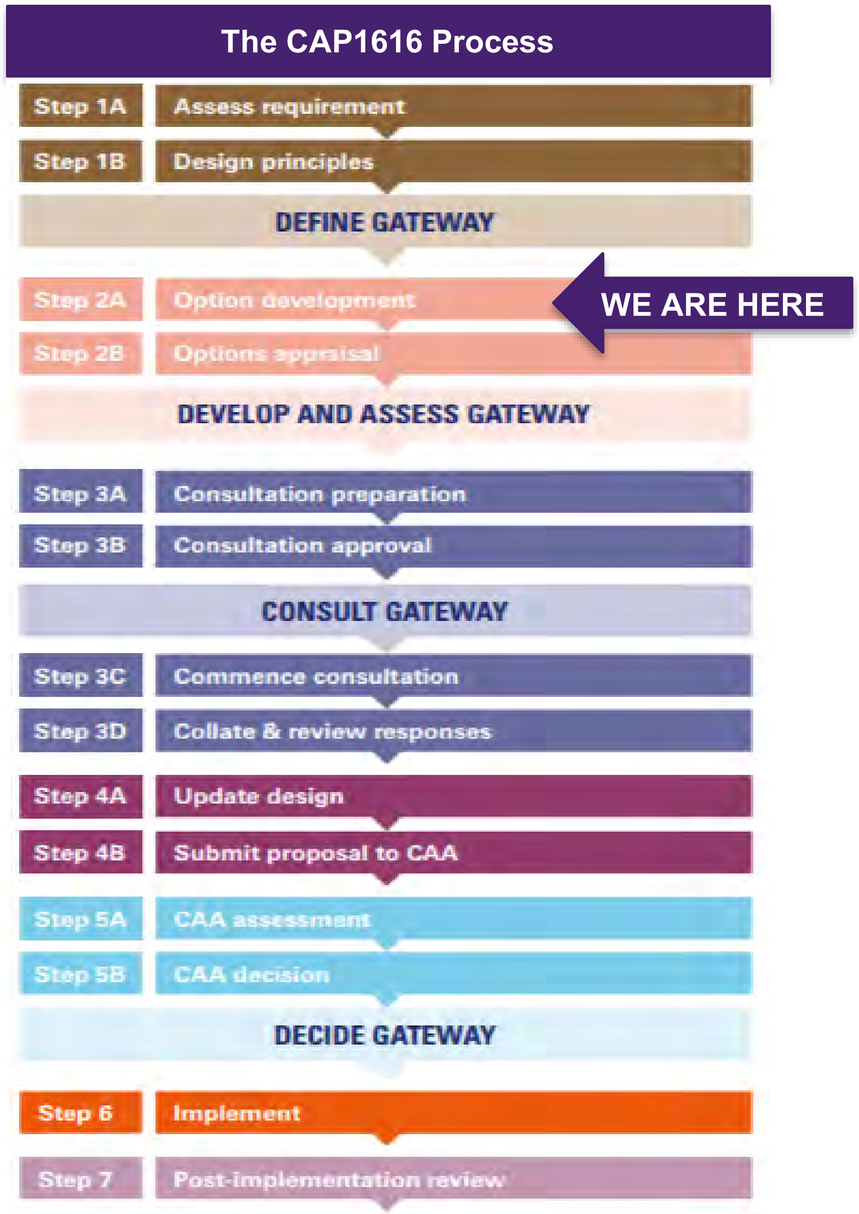
July 2021

Luton FASI-S

Comprehensive list of options

London Luton Airport

Purpose of this session



- We are following the Civil Aviation Authority's (CAA) Airspace Change Process, CAP1616
- We are at Stage 2 of our developing Airspace Change Proposal (ACP) for FASI-S
- This is the stage where we develop an initial comprehensive list of flight path options and then share these options with our stakeholders
- CAP1616 requires us to engage with stakeholders at this stage to "preliminarily tests these (options) with the same stakeholders it engaged with in Stage 1 (when we developed the design principles)"

Purpose of this engagement

The purpose of this engagement is **not** to seek feedback on individual route options by examining the detailed specific geographical position of the options.

We do not yet have any detail on the potential impacts of each option, that comes later.

The purpose of this session is to explore and test our approach to developing the initial set of options and answer questions relating to our approach.

We engaged with community groups and local authorities in Feb 2020 prior to pausing the ACP and captured their feedback. We are now sharing the same initial options with airlines, general aviation bodies, other airports and NATS.

We will use all the feedback to refine and/or develop a new set of options. We will share those new options with you in Q4 2021.

Development of the FASI-S initial comprehensive list of options

	Design Principle
1	Must be safe
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that
5	Should provide an equitable distribution of traffic where possible, through eg; Use of multiple routes New route structures Options (mechanisms) for respite
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft
7	Should minimise tactical intervention by ATC below 7000ft
8	Should minimise the impact on other airspace users through; Keeping CAS requirements to a minimum Simple airspace boundaries Allowing flexible use of airspace, where possible

Relationship with AD6

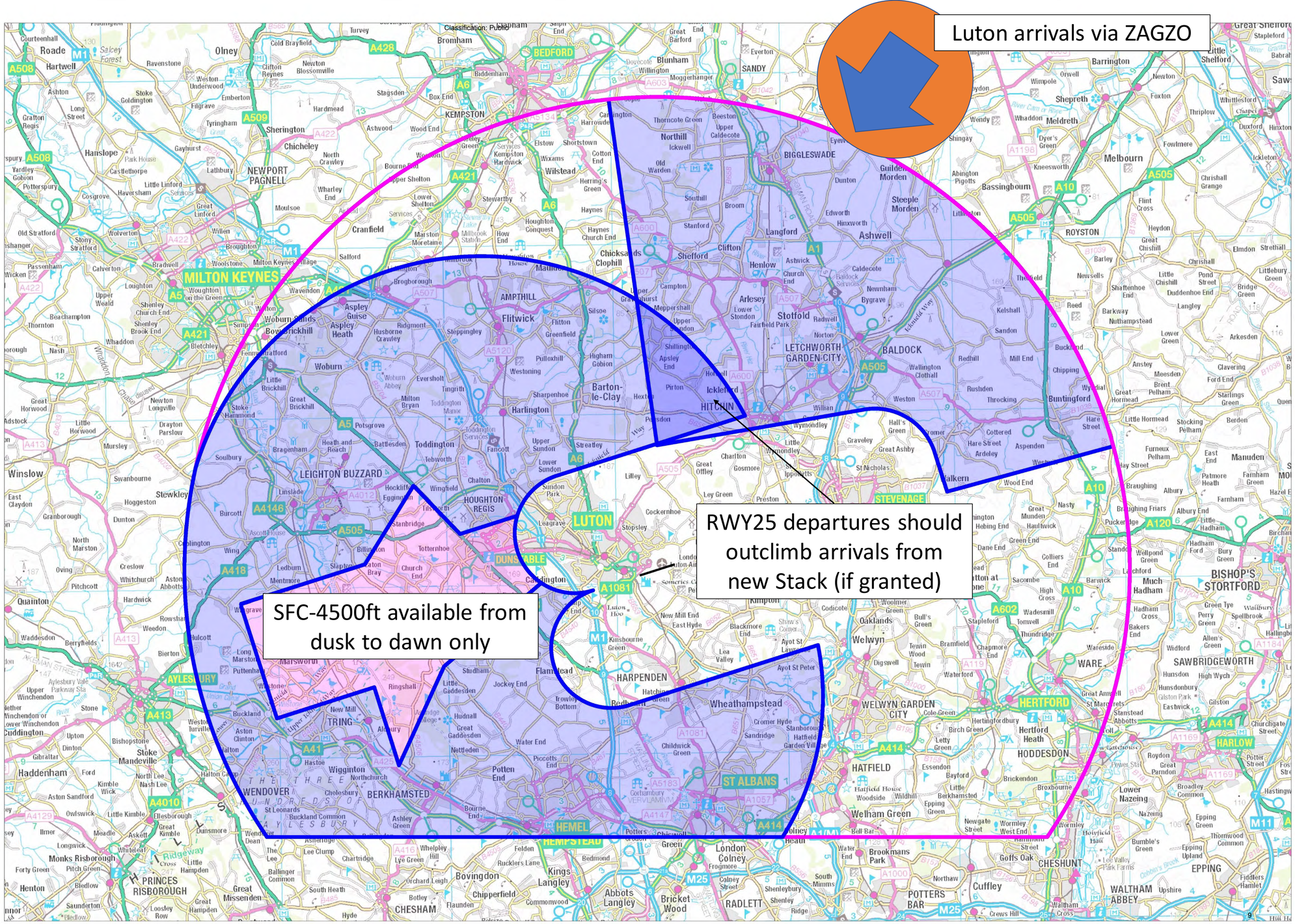
Progress on the AD6 ACP can be followed here.

The ACP was submitted to CAA on 25th June 2021. We are awaiting a CAA decision.

LUTON FASI-S DESIGN AREAS – WESTERLIES

The blue arrow indicates the position of the new Luton stack (ZAGZO) subject to CAA approval as part of the AD6 ACP.

The light blue shaded areas show where it is possible to position westerly arrival or departure routes (below 7000ft) as part of this FASI-S ACP.



LUTON FASI-S DESIGN AREAS – EASTERLIES

The blue arrow indicates the position of the new Luton stack (ZAGZO) subject to CAA approval as part of the AD6 ACP.

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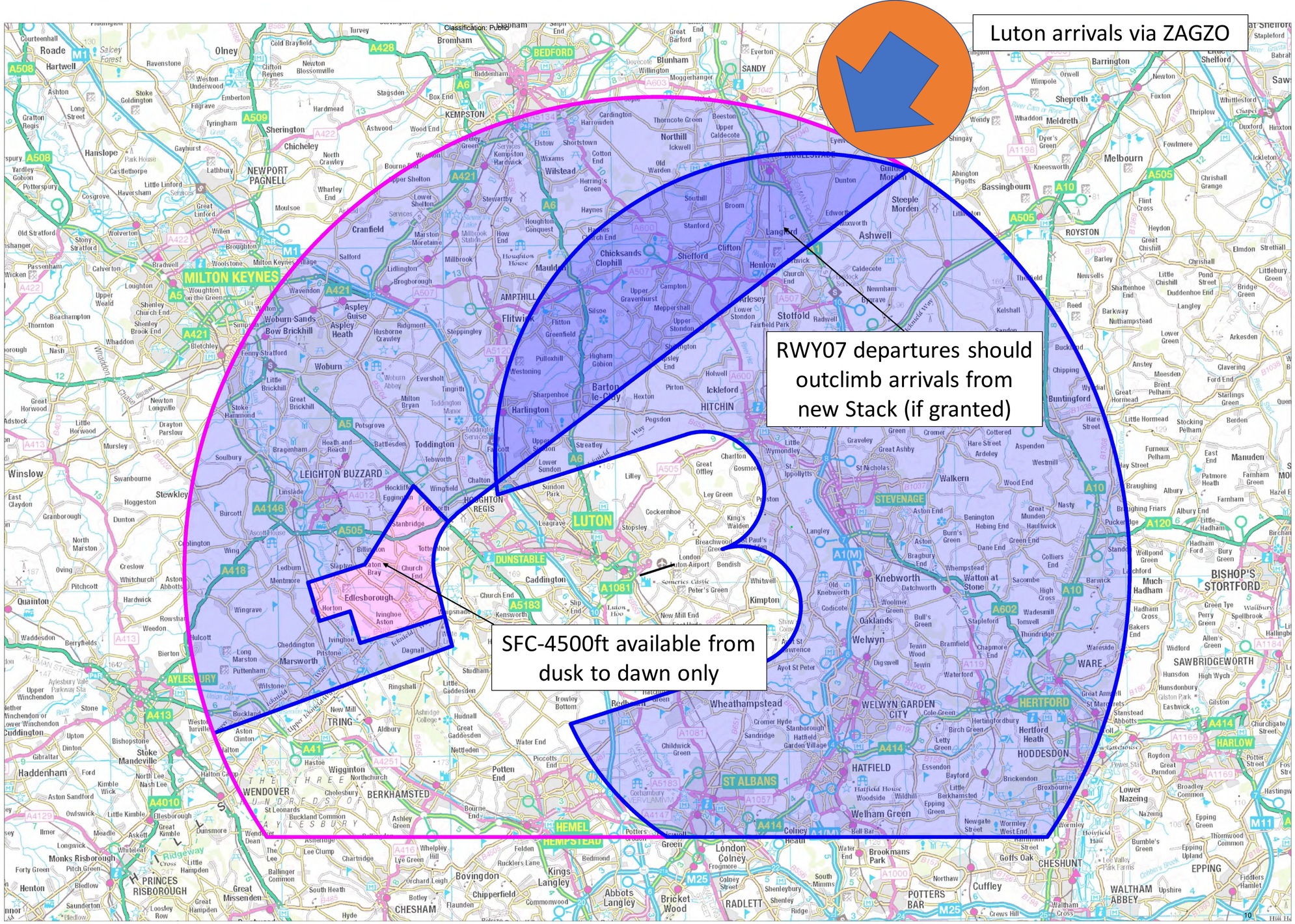
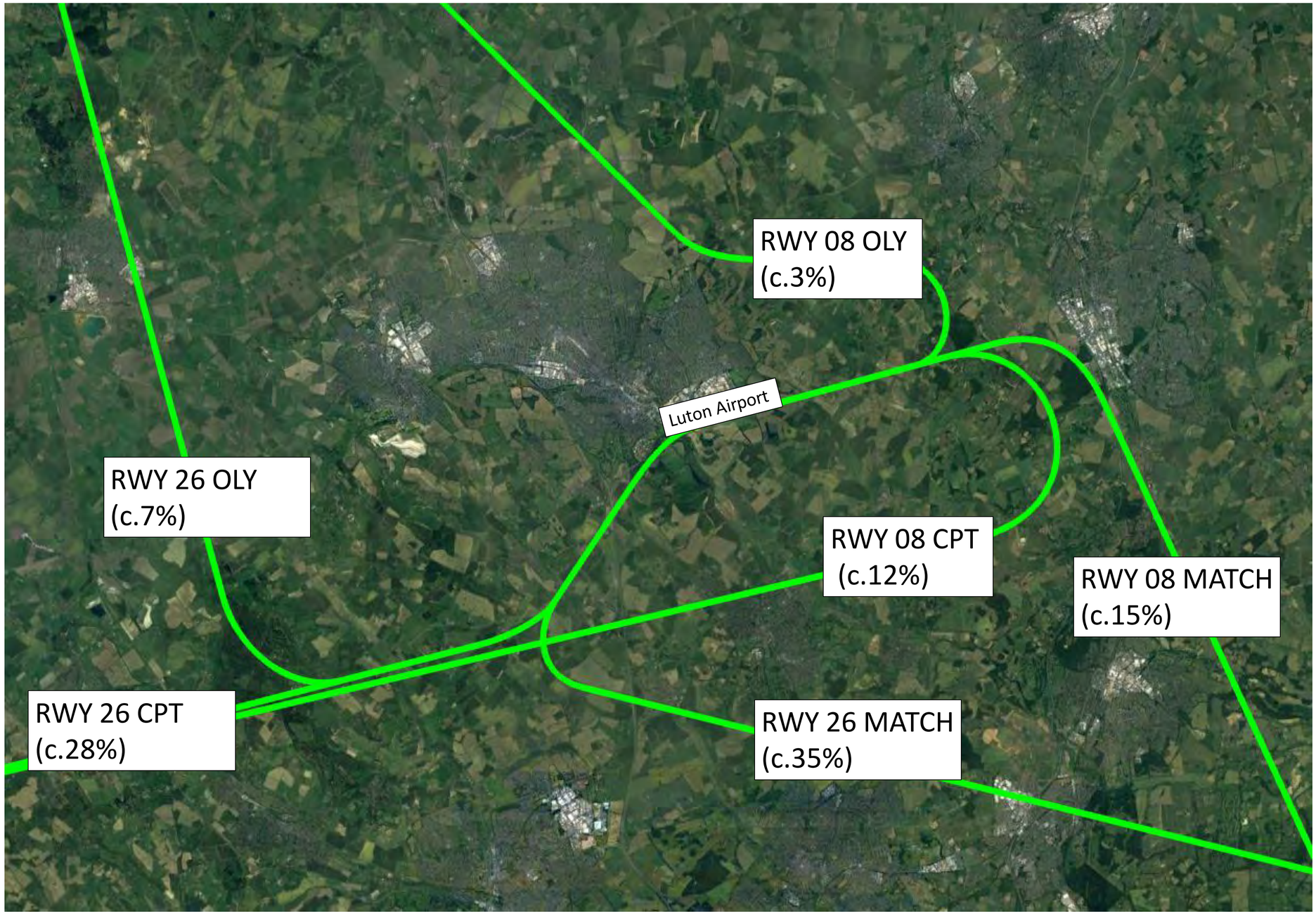
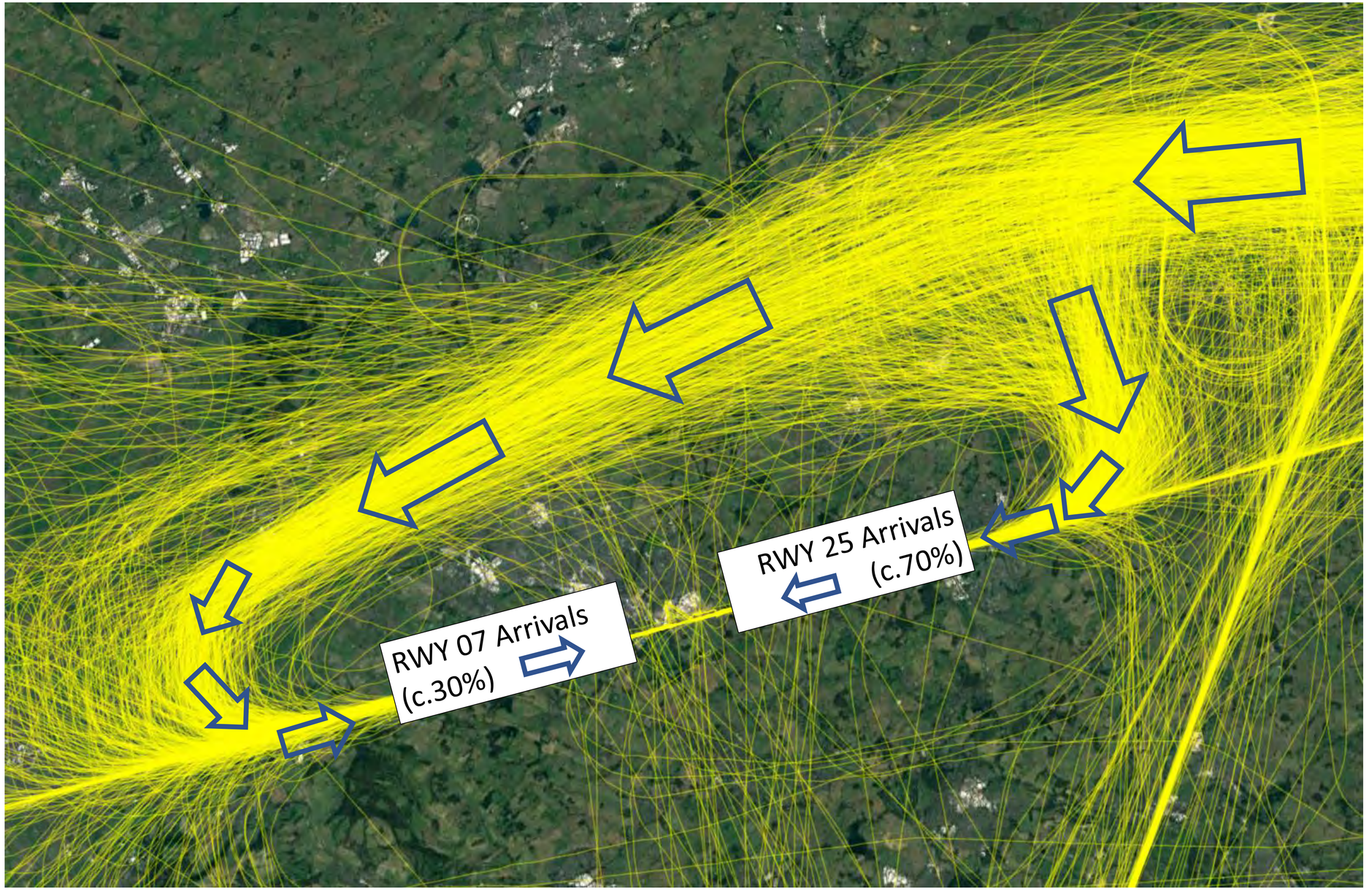


TODAY’S ROUTE STRUCTURE

Current published departure route structure and approximate usage (pre-covid)



Current typical arrival tracks (published route structure not used)



INITIAL OPTION DEVELOPMENT

ALL FLIGHT PATHS ILLUSTRATIVE ONLY

Route demand assumptions:

OLY 10%

CPT 40%

MATCH 50%

ALL FLIGHT PATHS SHOWN ARE FOR ILLUSTRATIVE PURPOSES ONLY TO DEMONSTRATE THE CONCEPT.
FLIGHT PATHS ARE ALL SUBJECT TO REFINEMENT THROUGHOUT THE AIRSPACE CHANGE PROCESS

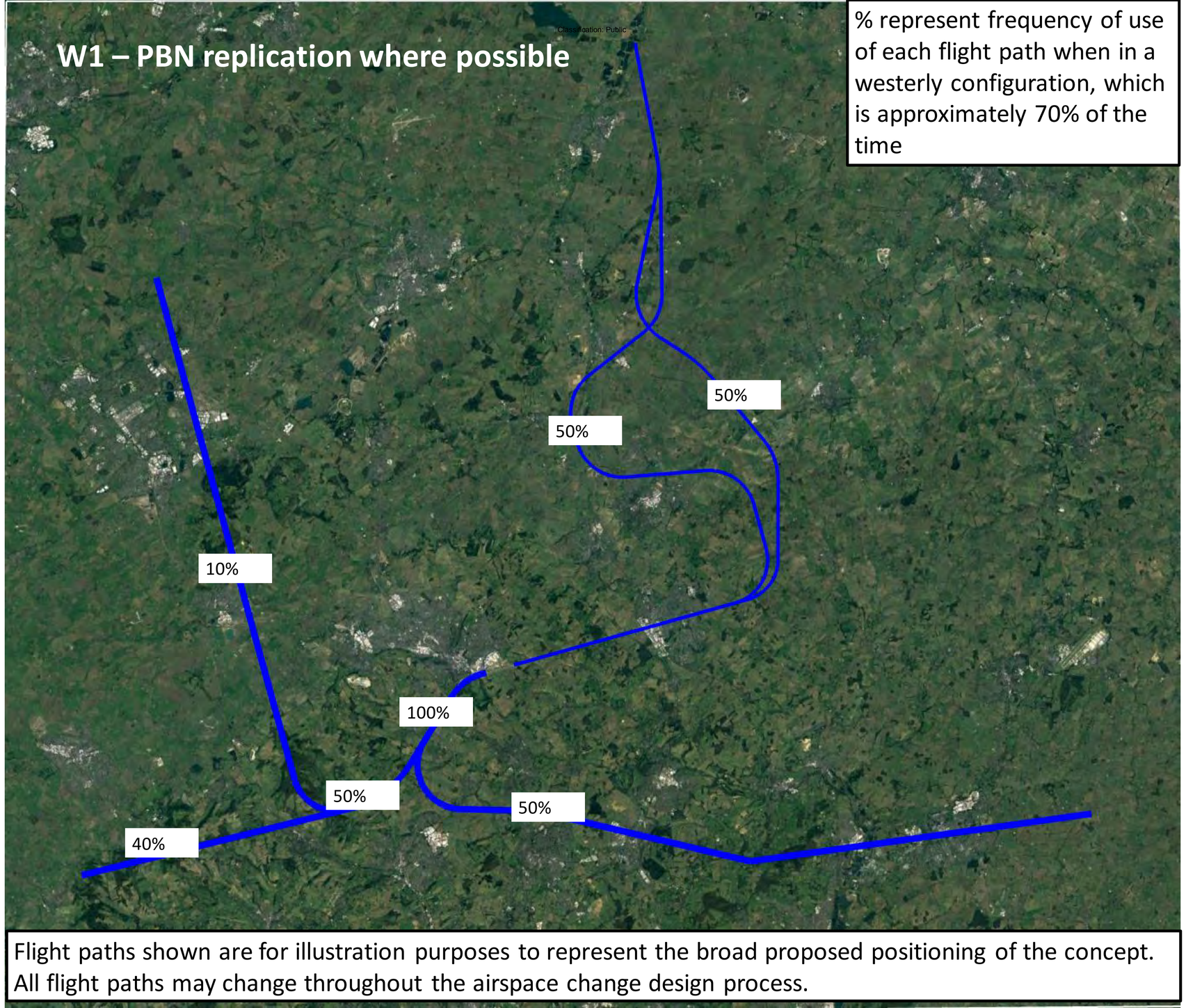
Westerly operations

ALL FLIGHT PATHS ILLUSTRATIVE ONLY

% represents the approximate percentage of overflight in that area from Westerly operations only

W1 – PBN replication where possible

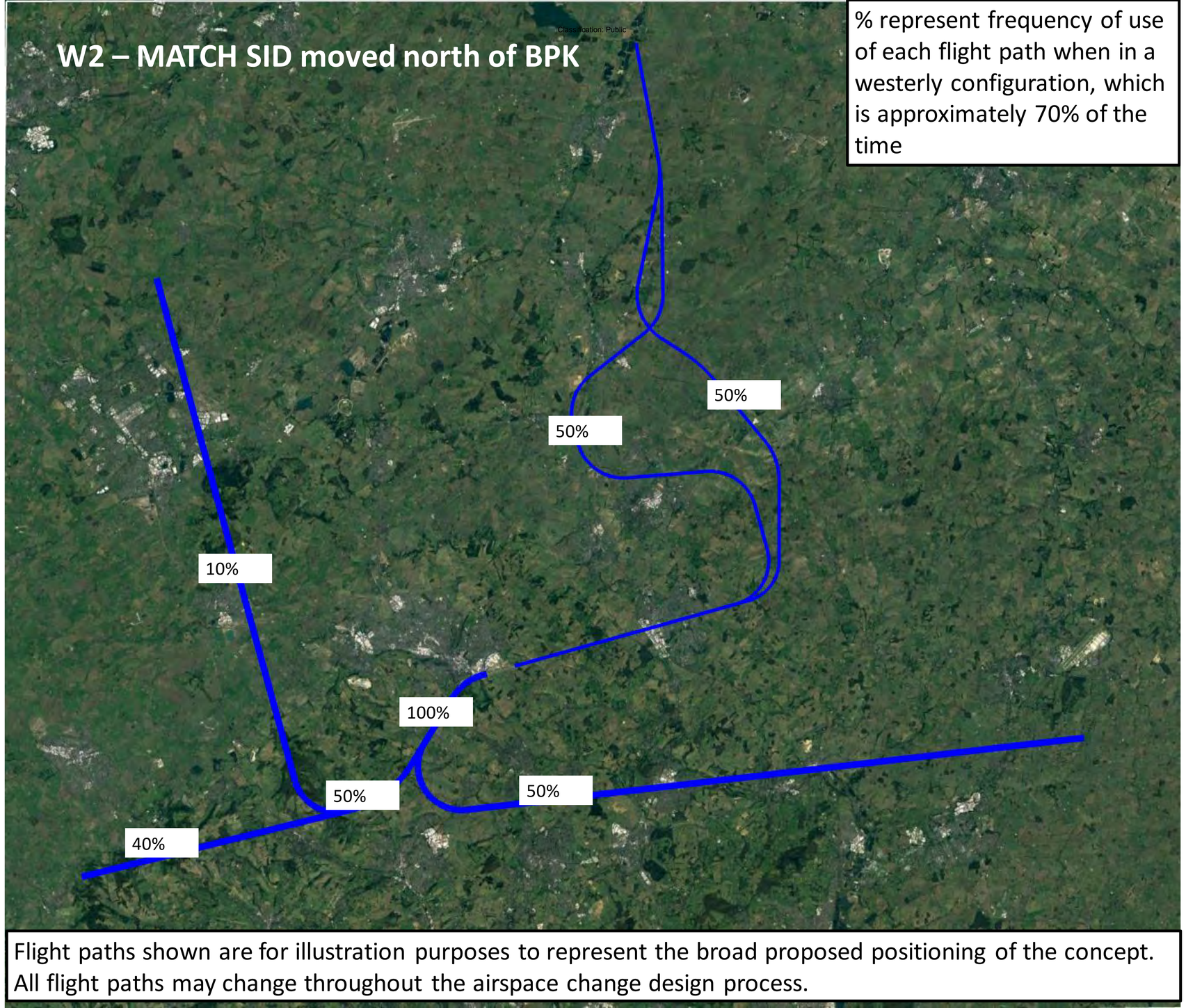
% represent frequency of use of each flight path when in a westerly configuration, which is approximately 70% of the time



Flight paths shown are for illustration purposes to represent the broad proposed positioning of the concept. All flight paths may change throughout the airspace change design process.

W2 – MATCH SID moved north of BPK

% represent frequency of use of each flight path when in a westerly configuration, which is approximately 70% of the time



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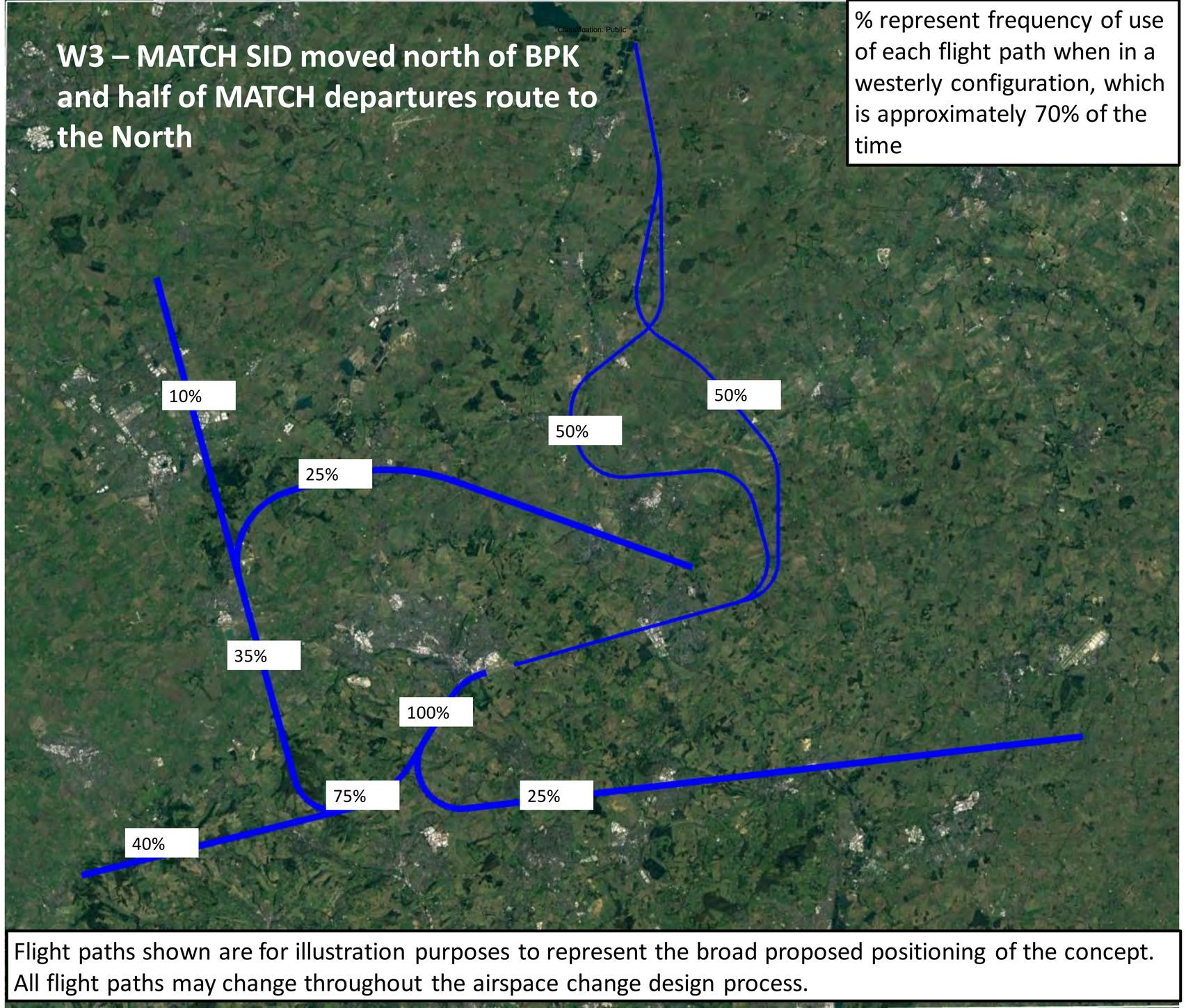
W3 – MATCH SID moved north of BPK and half of MATCH departures route to the North

% represent frequency of use of each flight path when in a westerly configuration, which is approximately 70% of the time



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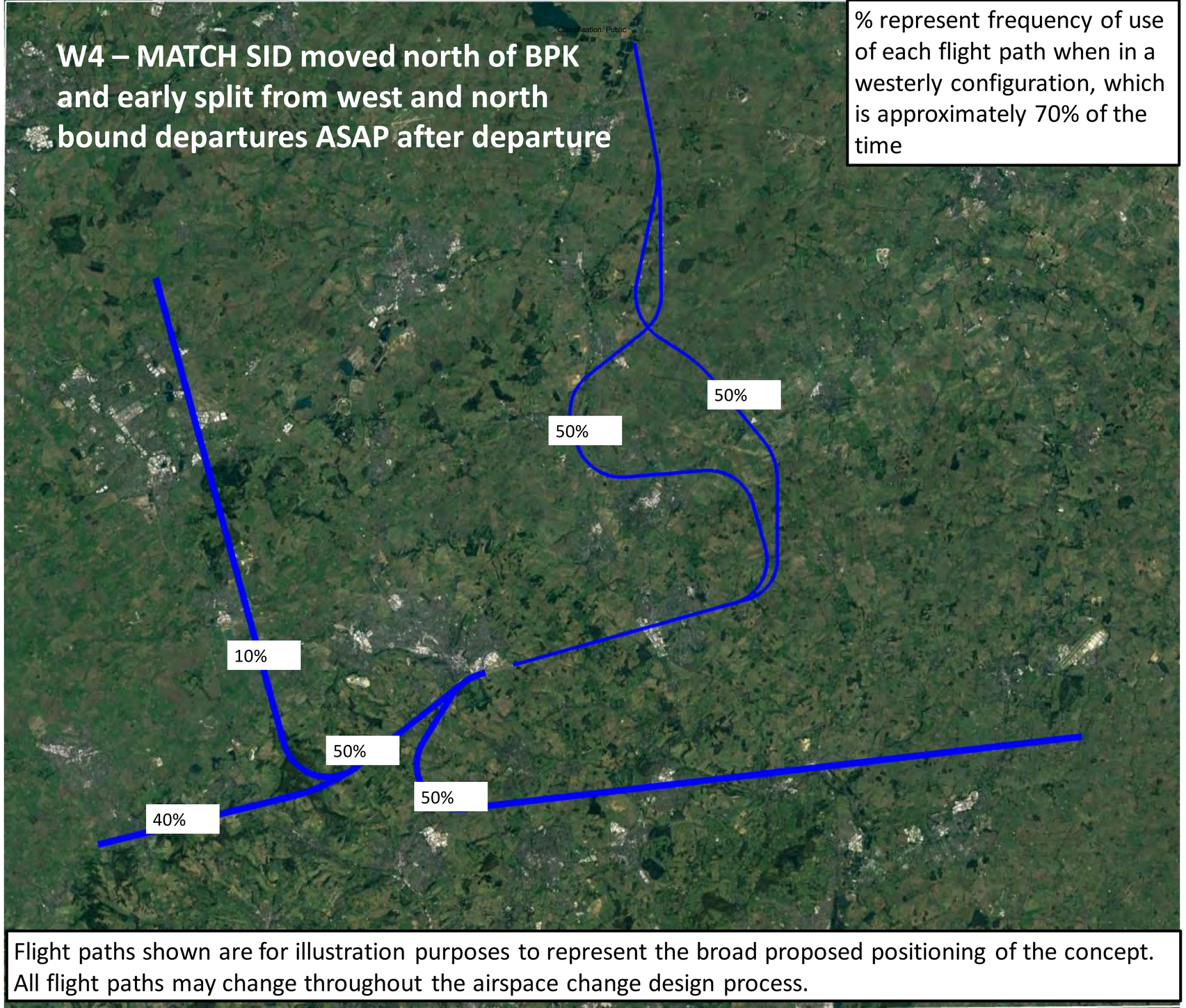
W4 – MATCH SID moved north of BPK and early split from west and north bound departures ASAP after departure

% represent frequency of use of each flight path when in a westerly configuration, which is approximately 70% of the time



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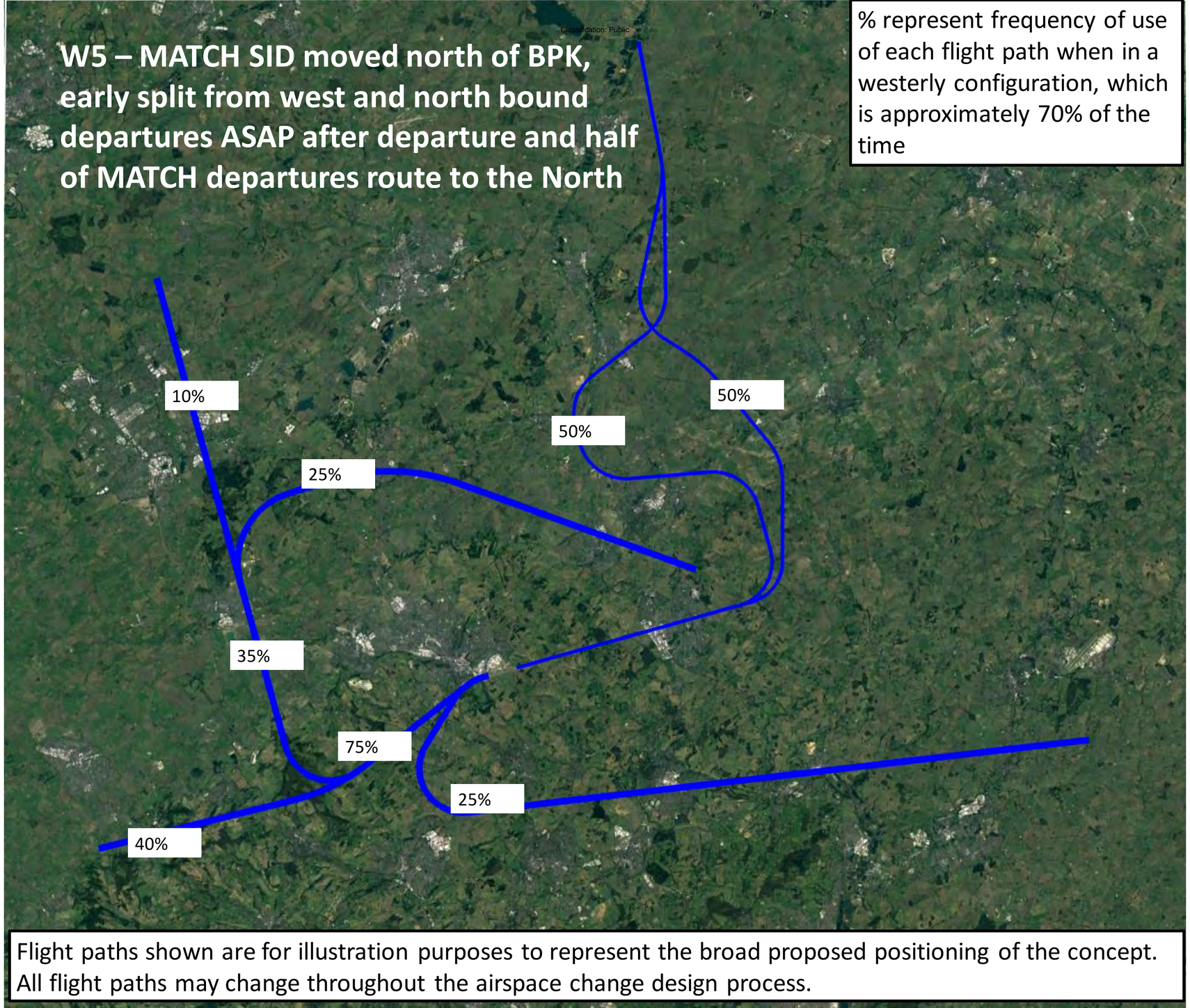
W5 – MATCH SID moved north of BPK, early split from west and north bound departures ASAP after departure and half of MATCH departures route to the North

% represent frequency of use of each flight path when in a westerly configuration, which is approximately 70% of the time



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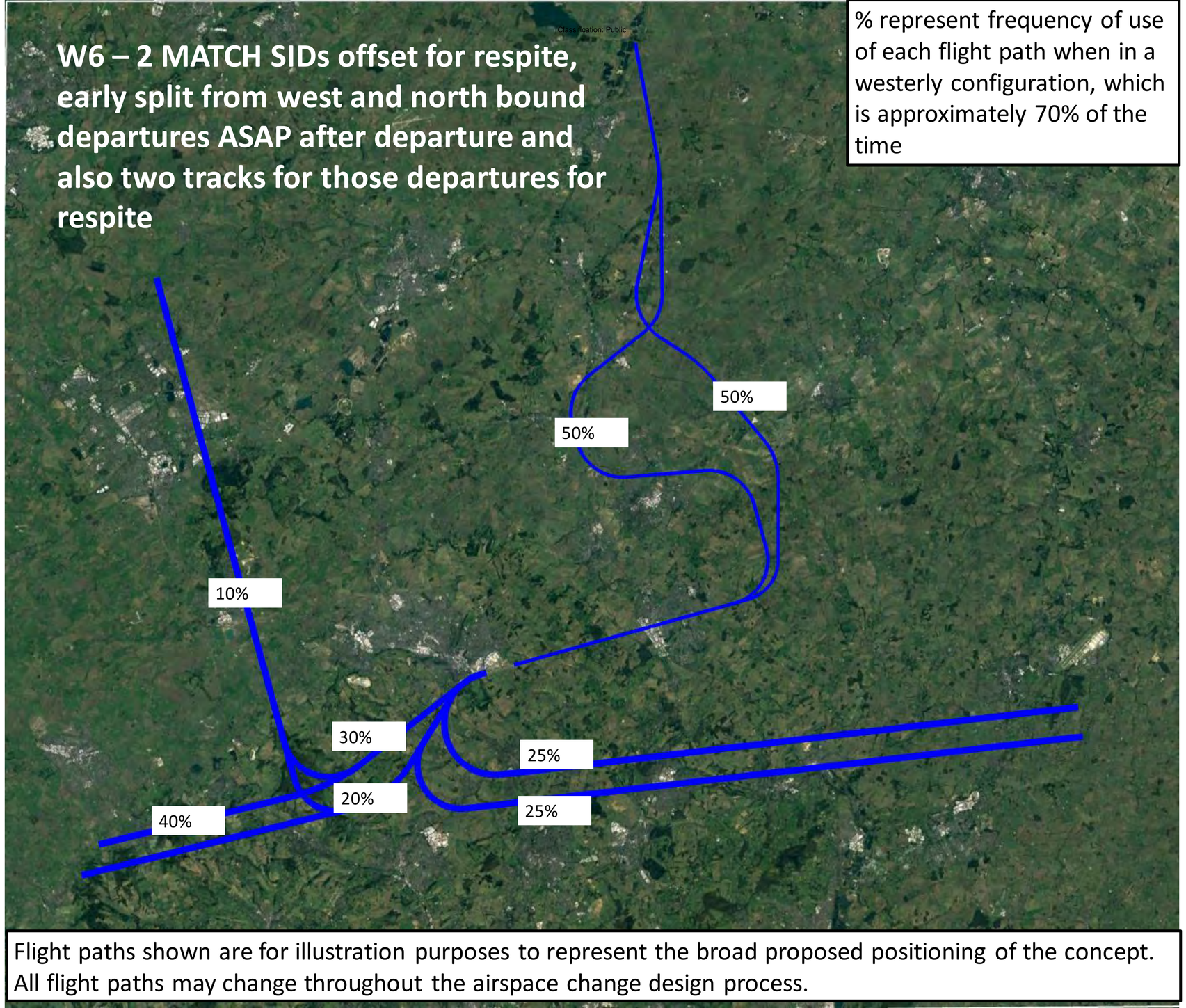
W6 – 2 MATCH SIDs offset for respite, early split from west and north bound departures ASAP after departure and also two tracks for those departures for respite

% represent frequency of use of each flight path when in a westerly configuration, which is approximately 70% of the time



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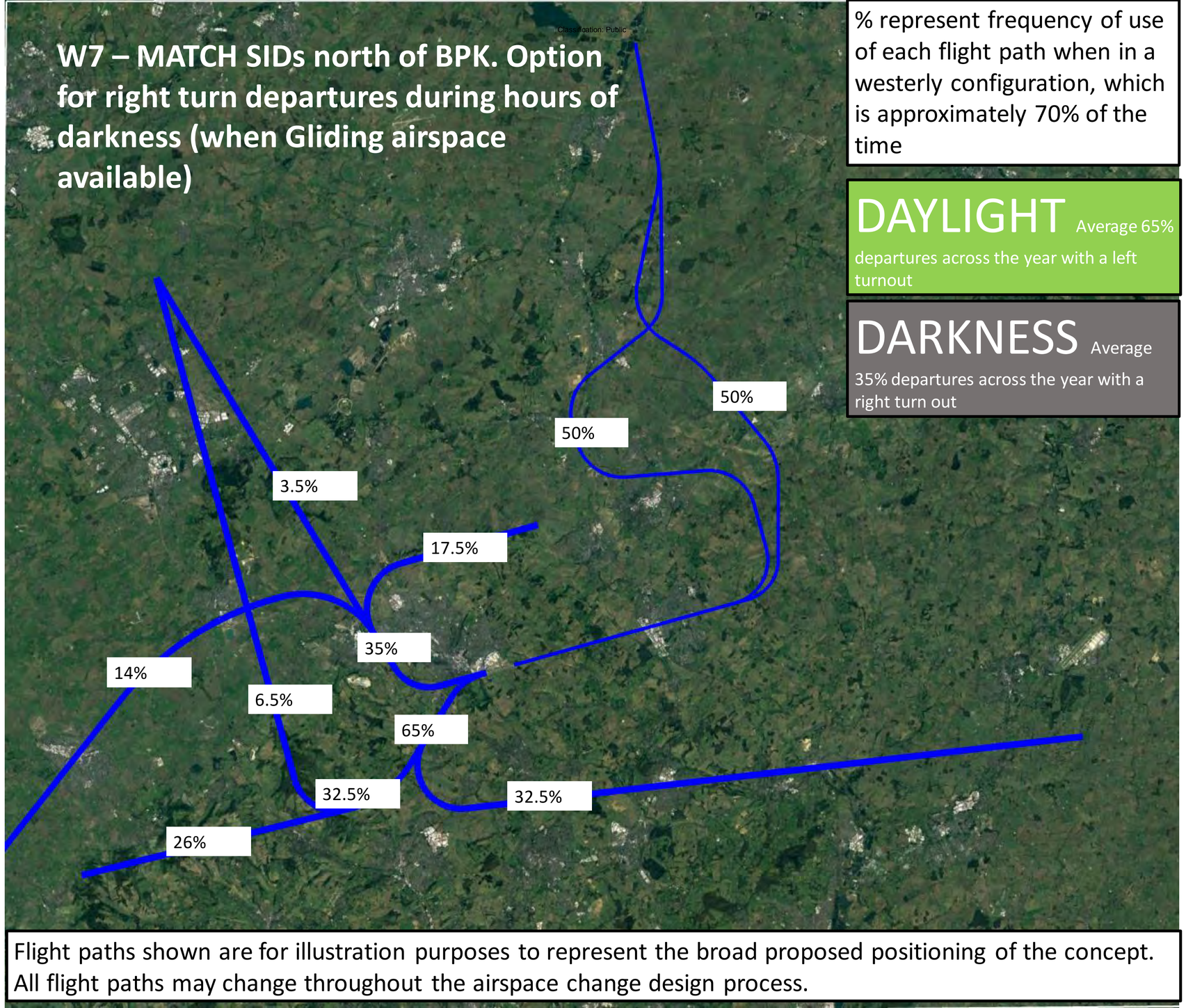
W7 – MATCH SIDs north of BPK. Option for right turn departures during hours of darkness (when Gliding airspace available)



% represent frequency of use of each flight path when in a westerly configuration, which is approximately 70% of the time

DAYLIGHT Average 65% departures across the year with a left turnout

DARKNESS Average 35% departures across the year with a right turn out

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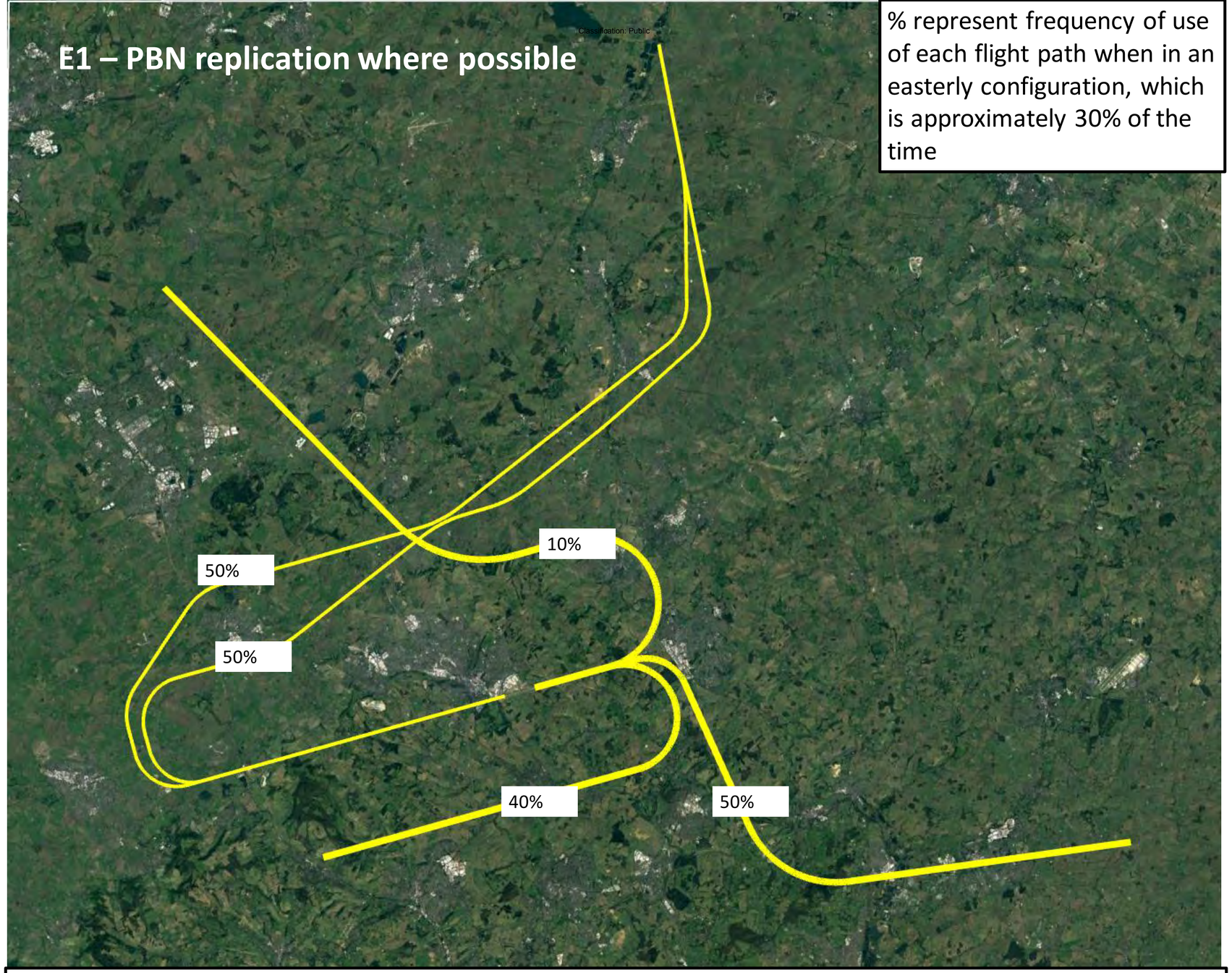
Easterly operations

ALL FLIGHT PATHS ILLUSTRATIVE ONLY

% represents the approximate percentage of overflight in that area from Easterly operations only

E1 – PBN replication where possible

% represent frequency of use of each flight path when in an easterly configuration, which is approximately 30% of the time



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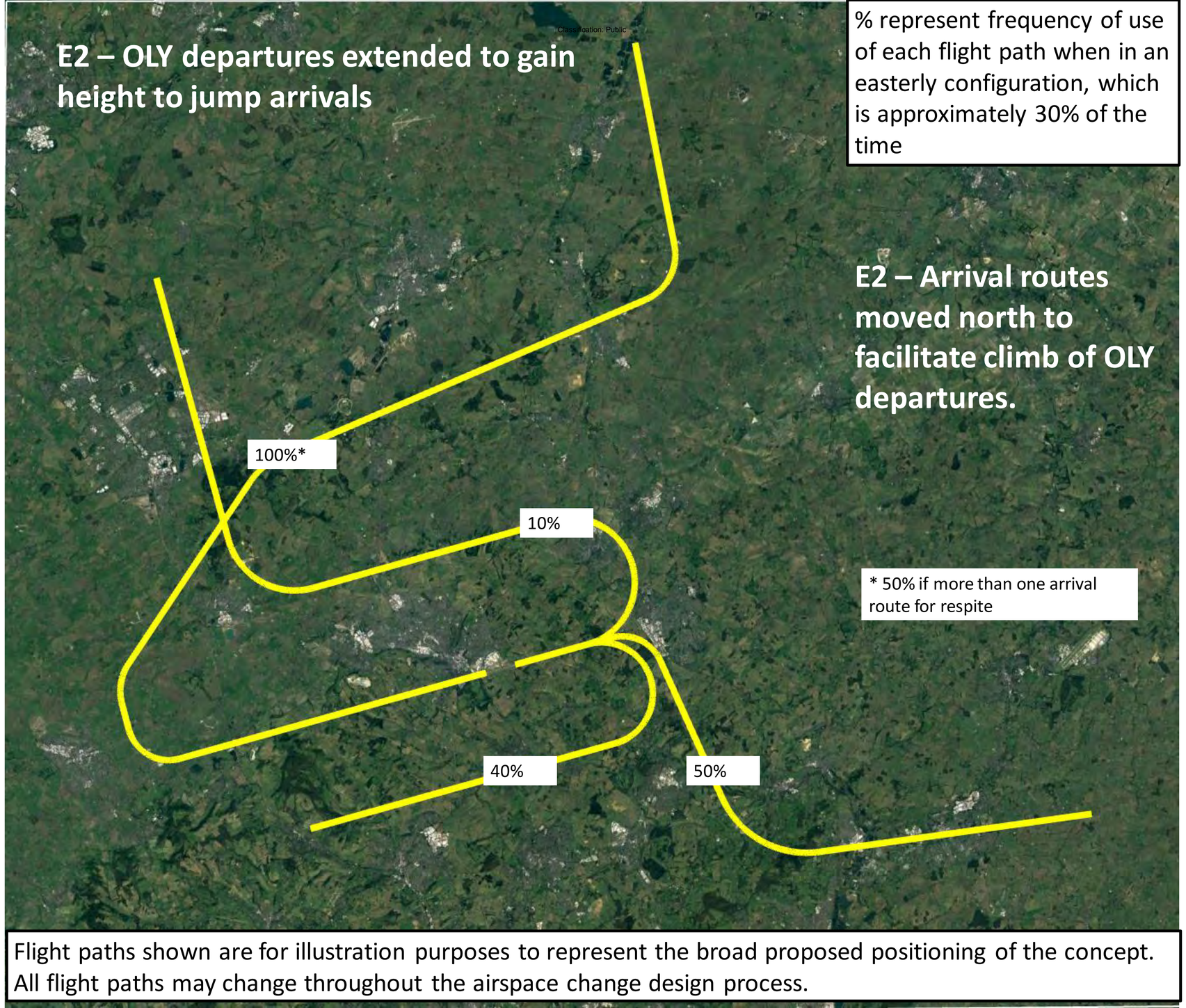

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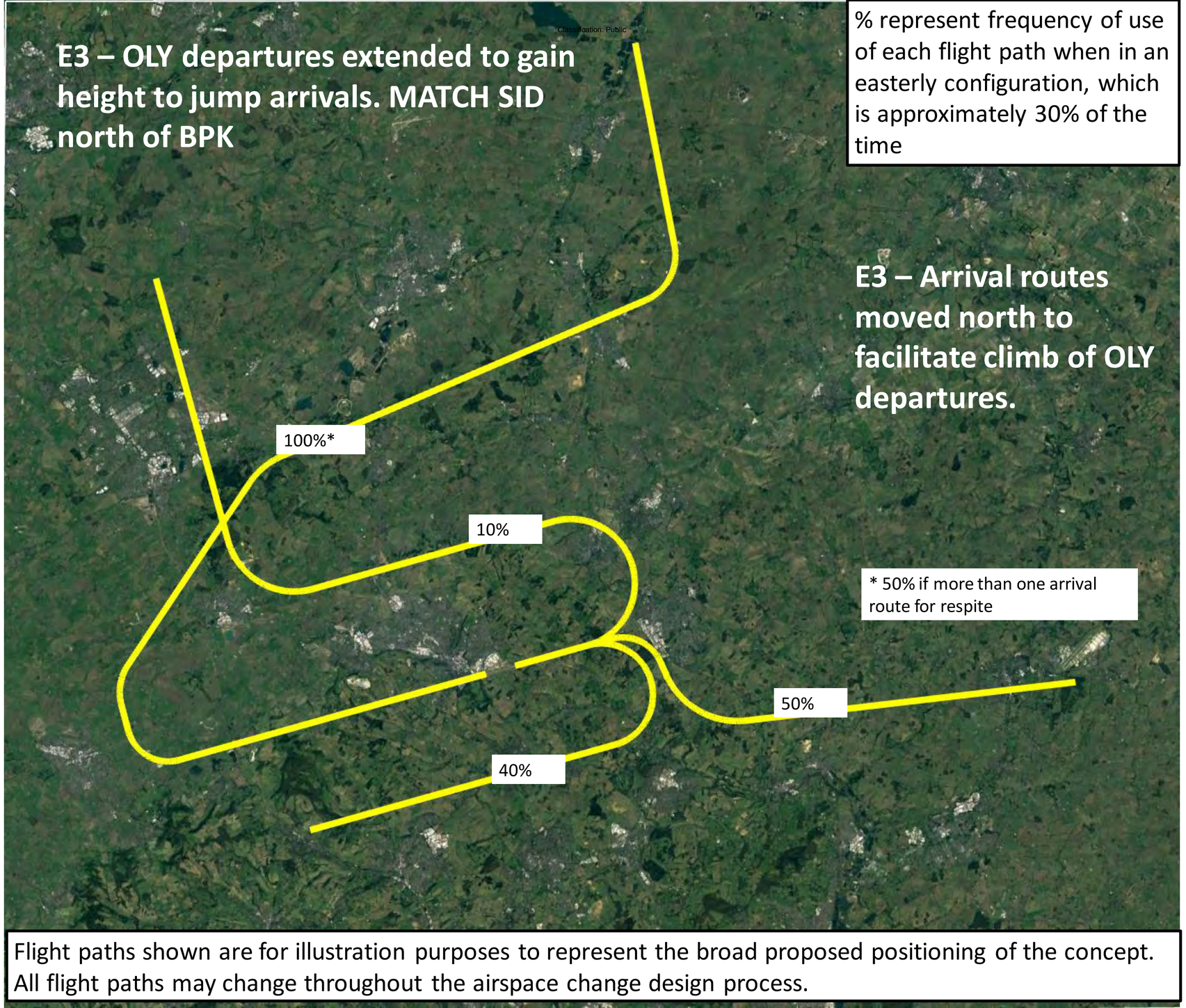

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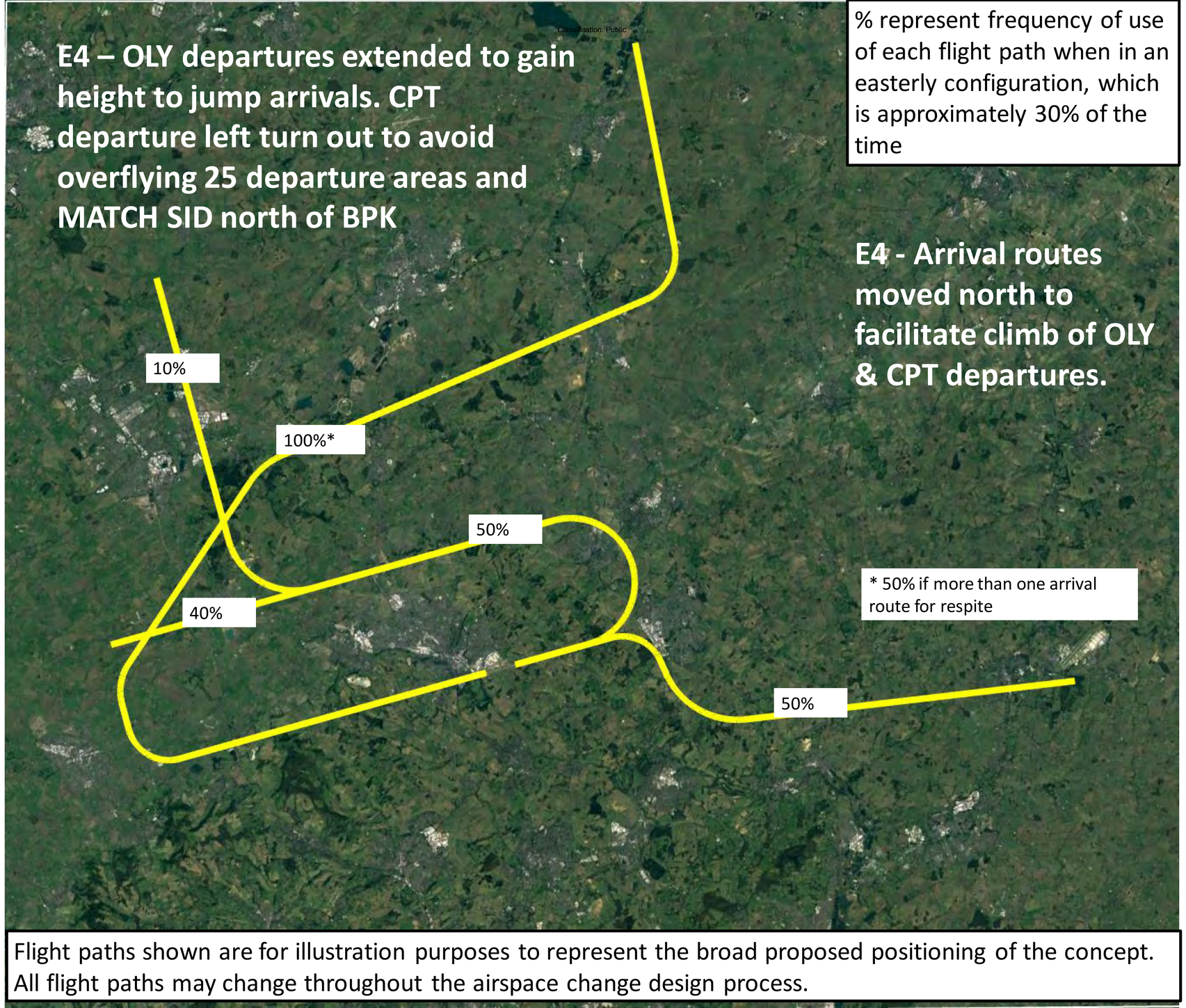
% represent frequency of use of each flight path when in an easterly configuration, which is approximately 30% of the time



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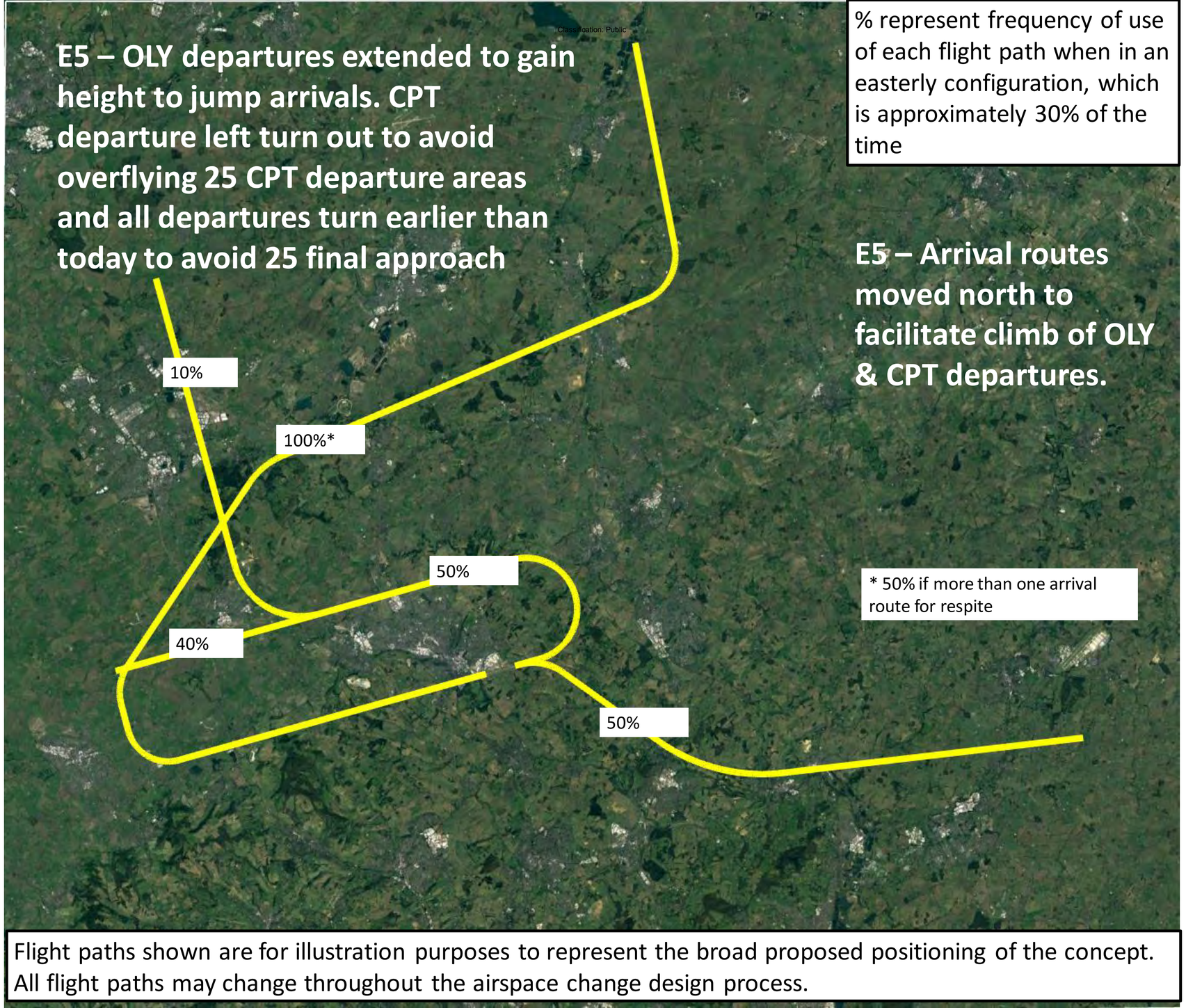

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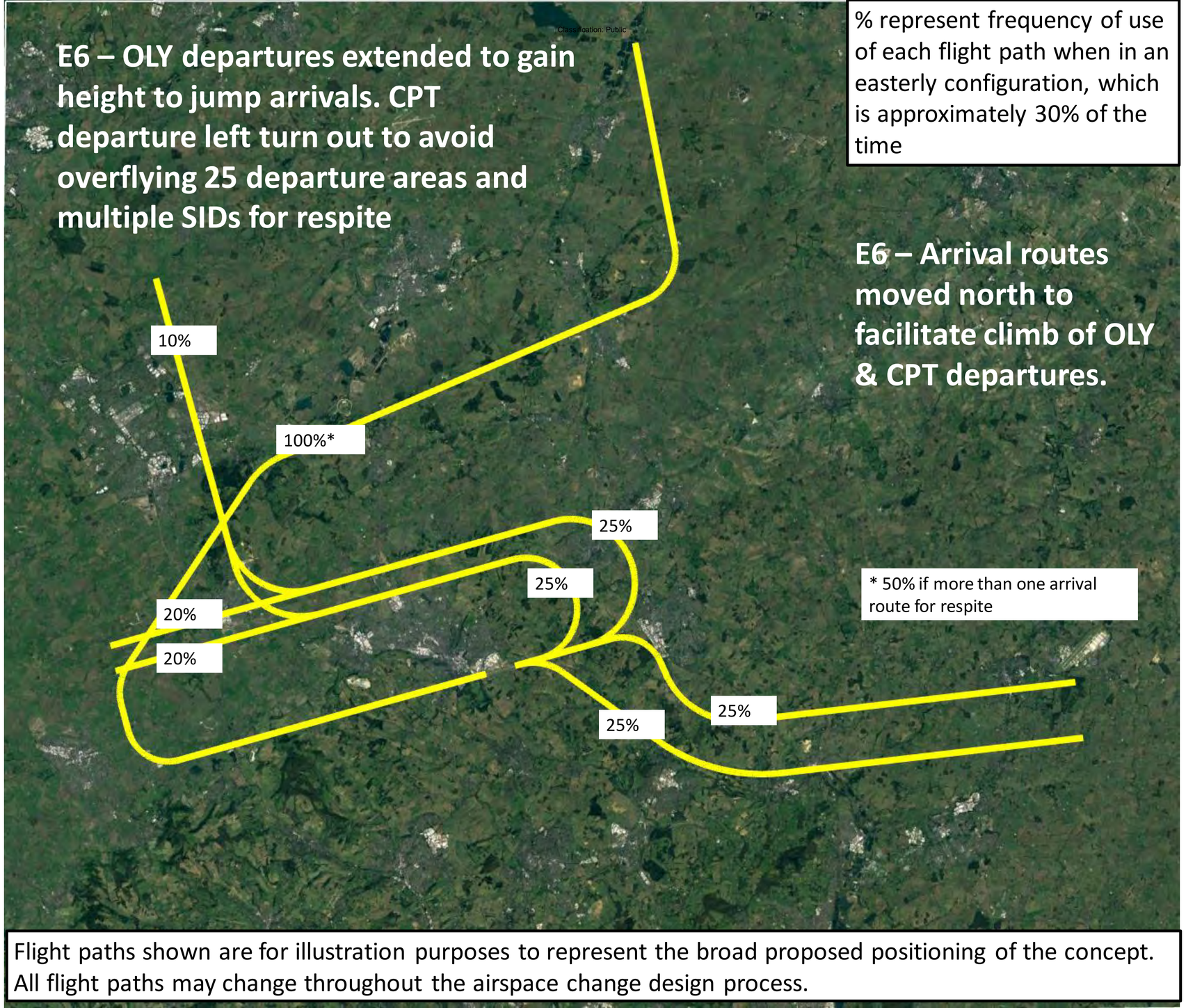
E6 – OLY departures extended to gain height to jump arrivals. CPT departure left turn out to avoid overflying 25 departure areas and multiple SIDs for respite

E6 – Arrival routes moved north to facilitate climb of OLY & CPT departures.



* 50% if more than one arrival route for respite

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Easterly & Westerly system options

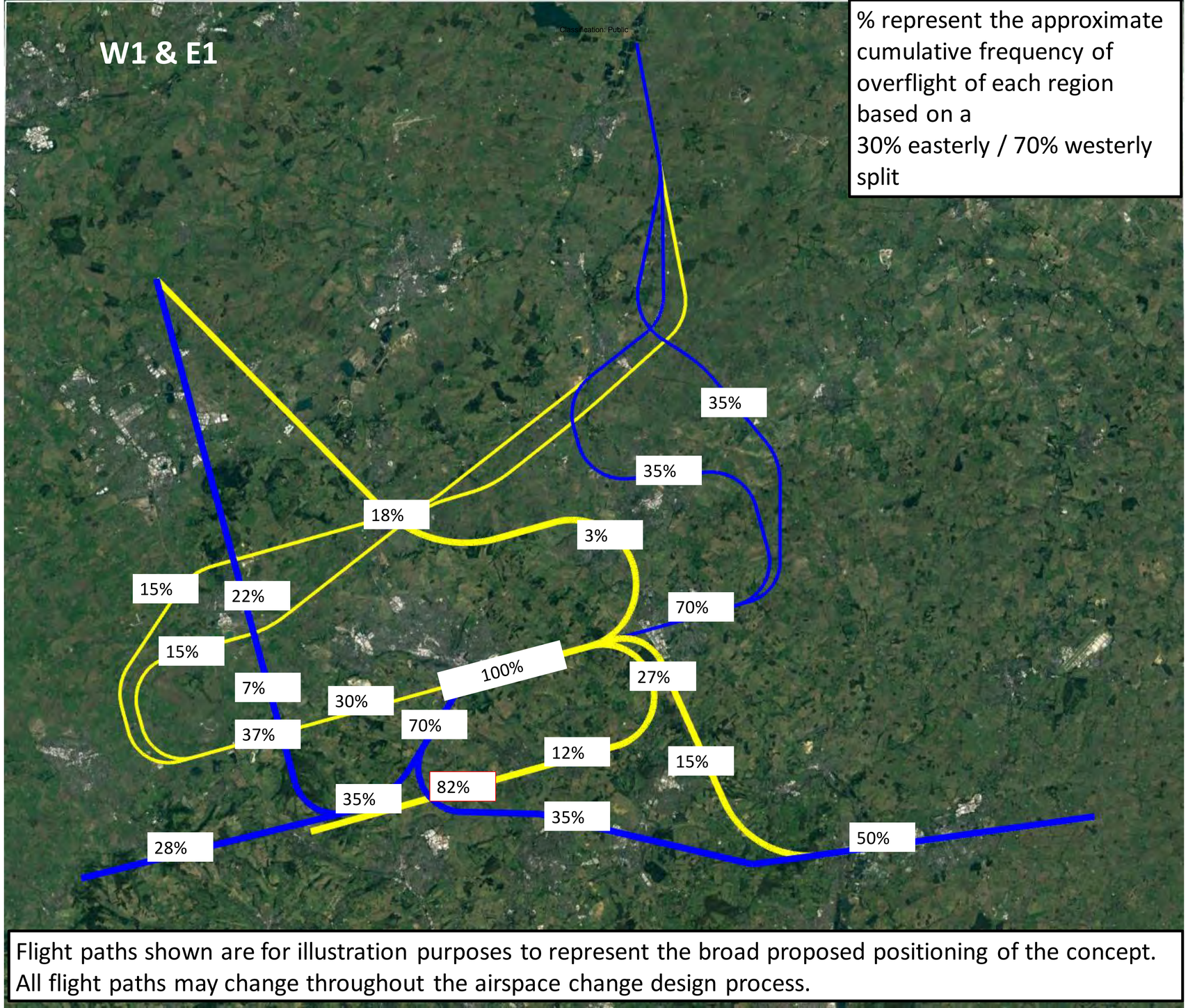
ALL FLIGHT PATHS ILLUSTRATIVE ONLY

The following slides show approximate % of overflight per year in that area, based on 30/70 E/W split

	Westerly (RWY25)	Easterly (RWY 07)
MATCH	50 (35%)	50 (15%)
CPT	40 (28%)	40 (12%)
OLY	10 (7%)	10 (3%)

W1 & E1

% represent the approximate cumulative frequency of overflight of each region based on a
30% easterly / 70% westerly split



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W1 & E2

% represent the approximate cumulative frequency of overflight of each region based on a
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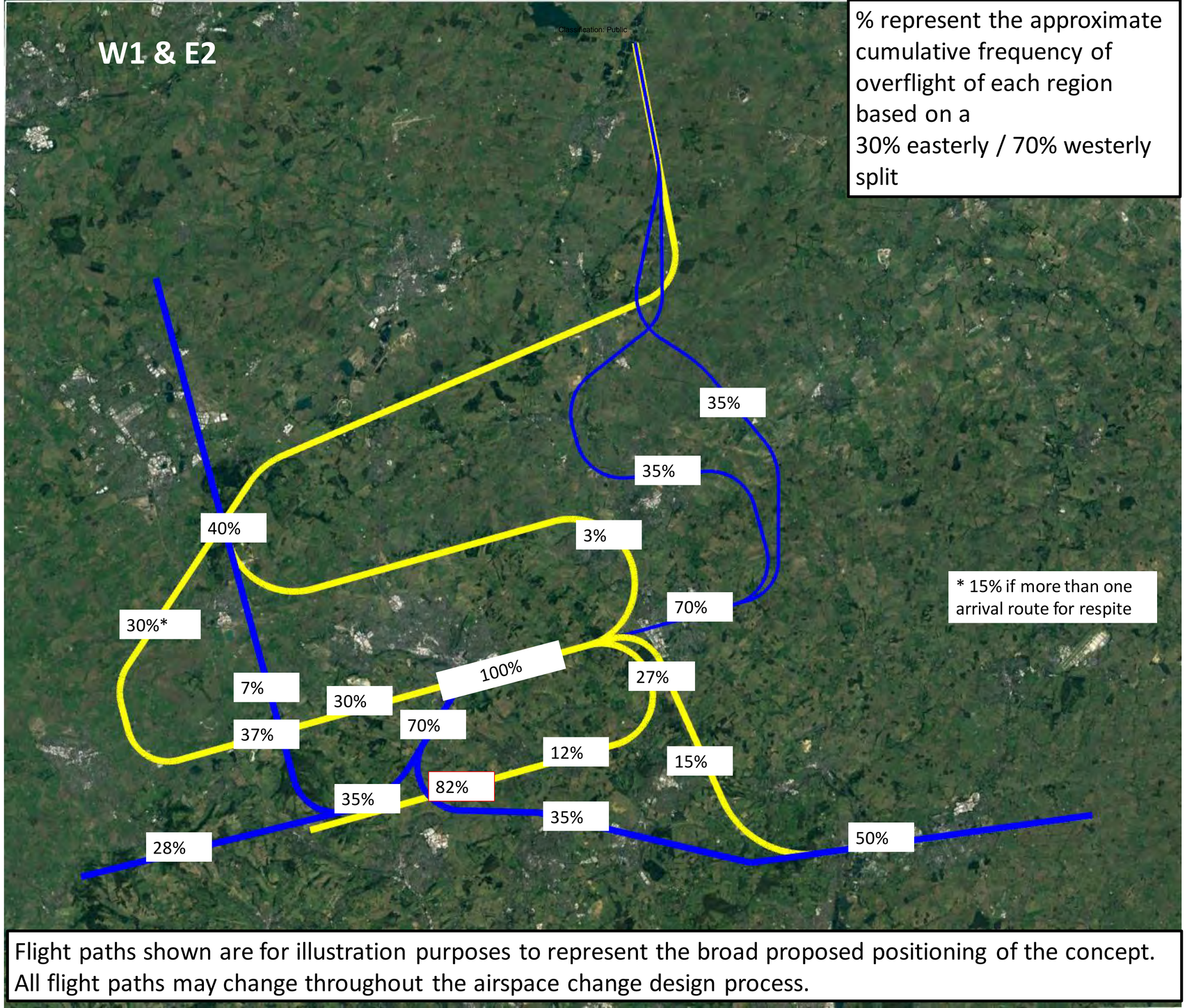

* 15% if more than one arrival route for respite

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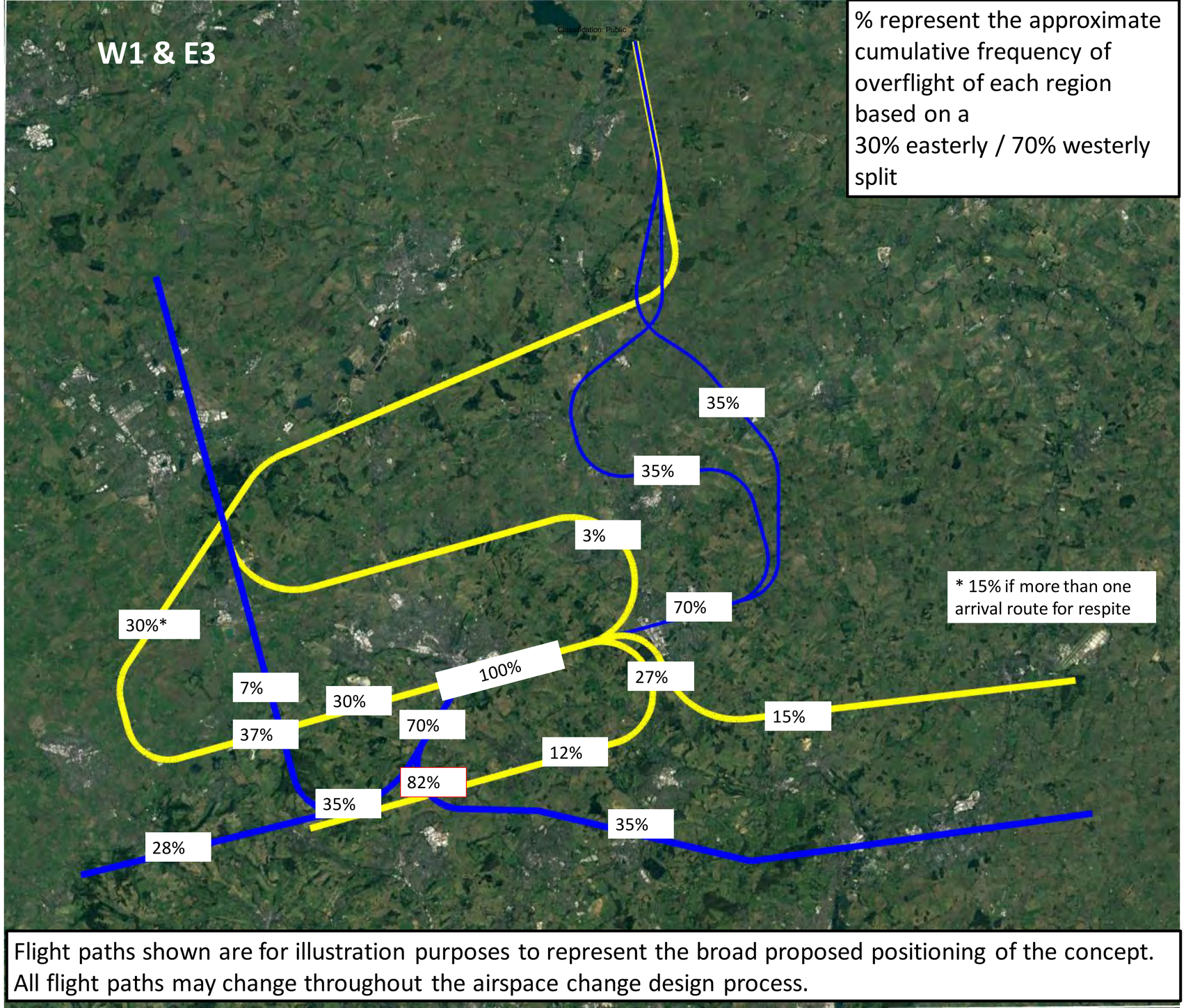
W1 & E3



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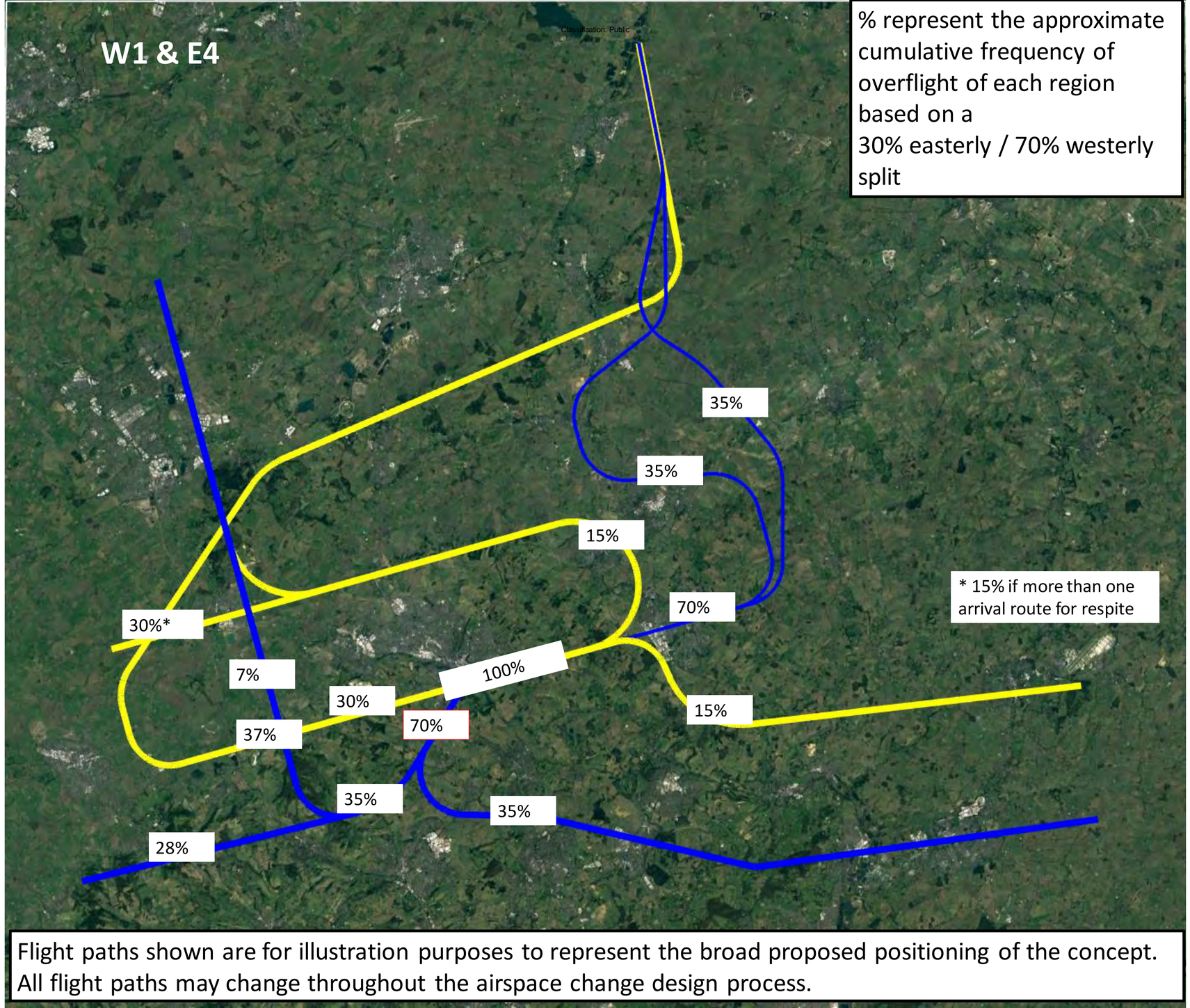
W1 & E4



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W1 & E5

% represent the approximate cumulative frequency of overflight of each region based on a
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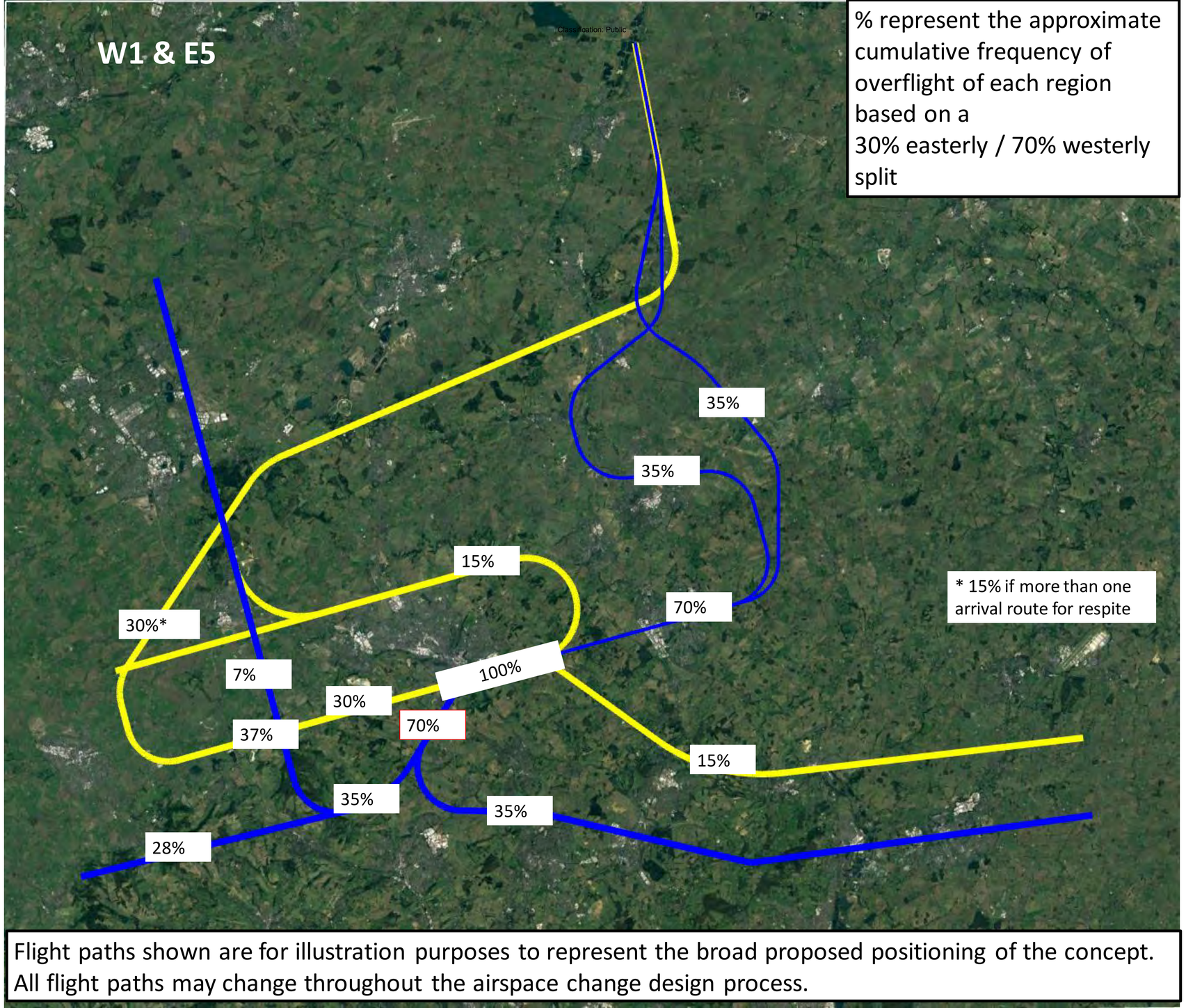

* 15% if more than one arrival route for respite

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W1 & E6

% represent the approximate cumulative frequency of overflight of each region based on a
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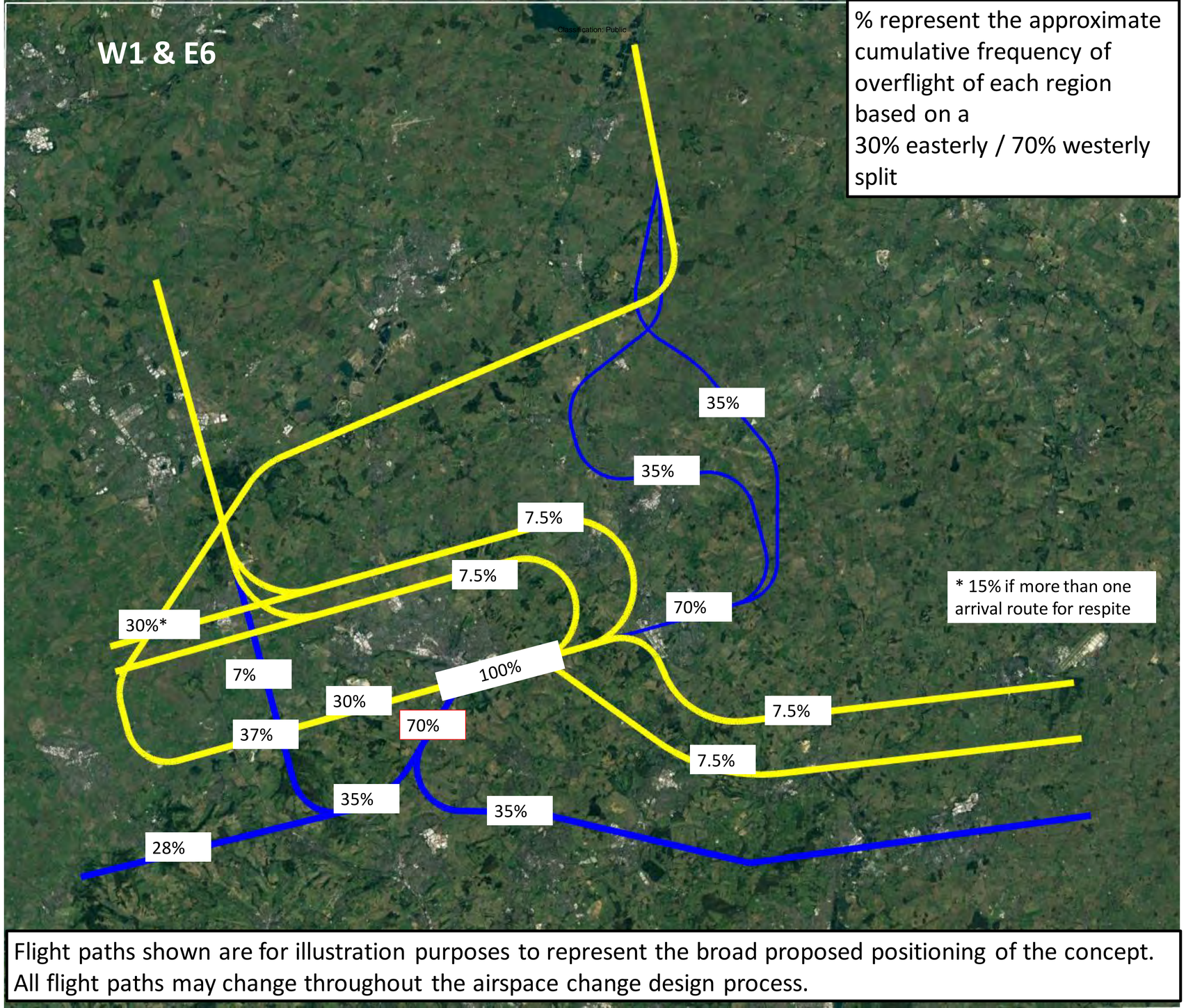

* 15% if more than one arrival route for respite

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W2 & E1

% represent the approximate cumulative frequency of overflight of each region based on a
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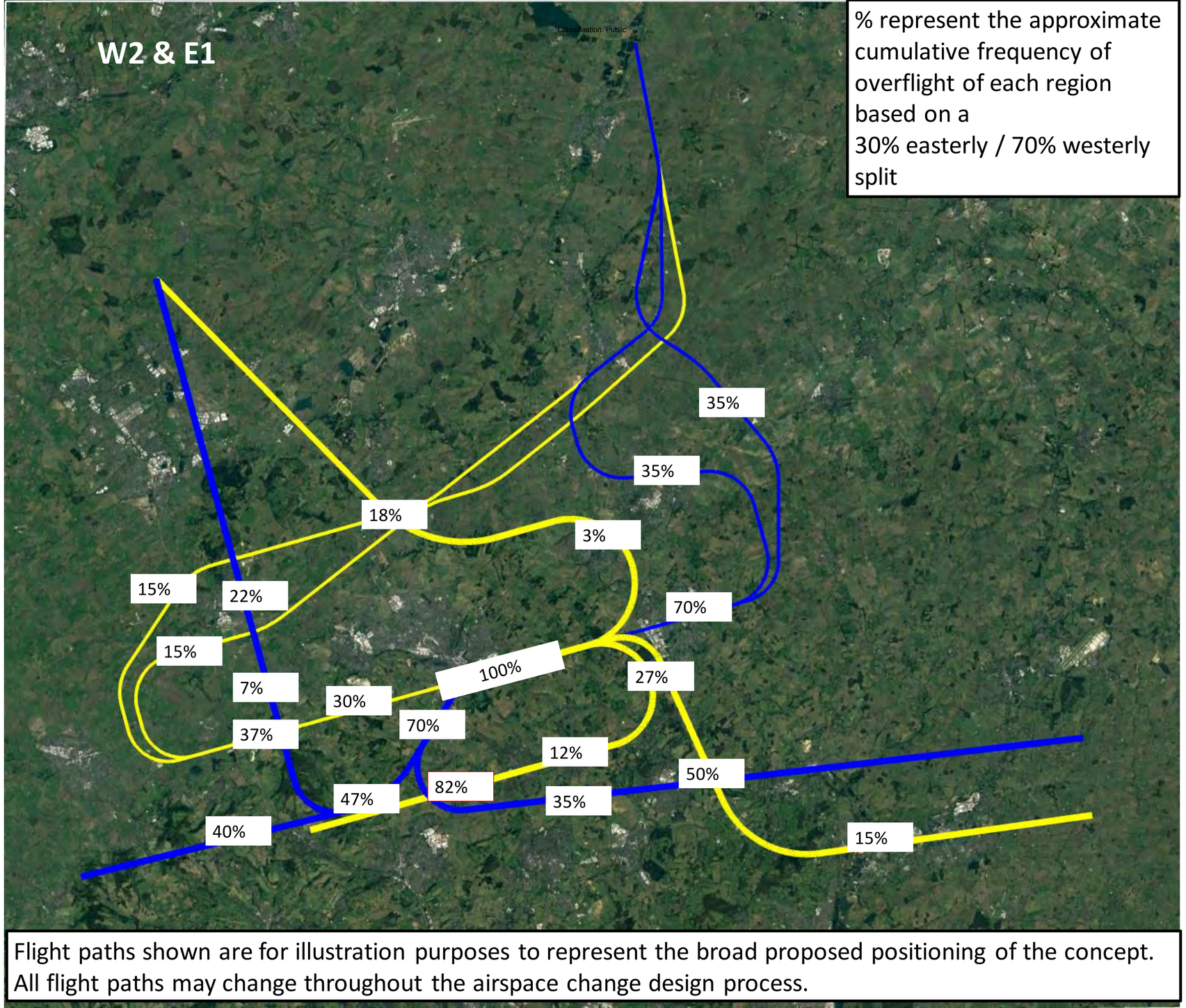

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W2 & E2

% represent the approximate cumulative frequency of overflight of each region based on a
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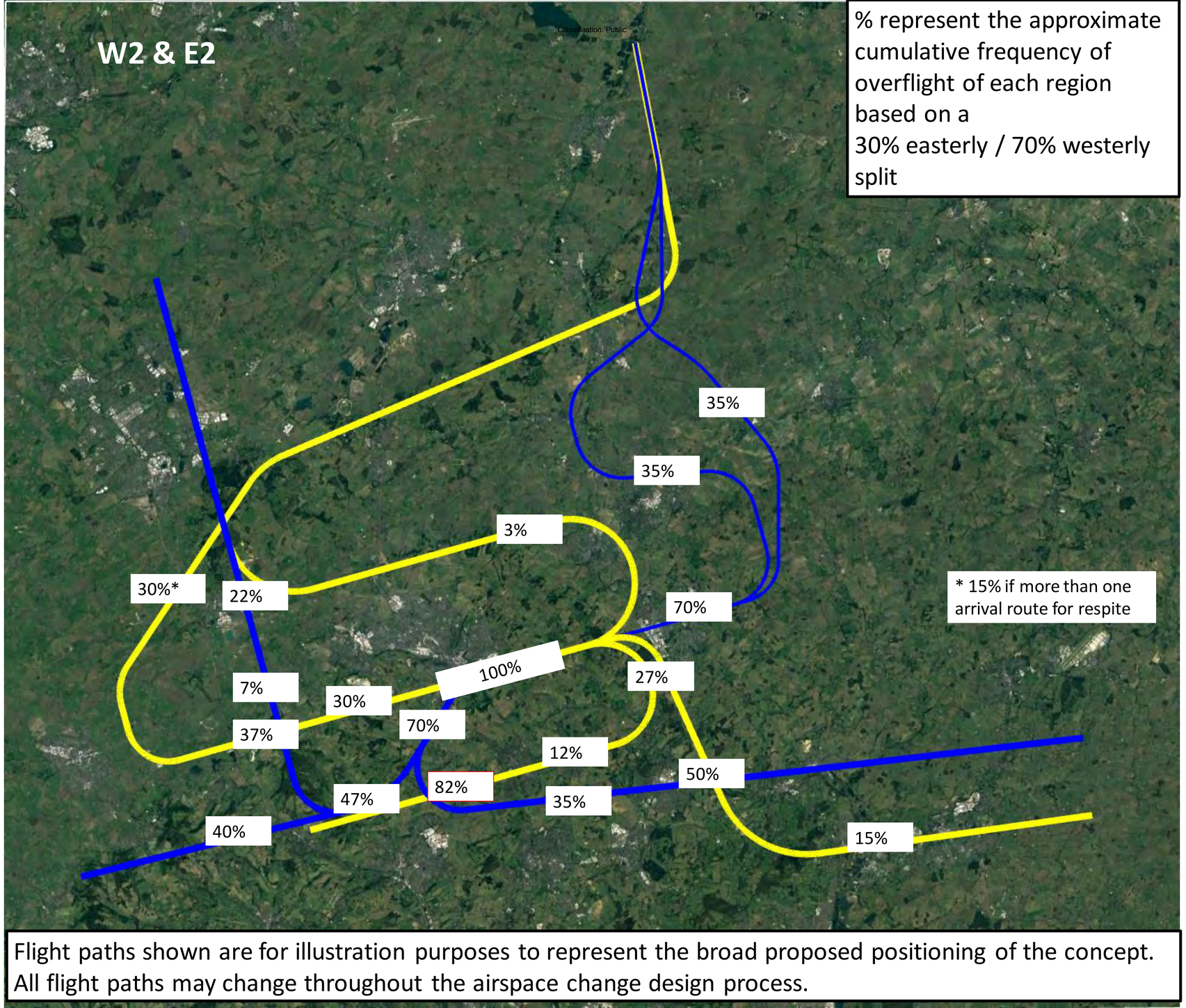

* 15% if more than one arrival route for respite

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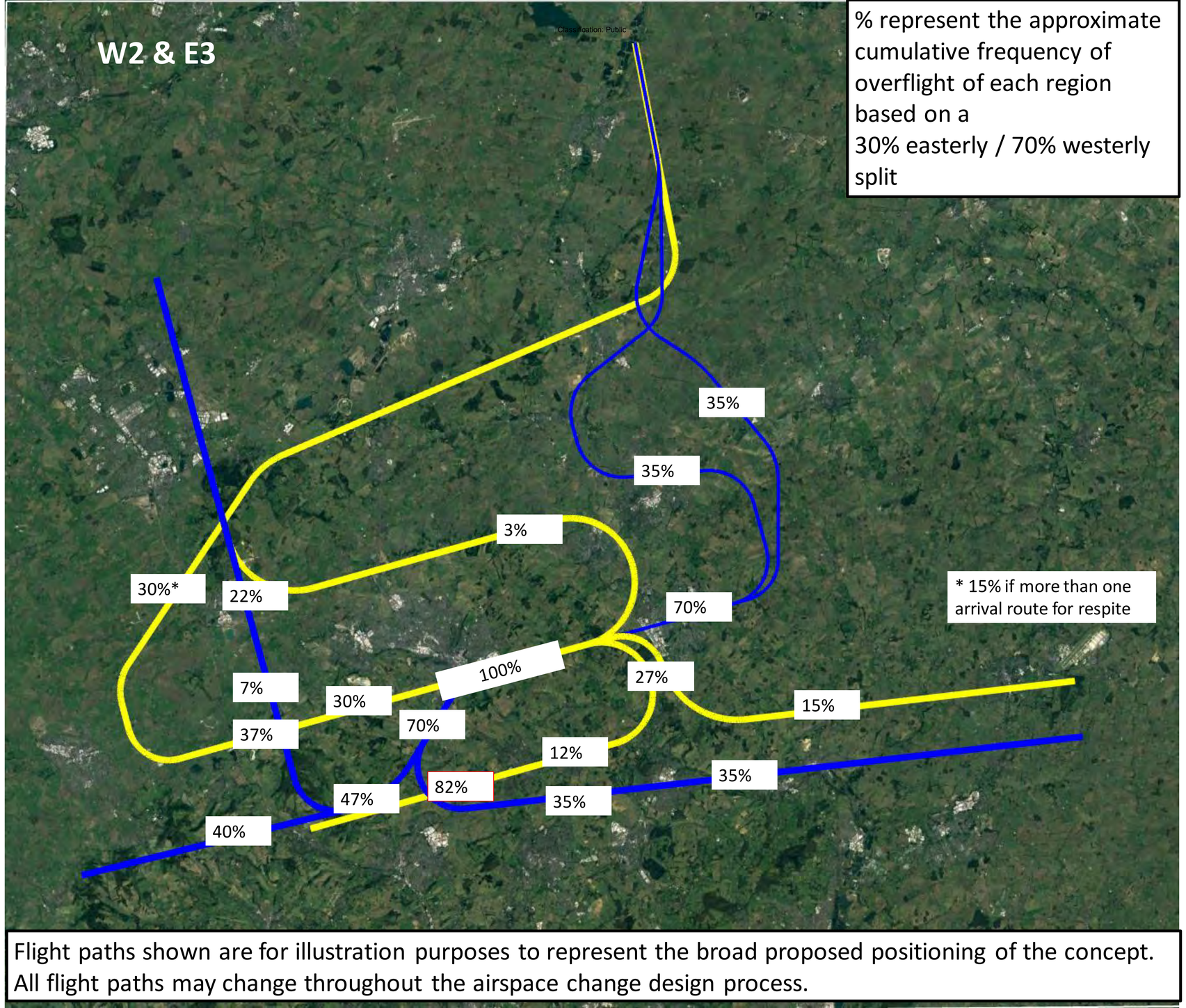
W2 & E3



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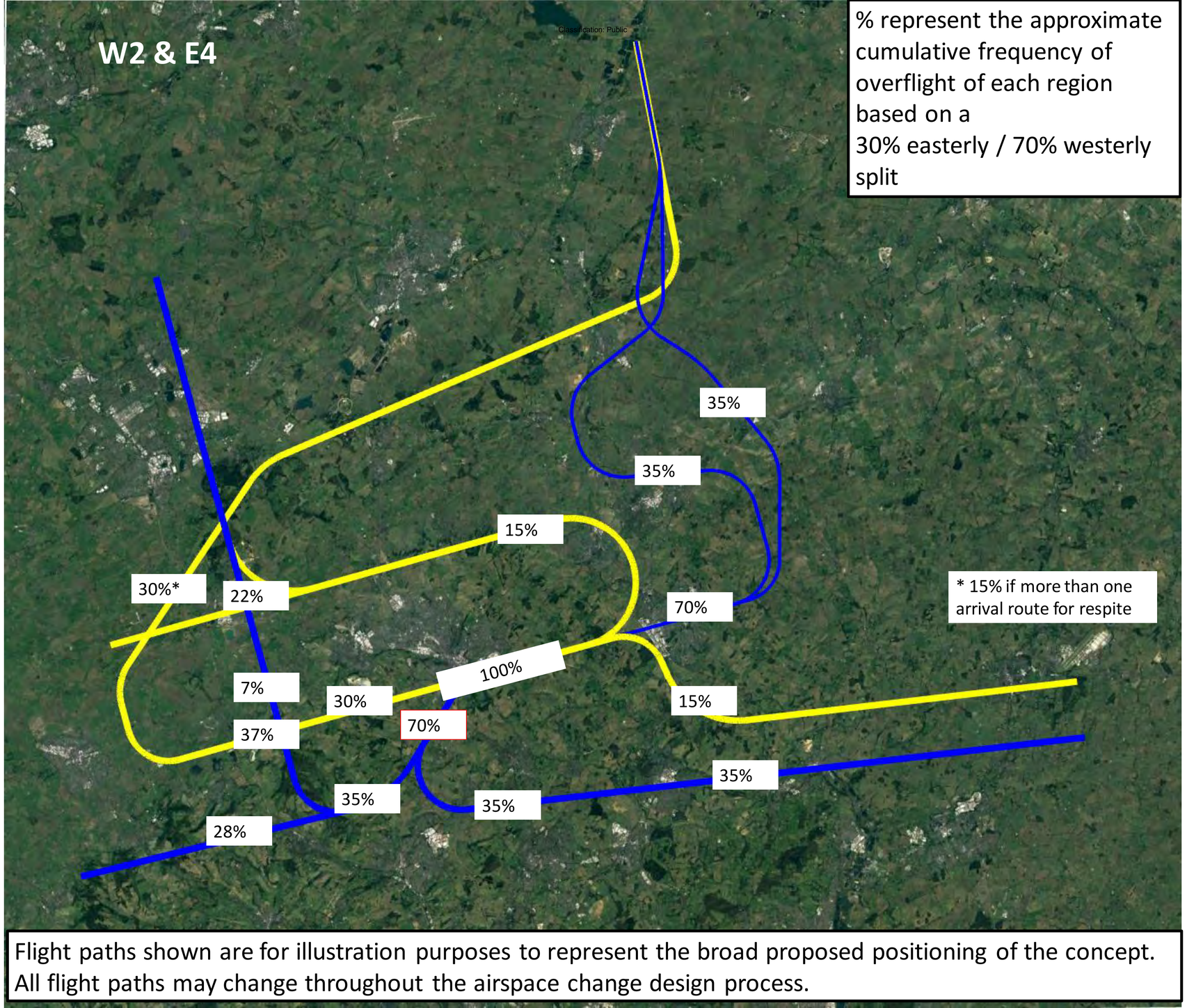
W2 & E4



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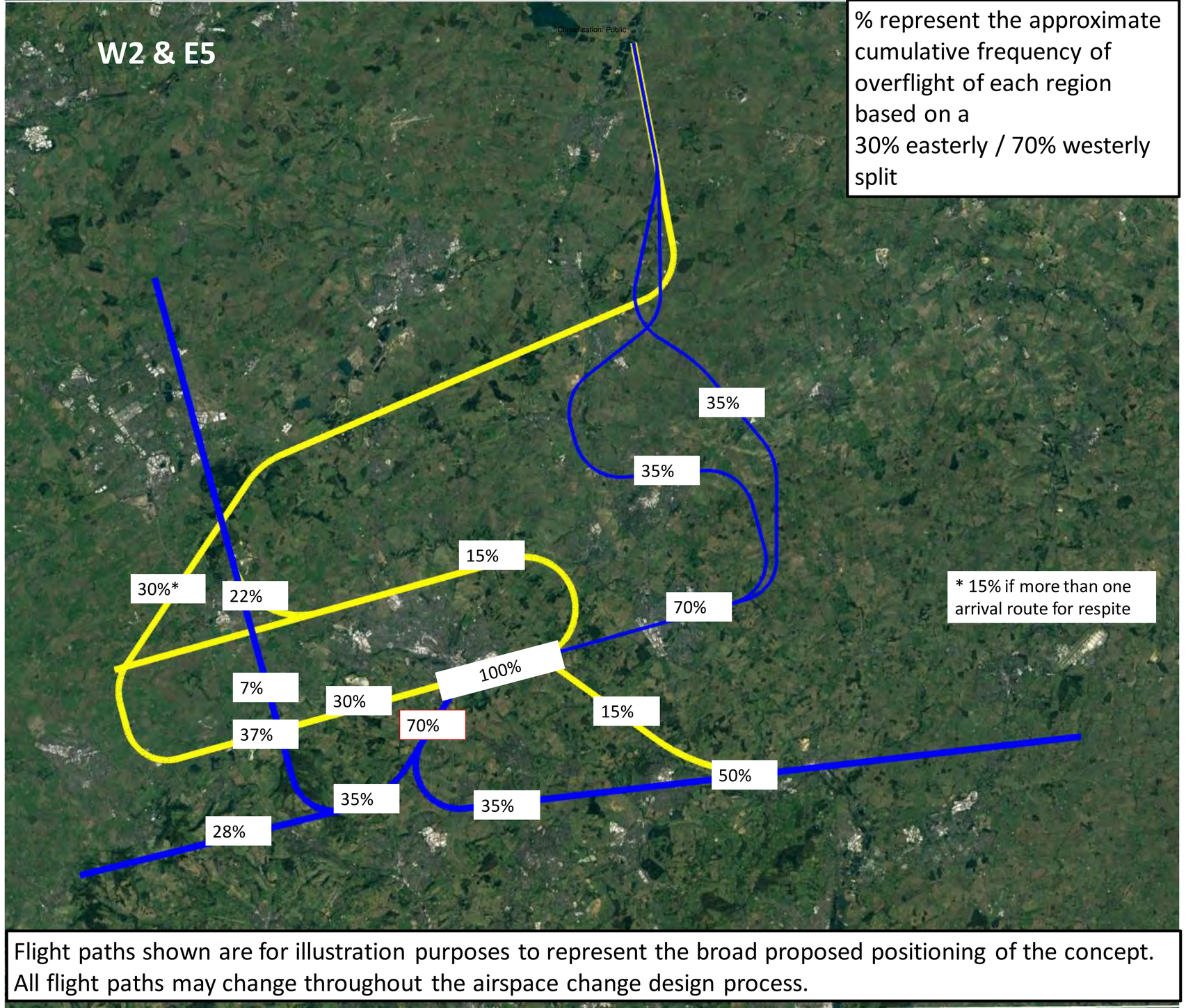
W2 & E5



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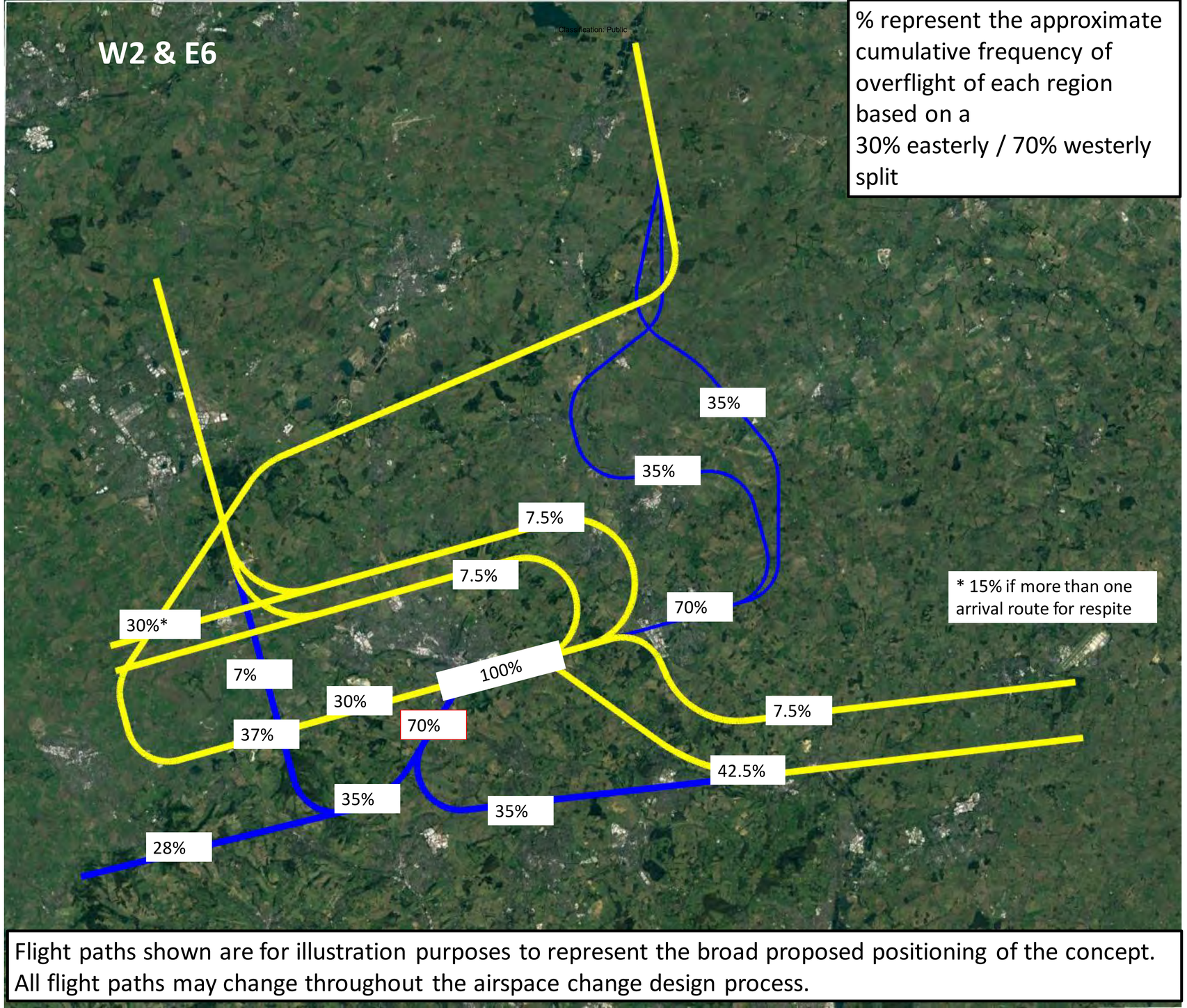
W2 & E6



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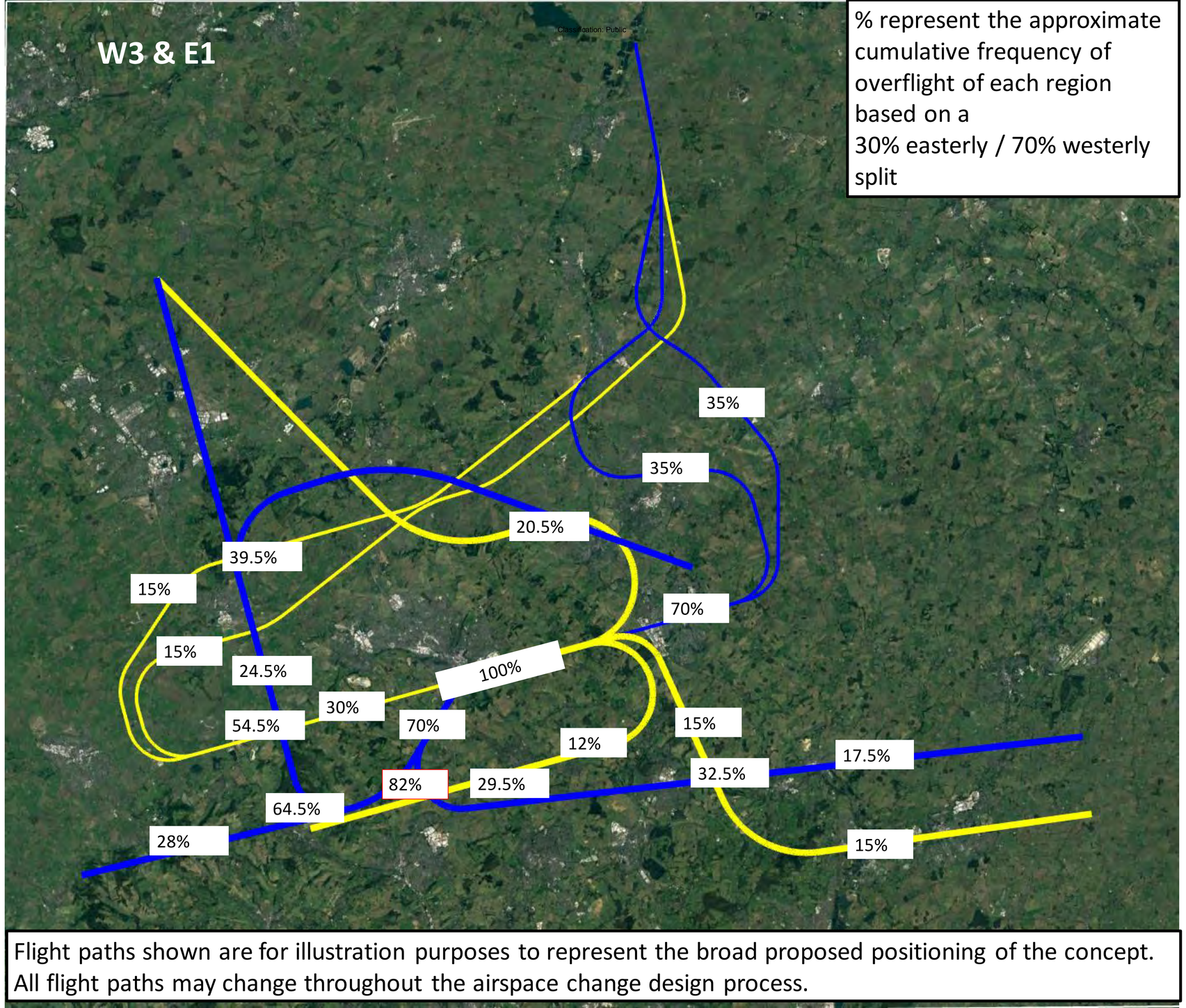
W3 & E1



% represent the approximate cumulative frequency of overflight of each region based on a
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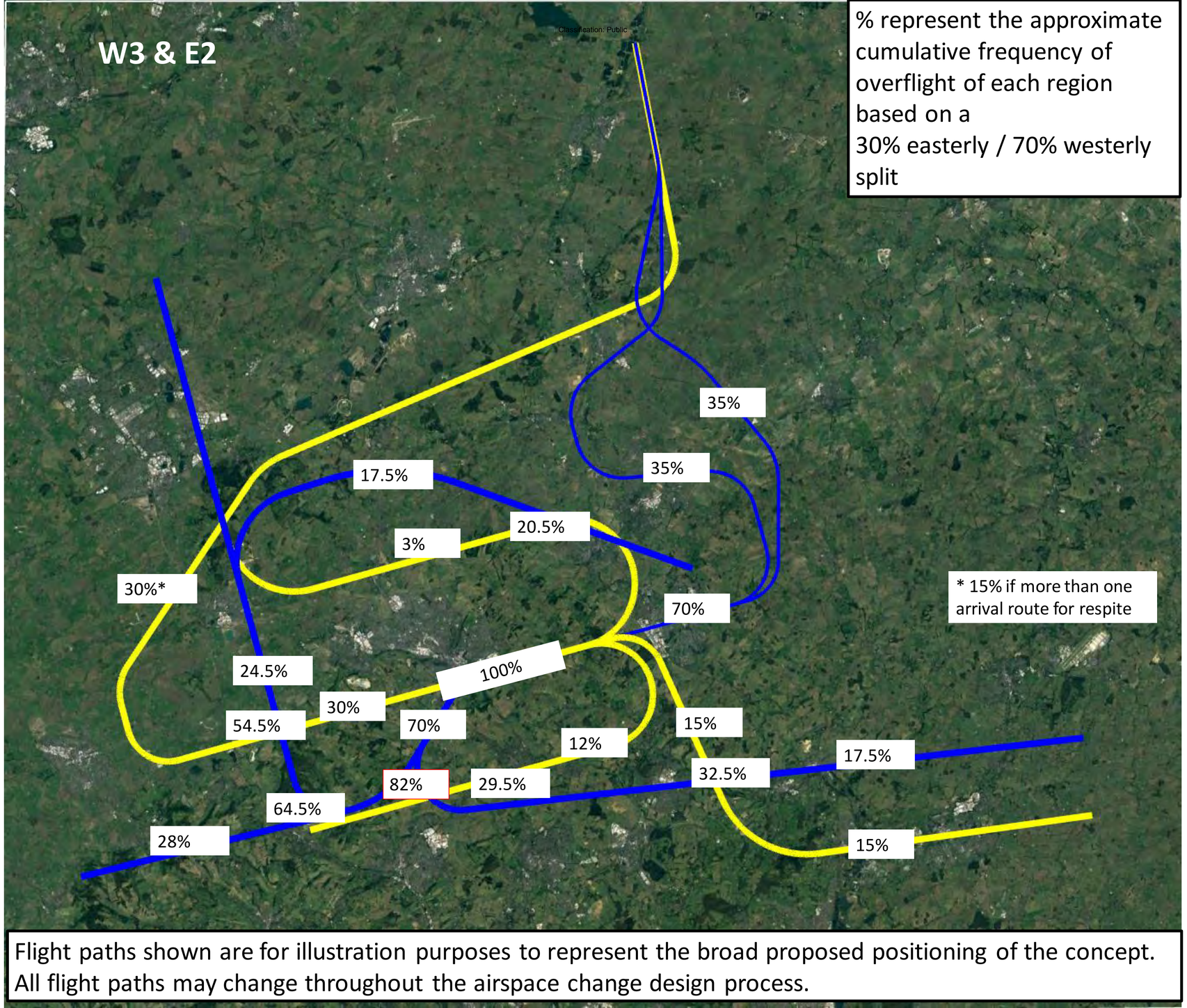
W3 & E2



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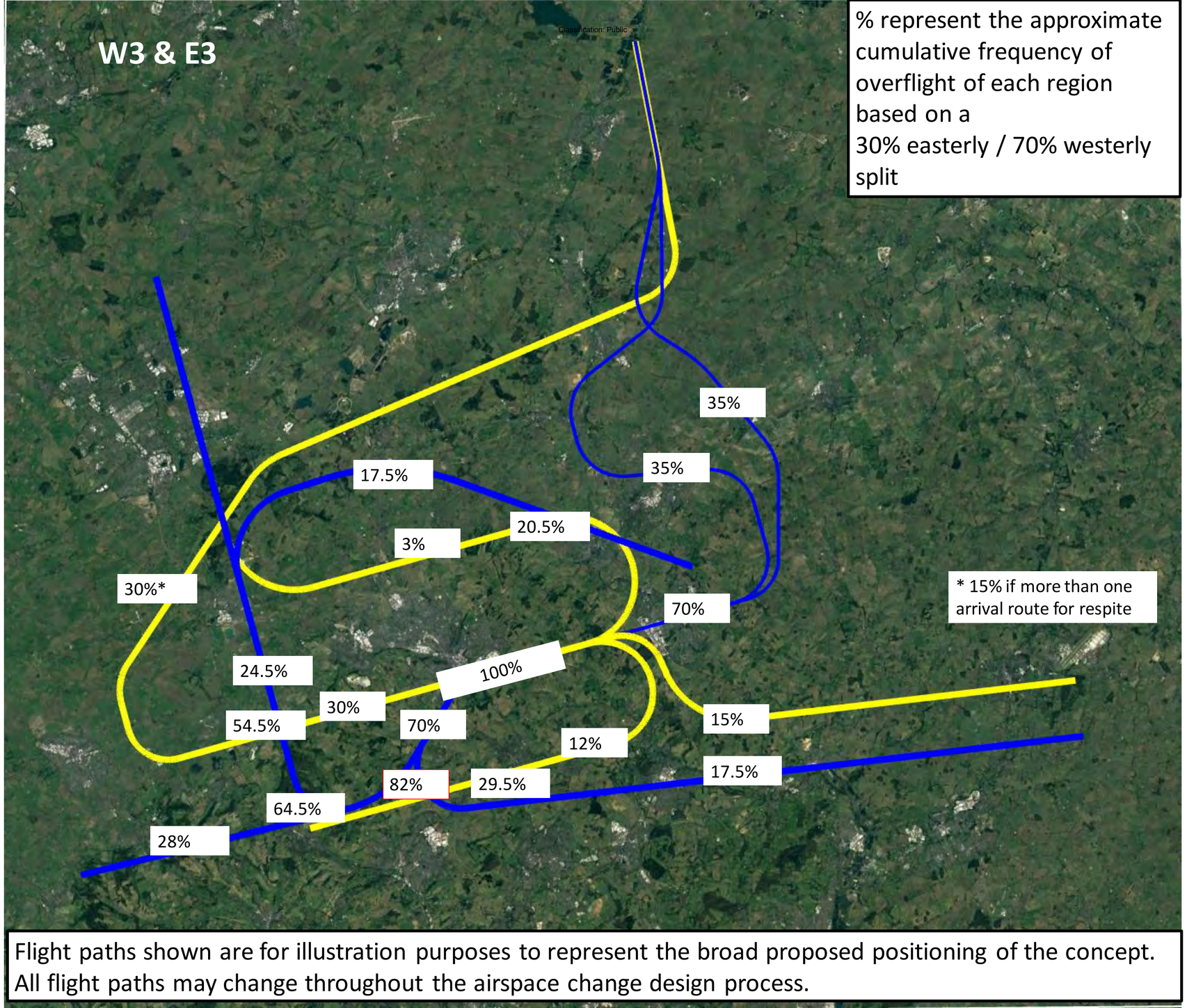
W3 & E3



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W3 & E4

% represent the approximate cumulative frequency of overflight of each region based on a
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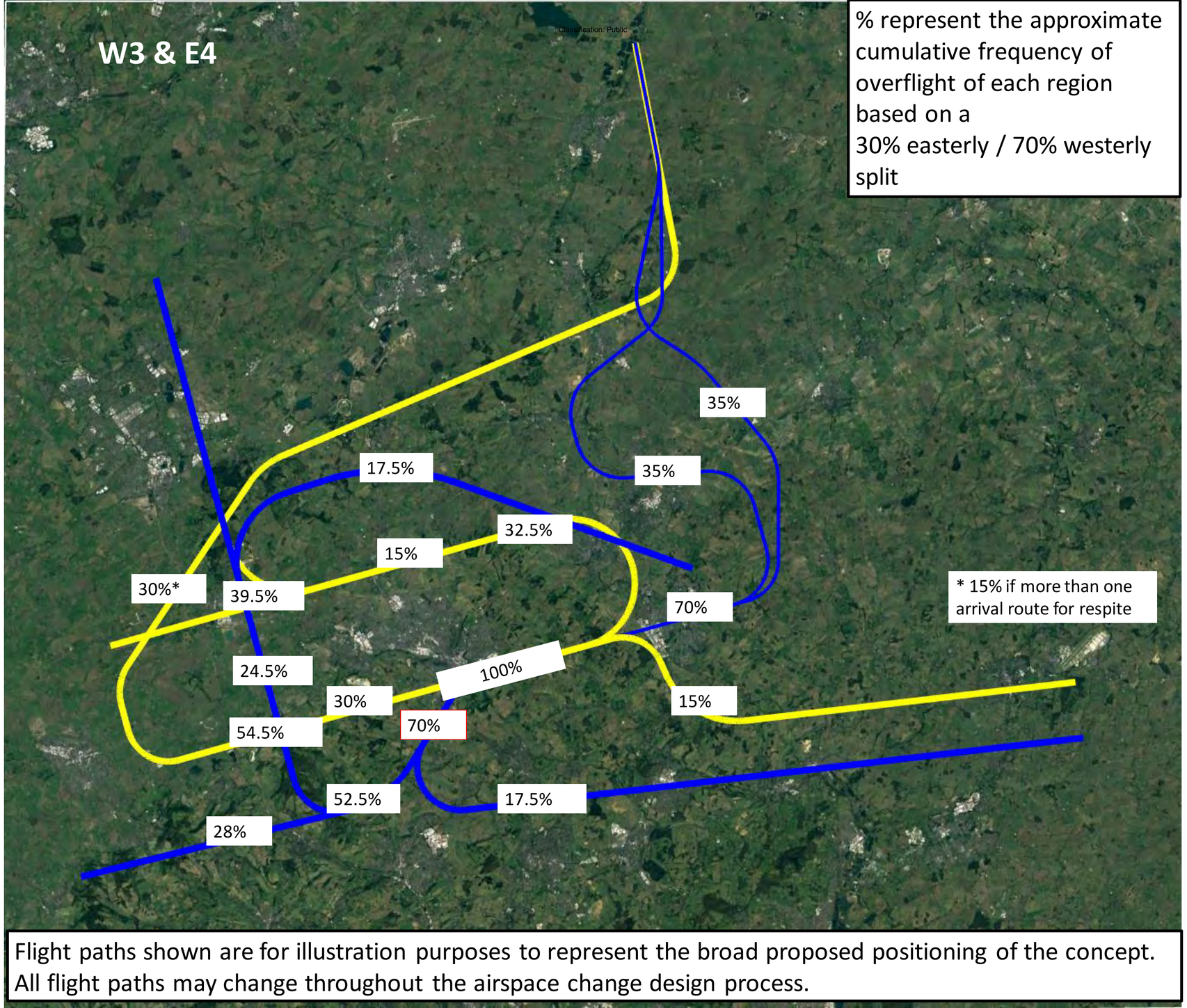

* 15% if more than one arrival route for respite

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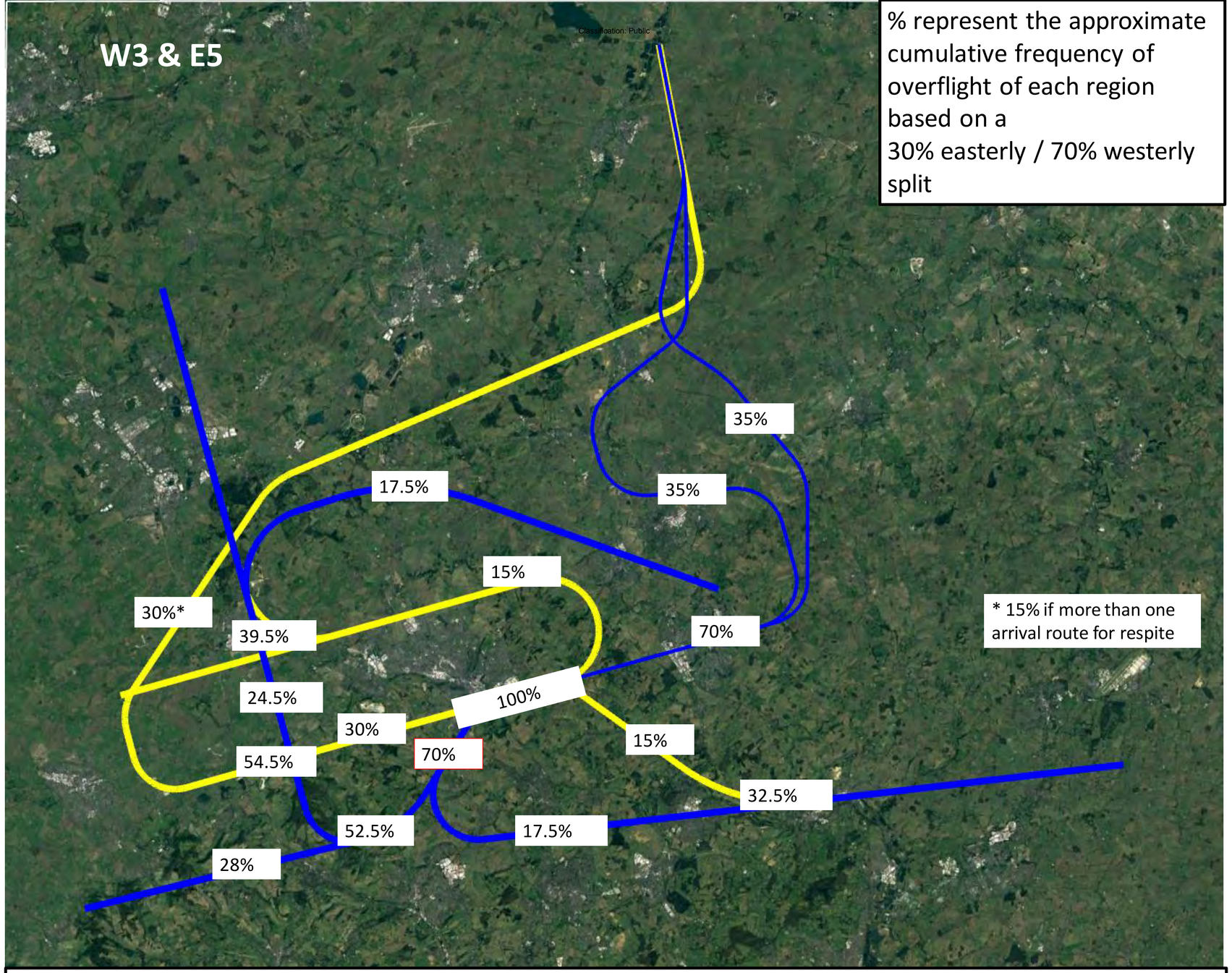
W3 & E5



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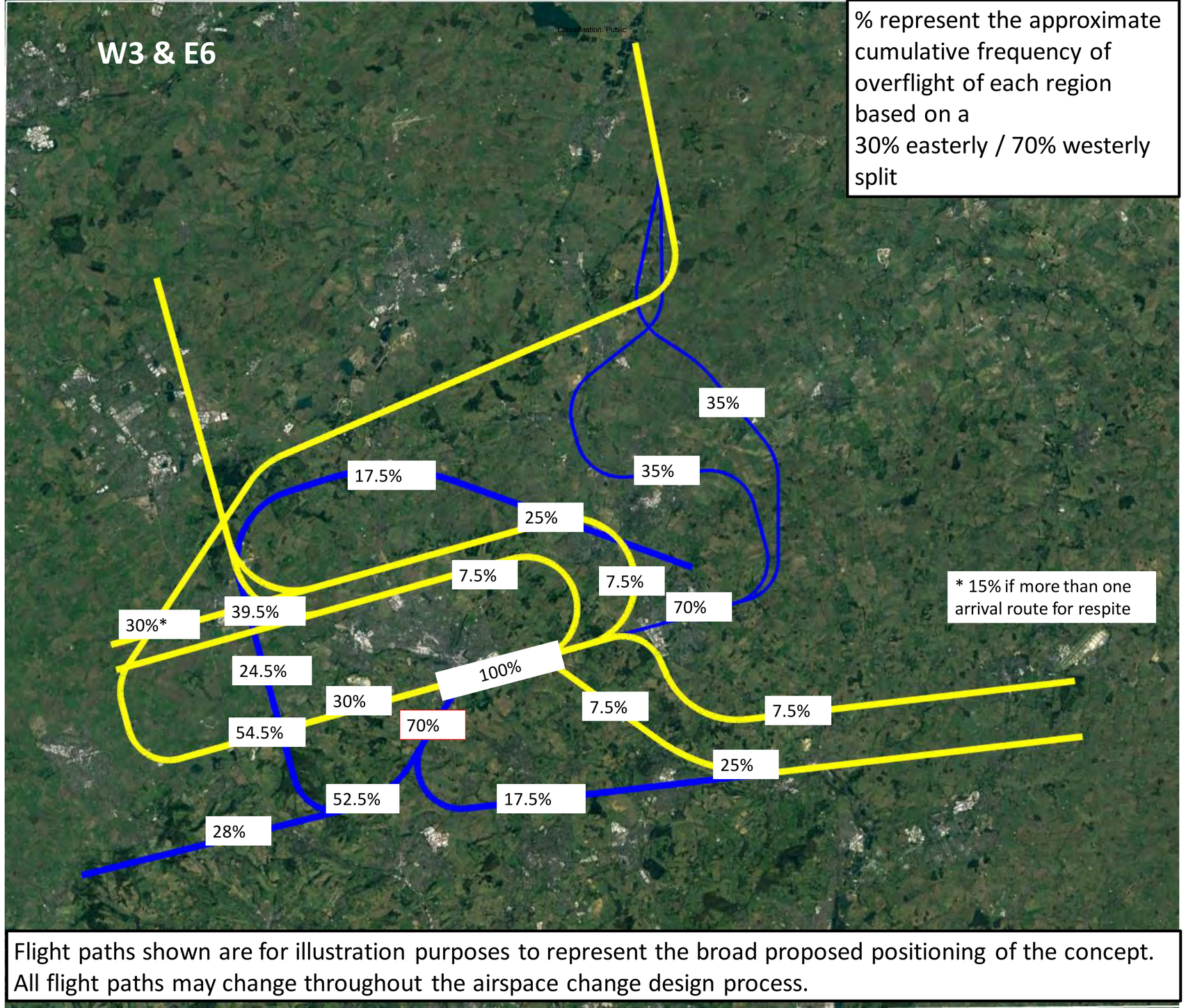
W3 & E6



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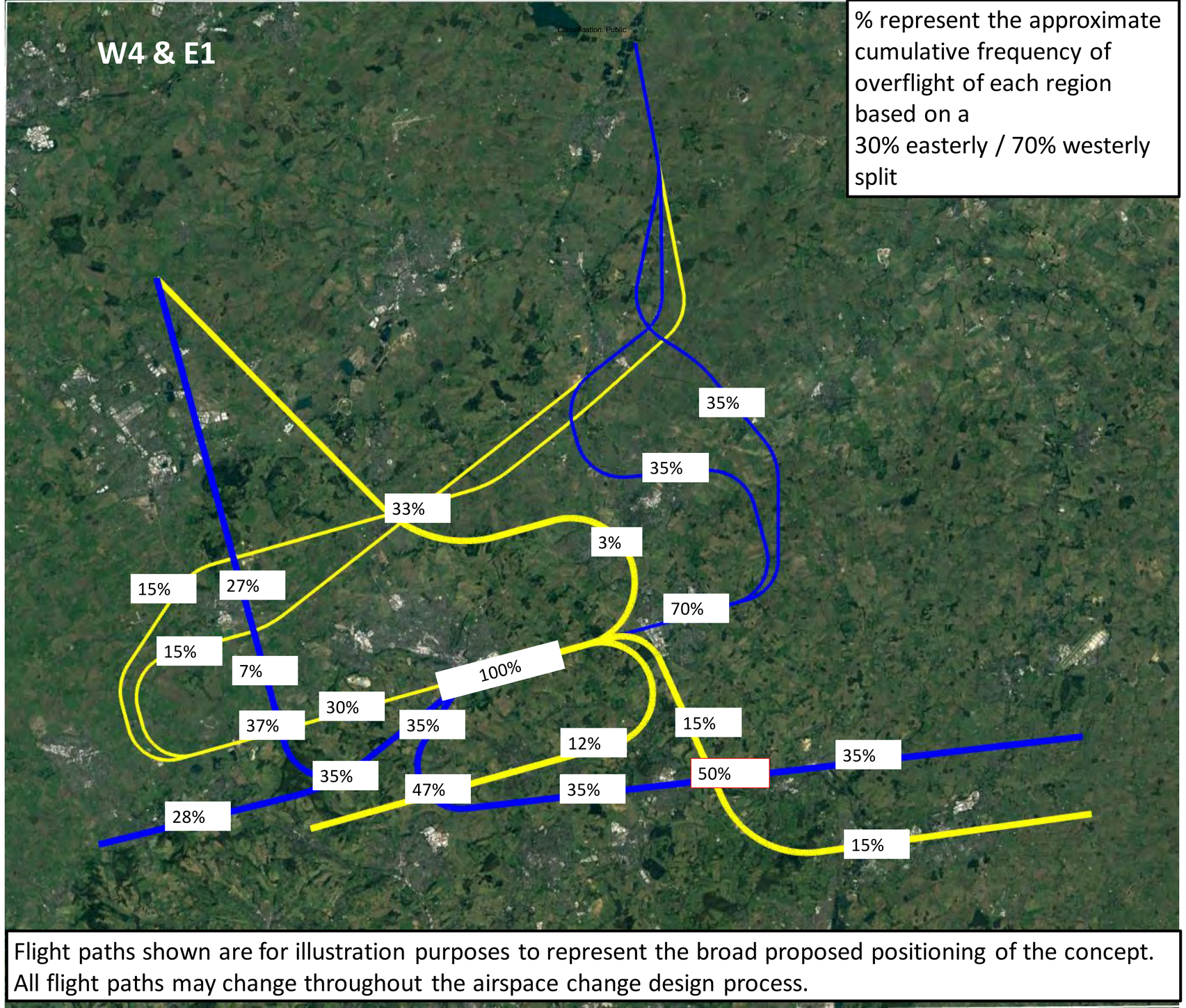
W4 & E1



% represent the approximate cumulative frequency of overflight of each region based on a
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W4 & E2

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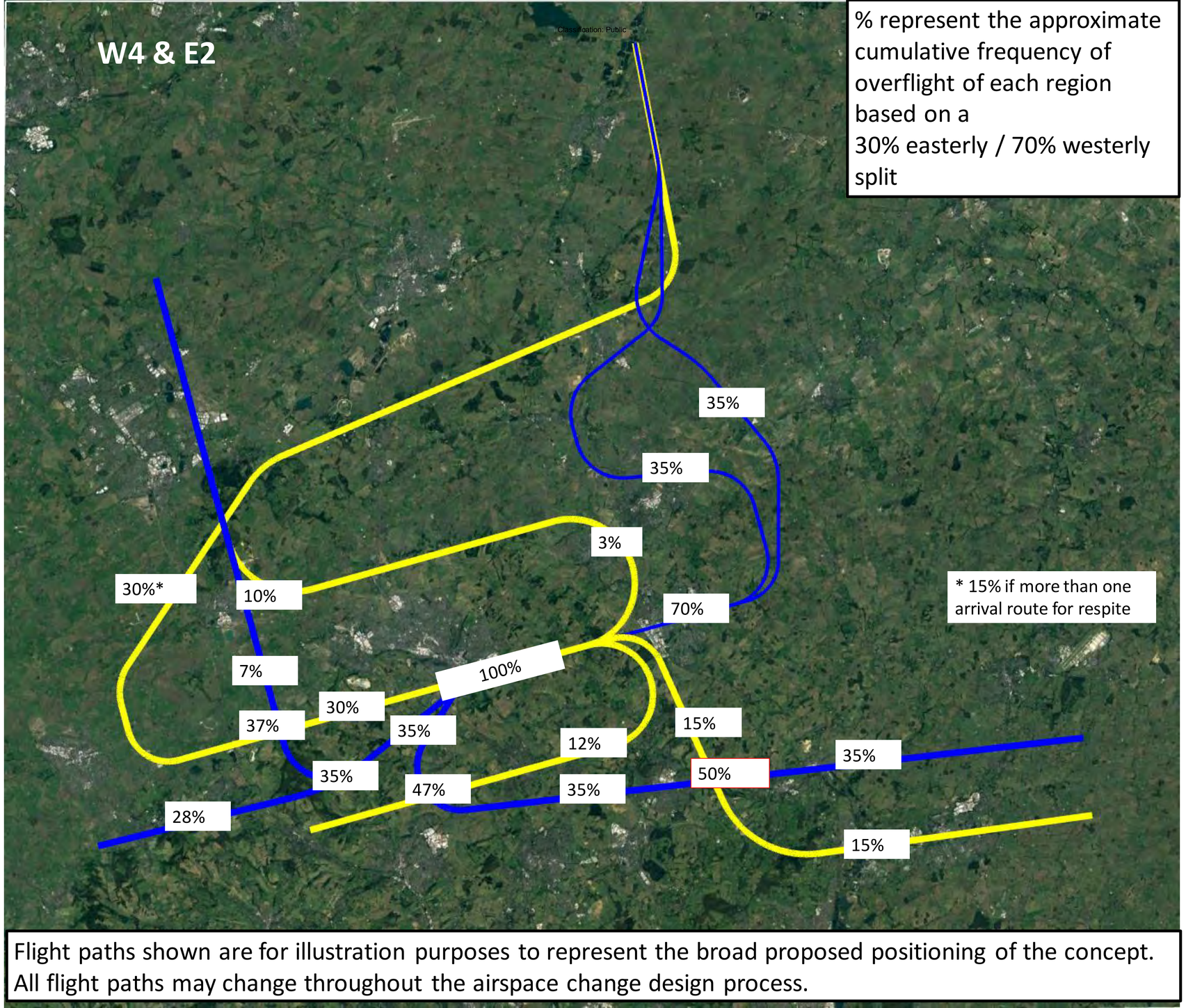

* 15% if more than one arrival route for respite

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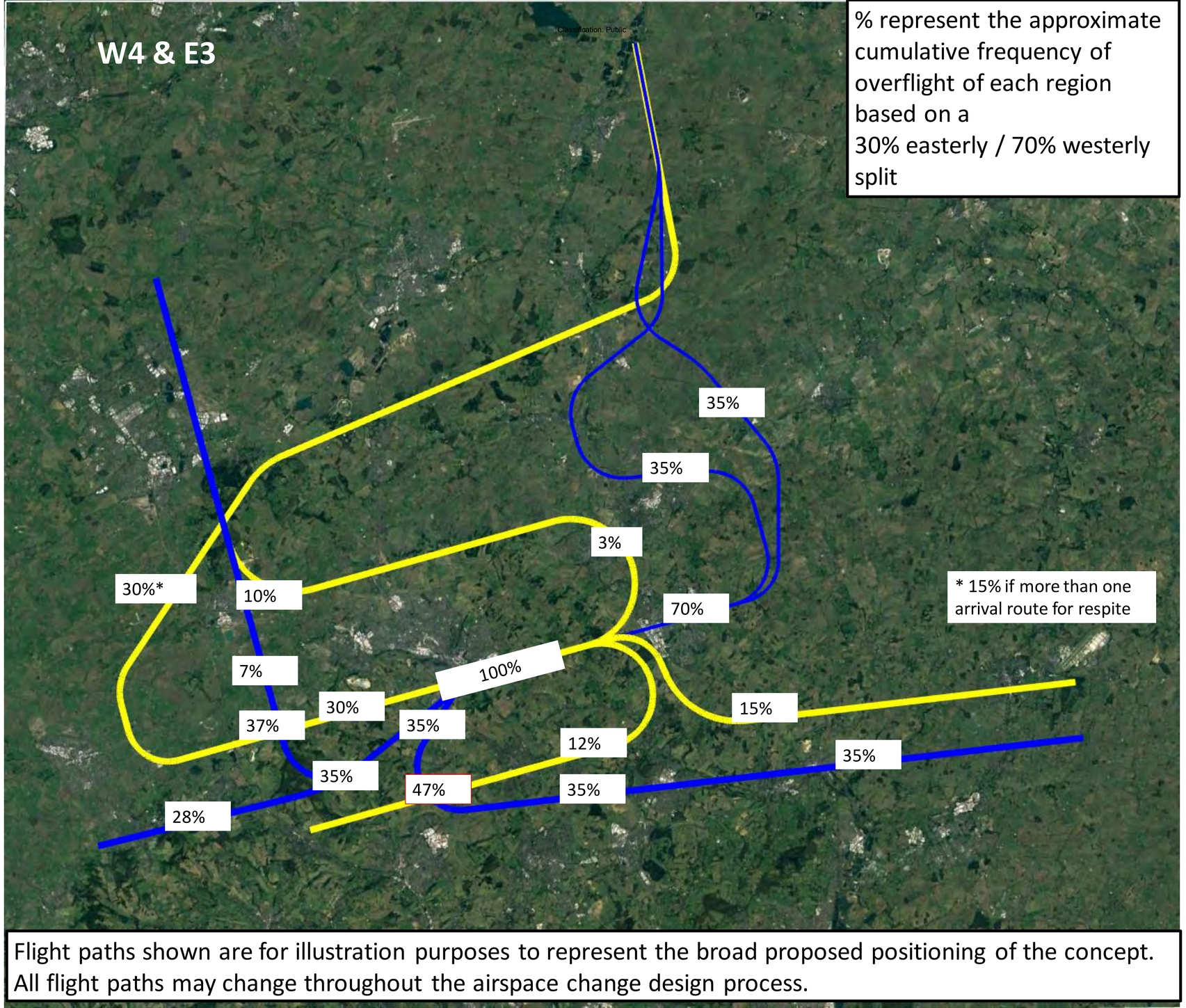
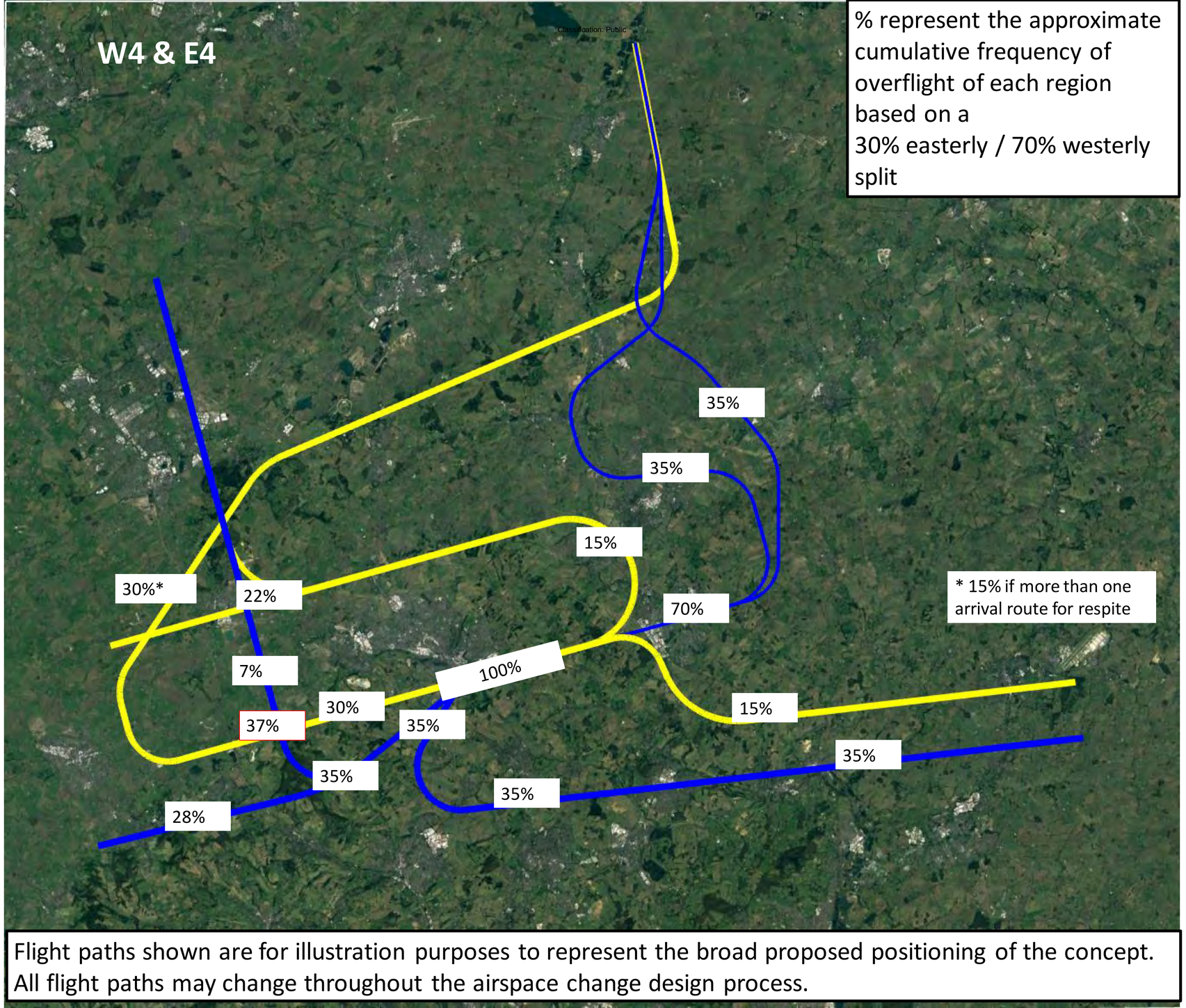
W4 & E3

% represent the approximate cumulative frequency of overflight of each region based on a
30% easterly / 70% westerly split



Flight paths shown are for illustration purposes to represent the broad proposed positioning of the concept. All flight paths may change throughout the airspace change design process.

W4 & E4



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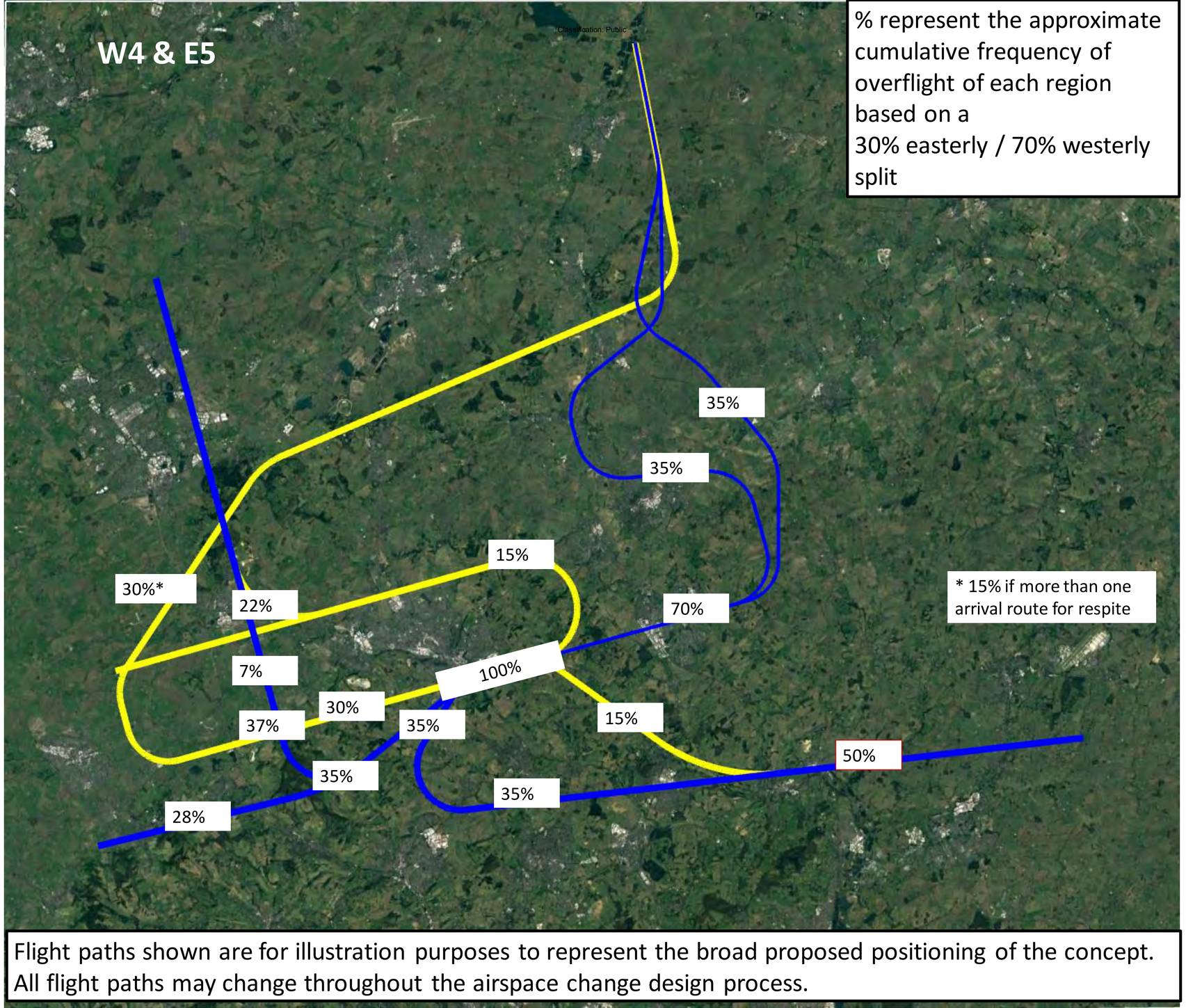
W4 & E5



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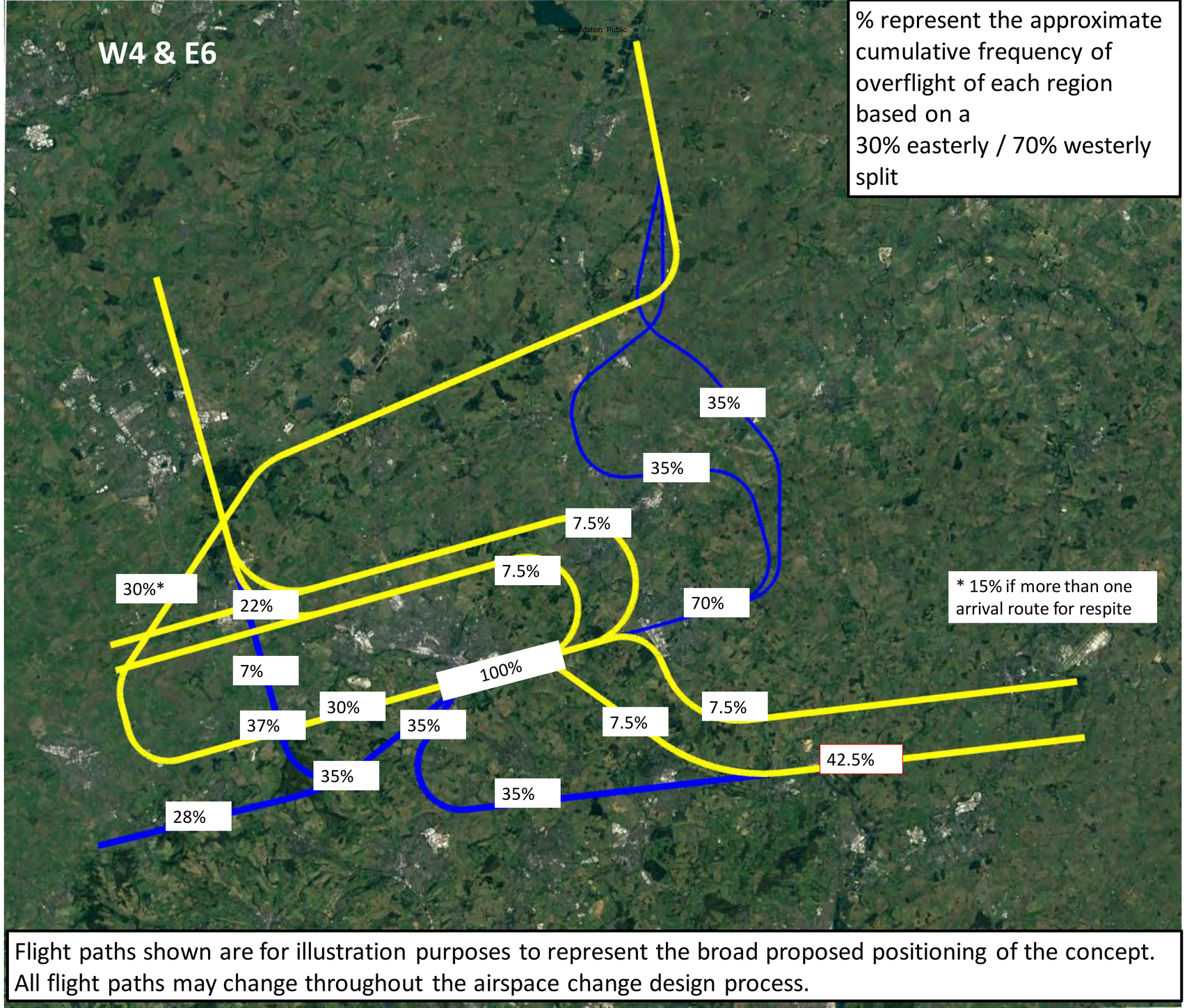
W4 & E6



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W5 & E1

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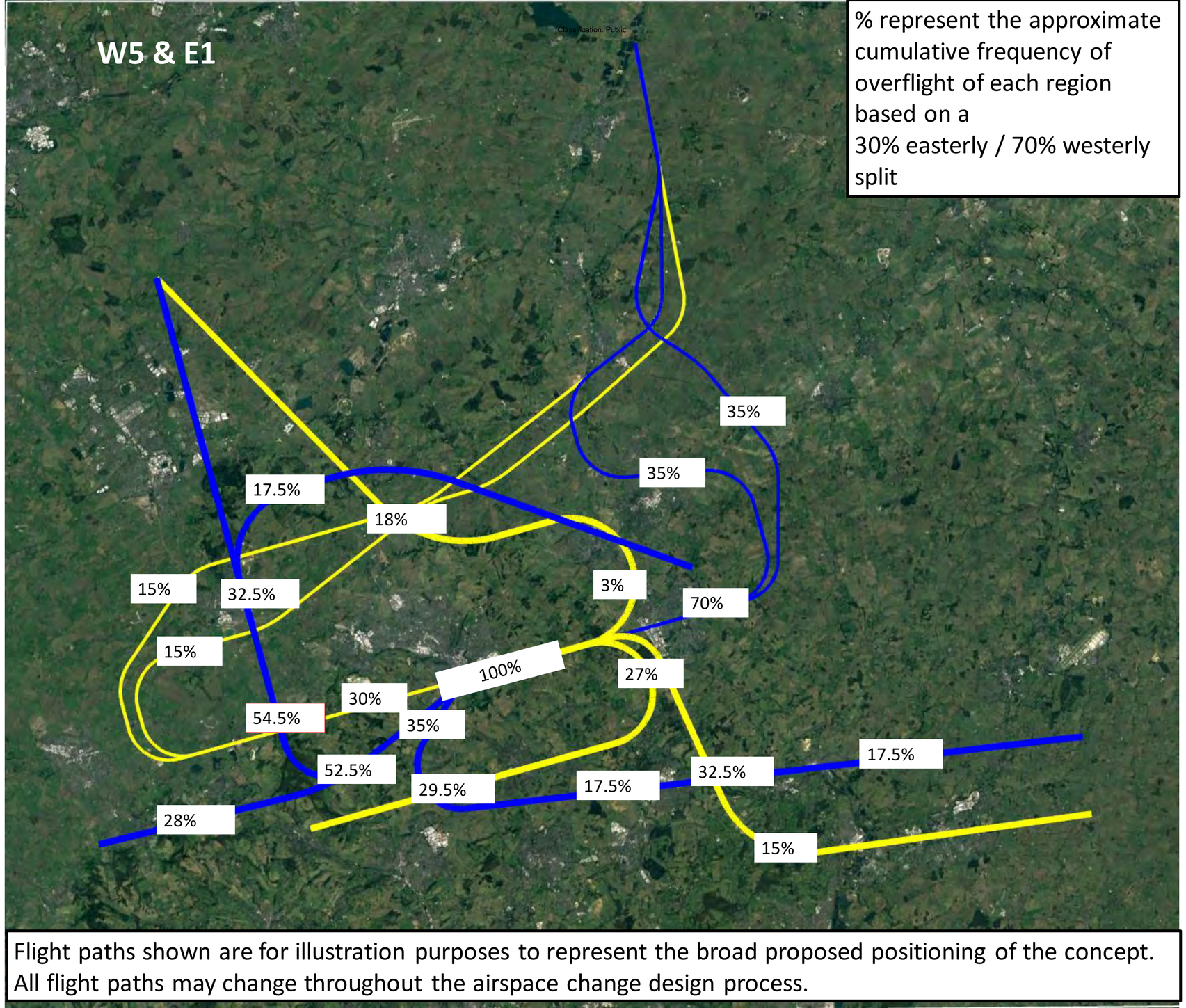

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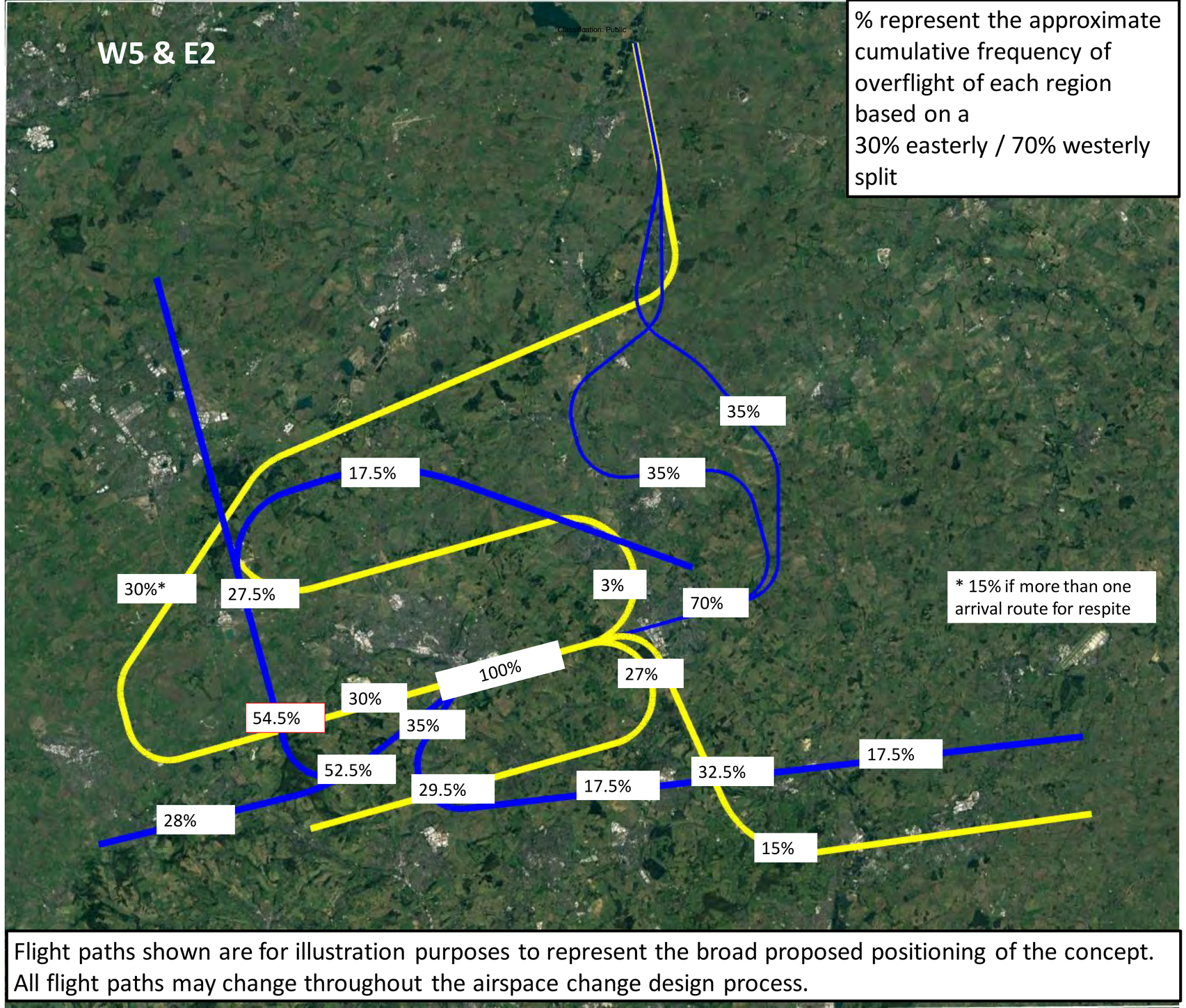
W5 & E2



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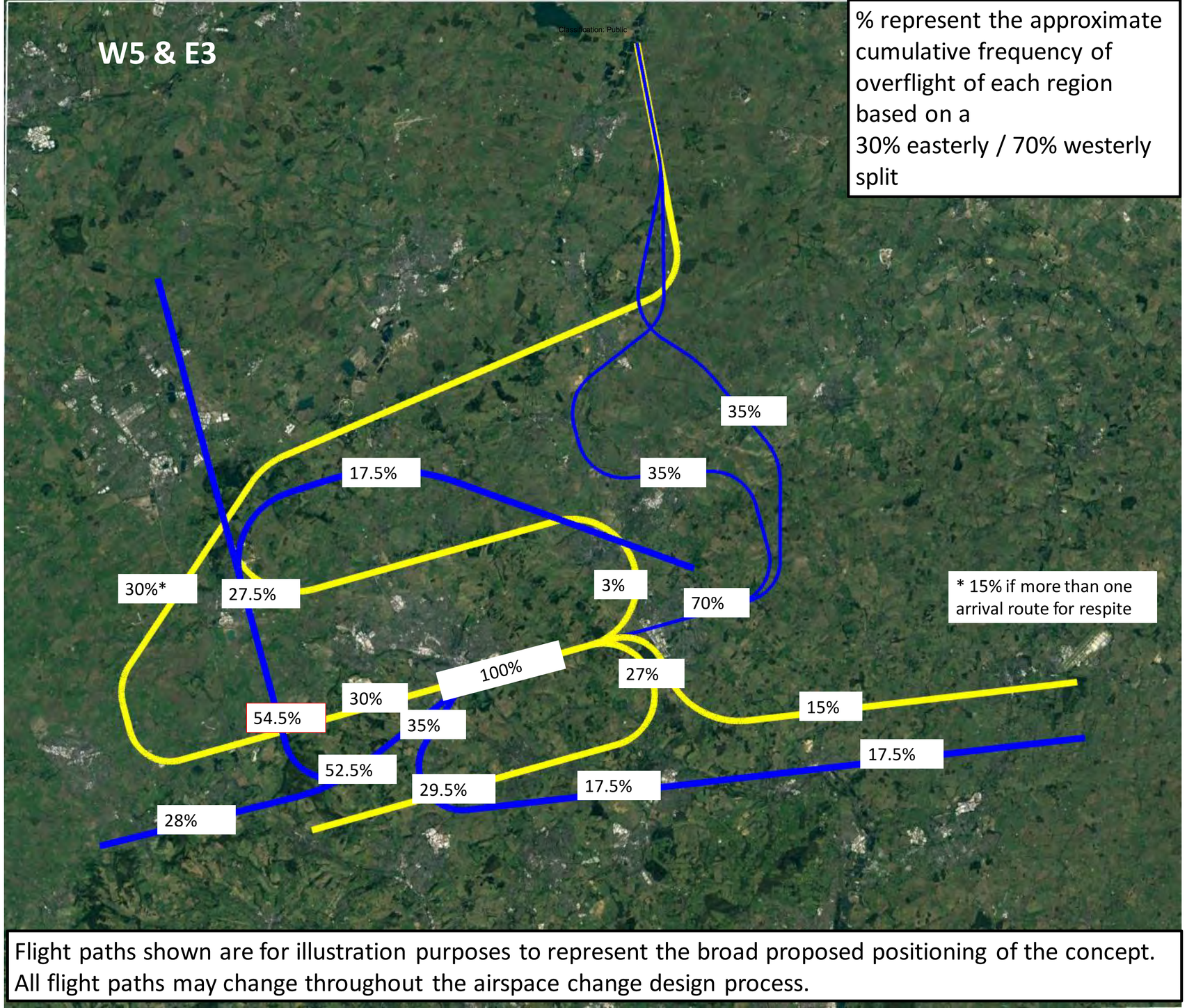
W5 & E3



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W5 & E4

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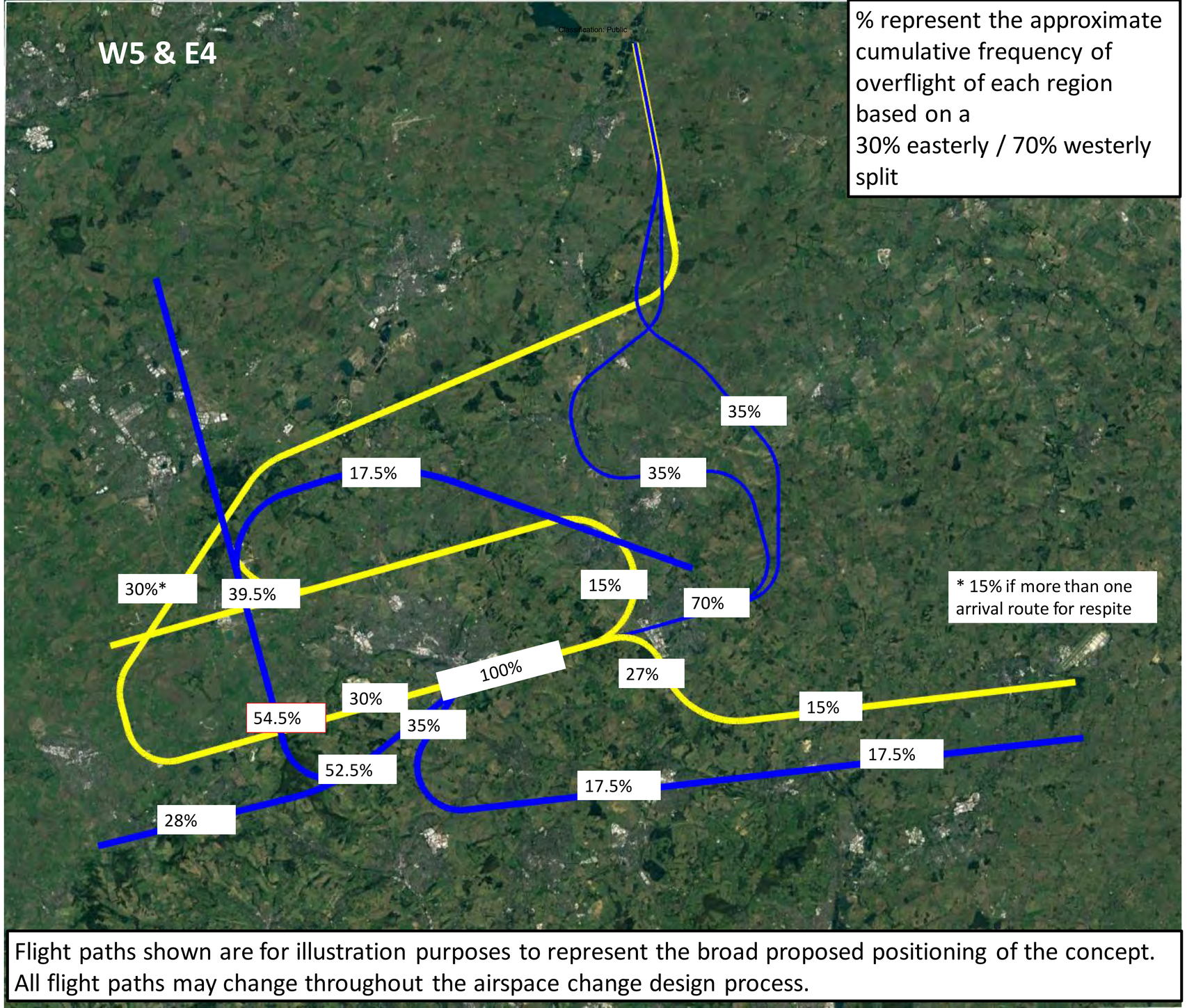

* 15% if more than one arrival route for respite

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W5 & E5

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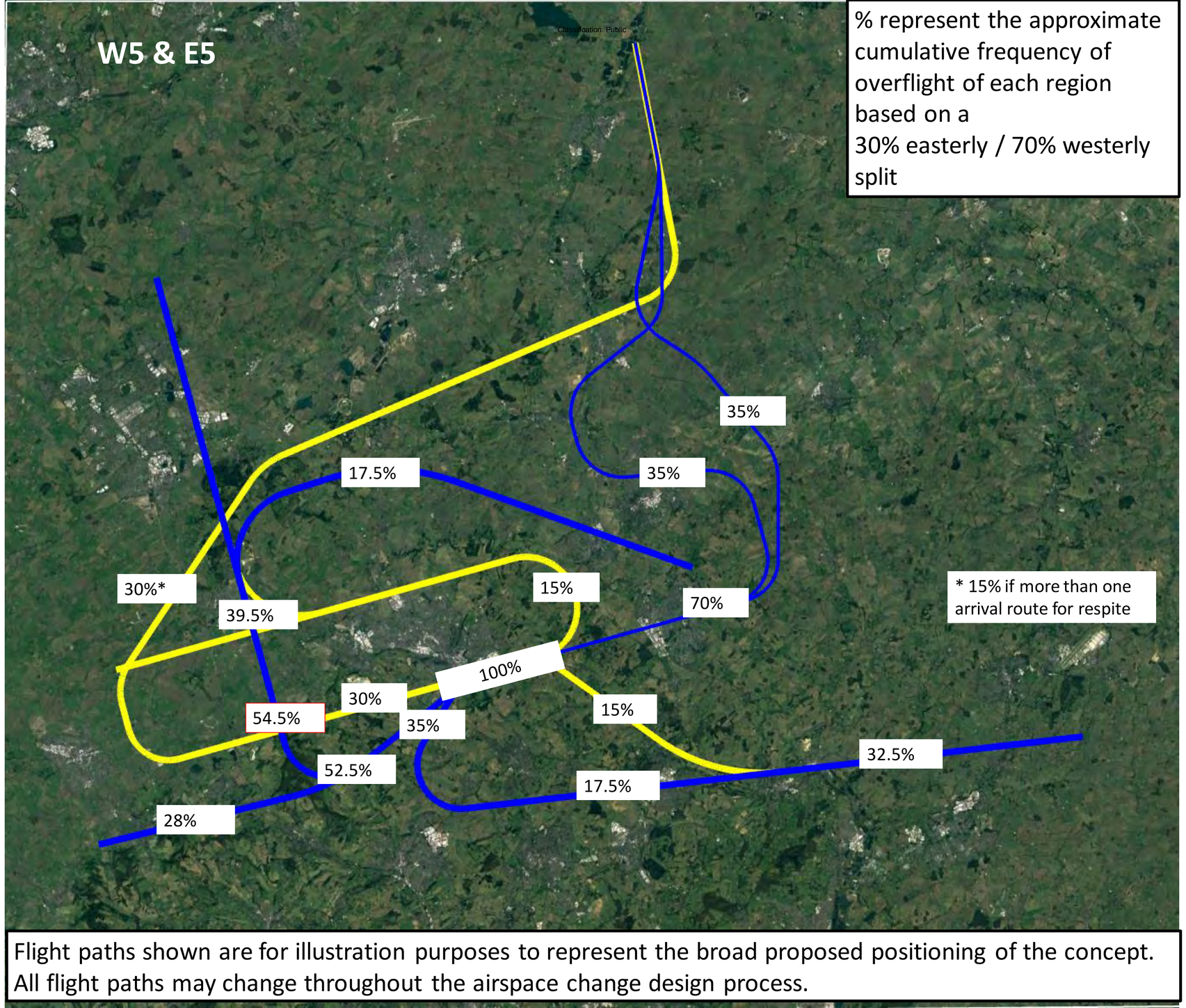

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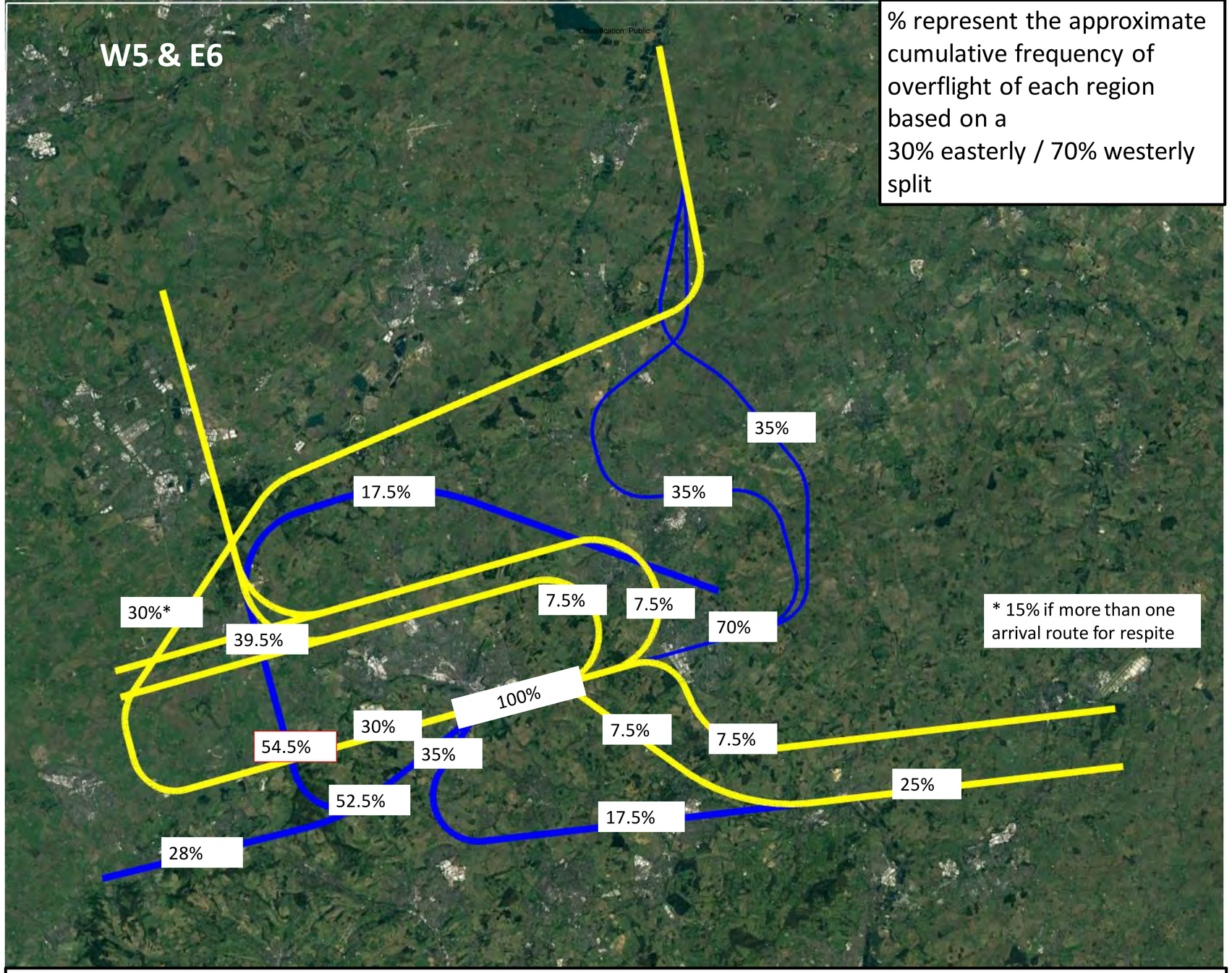
W5 & E6



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W6 & E1

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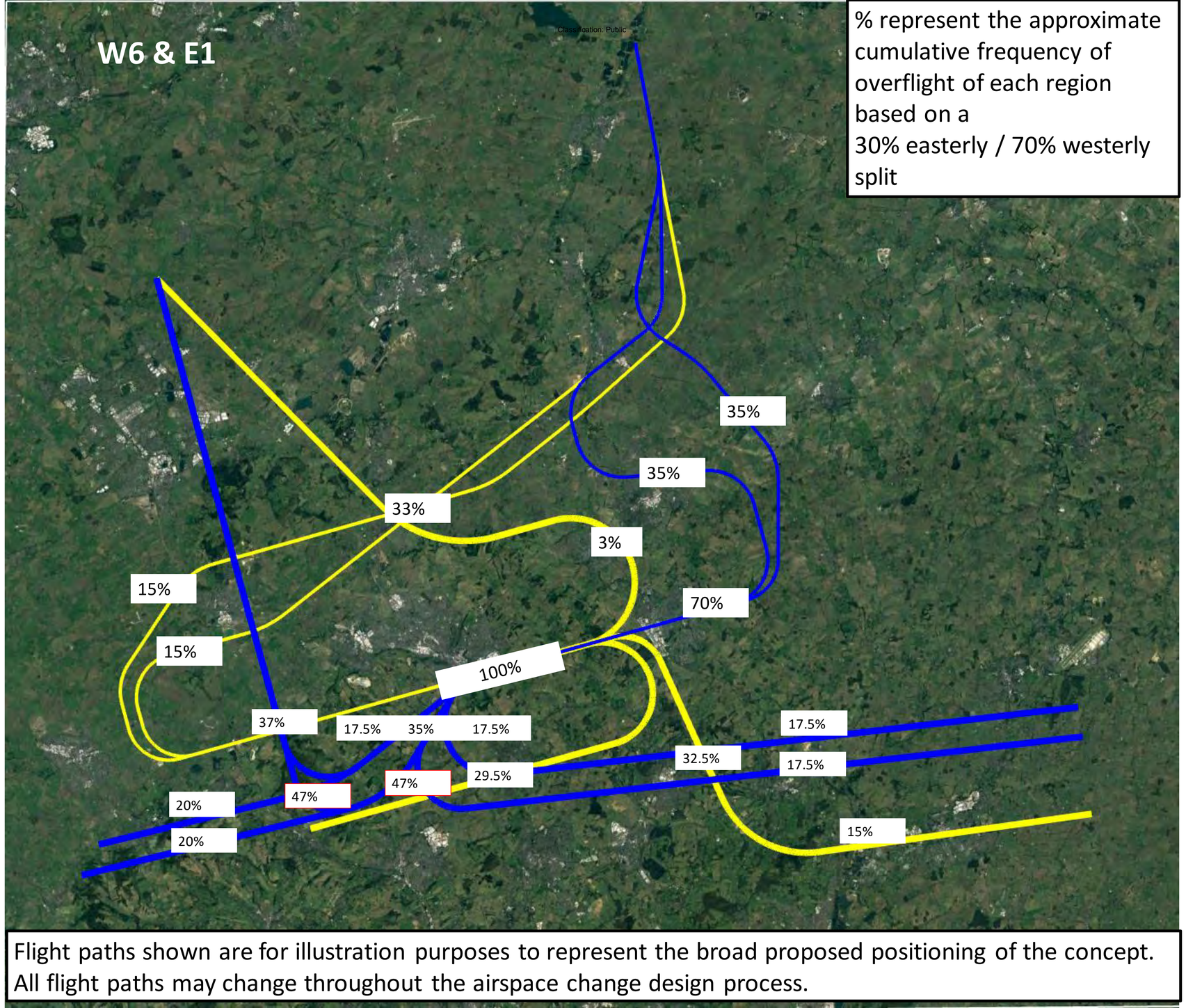

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W6 & E2

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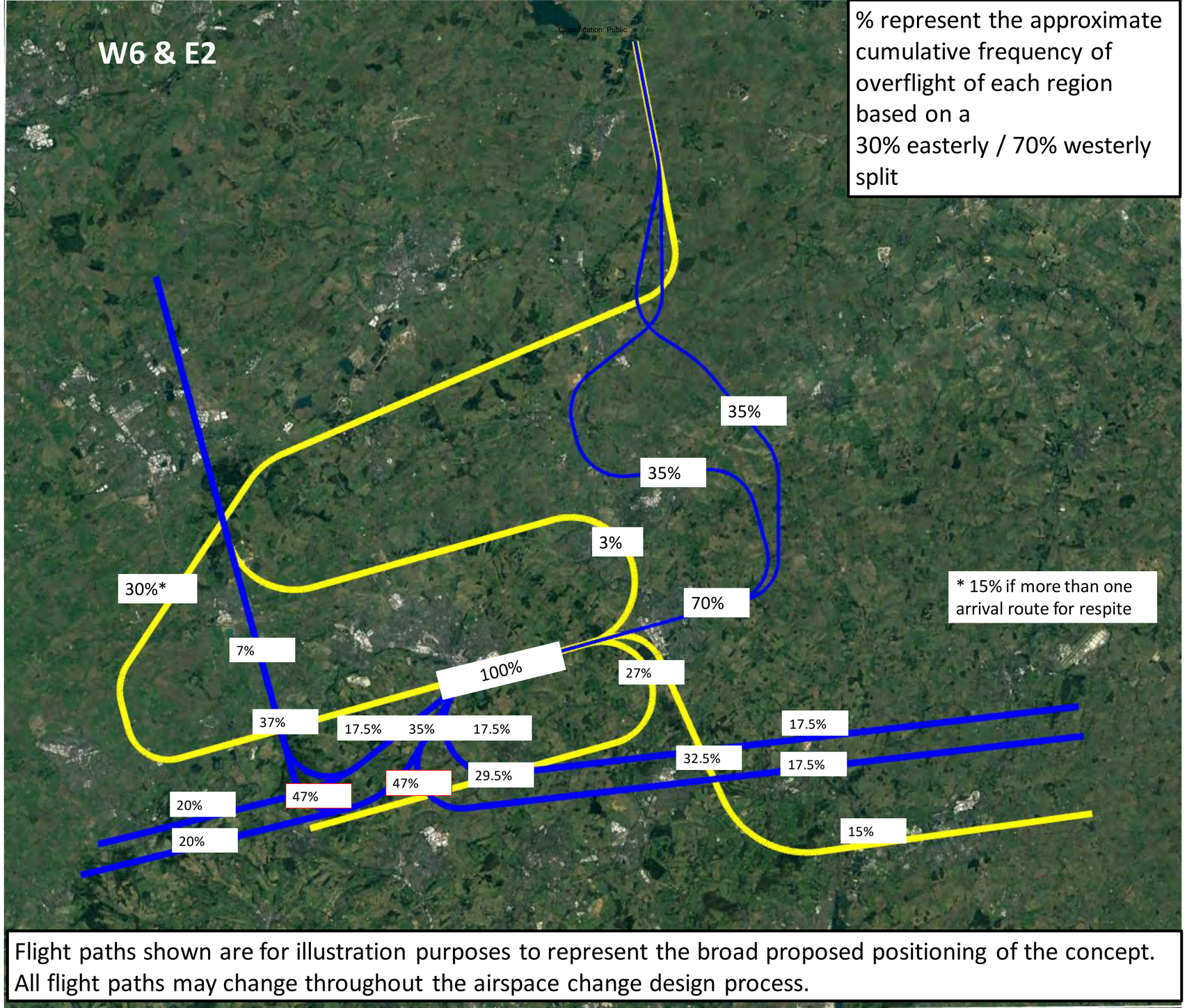

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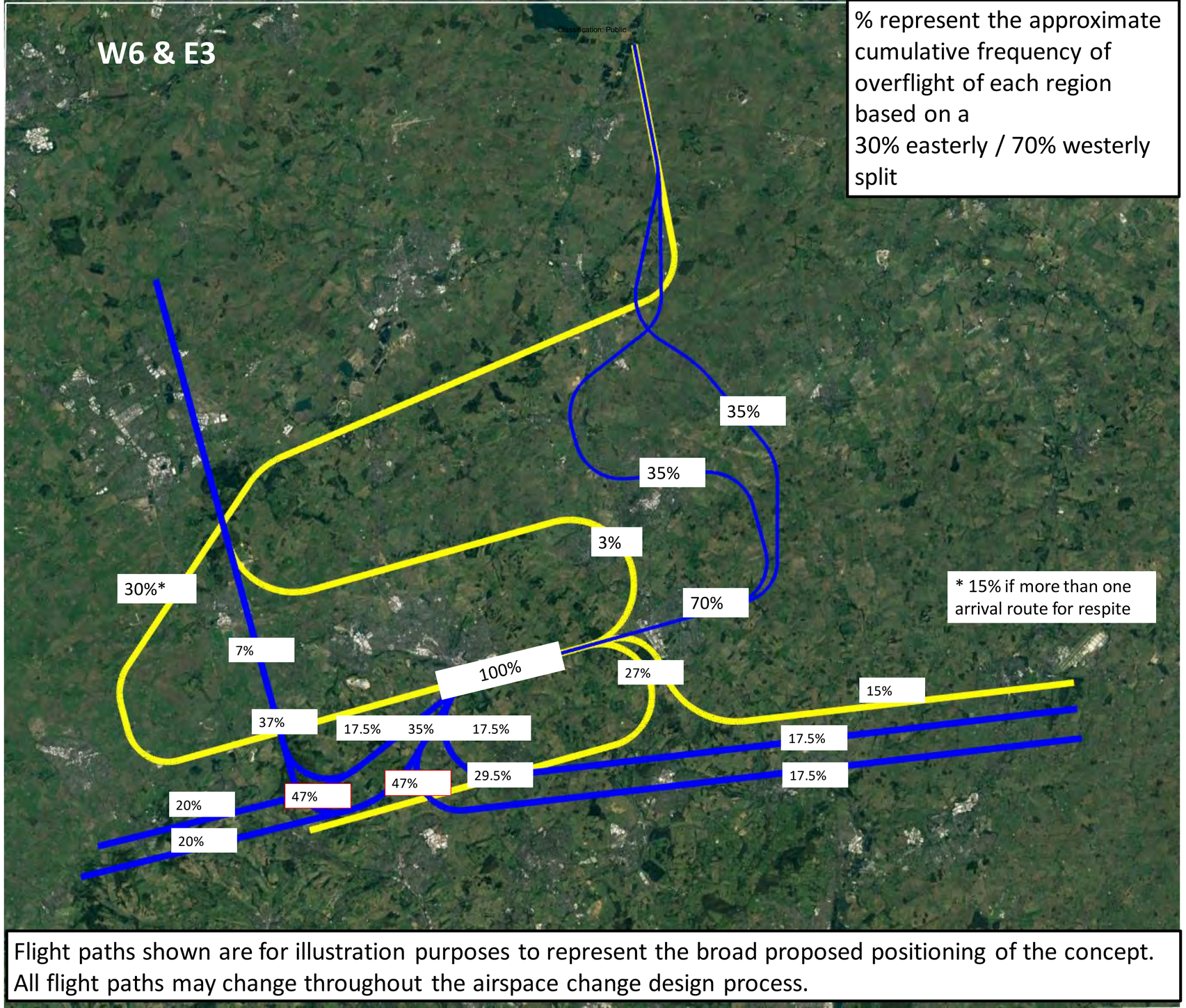
W6 & E3



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W6 & E4

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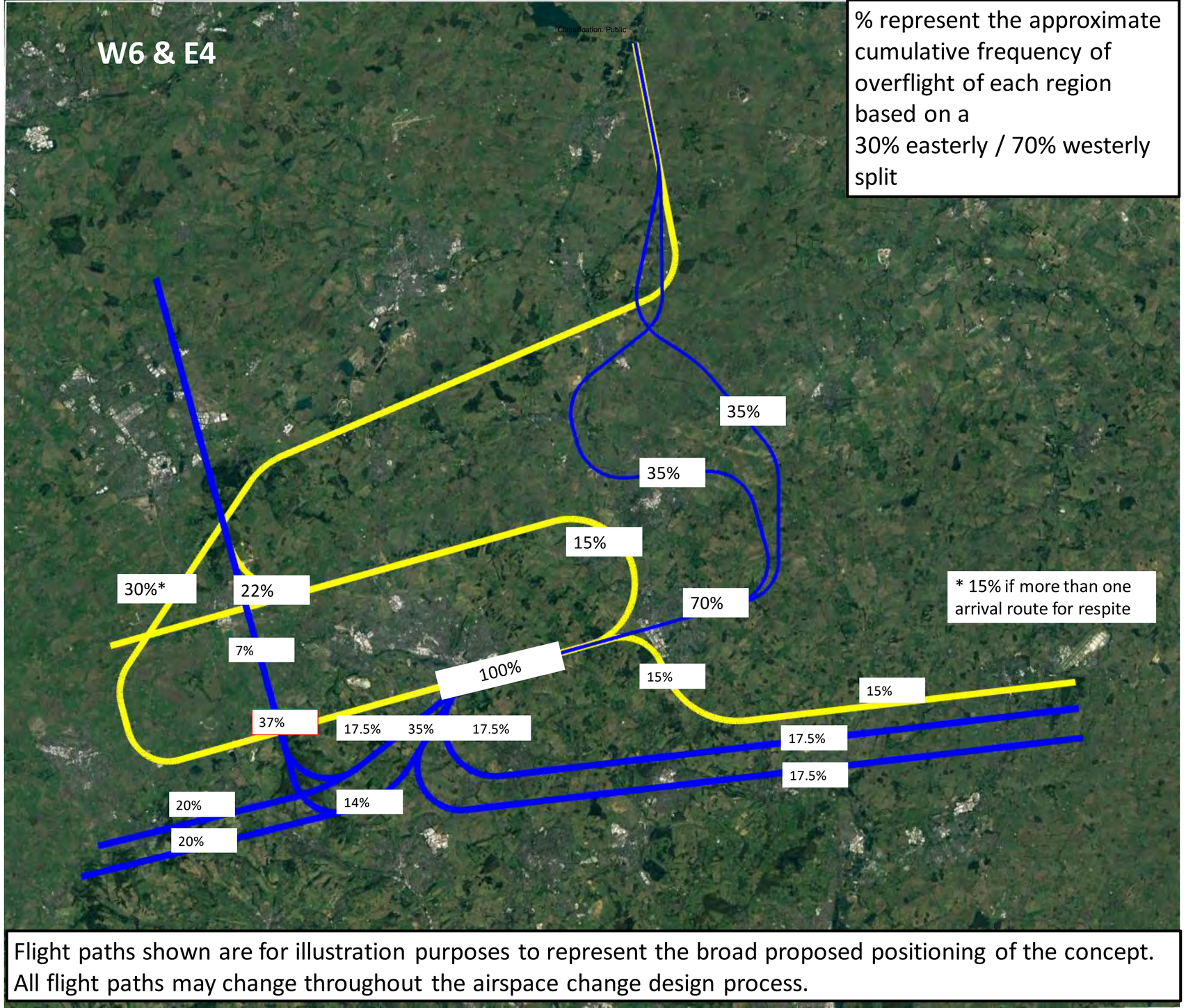

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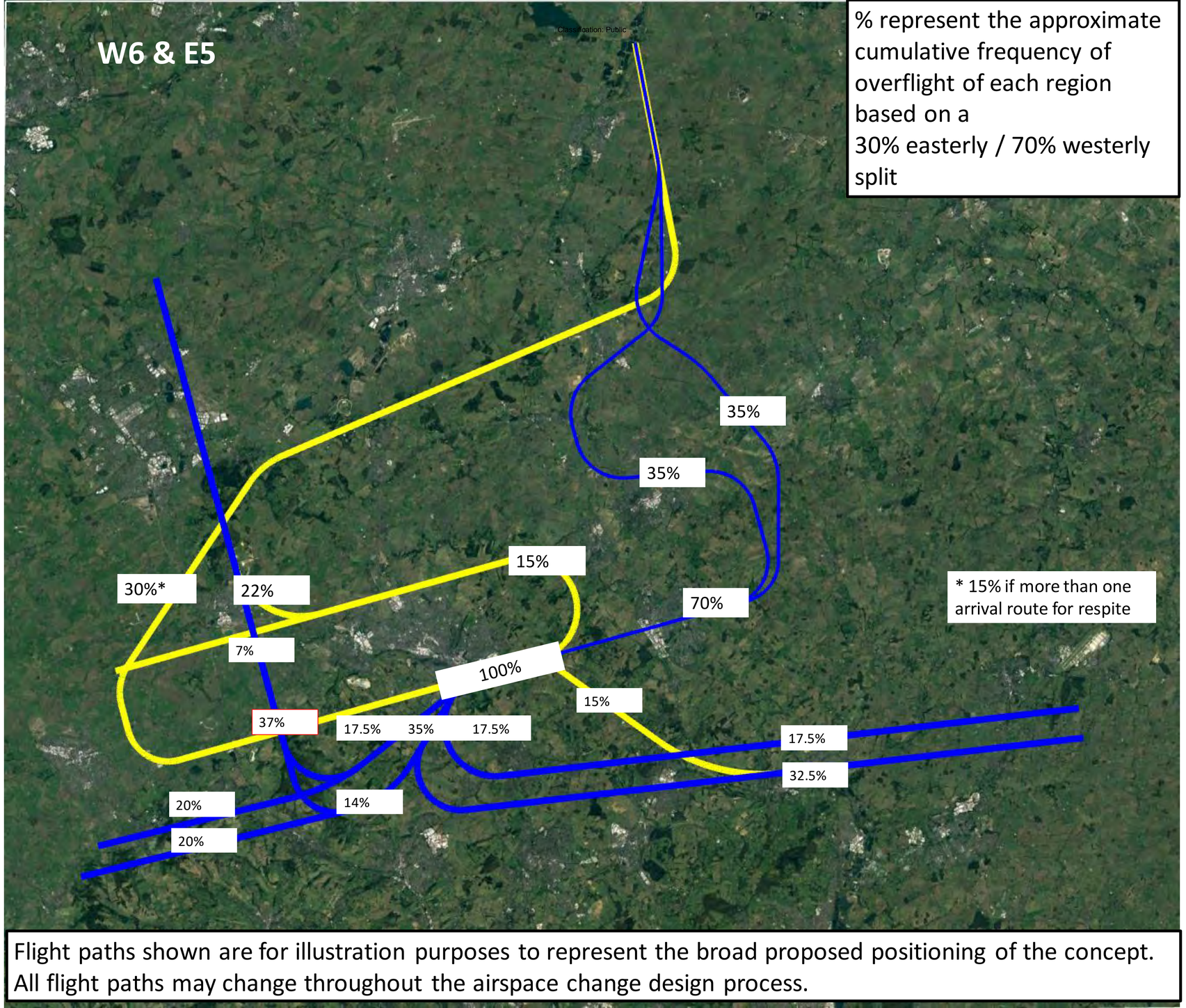
W6 & E5



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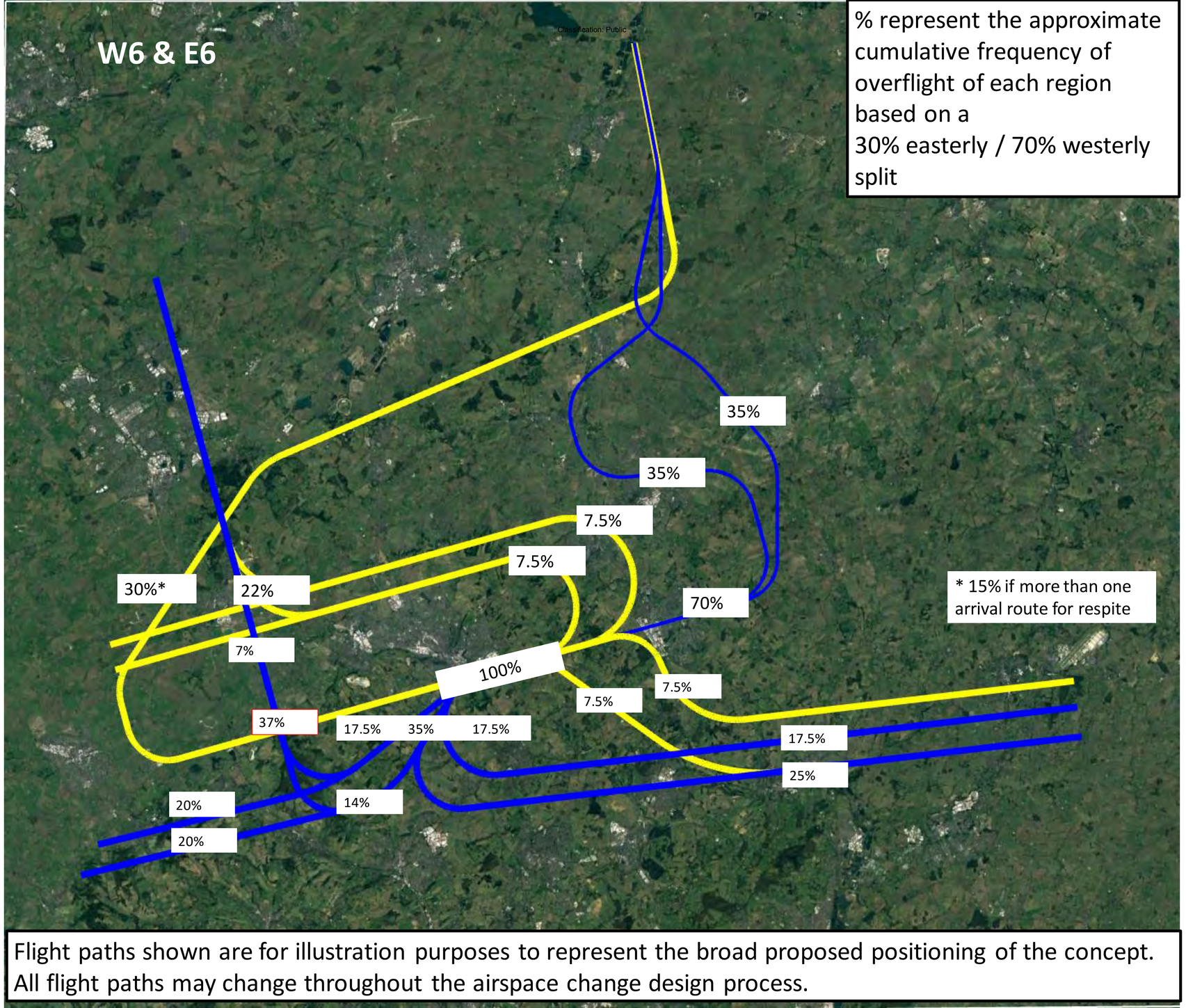
W6 & E6



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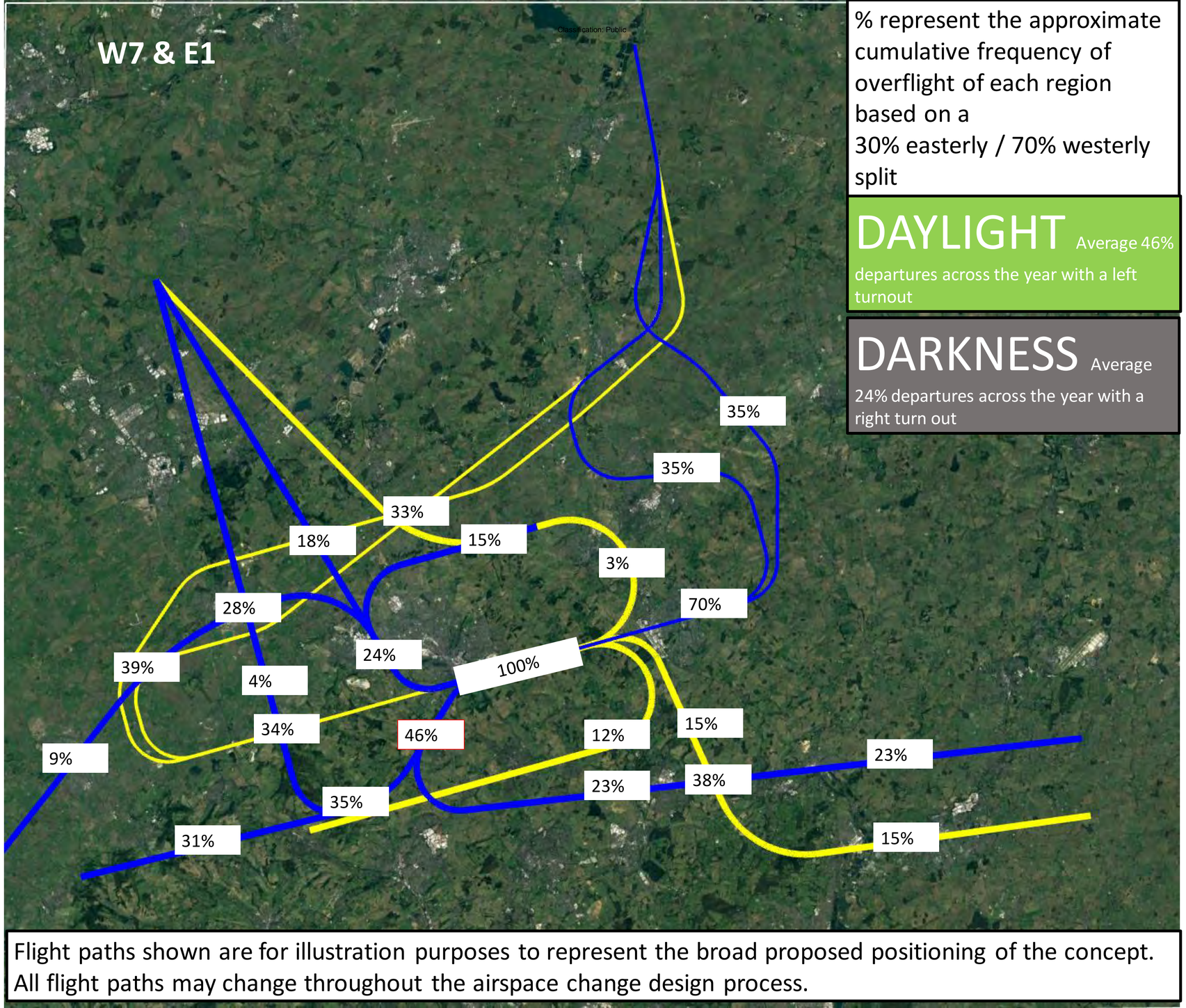
W7 & E1



% represent the approximate cumulative frequency of overflight of each region based on a
30% easterly / 70% westerly split

DAYLIGHT Average 46%

departures across the year with a left turnout

DARKNESS Average

24% departures across the year with a right turn out

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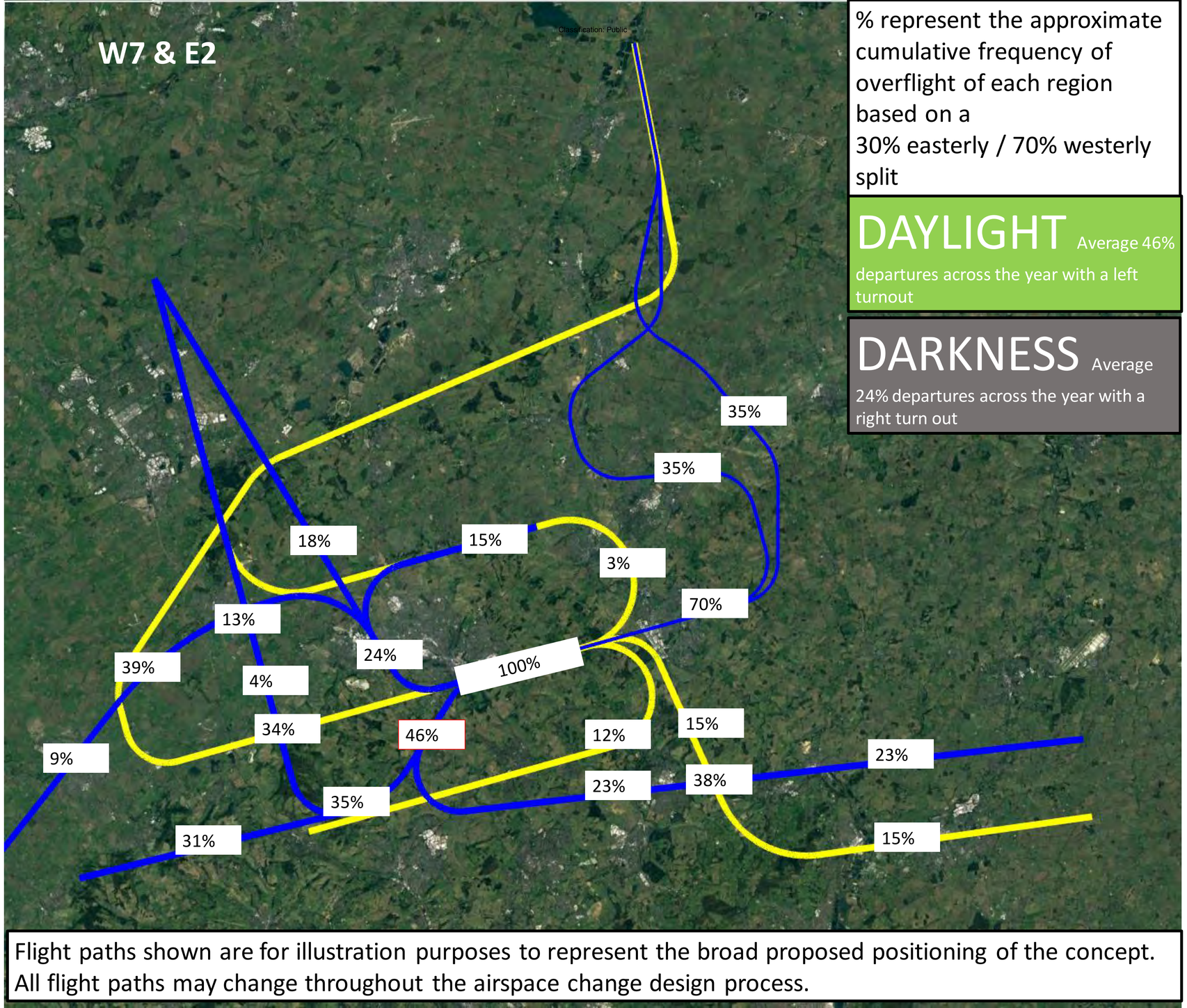
W7 & E2



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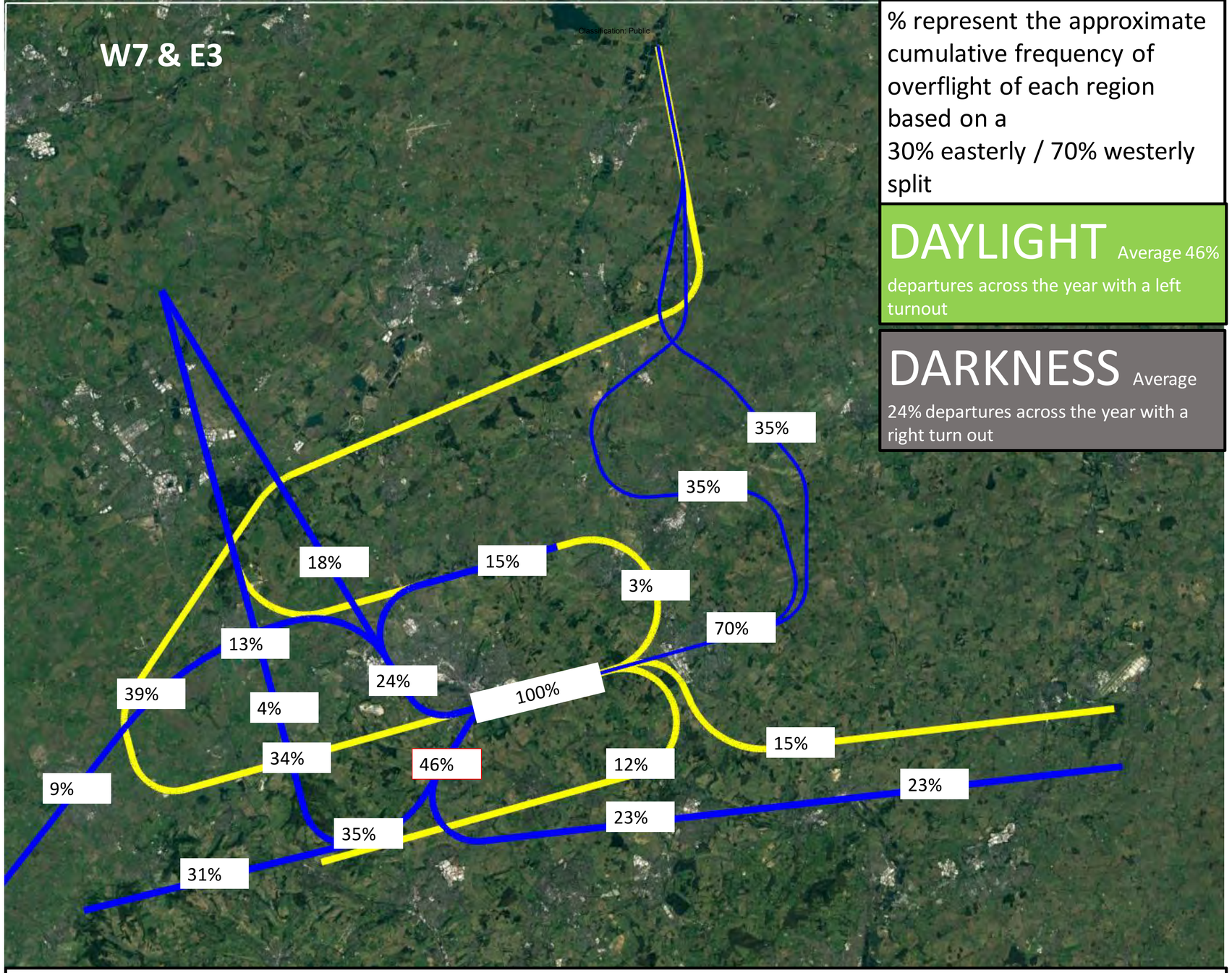
W7 & E3



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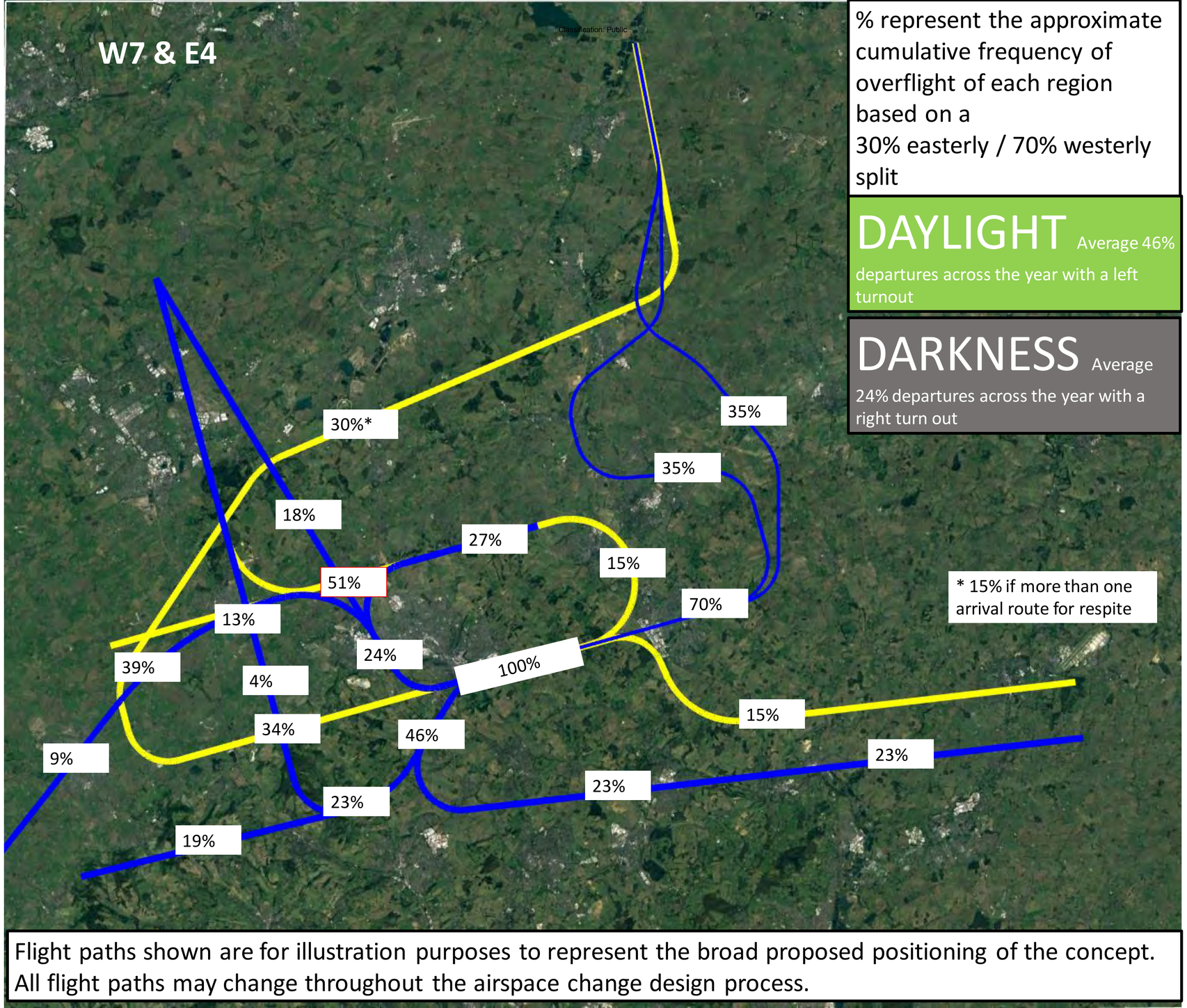
W7 & E4



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* 15% if more than one arrival route for respite

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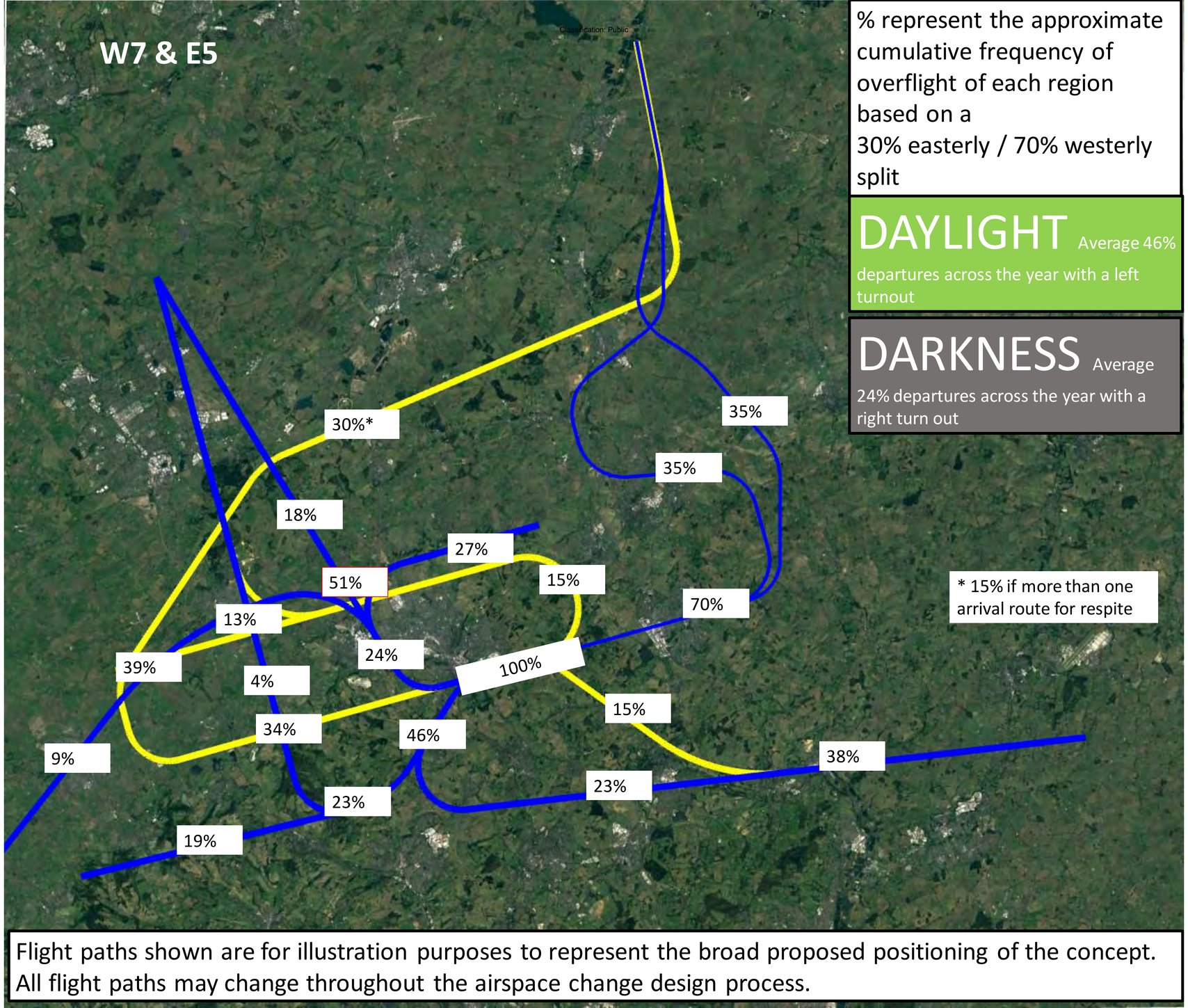
W7 & E5



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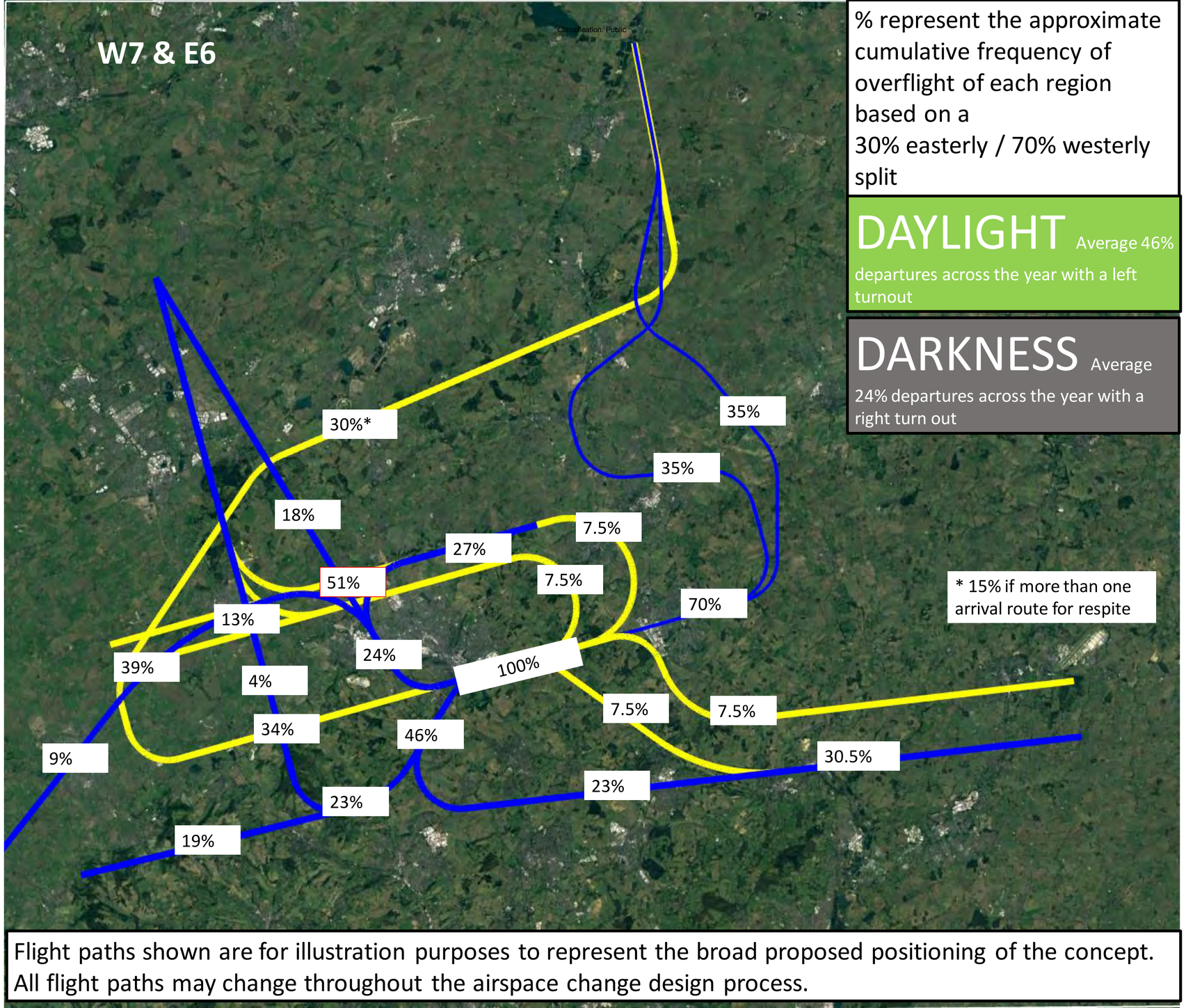
W7 & E6



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Flight paths shown are for illustration purposes to represent the broad proposed positioning of the concept. All flight paths may change throughout the airspace change design process.

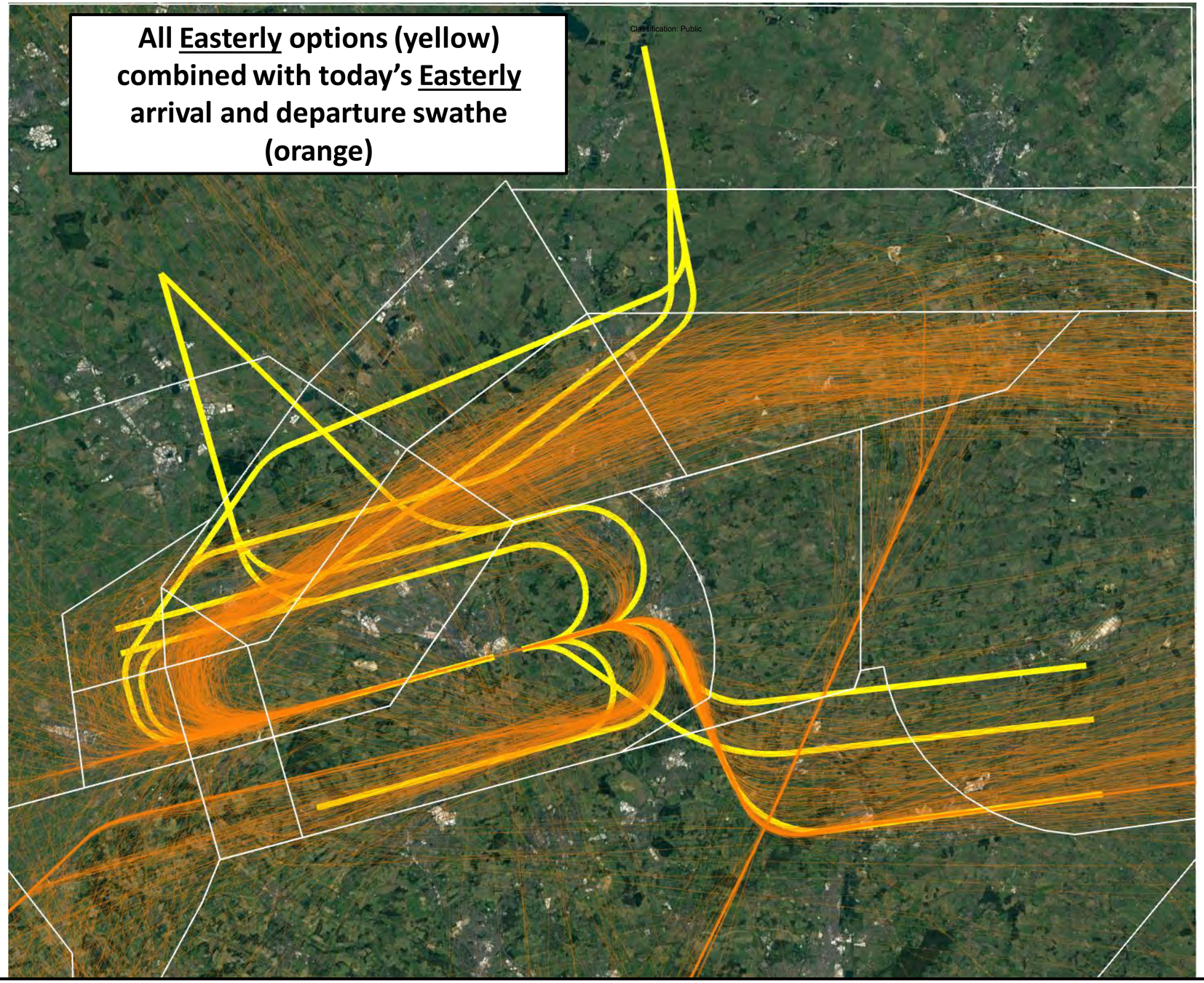
All options combined

ALL FLIGHT PATHS ILLUSTRATIVE ONLY

Altitude markers assume continuous climb to 7,000ft only at an 8% climb gradient and continuous descent from at least 7,000ft on a 3˚ (5.24%) descent gradient.

For departures, this assumes the aircraft starts climb from the very end of the runway. However, aircraft start climb approximately 2/3 down the runway so the altitudes shown here can be considered pessimistic.

All Easterly options (yellow) combined with today's Easterly arrival and departure swathe (orange)



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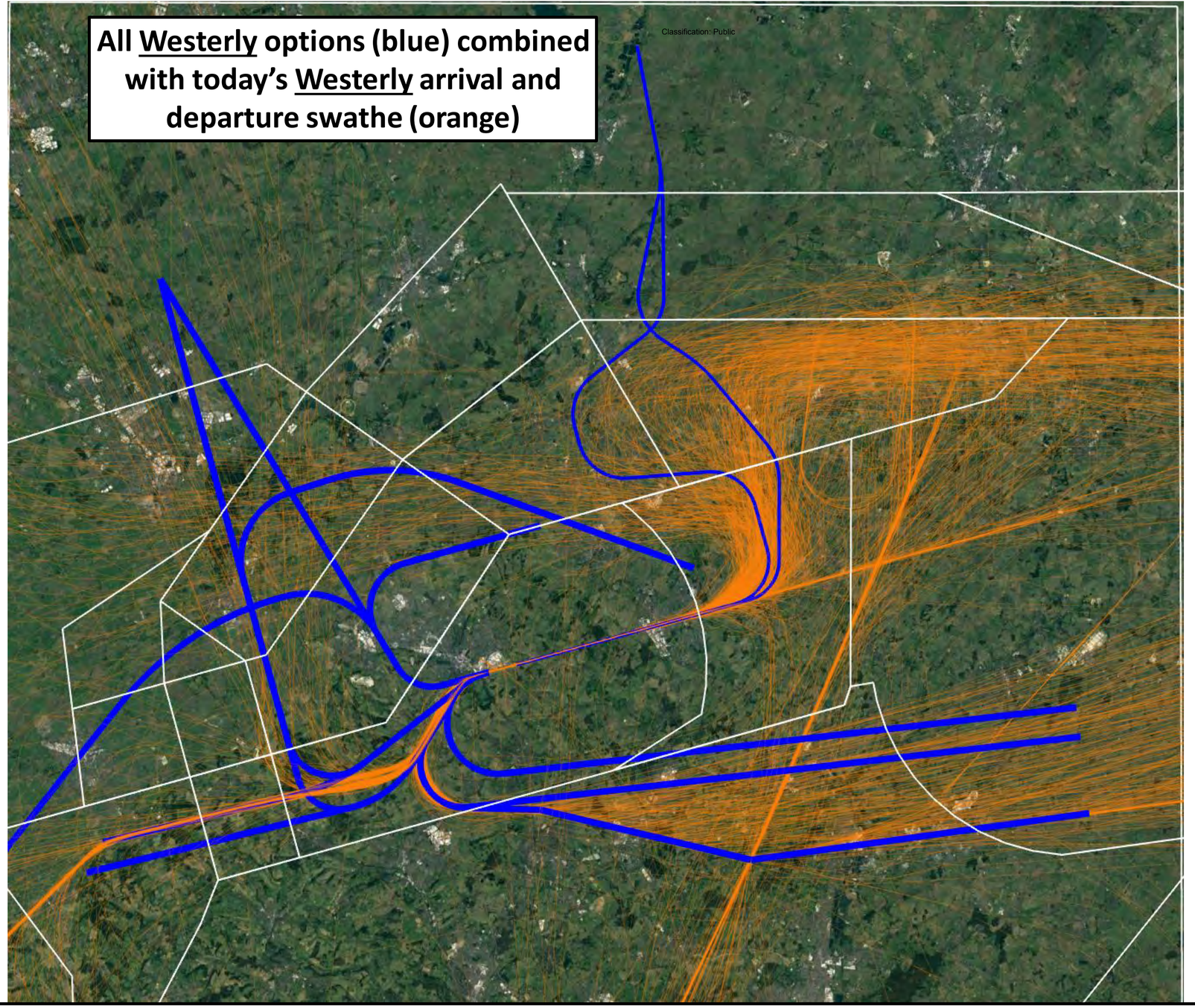
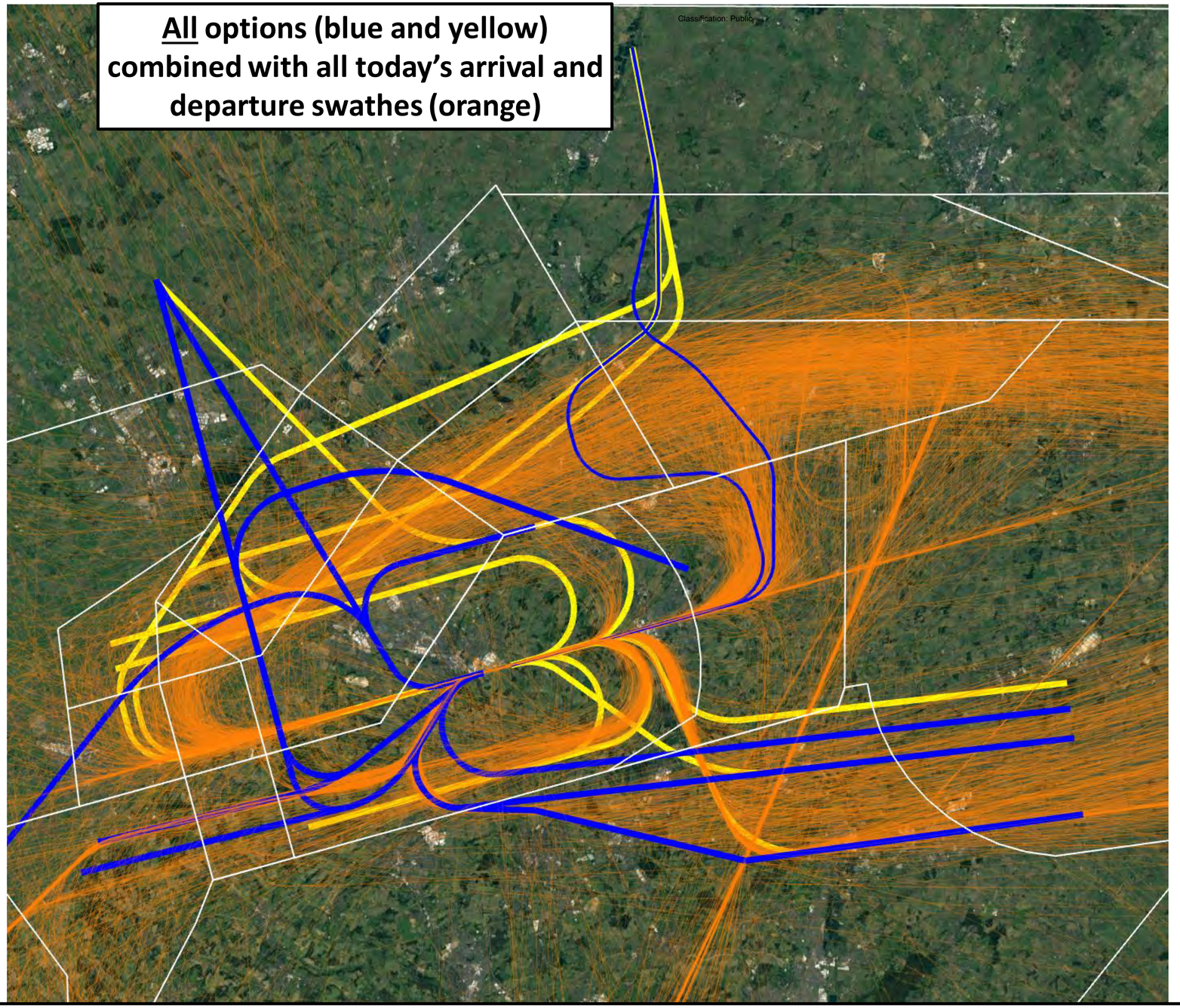


Flight paths shown are for illustration purposes to represent the broad proposed positioning of the concept. All flight paths may change throughout the airspace change design process.

All options (blue and yellow) combined with all today's arrival and departure swathes (orange)



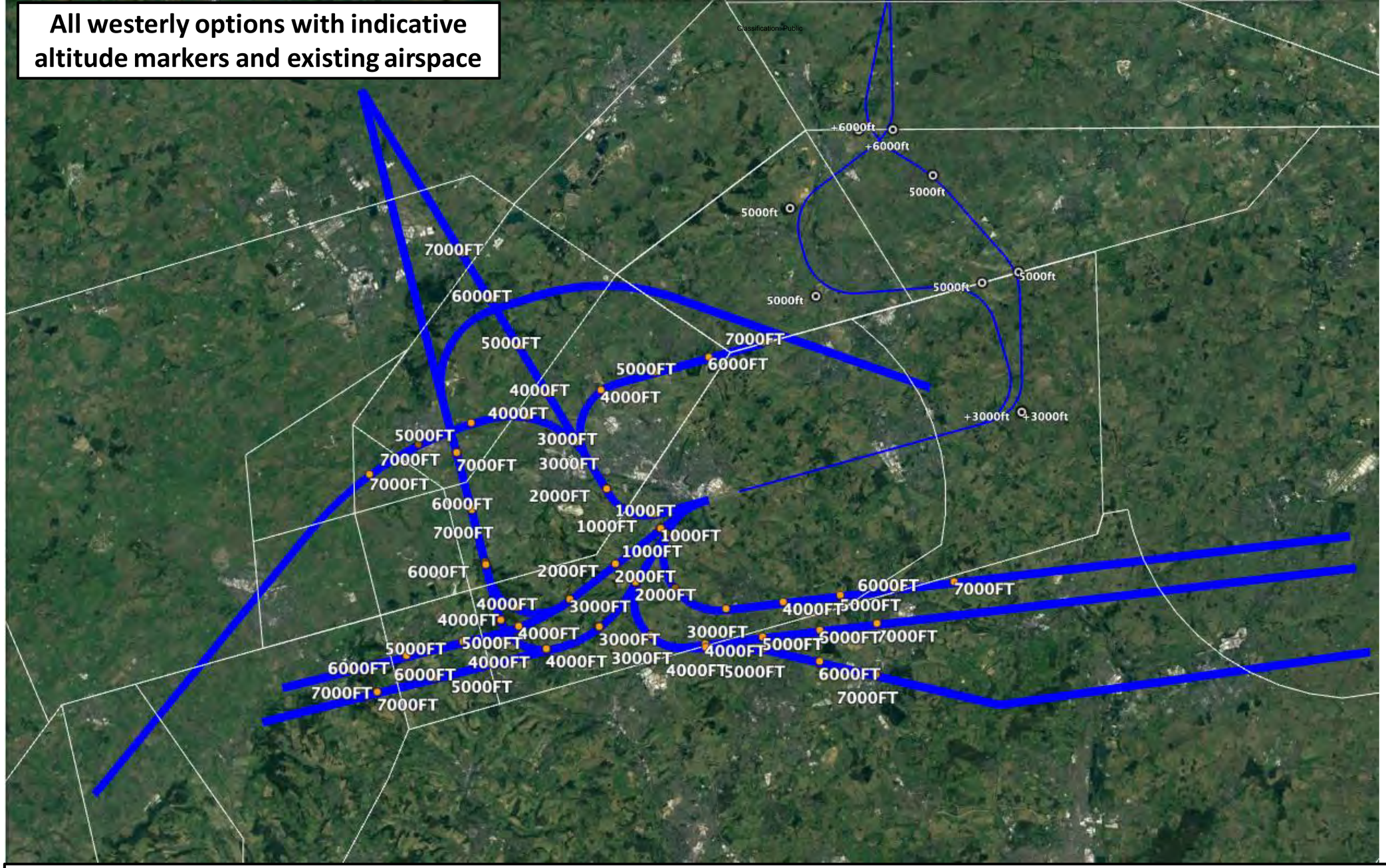
Flight paths shown are for illustration purposes to represent the broad proposed positioning of the concept. All flight paths may change throughout the airspace change design process.

This table shows highest % of overflight for each concept in any one area, excluding immediate climb out and final approach

	E1	E2	E3	E4	E5	E6
W1	82%	82%	82%	70%	70%	70%
W2	82%	82%	82%	70%	70%	70%
W3	82%	82%	82%	70%	70%	70%
W4	50%	50%	47%	37%	50%	42.5%
W5	54.5%	54.5%	54.5%	54.5%	54.5%	54.5%
W6	47%	47%	47%	37%	37%	37%
W7	46%	46%	46%	51%	51%	51%

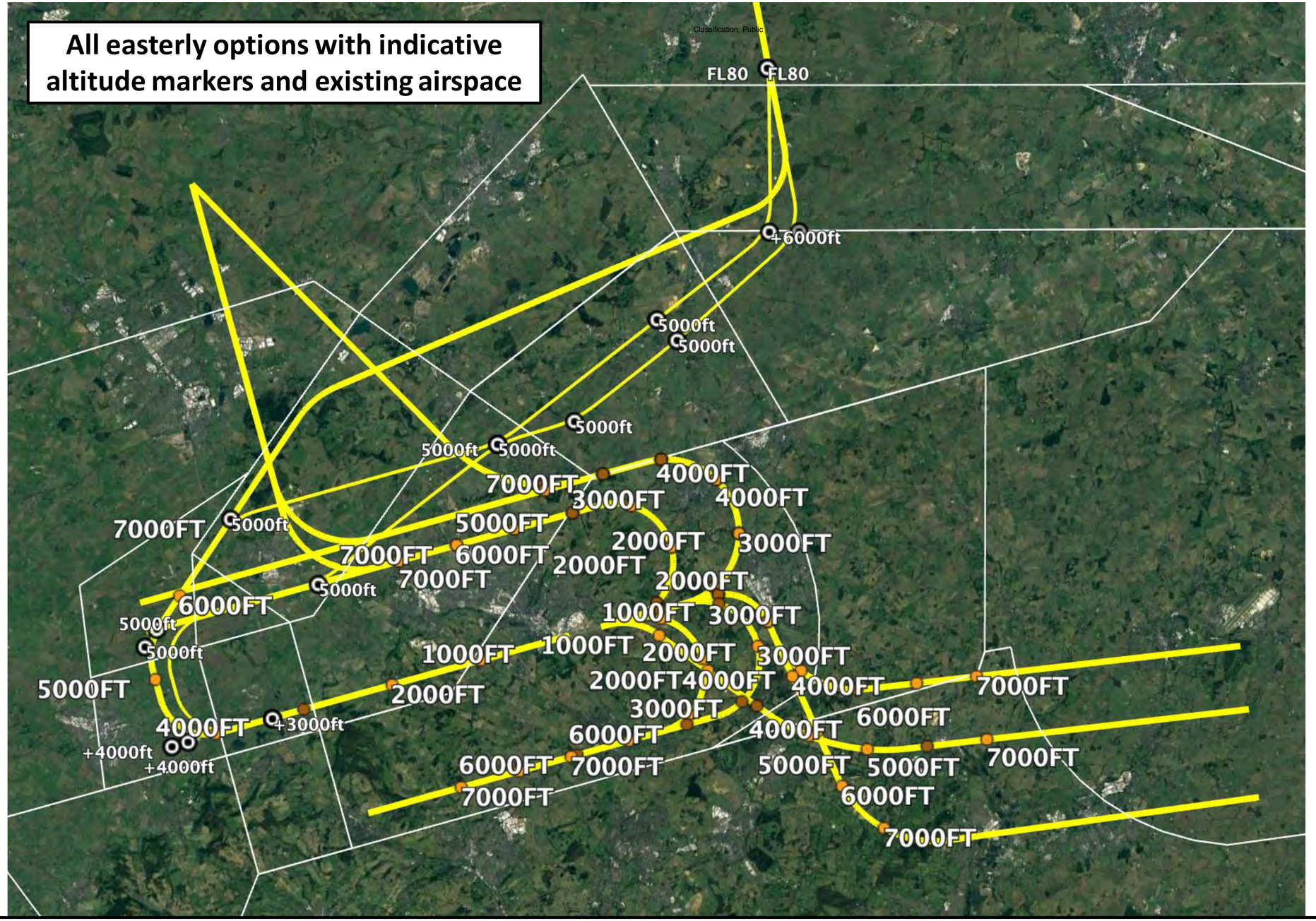
Typical profiles in relation to existing airspace

All westerly options with indicative altitude markers and existing airspace



1,000ft altitude markers based on 8% climb gradient or 3˚ (5.24%) descent gradient.
Arrival routes shown here are the PBN arrival options considered for AD6. Vertical arrival profiles may be improved over those shown here

All easterly options with indicative altitude markers and existing airspace



1,000ft altitude markers based on 8% climb gradient or 3˚ (5.24%) descent gradient. Blue arrival routes are those considered for AD6 so their vertical arrival profiles may be improved over those shown here. However, these would not work with a left turn CPT departure, therefore a route closer to the red arrival would be required and assumes no more CAS required to the higher profile.

Luton’s findings from initial options development:

In order to share the noise in the most equitable manner and avoiding overflying communities with multiple routes, where possible:

- RWY 07 CPT departures should turn left to provide respite from those under the 25 MATCH track
- The RWY 25 departures should have at least a 2-way initial split as soon as possible because 70% of all departures currently follow this initial track. This will be challenging due to the proximity of the gliding sites
- RWY 07 MATCH departures should follow a different track to the latter part of the RWY 25 MATCH track
- Offloading RWY 25 MATCH departures onto the existing RWY25 CPT/OLY path is not equitable. Use of a right turn for MATCH should only occur if it does not overfly those communities already under the RWY25 CPT track i.e immediate right turn when available.
- RWY 07 departures should turn off the centerline earlier than today to provide respite from more people under final approach to RWY 25

Other findings:

- If the RWY 07 OLY and CPT departures were to only be replicated they need enhancement to provide more efficient departure separations. This is due to the CPT and OLY departure routes ‘wrapping around’ too close to the initial climb out.

- The proximity of gliding sites makes options for the initial turn of Runway 25 departures especially challenging.

- The designs of the arrival transitions (or vectored swathe) from ZAGZO to Runway 07 that were designed for AD6 are not compatible with a FASI-S design option that sees a left turn out for Runway 07 CPT departures; the Runway 07 transitions or vectored swathes would need to be positioned further north.

We have received feedback from Community groups on the options. We will collate their feedback with yours to generate a new set up of options. We hope to share this with you in Q4 2021.

Next steps

We welcome your feedback from these slides. Please respond to AirspaceModernisation@ltn.aero by COP Monday 23 August 2021.

Once we have incorporated the feedback received, we will be arranging some more engagement to show the changes made and a new set of options. We expect this to be in October 2021. We will then perform a 'design principle evaluation'. This is where each option is evaluated against all the Design principles and sets out how each option has responded to the principles. We may discontinue options at this stage.

We will then perform an Initial Options Appraisal on all remaining options with all work published on the CAA airspace change portal. We expect this to be Q1 2022 subject to alignment with the 'FASI-S Masterplan' which may result in a delay to our Stage 2 gateway. We will update you as soon as we know more.

Stakeholder Update: Comprehensive List of Options, Design principle Evaluation and Initial Options Appraisal

February 2022

London Luton Airport Operations Ltd
FASI-S ACP-2018-70

Stakeholder Update: Comprehensive List of Options, Design principle Evaluation and Initial Options Appraisal

22nd February 2022

The purpose of today is to

- Let you know where we are in the Airspace Change Process
- Share the feedback received from you on our initial Comprehensive List of Options
- Show how we evolved the options as a result of that initial feedback
- Present a summary of our Design Principle Evaluation and our Initial Options Appraisal
- Present our shortlisted options as a result of the Design Principle Evaluation and Initial Options Appraisal
- Advise you that all the detailed information of our work so far will be available on the Airspace Change Portal in the next 2 weeks
- Advise you of the next steps

Where we are in the process

Luton Airport is developing an airspace change proposal (ACP) to upgrade the airport's arrival and departure routes. The ACP will cover a review of routes from the ground up to 7000ft and will also review the boundaries between controlled and uncontrolled airspace.

Every ACP sponsor must follow the regulatory process for changing the airspace design, including community engagement requirements - known as CAP1616 (Civil Aviation Publication no. 1616).

- CAP1616 sets out the process for developing airspace change options. This entails engaging with affected stakeholders, evaluating the impacts of options, consulting the public, regulatory approval and implementation.

- The outputs of each stage are reviewed by the CAA to ensure the engagement and analysis is robust prior to moving to the next stage.

Where we are in the process

In December 2018 Luton Airport commenced the ACP by submitting a Statement of Need to the CAA.

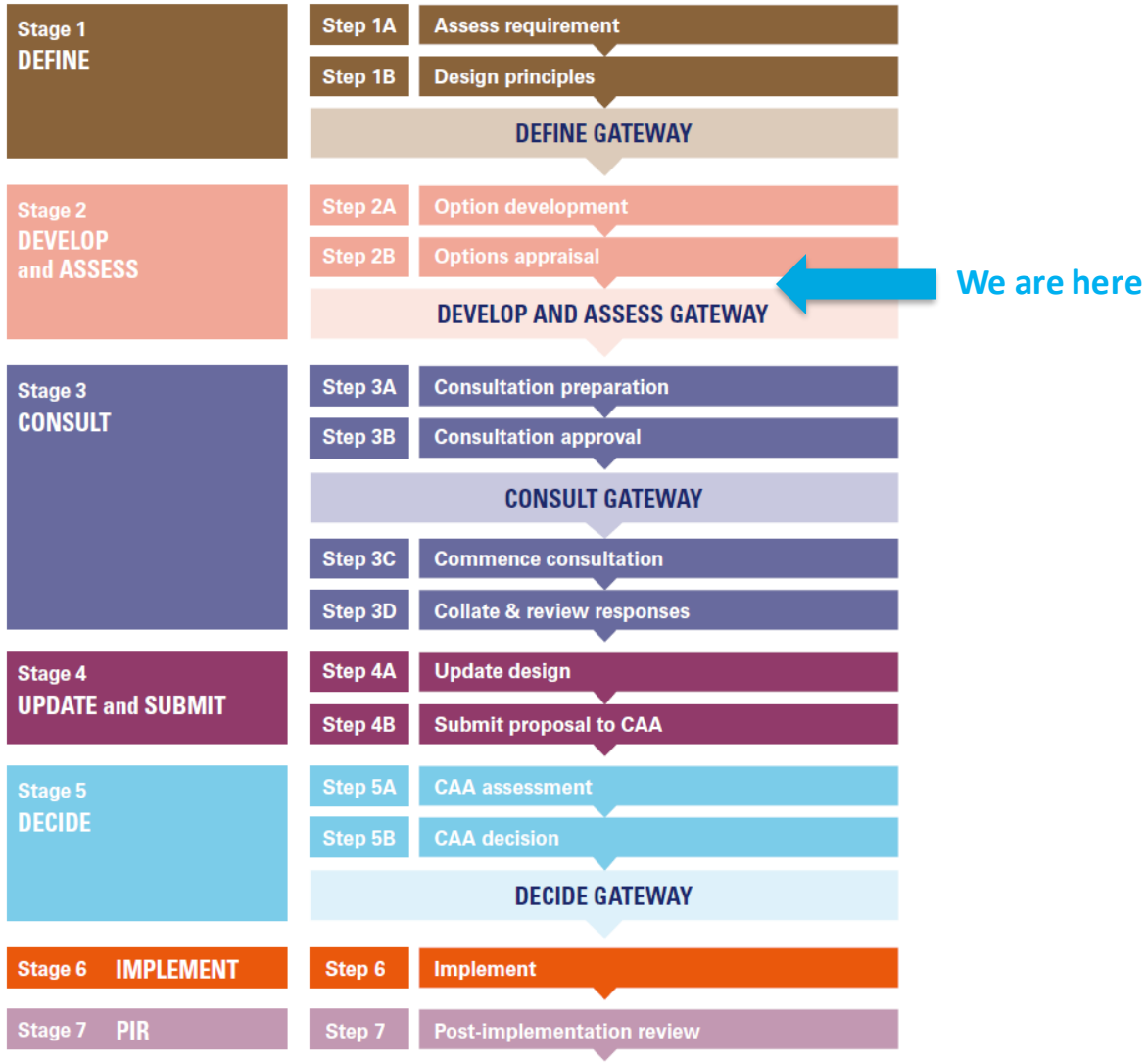
Between February and May 2019, we developed our Design Principles with identified stakeholders. In June 2019 we passed through Stage 1 of the process (Define Gateway).

In February 2020 we shared our initial list of airspace design options with our community stakeholders. Due to COVID-19 the ACP was paused in March 2020.

Following the announcement in March 2021 from the Department for Transport and the CAA of short-term financial support for the next phase of the FASI project, Luton Airport recommenced the ACP in June 2021.

Since then, we shared the options with those stakeholders we hadn't already done before the pause and then refined the options to take on board the feedback.

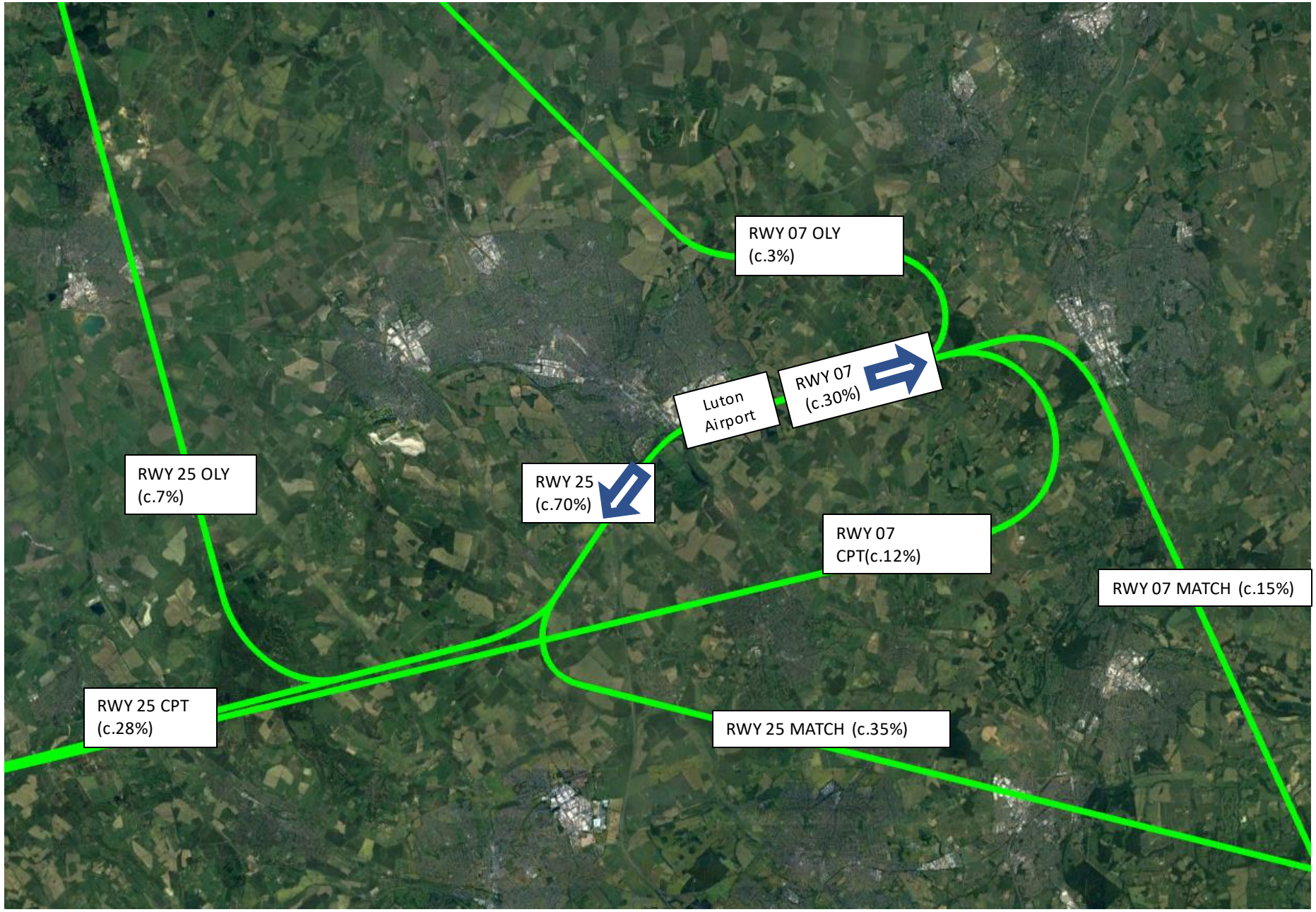
We have now performed the Design Principle Evaluation and Initial Options Appraisal and are ready to submit our work to the CAA for the Develop and Assess Gateway.



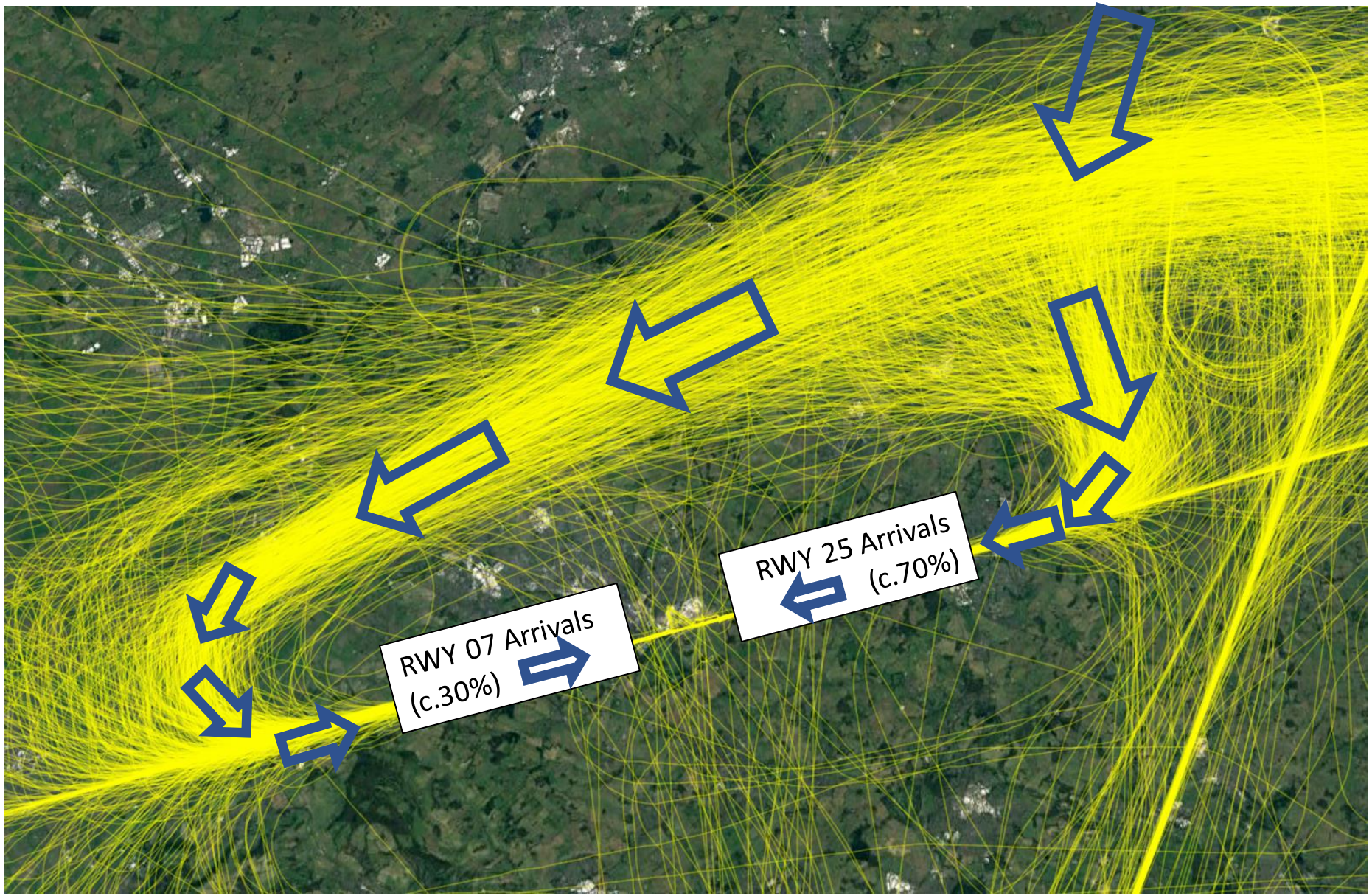
Our Design Principles

	Design Principle
1	Must be safe
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that
5	Should provide an equitable distribution of traffic where possible, through eg; • Use of multiple routes • New route structures • Options (mechanisms) for respite
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft
7	Should minimise tactical intervention by ATC below 7000ft
8	Should minimise the impact on other airspace users through; • Keeping CAS requirements to a minimum • Simple airspace boundaries • Allowing flexible use of airspace, where possible

Current published departure route structure and approximate usage



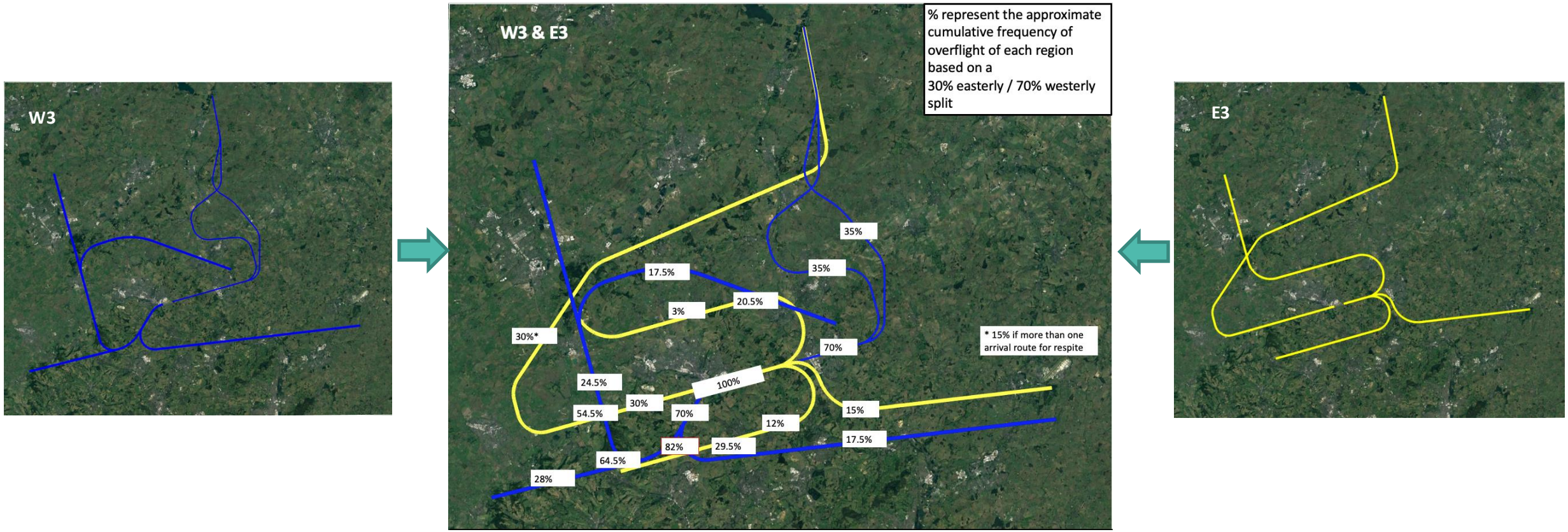
Current typical arrival tracks (no published route structure)



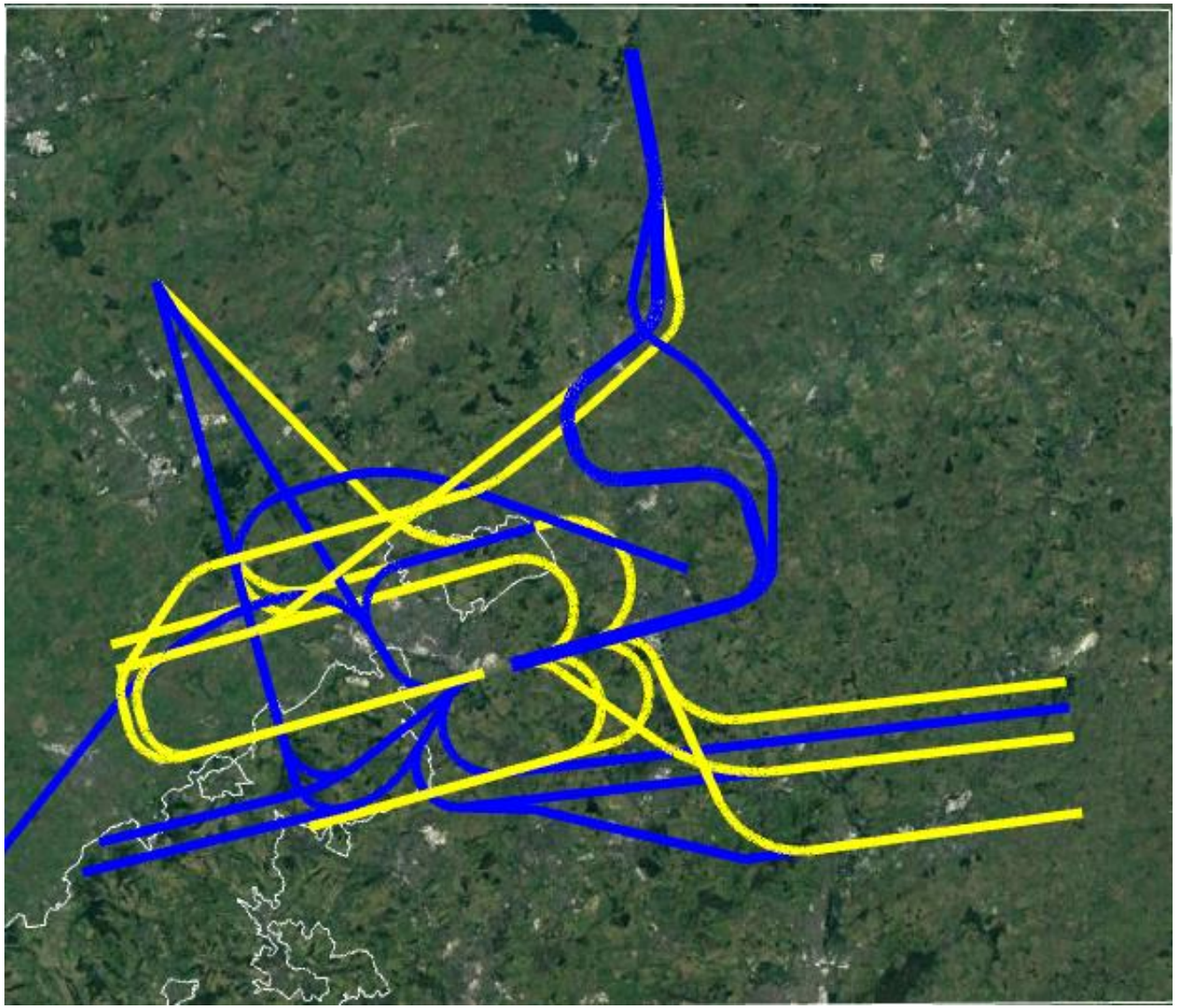
Our initial options and your feedback

Our Initial Options

We initially developed a number of different Westerly (7) and Easterly configurations (6). We showed you how each of these options would look in combination (each Westerly option with each Easterly configuration) and provided an indication of cumulative frequency of overflight with each of those combinations.



All original options (Easterly and Westerly combined)



Our Initial Options

We shared all the options with the same stakeholders we developed the Design Principles with, in Stage 1

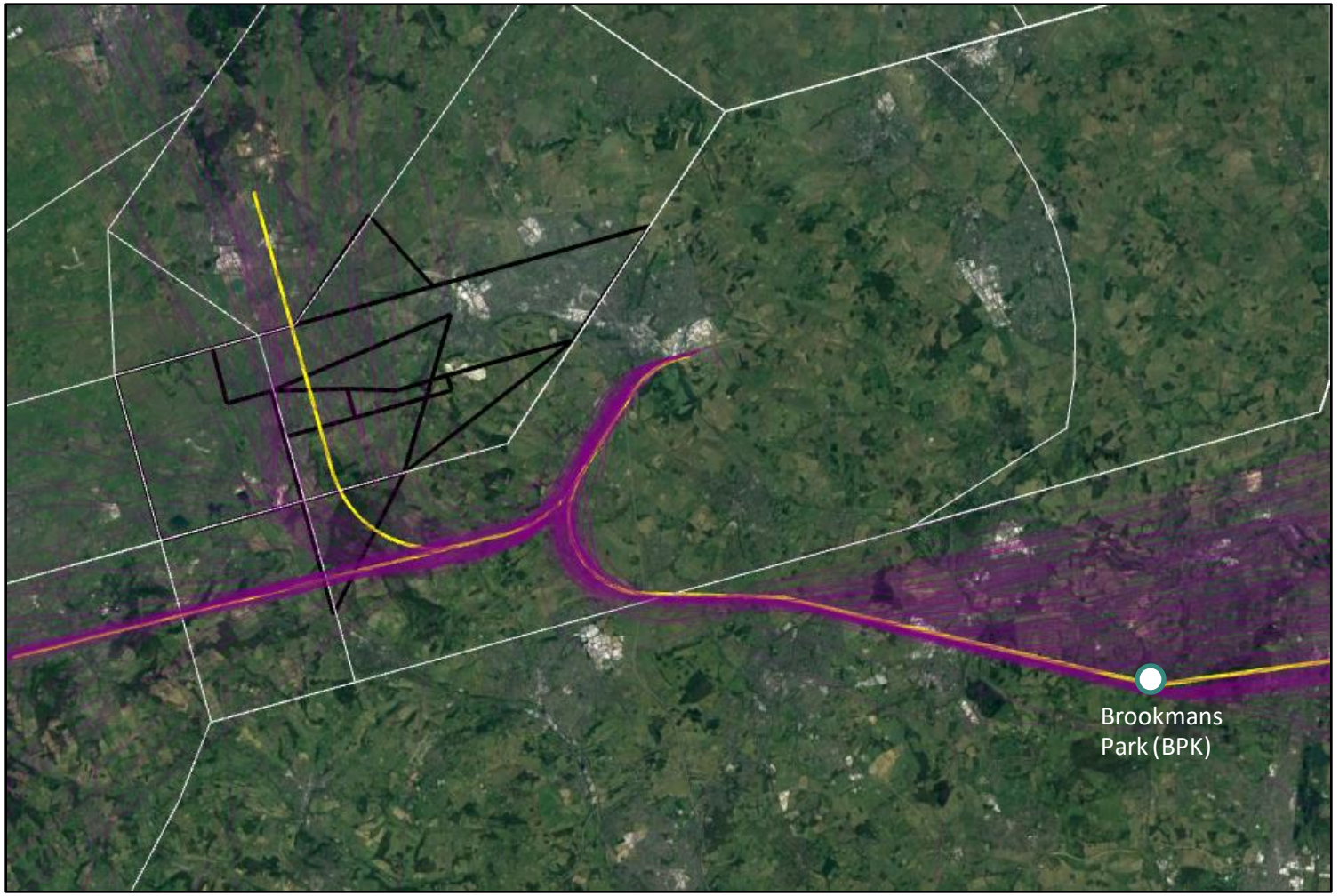
Bedfordshire Association of Town and Parish Councils	Stop Luton Airport Expansion	NATS	Virgin	Guild of Air Traffic Control Officers
Chilterns Conservation Board	Luton Borough Council	MoD	London City Airport	Light Aircraft Association
Stevenage Borough Council	HarpendenSky	Veuling	Aircraft Owners and Pilots Association	UK Flight Safety Committee
Aylesbury Vale District Council	St Albans Quieter Skies	Flairjet	Association of Remotely Piloted Aircraft Systems	London Gliding Club
Buckinghamshire County Council	St Albans Quieter Skies	Signature Aviation	Aviation Environment Federation	Wizz Air
North Herts District Council	Breachwood Green Society	Vistajet	British Airways	Netjets
People against Aircraft intrusive Noise	East Herts Council	Harrods Aviation	British Airline Pilots' Association	TUI
Buckinghamshire and Milton Keynes Association of Local Councils	Hertfordshire County Council	DHL	British Business and General Aviation Association	Lux Aviation
Dacorum Borough Council	London Luton Airport Limited	Ryanair	British Gliding Association	Air Charter Scotland
Luton And District Association for the Control of Aircraft Noise	Hertfordshire Association of Parish and Town Councils	easyJet	British Helicopter Association	British Sky Diving
Kings Walden Parish Council	RAF Northolt	Stansted Airport	British Hang Gliding and Paragliding Association	Drone Major
	Airspace4All	Heathrow Airport	British Microlight Aircraft Association	

Summary of your feedback

- Routes should follow major roads/motorways
- Breachwood Green should be avoided by departures on easterly operations
- An 8% climb gradient is too high/too low
- Designs are too close/too far away from Northolt and Heathrow
- Develop options for vectoring of arrivals
- Want to know the schedule that any route alternation would operate to
- Develop options that overfly Leighton Buzzard
- Too many options
- Maps have too much/too little information
- Easterly left turn CPT/OLYs should go even further north
- More detail required. Want to see noise and CO_2 impacts
- Want more overflight of Bedfordshire, less overflight of Hertfordshire
- Want no reduction in Class G airspace but PBN could require more CAS
- Continuous climb above 6000ft could increase risk
- Preserve the Gliding Airspace
- Develop options that make use of the gliding airspace (RWY26 right turn)
- Avoid Harpenden
- Climb straight ahead for longer
- Want options with a shorter final approach
- Preserve and improve the tranquillity of AONB

Our updated options as a result of your feedback

Westerly Departures – Option 1 Do Nothing



See Design Principle Evaluation Summary of this Option

See if option shortlisted

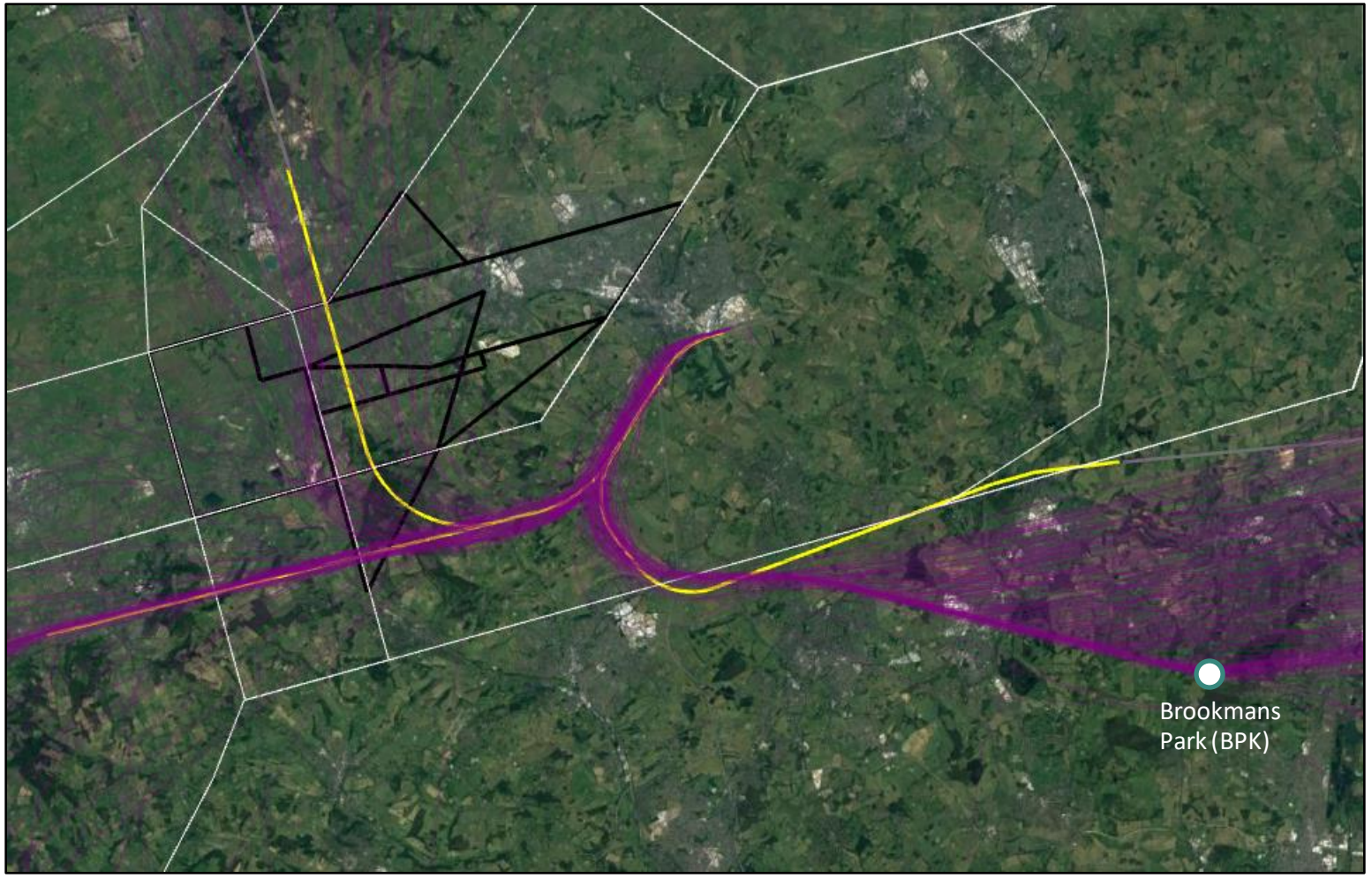
Rationale for progression or discontinuation

Westerly Departures – Option 2

Reposition MATCH SID to the North East

Vertical profiles same as today

Not dependent on other airports



See Design Principle Evaluation Summary of this Option

See if option shortlisted

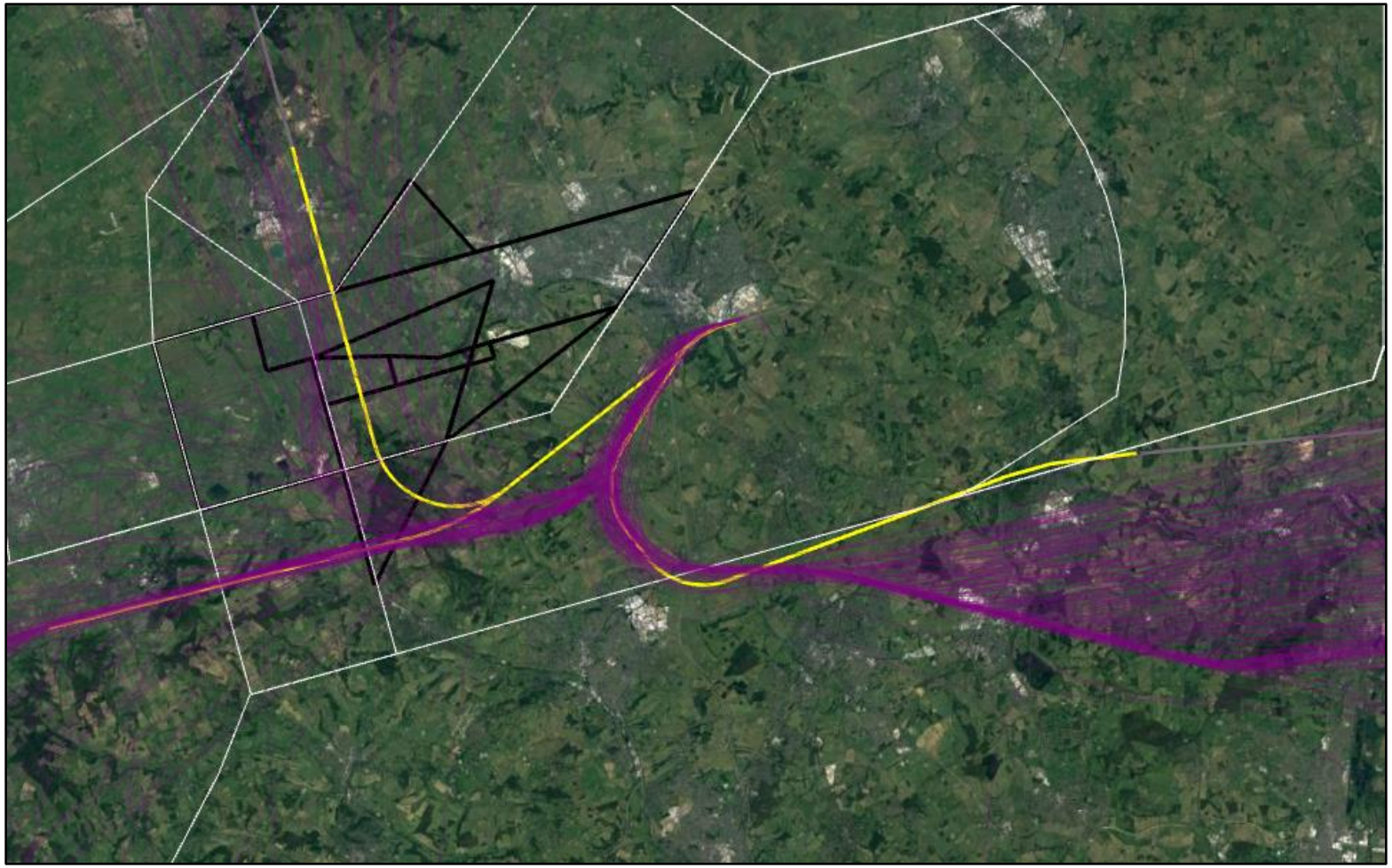
Rationale for progression or discontinuation

Westerly Departures – Option 3

OLY/CPT to diverge from MATCH SID earlier

Vertical profiles same as today

Not dependent on other airports



See Design Principle Evaluation Summary of this Option

See if option shortlisted

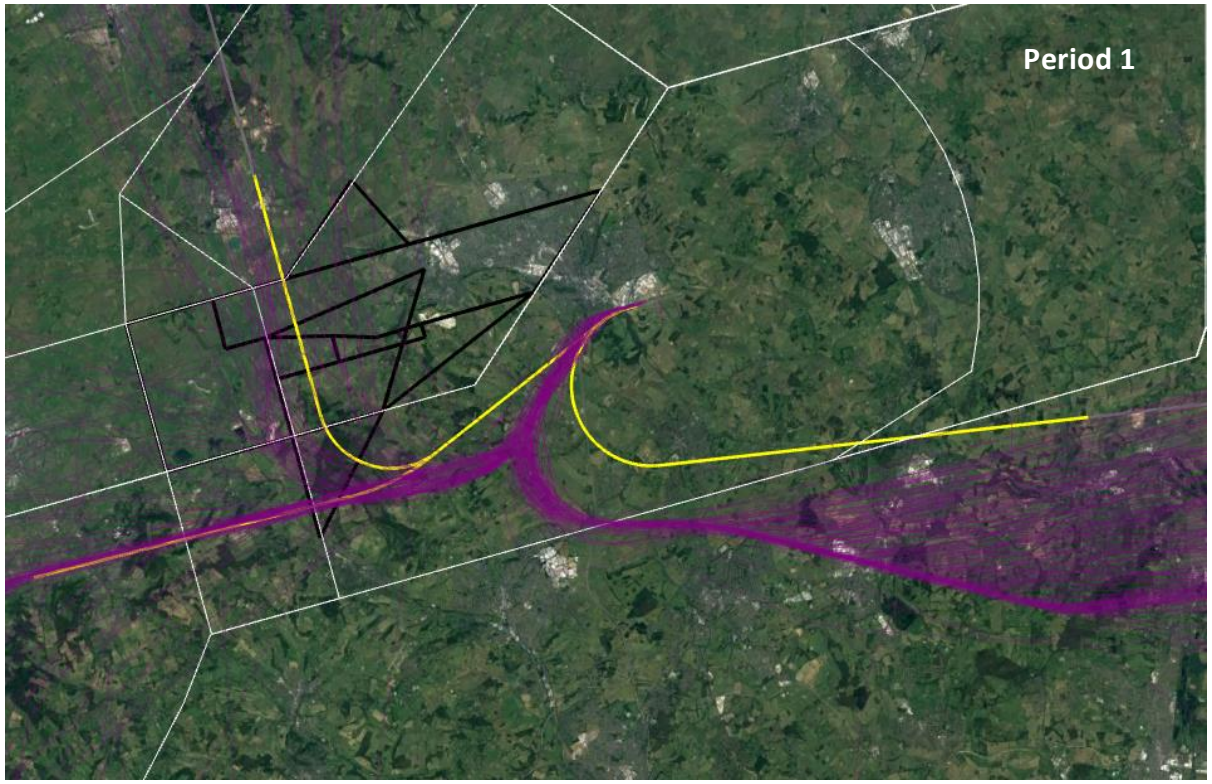
Rationale for progression or discontinuation

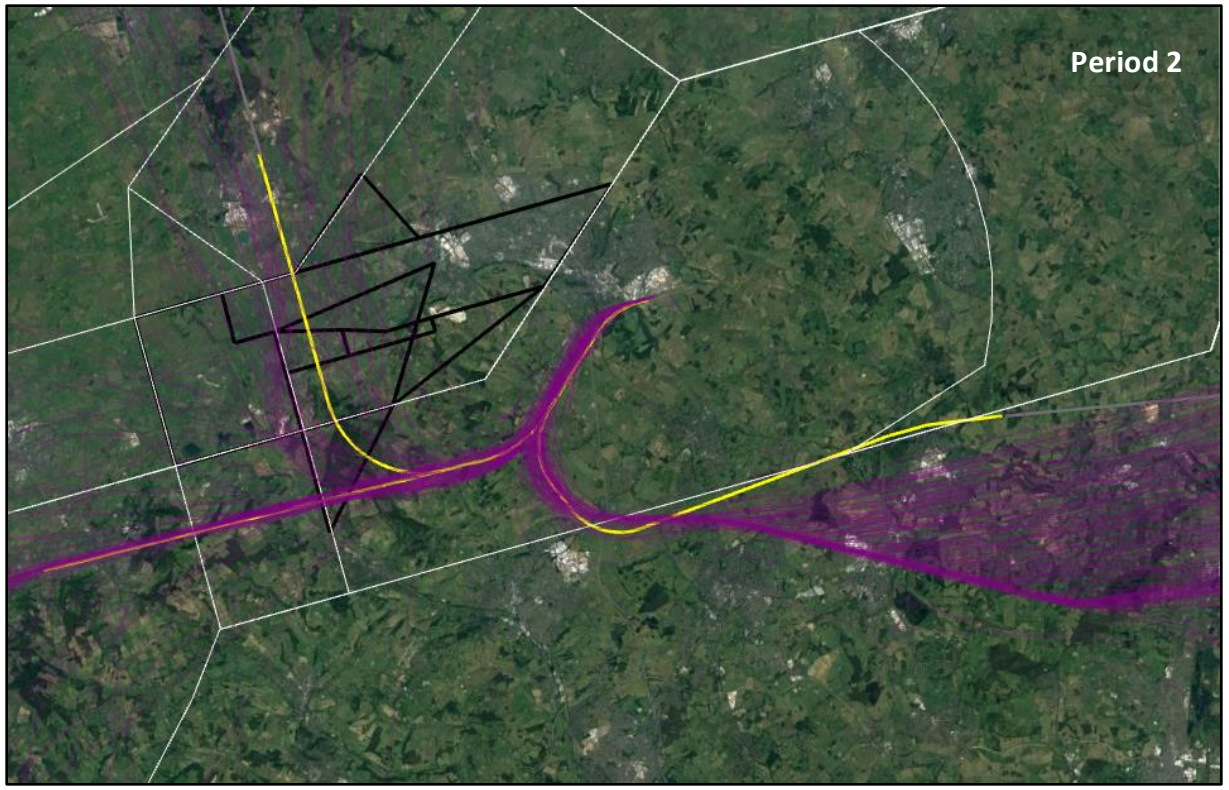
Westerly Departures – Option 4

See Design Principle Evaluation Summary of this Option

See if option shortlisted

Rationale for progression or discontinuation





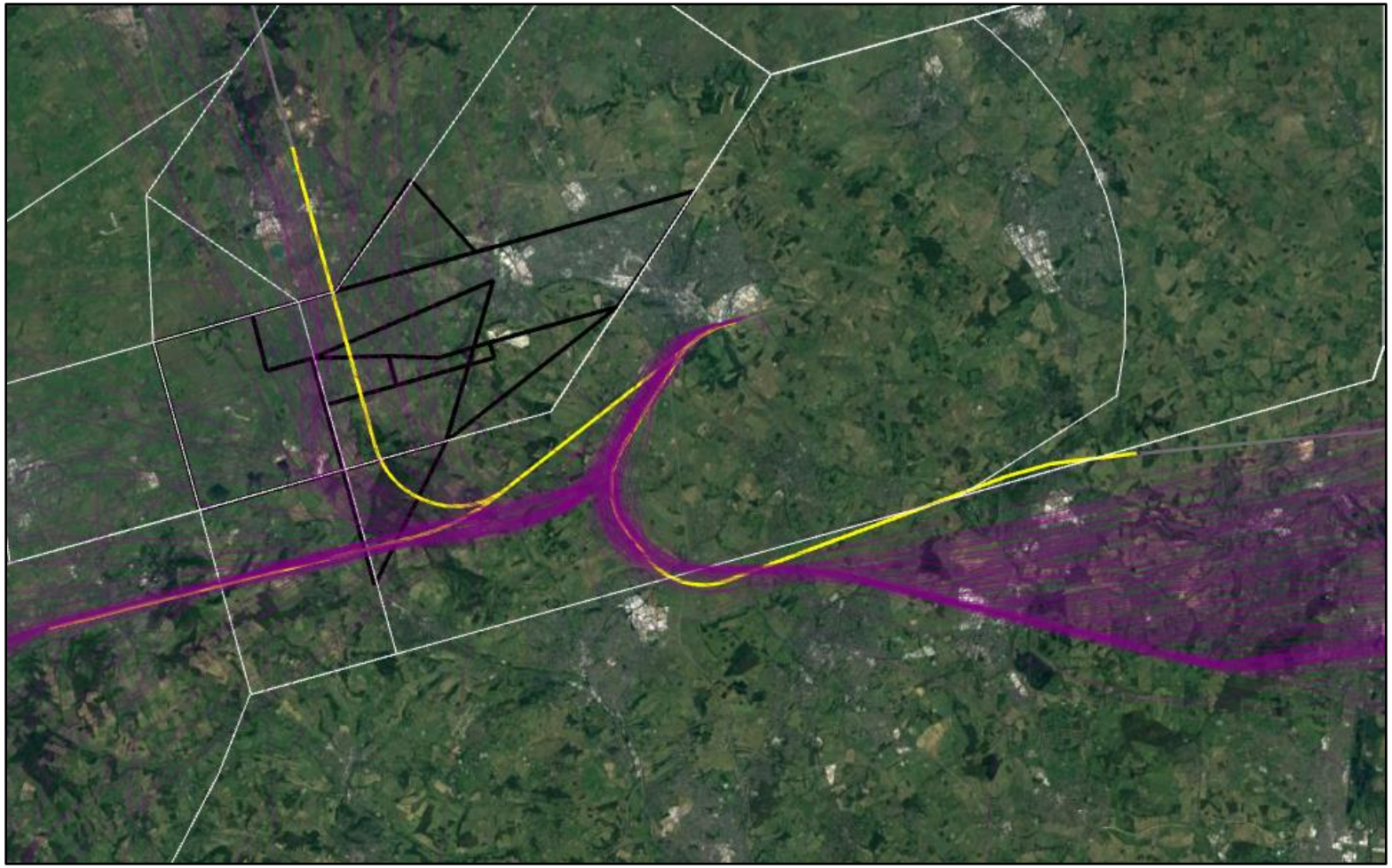
OLY/CPT to diverge from MATCH SID earlier. Multiple routes to share the noise.
Vertical profiles same as today. Not dependent on other airports

Westerly Departures – Option 5

OLY/CPT to diverge from MATCH SID earlier

Vertical profiles better than today

Dependent on other airports

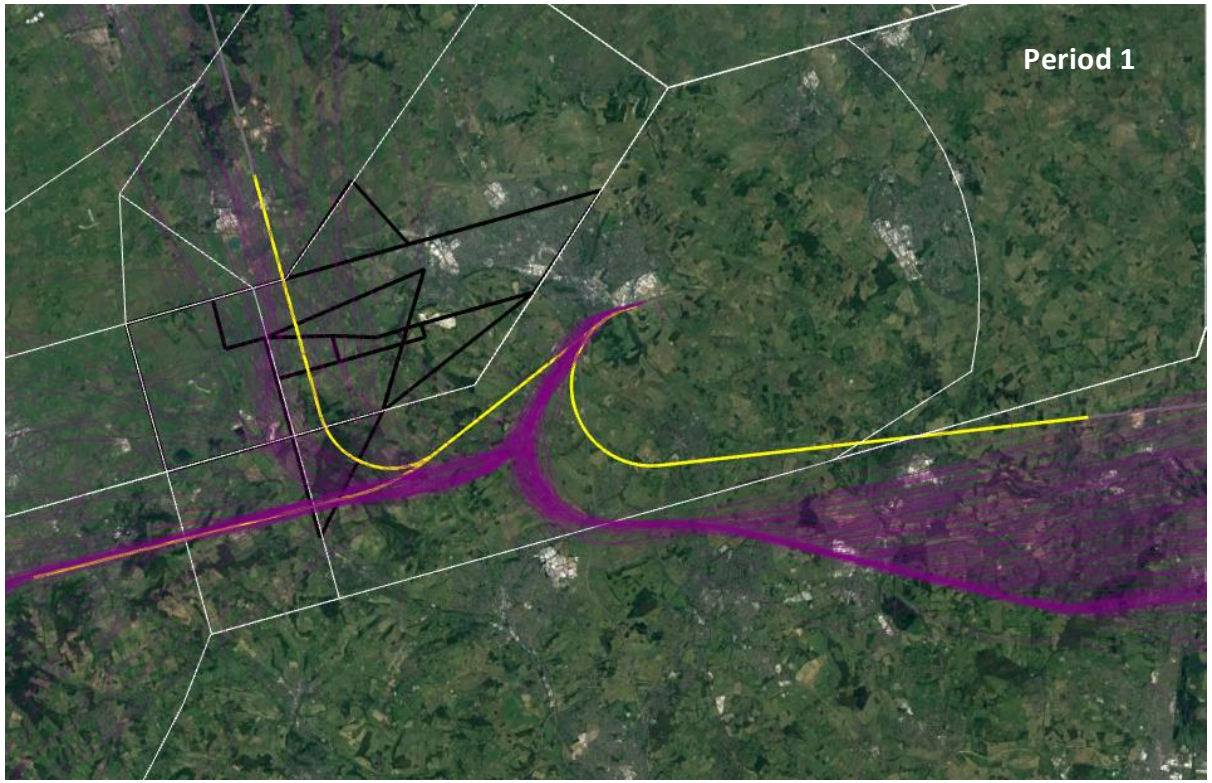


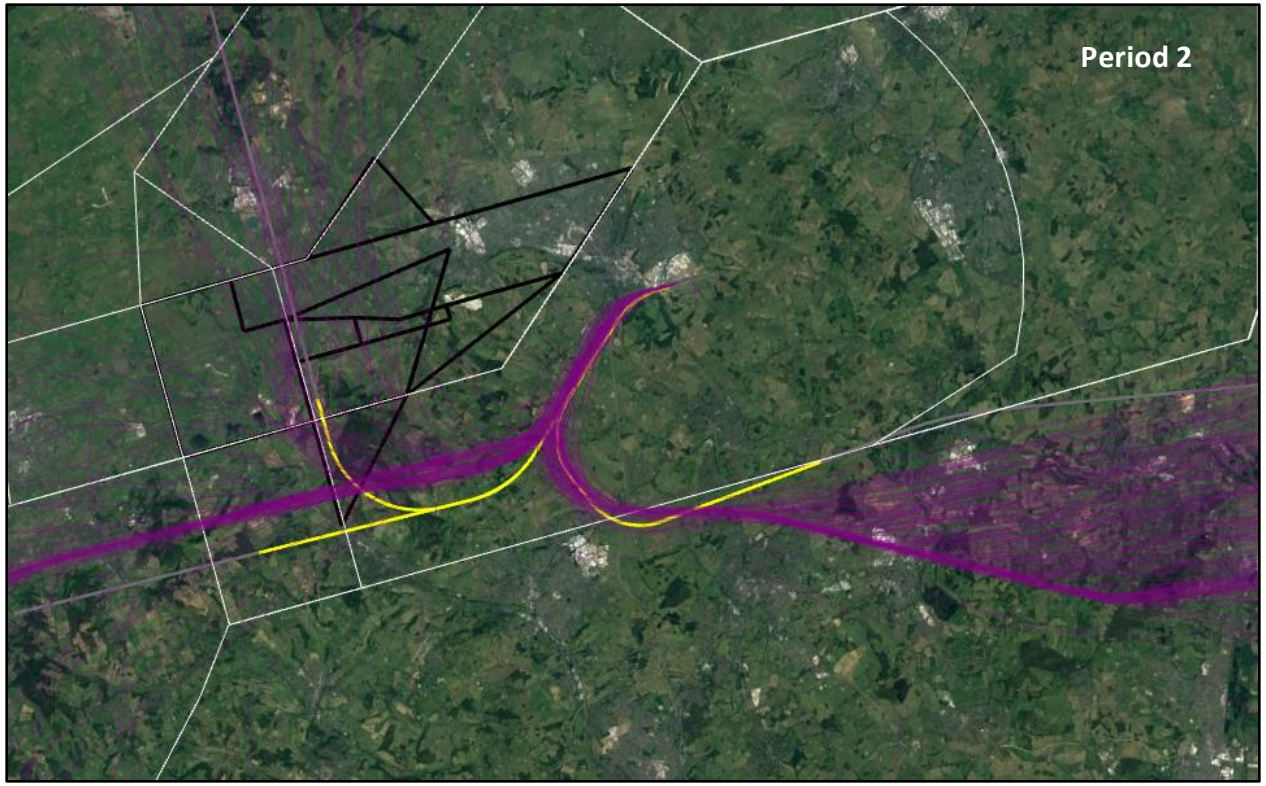
See Design Principle Evaluation Summary of this Option

See if option shortlisted

Rationale for progression or discontinuation

Westerly Departures – Option 6





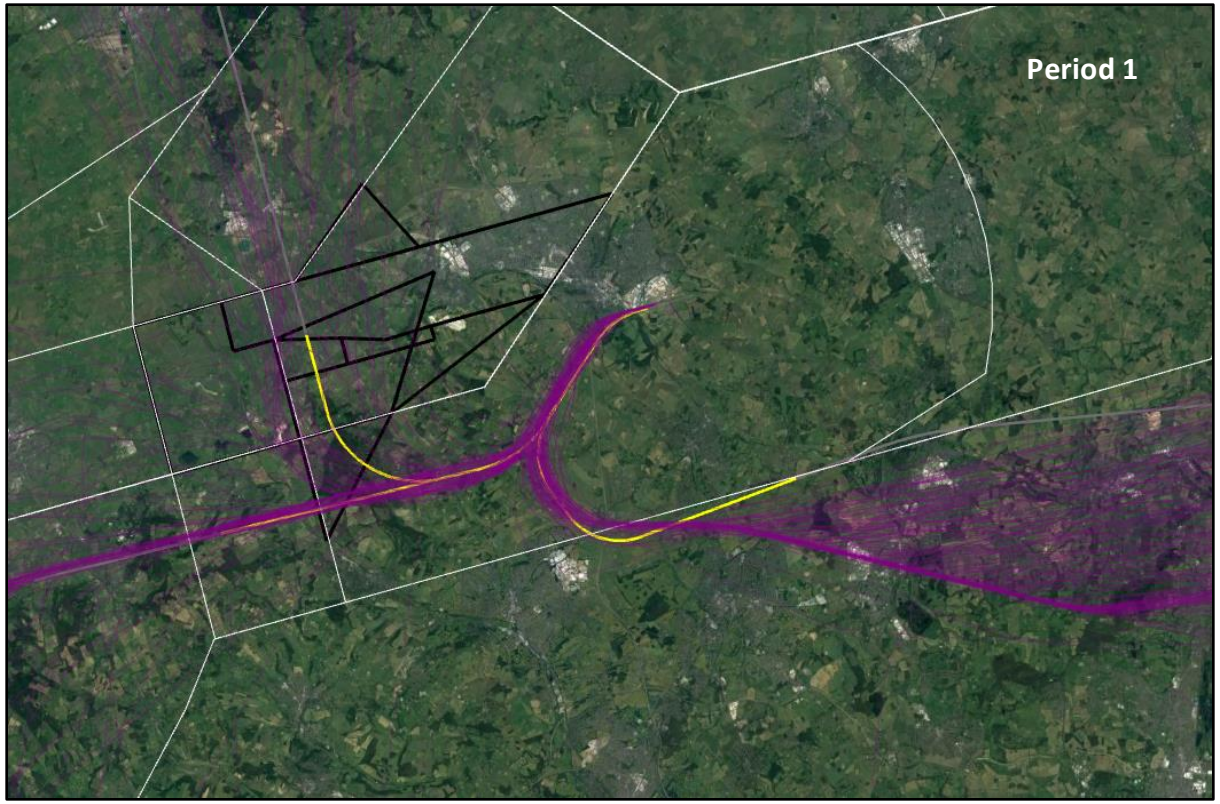
OLY/CPT to diverge from MATCH SID earlier. Multiple routes to share the noise.
Vertical profiles better than today. OLY Period 2 further south. Dependent on other airports

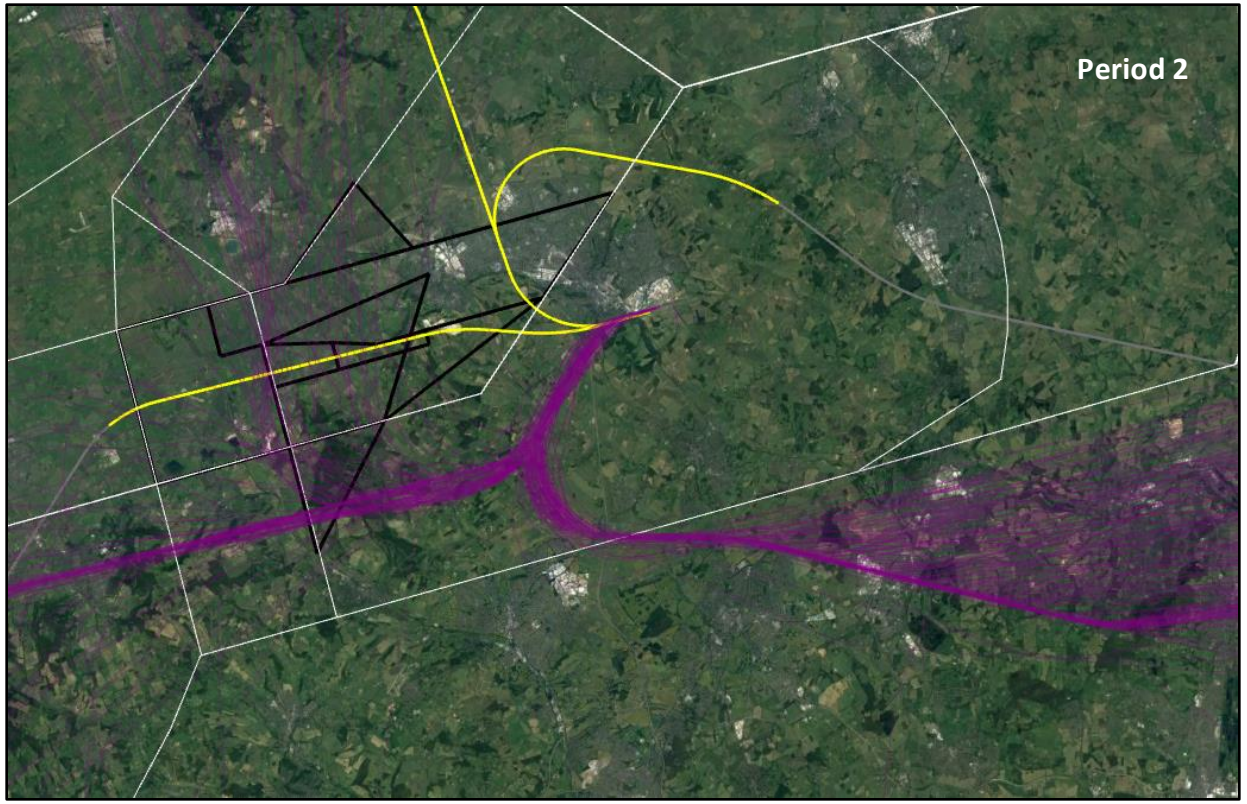
Westerly Departures – Option 7

See Design Principle Evaluation Summary of this Option

See if option shortlisted

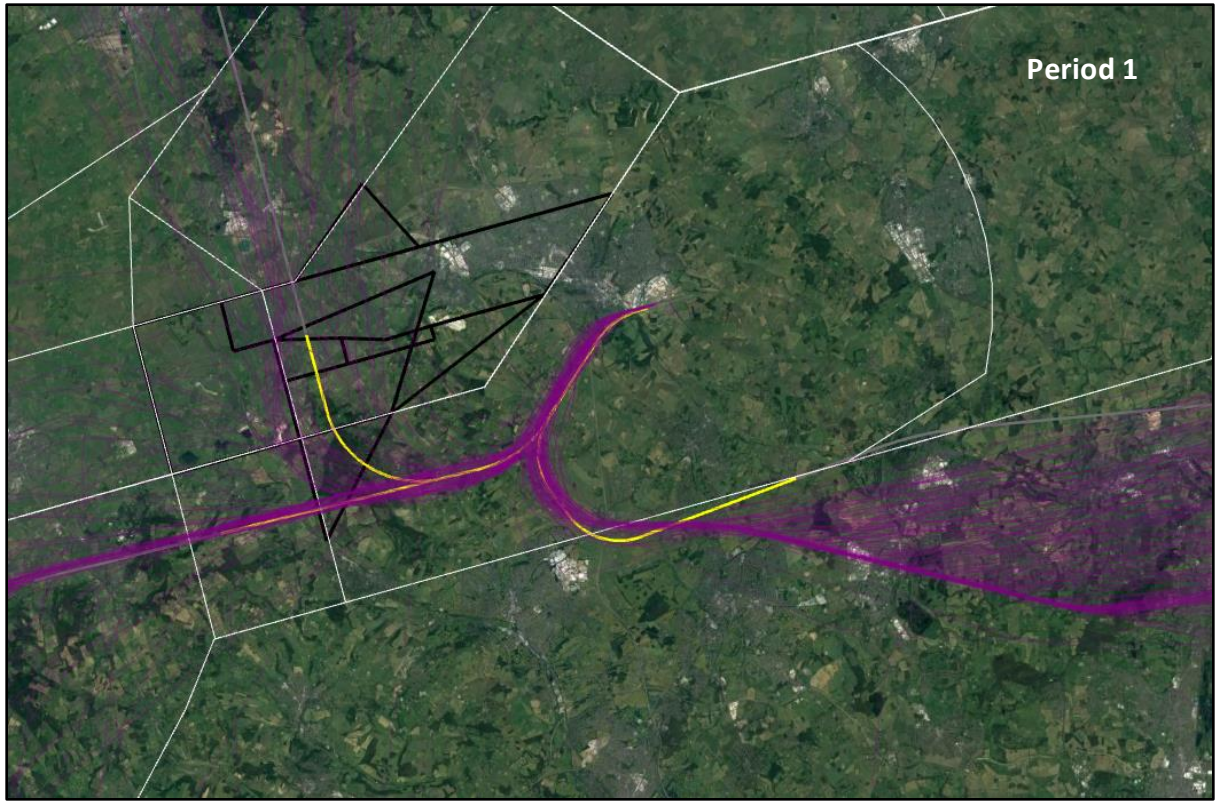
Rationale for progression or discontinuation

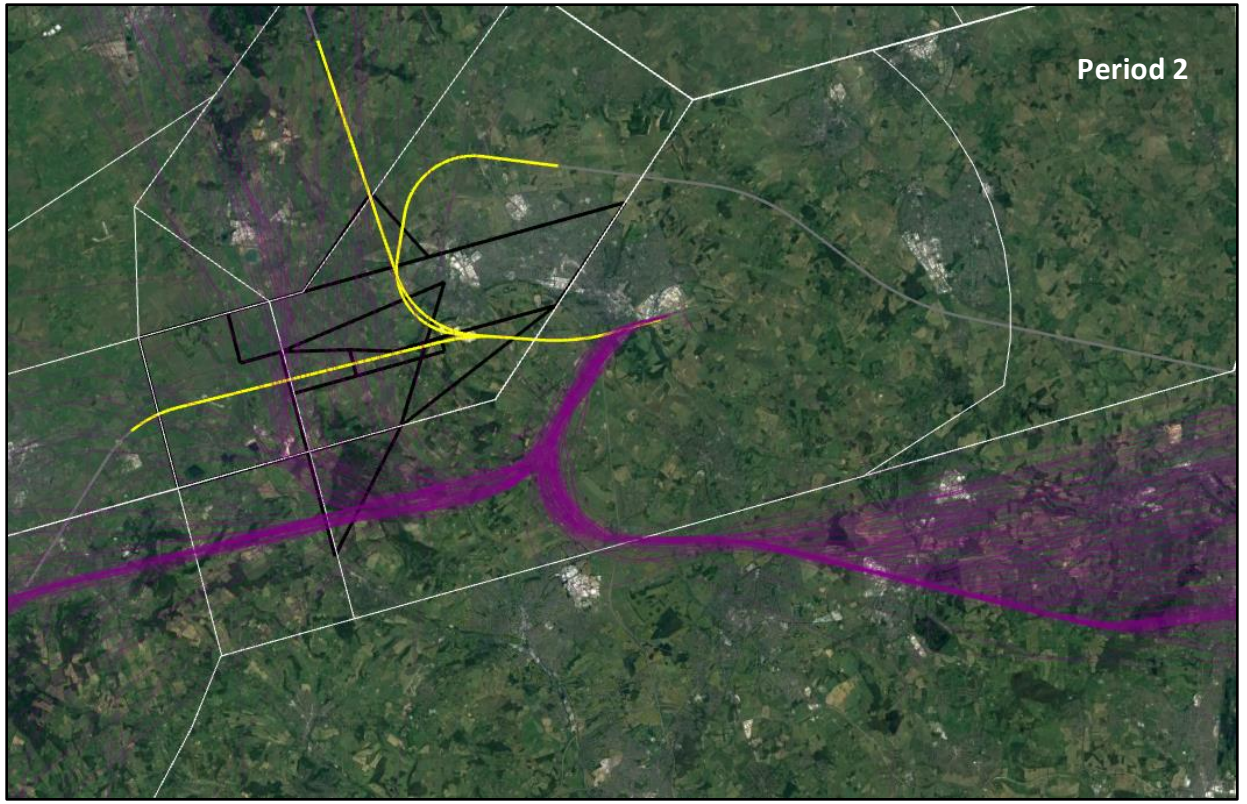




NEW: Period 2 OLY/MATCH SIDs early right turn (to follow M1, avoid more of AONB, reduce CO2)
CPT SID routes to north of final approach more direct (reduce CO2)
Dependent on other airports

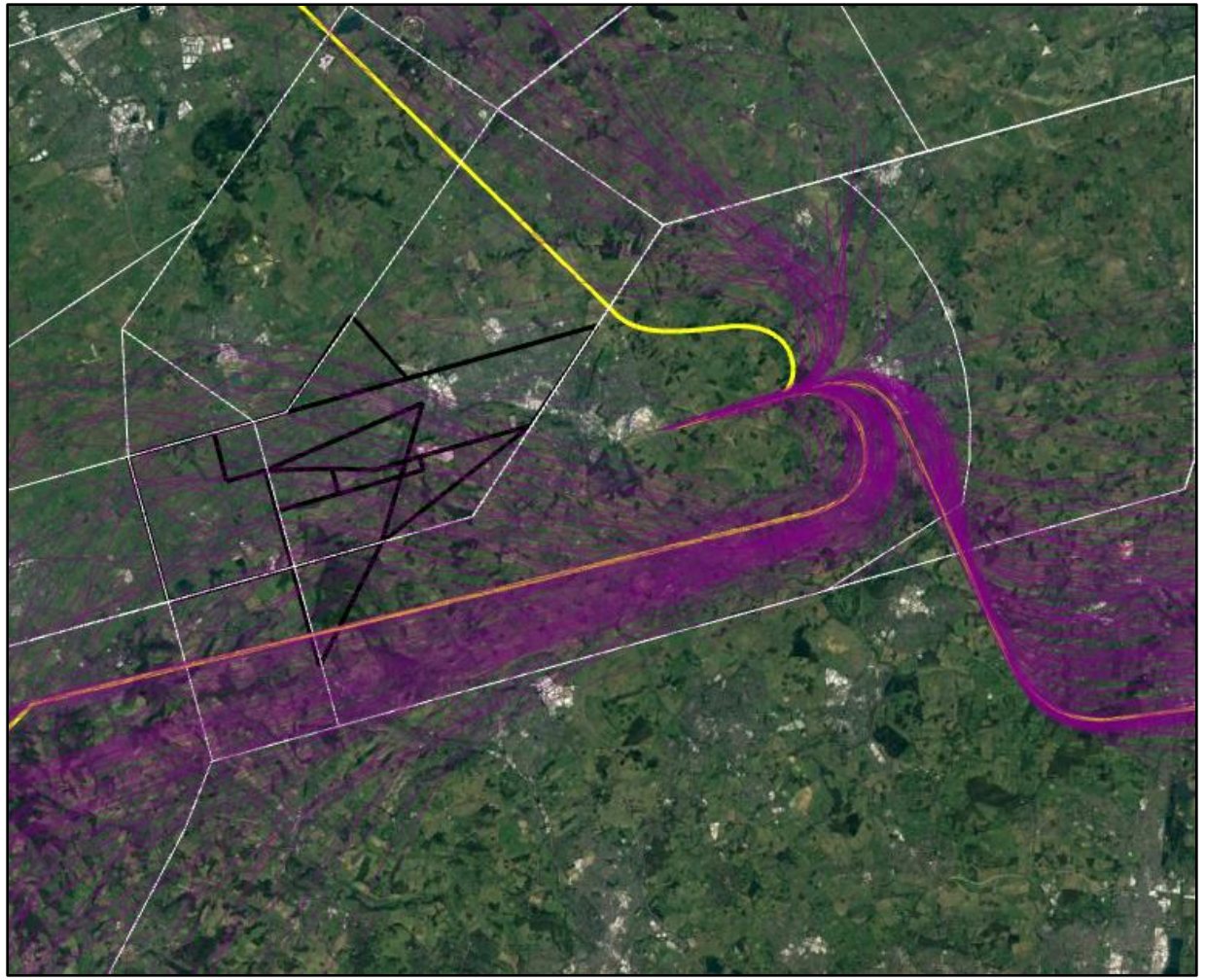
Westerly Departures – Option 8





Revised: Period 2 OLY/MATCH SIDs later right turn (to avoid Luton and Dunstable)
CPT SID routes to north of final approach more direct (reduce CO2)
Dependent on other airports

Easterly Departures – Option 1 Do Nothing



See Design Principle Evaluation Summary of this Option

See if option shortlisted

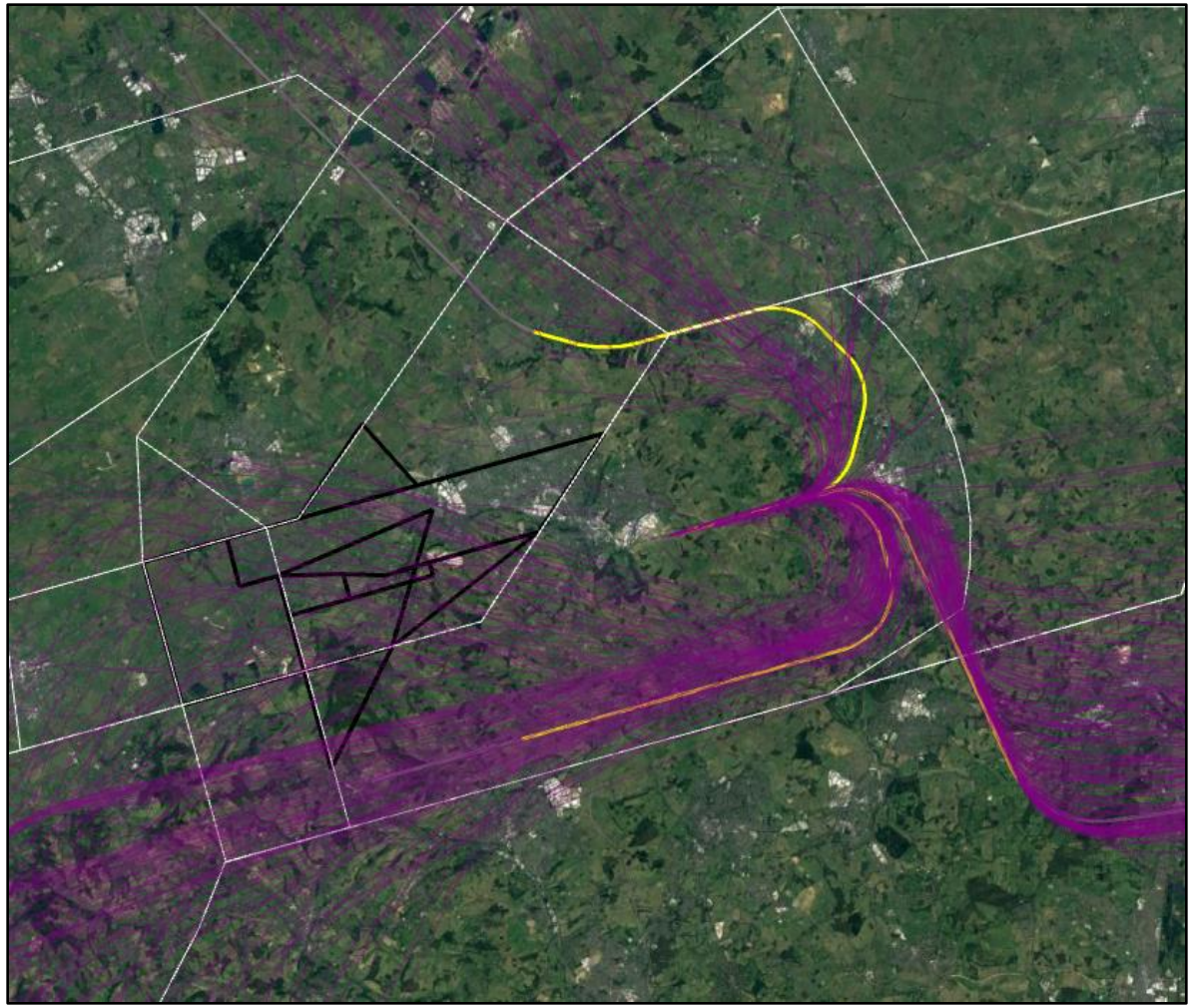
Rationale for progression or discontinuation

Easterly Departures – Option 2

Largely replication but change to westerly track of CPT SID

OLY centreline between Hitchin and Letchworth Garden City

Not dependent on other airports



See Design Principle Evaluation Summary of this Option

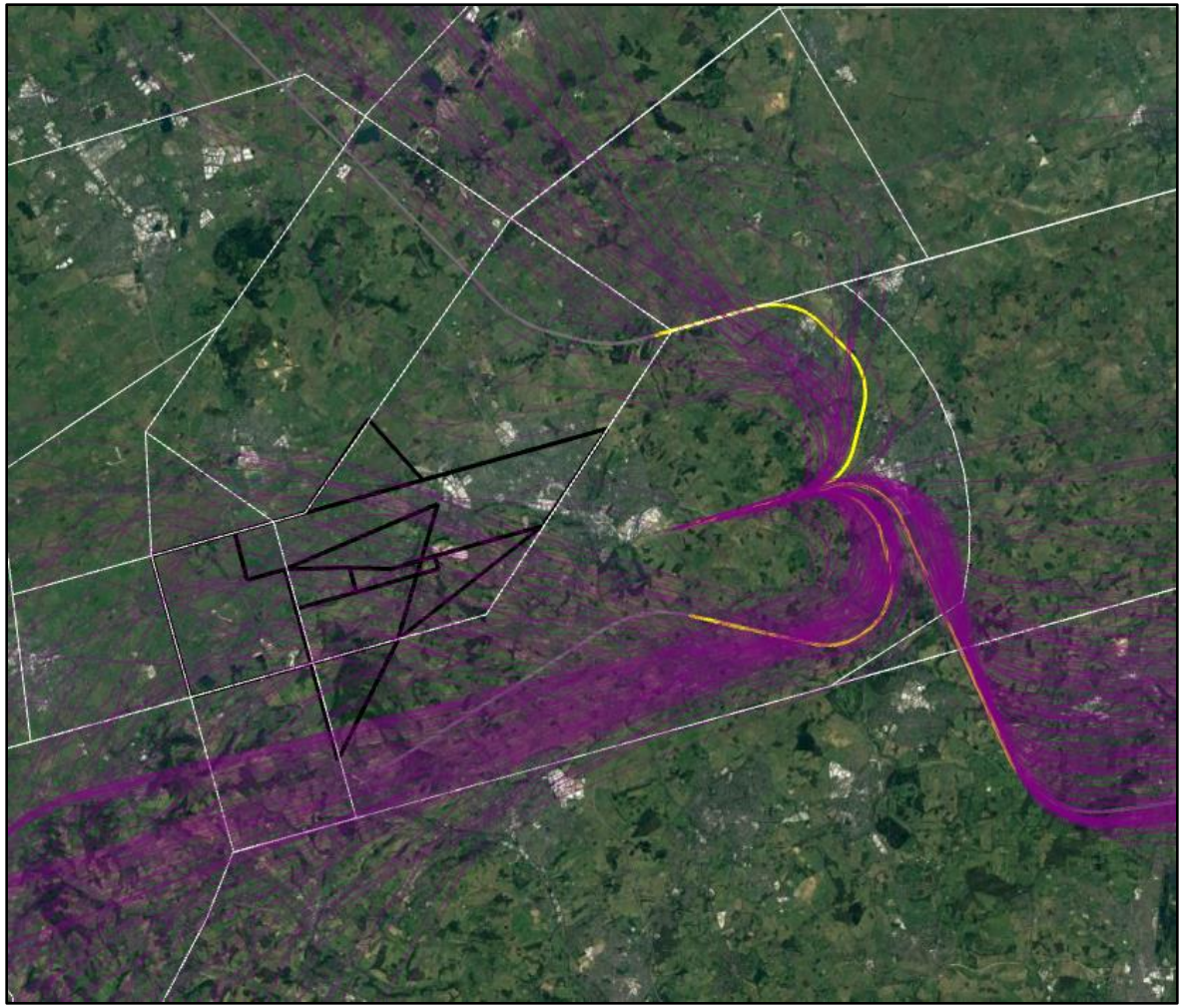
See if option shortlisted

Rationale for progression or discontinuation

Easterly Departures – Option 3

NEW: CPT SID avoids Harpenden

Dependent on changes at other airports



See Design Principle Evaluation Summary of this Option

See if option shortlisted

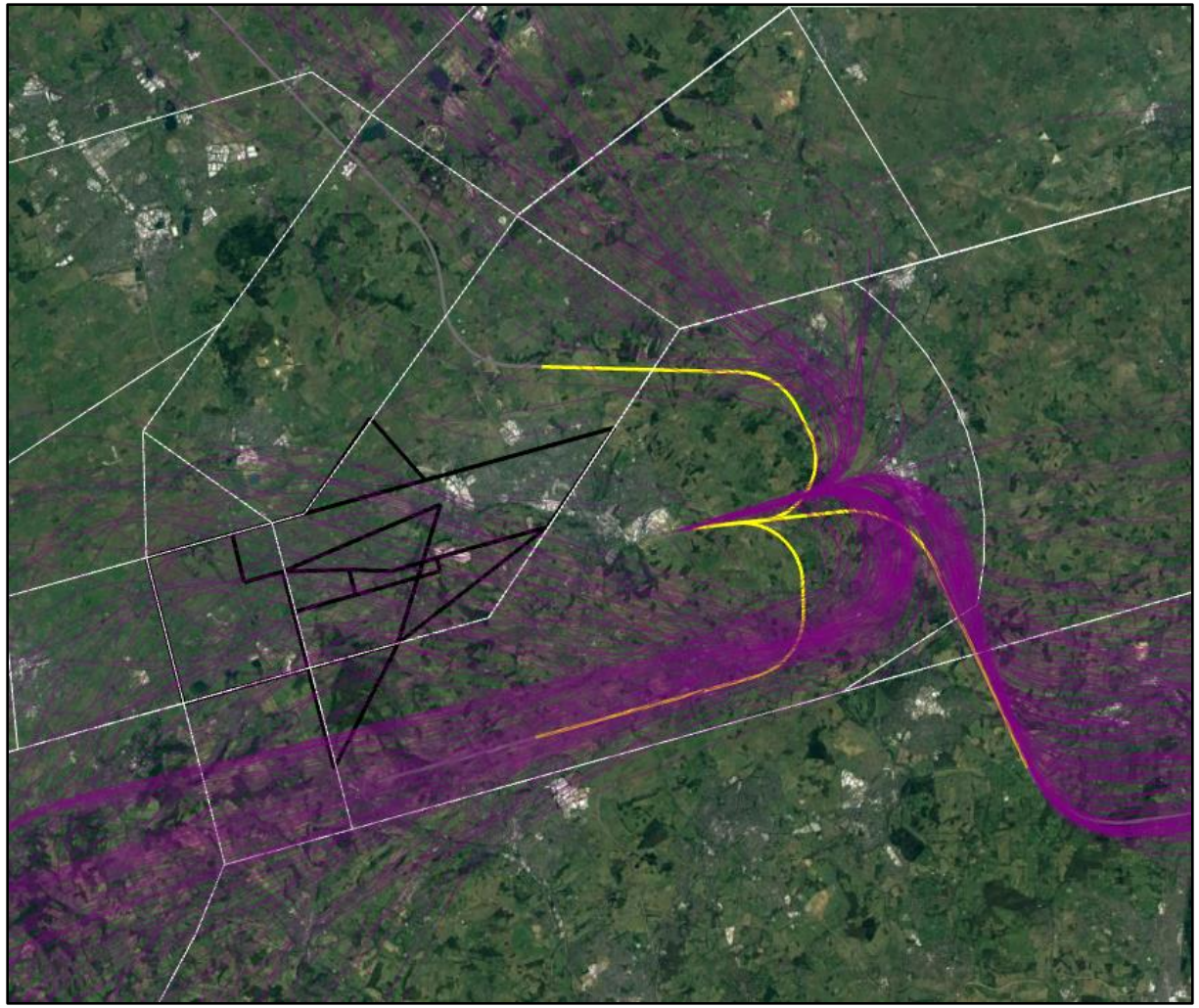
Rationale for progression or discontinuation

Easterly Departures – Option 4

Revised:
Departures offset to South of Breachwood Green.

CPT departure turns west earlier. Scope to also shorten MATCH route

Vertical profiles as today. Not dependent on other airports



See Design Principle Evaluation Summary of this Option

See if option shortlisted

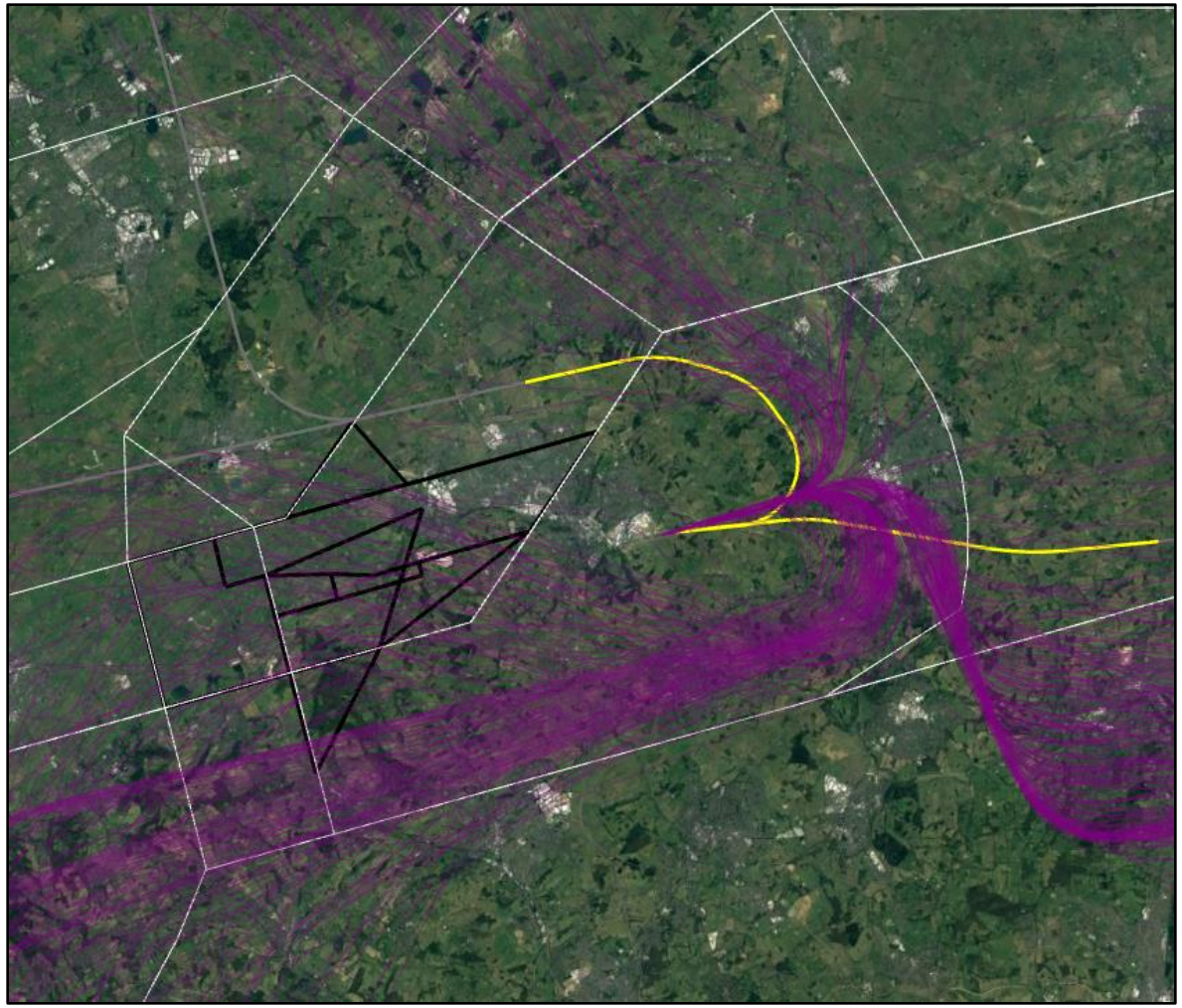
Rationale for progression or discontinuation

Easterly Departures – Option 5

Revised:
Departures offset to South of Breachwood Green.

MATCH SID more direct

Dependent on other airports



See Design Principle Evaluation Summary of this Option

See if option shortlisted

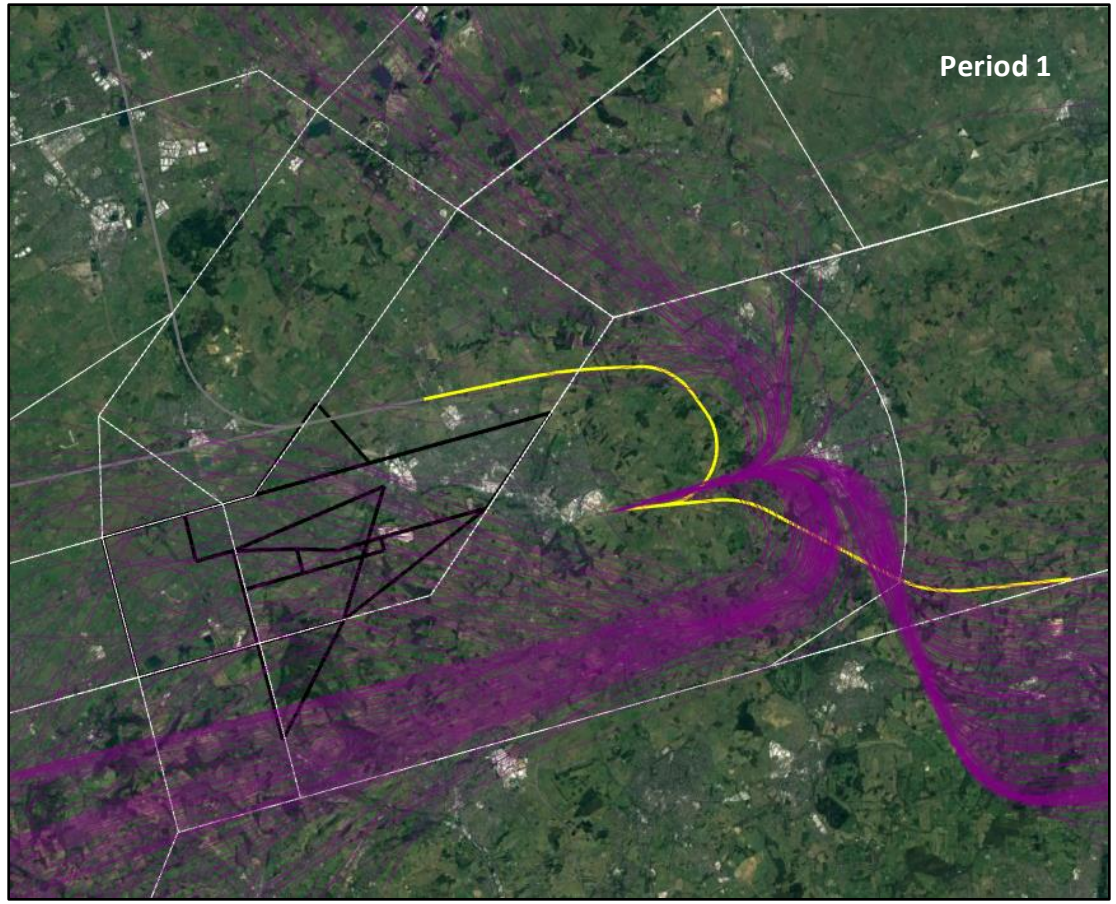
Rationale for progression or discontinuation

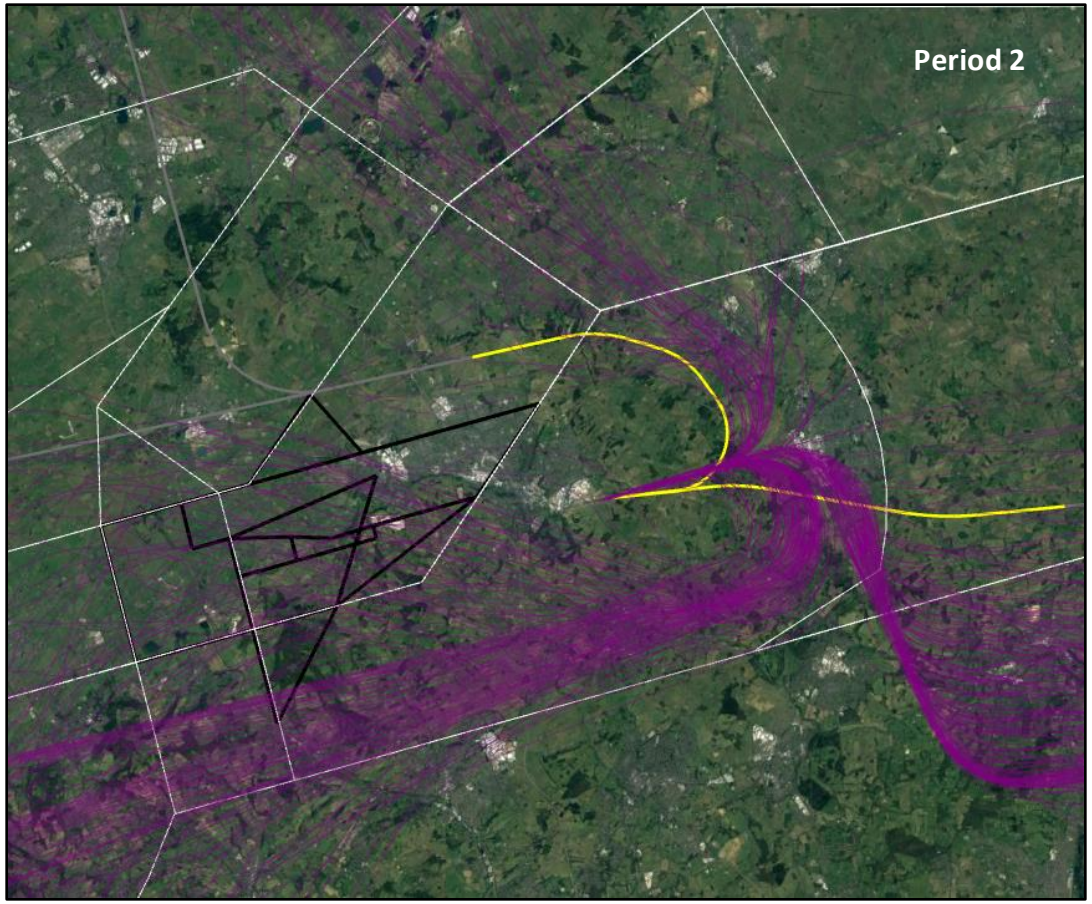
Easterly Departures – Option 6

See Design Principle Evaluation Summary of this Option

See if option shortlisted

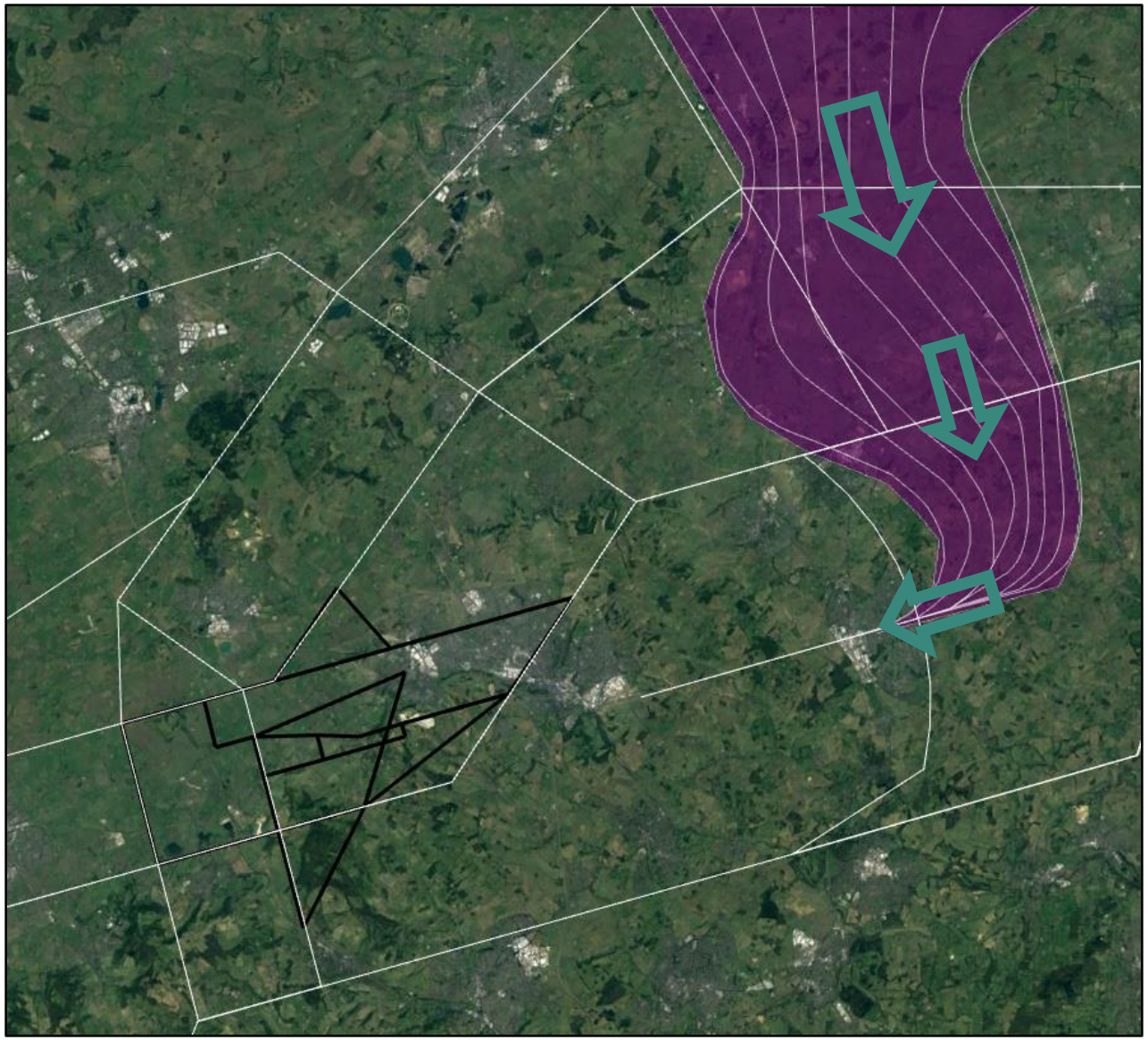
Rationale for progression or discontinuation





Revised: Departures offset to South of Breachwood Green. MATCH more direct.
Dependent on other airports

Westerly Arrivals – Option 1 Do Nothing



See Design Principle Evaluation Summary of this Option

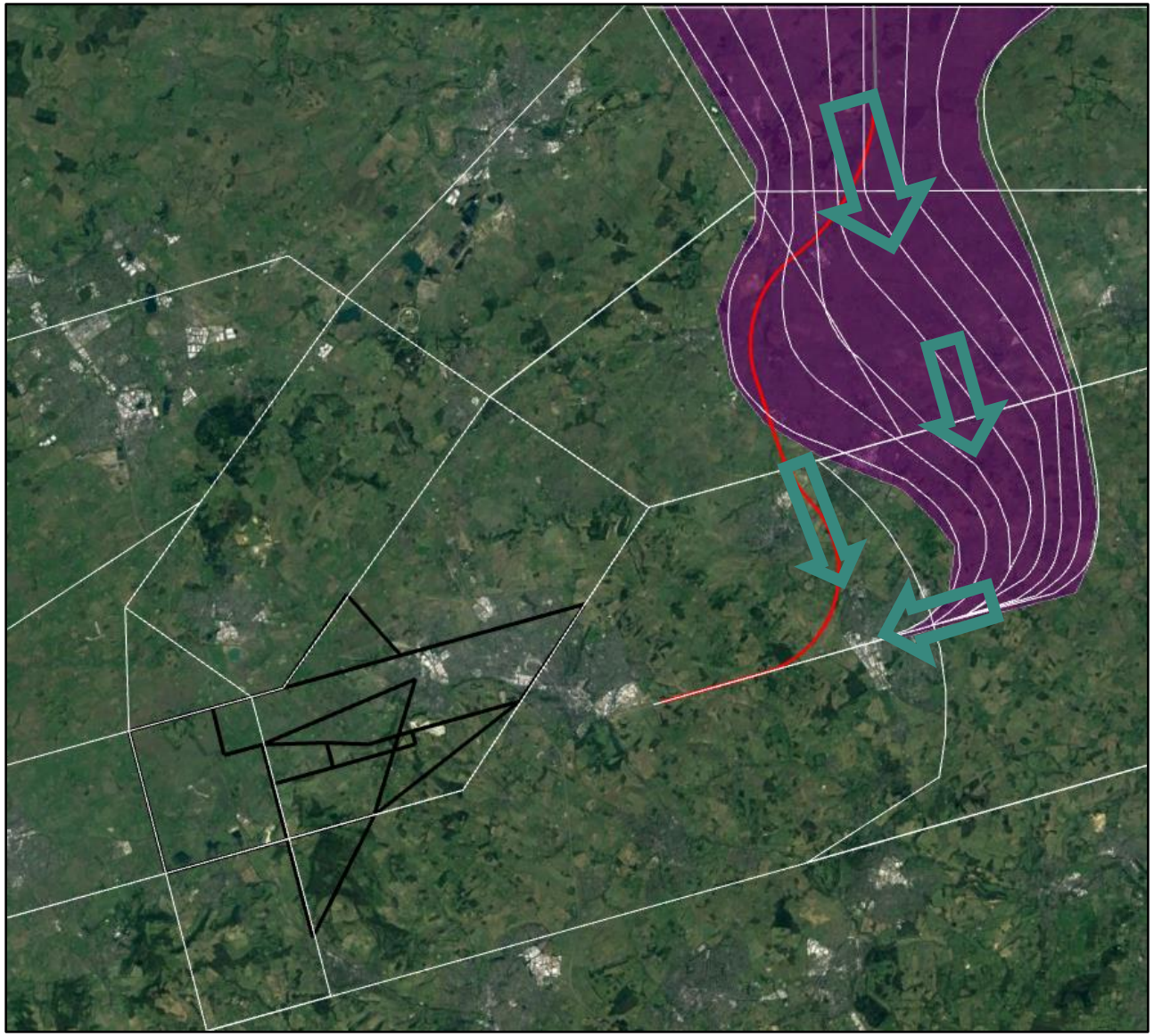
See if option shortlisted

Rationale for progression or discontinuation

Westerly Arrivals – Option 2

New: Main flow of arrivals continue to be vectored but with Ad-hoc use of a shorter route by equipped operators.

Not dependent on other airports



See Design Principle Evaluation Summary of this Option

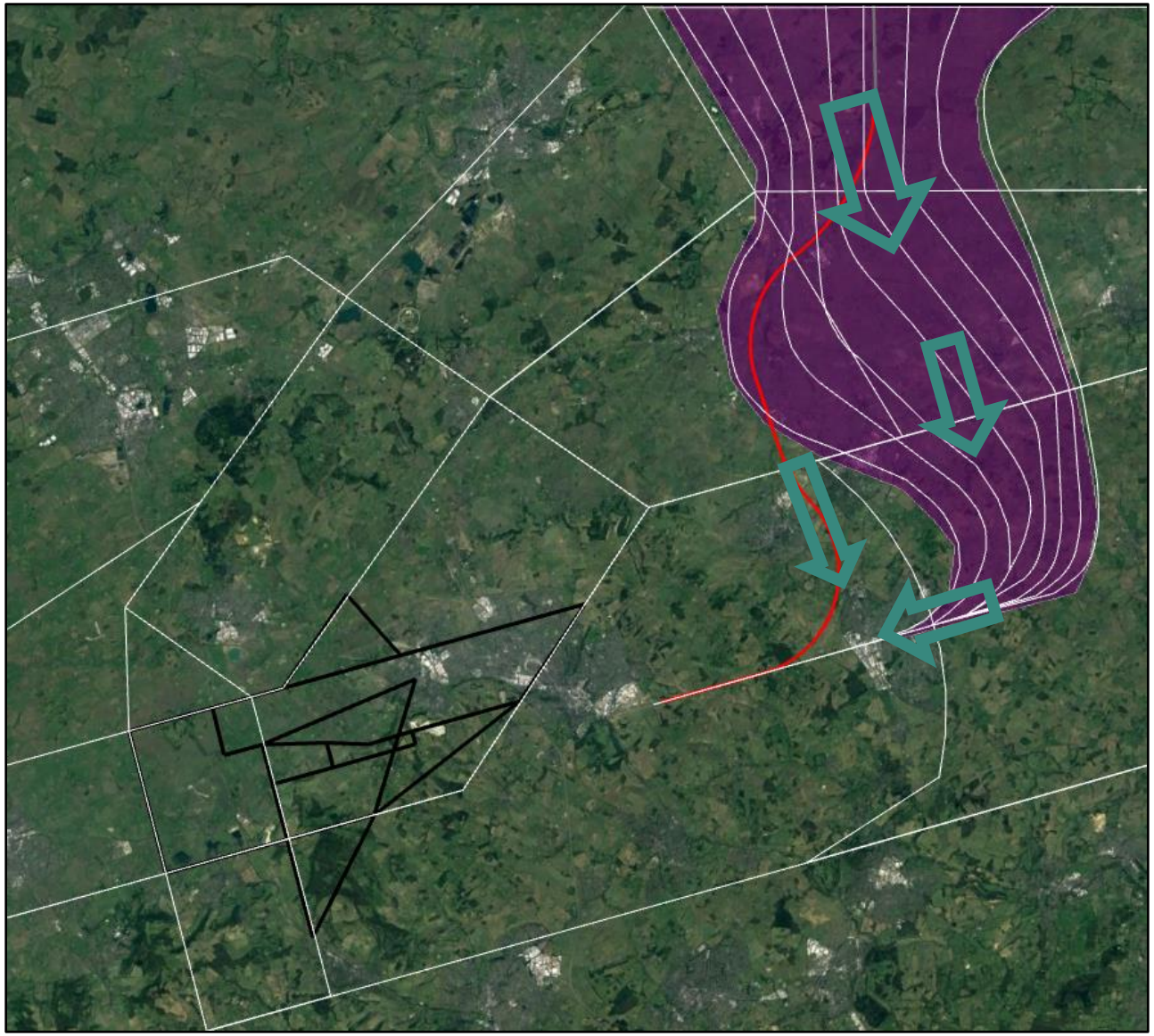
See if option shortlisted

Rationale for progression or discontinuation

Westerly Arrivals – Option 3

New: As per Option 2 but with CDA from higher than today.

Dependent on other airports



See Design Principle Evaluation Summary of this Option

See if option shortlisted

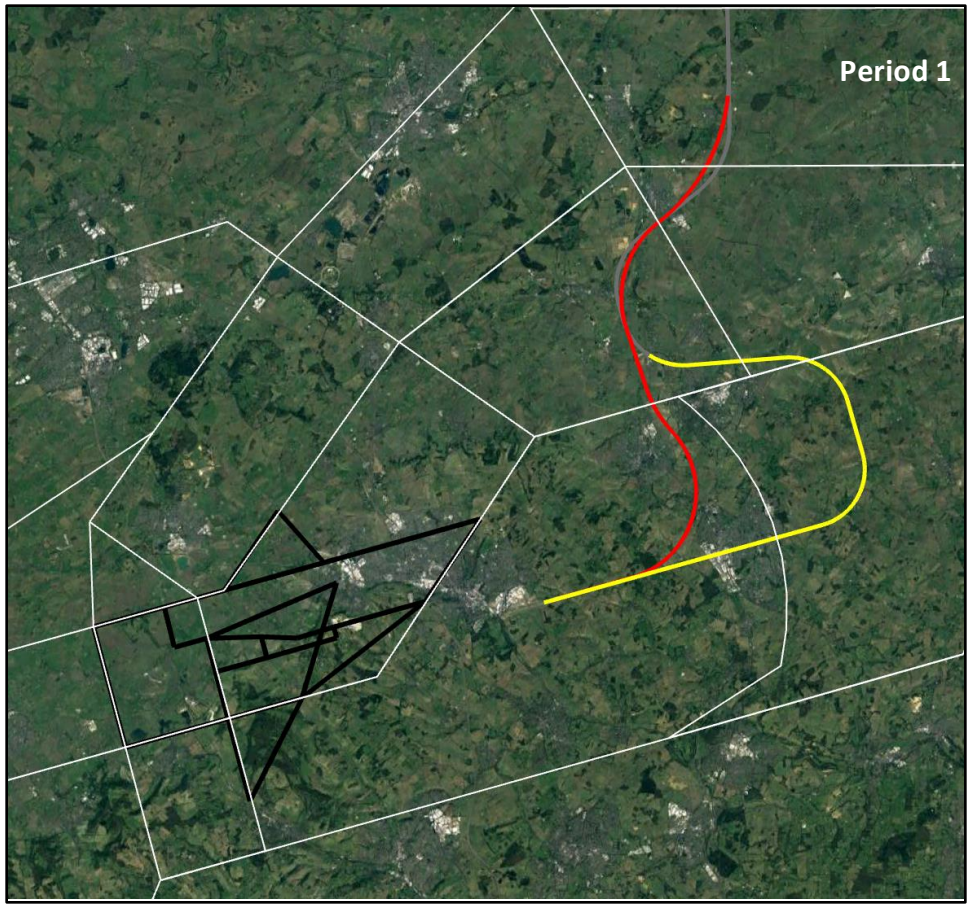
Rationale for progression or discontinuation

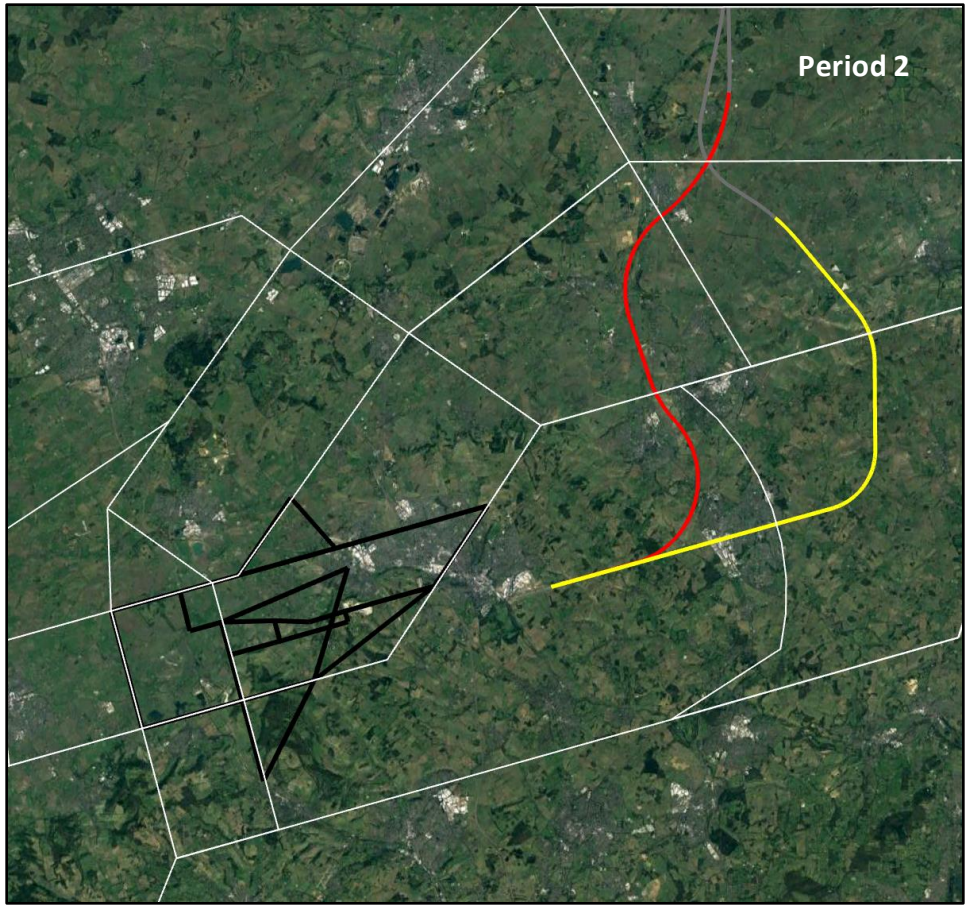
Westerly Arrivals – Option 4

See Design Principle Evaluation Summary of this Option

See if option shortlisted

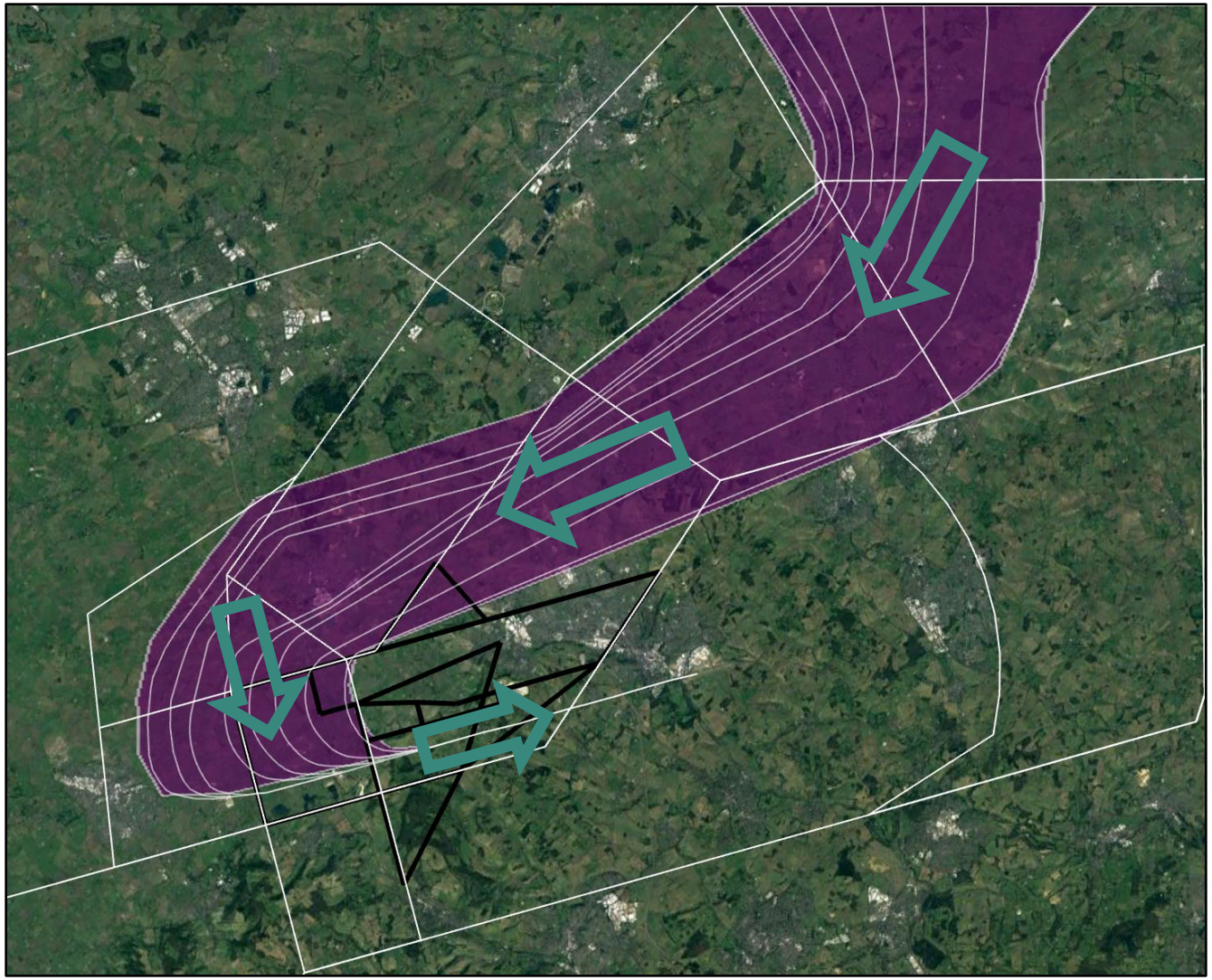
Rationale for progression or discontinuation





2 x PBN arrival routes used in rotation.
1 more PBN arrival route used Ad-Hoc by equipped users
CDA from higher than today. Dependent on other airports

Easterly Arrivals – Option 1 Do Nothing



See Design Principle Evaluation Summary of this Option

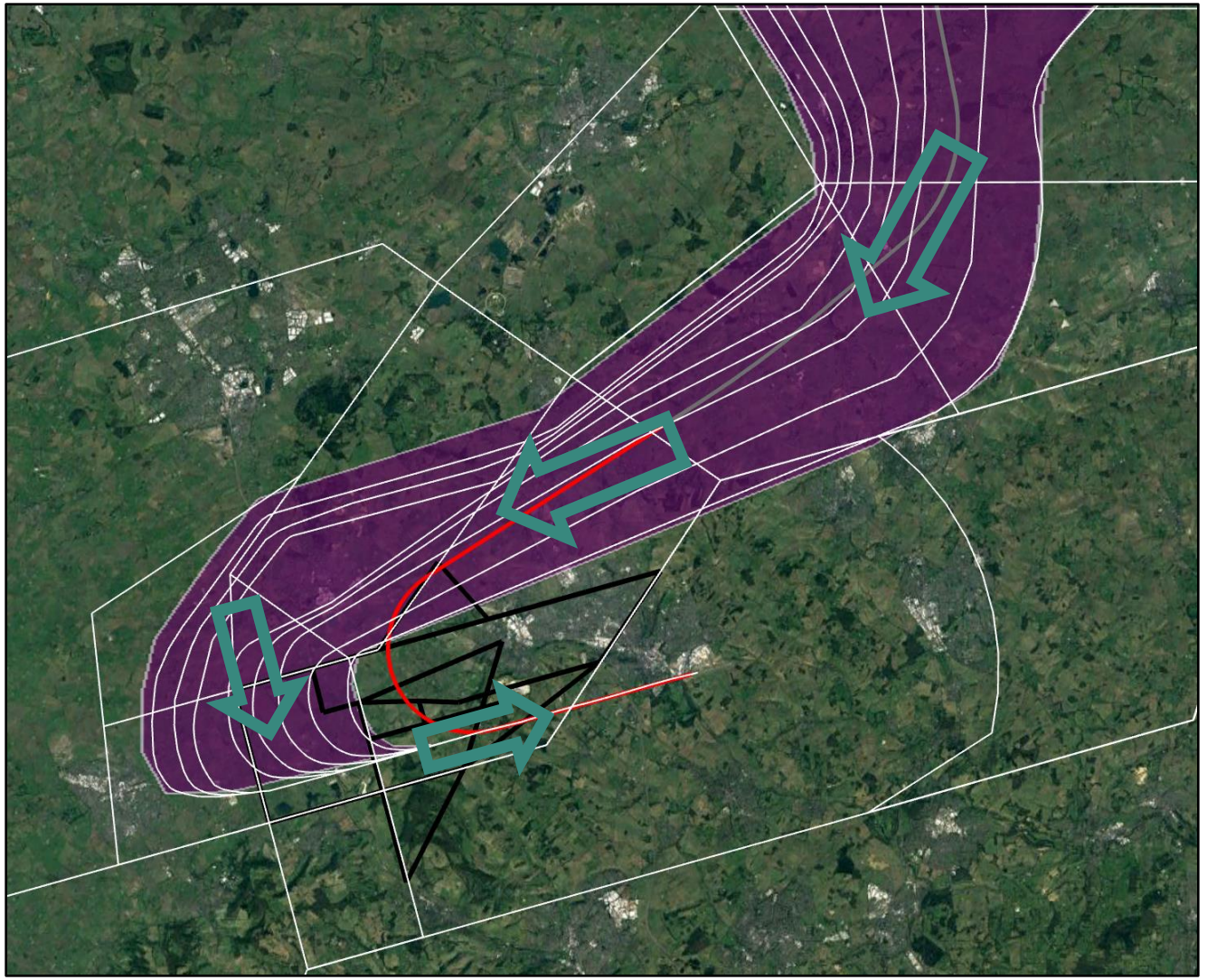
See if option shortlisted

Rationale for progression or discontinuation

Easterly Arrivals – Option 2

New: Main flow of arrivals continue to be vectored but with Ad-hoc use of a shorter route by equipped operators.

Not dependent on other airports



See Design Principle Evaluation Summary of this Option

See if option shortlisted

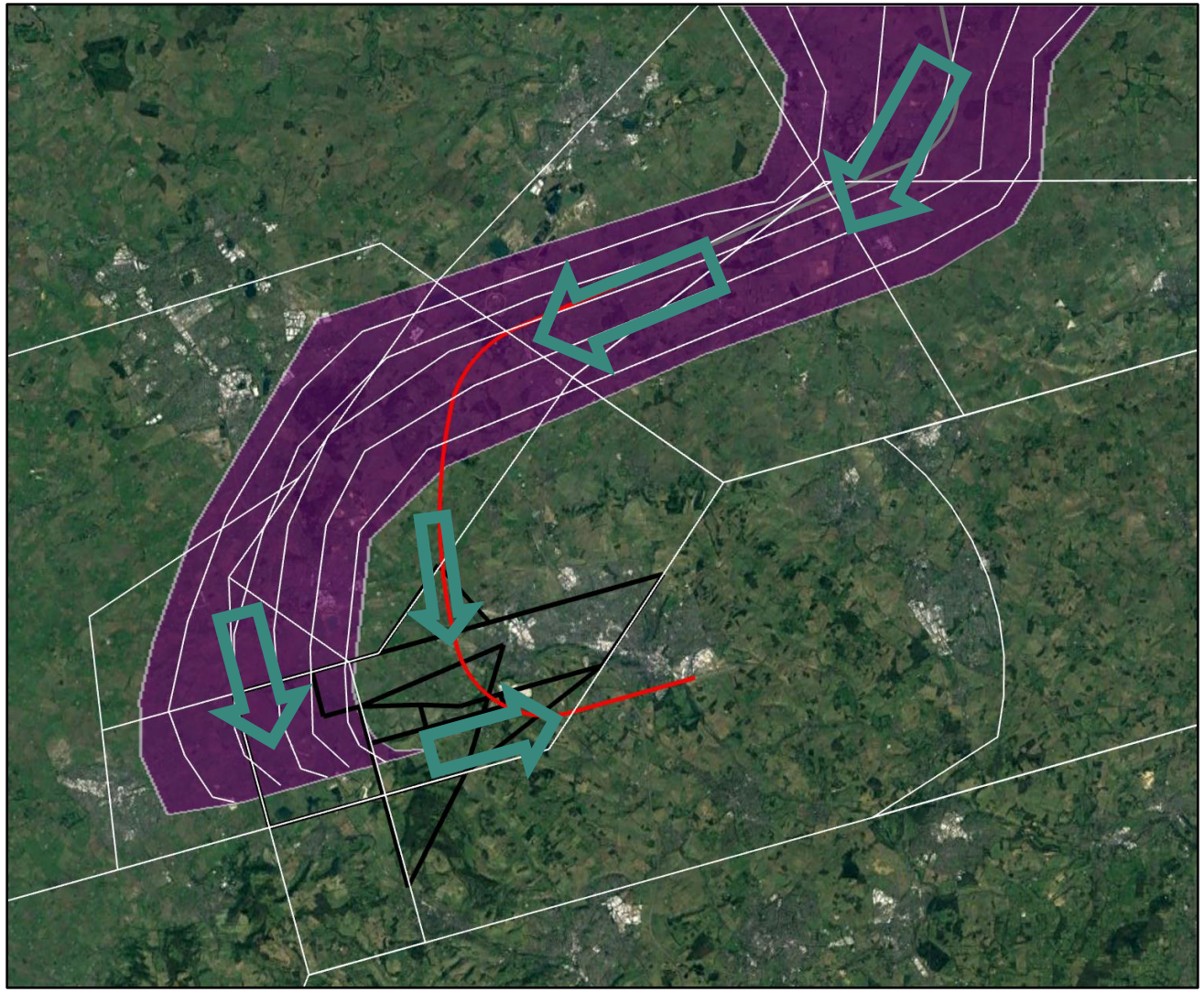
Rationale for progression or discontinuation

Easterly Arrivals – Option 3

New: Main flow of arrivals continue to be vectored but swathe moved north to facilitate Easterly SID Groups 5 and 6.

Ad-hoc use of a shorter route by equipped operators

Dependent on other airports



See Design Principle Evaluation Summary of this Option

See if option shortlisted

Rationale for progression or discontinuation

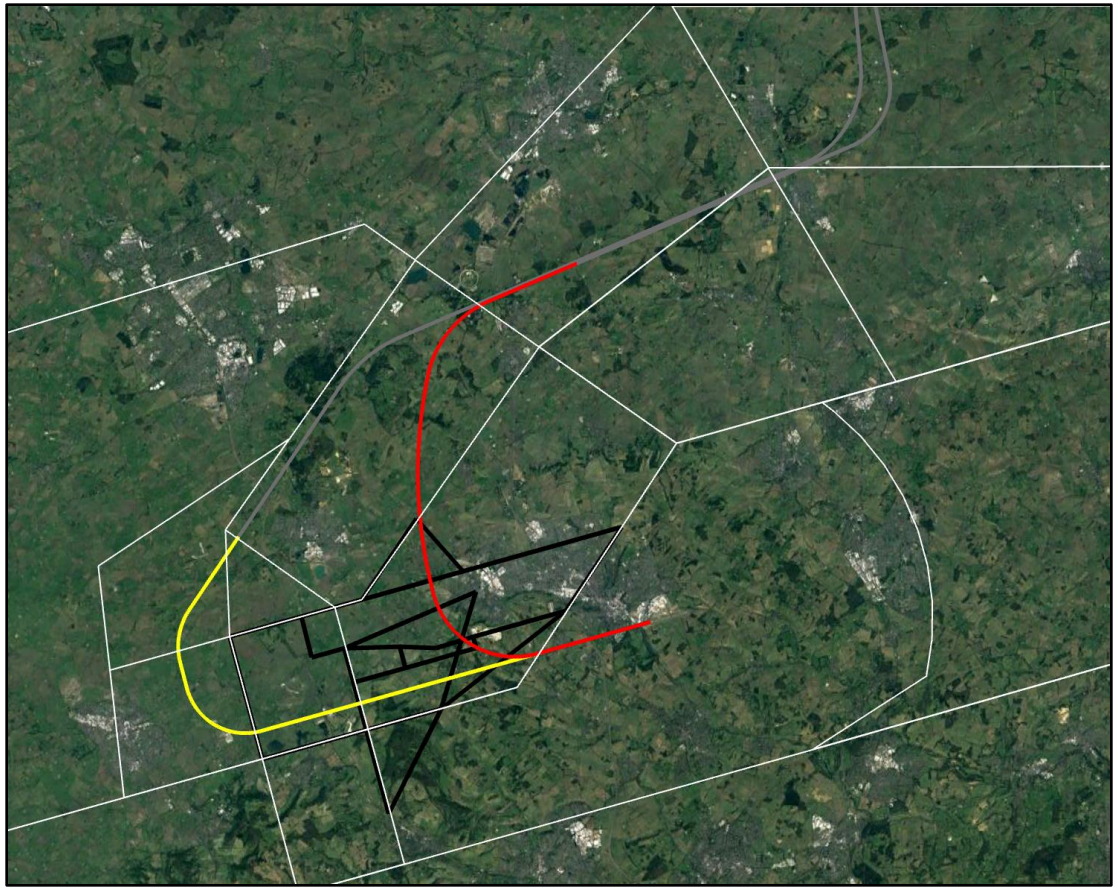
Easterly Arrivals – Option 4

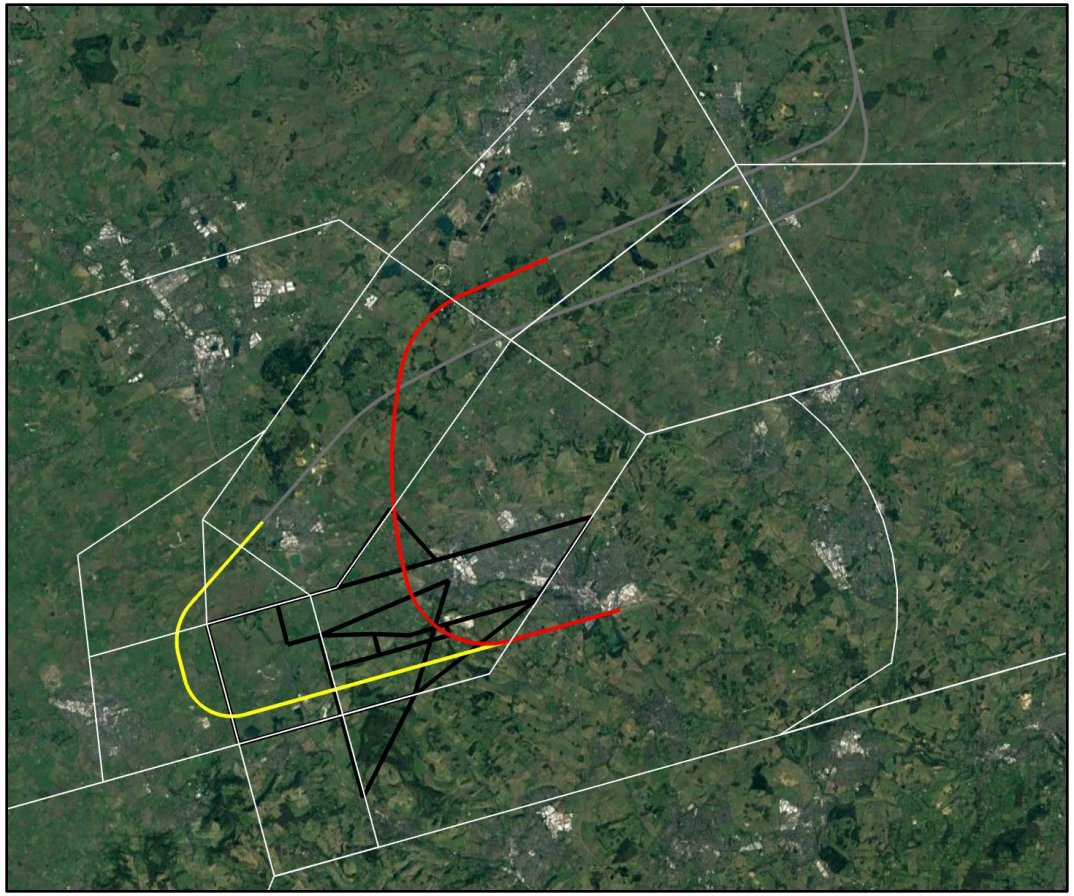
Classification: Public

See Design Principle Evaluation Summary of this Option

See if option shortlisted

Rationale for progression or discontinuation





Revised: 2 x PBN arrival routes used in rotation, one over Leighton Buzzard

1 more PBN arrival route used Ad-Hoc by equipped users

CDA from higher than today. Arrivals further north than today. Dependent on other airports

Summary of our Design Principle Evaluation

The Design Principle Evaluation

The DPE is a qualitative evaluation to understand the extent to which each options meets each Design Principle.

We had to break down some of the DPs into more assessment categories.

The following slides only show the Green (Met) /Amber (Partially Met) / Red (Not Met) status. The CAA submission contains the text to support the ranking, together with the methodology used for the evaluation.

As the DPs were prioritised (1 – 8), it was also suggested that we could apply a weighted scoring to help articulate which options are best meeting the range of DPs. This score is at the bottom of the summary tables.

Prioritised DP	Met	Partially Met	Not Met
1	10	5	0
2*	9	4.5	0
3	8	4	0
4	7	3.5	0
5	6	3	0
6	5	2.5	0
7	4	2	0
8	3	1.5	0

*When scoring the baseline (do nothing) options, we felt it would make these options look 'unfairly bad' against all other options if we attributed no points against this DP. We therefore gave a score of 4.5 to these assessments on each of the do-nothing options.

Westerly SID Group Options

Classification: Public

		IS OPTION DEPENDENT ON CHANGES TO OTHER AIRPORTS' ROUTES?							
		NO	NO	NO	NO	YES	YES	YES	YES
DESIGN PRINCIPLE (Click on name to take you to slide showing that option)		W SID Grp 1	W SID Grp 2	W SID Grp 3	W SID Grp 4	W SID Grp 5	W SID Grp 6	W SID Grp 7	W SID Grp 8
Must be safe									
Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof	Reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise	N/A							
	Make a significant and cost-effective contribution towards reducing global emissions	N/A							
	Minimise local air quality emissions	N/A							
	Routes below 7,000 feet should seek to avoid flying over Areas of Outstanding Natural Beauty (AONB) and National Parks	N/A							
Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met									
Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that									
Should provide an equitable distribution of traffic where possible, through eg;	Use of multiple routes								
	New route structures								
	Options (mechanisms) for respite								
Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft									
Should minimise tactical intervention by ATC below 7000ft									
Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum								
	Simple airspace boundaries								
	Allowing flexible use of airspace, where possible								
Weighted Score		38.5	62.5	63.5	70.8	66.5	74	52.5	51

Easterly SID Group Options

		IS OPTION DEPENDENT ON CHANGES TO OTHER AIRPORTS' ROUTES?					
		NO	YES	NO	YES	YES	YES
DESIGN PRINCIPLE (Click on name to take you to slide showing that option)		E SID Grp 1	E SID Grp 2	E SID Grp 3	E SID Grp 4	E SID Grp 5	E SID Grp 6
Must be safe							
Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof	Reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise	N/A					
	Make a significant and cost-effective contribution towards reducing global emissions	N/A					
	Minimise local air quality emissions	N/A					
	Routes below 7,000 feet should seek to avoid flying over Areas of Outstanding Natural Beauty (AONB) and National Parks	N/A					
Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met							
Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that							
Should provide an equitable distribution of traffic where possible, through eg;	Use of multiple routes						
	New route structures						
	Options (mechanisms) for respite						
Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft							
Should minimise tactical intervention by ATC below 7000ft							
Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum						
	Simple airspace boundaries						
	Allowing flexible use of airspace, where possible						
Weighted Score		38.5	38	53	45.5	66.5	78.5

Westerly Arrival Options

		IS OPTION DEPENDENT ON CHANGES TO OTHER AIRPORTS' ROUTES?			
		NO	NO	YES	YES
DESIGN PRINCIPLE (Click on name to take you to slide showing that option)		W Arrival 1	W Arrival 2	W Arrival 3	W Arrival 4
Must be safe					
Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof	Reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise	N/A			
	Make a significant and cost-effective contribution towards reducing global emissions	N/A			
	Minimise local air quality emissions	N/A			
	Routes below 7,000 feet should seek to avoid flying over Areas of Outstanding Natural Beauty (AONB) and National Parks	N/A			
Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met					
Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that					
Should provide an equitable distribution of traffic where possible, through eg;	Use of multiple routes				
	New route structures				
	Options (mechanisms) for respite				
Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft					
Should minimise tactical intervention by ATC below 7000ft					
Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum				
	Simple airspace boundaries				
	Allowing flexible use of airspace, where possible				
Weighted Score		48.5	62	62	63.5

Easterly Arrival Options

		IS OPTION DEPENDENT ON CHANGES TO OTHER AIRPORTS' ROUTES?			
		NO	NO	YES	YES
DESIGN PRINCIPLE (Click on name to take you to slide showing that option)		E Arrival 1	E Arrival 2	E Arrival 3	E Arrival 4
Must be safe					
Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof	Reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise	N/A			
	Make a significant and cost-effective contribution towards reducing global emissions	N/A			
	Minimise local air quality emissions	N/A			
	Routes below 7,000 feet should seek to avoid flying over Areas of Outstanding Natural Beauty (AONB) and National Parks	N/A			
Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met					
Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that					
Should provide an equitable distribution of traffic where possible, through eg;	Use of multiple routes				
	New route structures				
	Options (mechanisms) for respite				
Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft					
Should minimise tactical intervention by ATC below 7000ft					
Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum				
	Simple airspace boundaries				
	Allowing flexible use of airspace, where possible				
Weighted Score		48.5	56	60.5	62.5

Summary of our Initial Options Appraisal

The Initial Options Appraisal

The Initial Options Appraisal (IOA) is the first stage in a three-phase appraisal of airspace change options. It involves the mainly qualitative appraisal of the airspace change options that have proceeded from Stage 2A (the DPE).

As options progress through the airspace change process, the two following appraisals, the Full Options Appraisal and Final Options Appraisal undertaken at Stage 3 and 4, will quantitively evaluate options in further detail.

The IOA requires sponsors to carry out an initial qualitative assessment of the benefits and impacts of each option, tested against the 'do nothing' baseline scenario. The purpose of this initial appraisal is to highlight to change sponsors, stakeholders and the CAA the relative differences between the impacts, both positive and negative, of each option.

The Initial Options Appraisal

Our assessment criteria shown in the table have been categorised based on the requirements of CAP1616 Appendix E.

However, at the request of the CAA we have added additional categories to assess 'Interdependencies, conflicts and trade-offs' to outline potential interdependencies with other FASI-S ACPs and another to assess "Alignment with the strategic vision of the Airspace Modernisation Strategy".

Each of our options were appraised against these categories using the same methodology.

Category	Impact
Communities	Noise impact on health and quality of life
	Air Quality
Wider Society	Greenhouse gas impact
	Capacity / resilience
General Aviation	Access
General Aviation / Commercial airlines	Economic impact from increased effective capacity
	Fuel burn
Commercial airlines	Training costs
	Other costs
Airport / Air navigation service provider	Infrastructure costs
	Operational costs
	Deployment costs
All	Safety
Masterplan	Interdependencies, conflicts and trade-offs
AMS	Alignment with strategic vision of AMS

Initial Options Appraisal: Example of data comparison

Average movements per day.

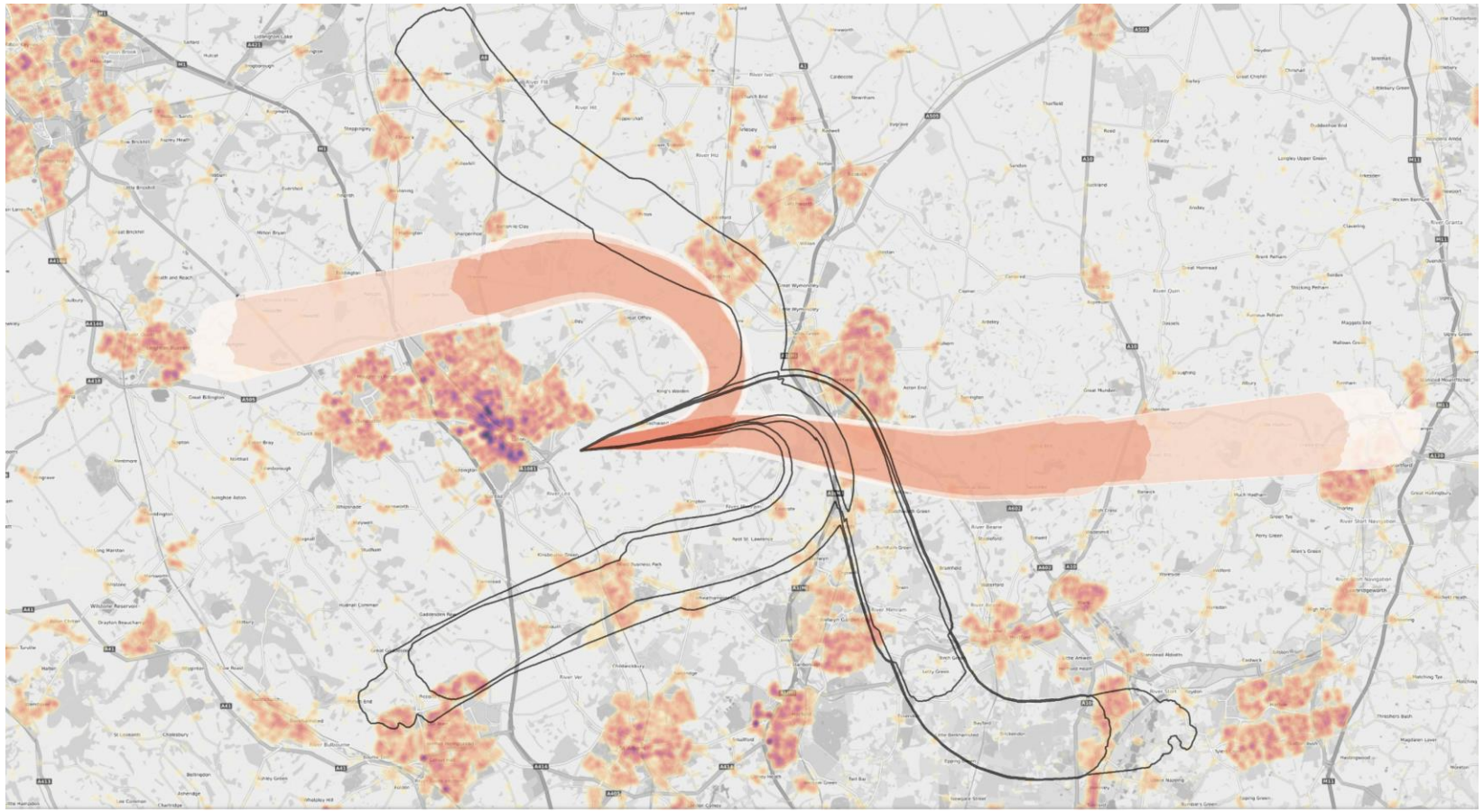
Assumes 70% of Luton's departures averaged across 365 days

Westerly SID Group Option 2 overflight contour 0 - 7000ft (day)

Baseline (centreline) contours outlined in black

	Population over flown 0-7000ft (1 times per day)	Population over flown 0-7000ft (10 times per day)	Population over flown 0-7000ft (50 times per day)	Population over flown 0-7000ft (100 times per day)	Population over flown 0-4000ft (1 times per day)	Population over flown 0-4000ft (10 times per day)	Population over flown 0-4000ft (50 times per day)	Population over flown 0-4000ft (100 times per day)	Population over flown 4-7000ft (1 times per day)	Population over flown 4-7000ft (10 times per day)	Population over flown 4-7000ft (50 times per day)	No. Schools 0-7000ft	No. Schools 0-4000ft	No. Schools 4-7000ft	No. Hospitals 0-7000ft	No. Hospitals 0-4000ft	No. Hospitals 4-7000ft	No. Worship. 0-7000ft	No. Worship. 0-4000ft	No. Worship. 4-7000ft	No. Historic Parks/Gdns 0-7000ft	No. Historic Parks/Gdns 0-4000ft	No. Historic Parks/Gdns 4-7000ft	Area (Km2) of AONB overflown. 0-7000ft	Area (Km2) of AONB overflown. 0-4000ft	Area (Km2) of AONB overflown. 4-7000ft	No SSSI. 0-4000ft	No.Nat2000 0-4000ft
Baseline Westerly Dep Option 1 (centreline)	153814.2	86233.8	14940.9	2535.9	8058.7	6305.1	3777.8	2531.5	149803.7	82188.0	10780.8	152.0	13.0	147.0	2.0	0.0	2.0	80.0	6.0	79.0	3.0	1.0	2.0	95.9	19.0	95.9	0.0	0.0
Westerly Dep Option 2	129042.5	65989.4	15026.3	986.1	11235.2	10122.4	2395.4	986.1	126362.5	63273.4	11568.3	131.0	12.0	127.0	1.0	0.0	1.0	65.0	4.0	64.0	3.0	1.0	2.0	96.1	19.6	96.1	0.0	0.0

Initial Options Appraisal: Example of data comparison



Average movements per day.

Assumes 30% of Luton's departures averaged across 365 days

Easterly SID Group Option 5 overflight contour 0 - 7000ft (day)

Baseline (centreline) contours outlined in black

	Population over flown 0-7000ft (1 times per day)	Population over flown 0-7000ft (10 times per day)	Population over flown 0-7000ft (50 times per day)	Population over flown 0-7000ft (100 times per day)	Population over flown 0-4000ft (1 times per day)	Population over flown 0-4000ft (10 times per day)	Population over flown 0-4000ft (50 times per day)	Population over flown 0-4000ft (100 times per day)	Population over flown 4-7000ft (1 times per day)	Population over flown 4-7000ft (10 times per day)	Population over flown 4-7000ft (50 times per day)	No. Schools 0-7000ft	No. Schools 0-4000ft	No. Schools 4-7000ft	No. Hospitals 0-7000ft	No. Hospitals 0-4000ft	No. Hospitals 4-7000ft	No. Worship. 0-7000ft	No. Worship. 0-4000ft	No. Worship. 4-7000ft	No. Historic Parks/Gdns 0-7000ft	No. Historic Parks/Gdns 0-4000ft	No. Historic Parks/Gdns 4-7000ft	Area (Km2) of AONB overflown. 0-7000ft	Area (Km2) of AONB overflown. 0-4000ft	Area (Km2) of AONB overflown. 4-7000ft	No SSSI. 0-4000ft	No.Nat2000 0-4000ft
Baseline Easterly Dep Option 1 (Centreline)	201573.7	30483.5	0.0	0.0	17616.5	7510.6	0.0	0.0	200914.7	28299.3	0.0	213.0	26.0	208.0	6.0	0.0	6.0	115.0	16.0	111.0	2.0	1.0	1.0	11.3	0.0	11.3	1.0	0.0
Easterly Dep Option 5	61816.7	19951.2	0.0	0.0	14718.2	6071.0	0.0	0.0	60749.2	18184.9	0.0	83.0	15.0	78.0	1.0	0.0	1.0	49.0	11.0	45.0	2.0	1.0	1.0	36.0	0.4	36.0	132.0	0.0

The Shortlist: Options discounted and carried forward

Our shortlisted options

	Westerly Departures							
	W SID Grp 1	W SID Grp 2	W SID Grp 3	W SID Grp 4	W SID Grp 5	W SID Grp 6	W SID Grp 7	W SID Grp 8
Progressed	X	YES	X	YES	YES	YES	X	X
	Easterly Departures							
	E SID Grp 1	E SID Grp 2	E SID Grp 3	E SID Grp 4	E SID Grp 5	E SID Grp 6		
Progressed	X	X	YES	YES	YES	YES		
	Westerly Arrivals							
	W Arrival 1	W Arrival 2	W Arrival 3	W Arrival 4				
Progressed	X	YES	YES	YES				
	Easterly Arrivals							
	E Arrival 1	E Arrival 2	E Arrival 3	E Arrival 4				
Progressed	X	X	YES	YES				

Options taken forward which are independent of other airports

- Westerly SID Option 2: Repositioning of MATCH departures north of BPK that enables more frequent, tactical continuous climb
- Westerly SID Option 4: Multiple SIDs used in rotation which share the noise from MATCH/OLY/CPT departures over a greater area
- Westerly Arrival Option 2: A PBN route to a shorter final approach joining point (with the main vectored arrival swathe continuing as today)
- Easterly SID Option 4: A more direct CPT and/or MATCH SID potentially with an initial track to avoid Breachwood Green and enable more tactical continuous climb (of MATCH departures). There is potential for the MATCH SID option from Easterly SID Group 5 to be deployed early as part of Option 4, but without the guaranteed CCO, subject to safety assurances.

Options taken forward which are dependent on other airports

- Westerly SID Option 5: MATCH/OLY/CPT with improved CCO, possibly with earlier route divergence
- Westerly SID Option 6: Multiple SIDs which share westerly departures over a greater area with improved CCO
- Westerly Arrival Option 3: Vectors with improved CDA potentially also with a PBN route to a shorter final approach joining point
- Westerly Arrival Option 4: 2 x PBN arrival routes used in rotation with improved CDA, potentially also with a PBN route to a shorter final approach joining point
- Easterly SID Option 3: CPT SID to the south of the airport which avoids Harpenden with improved CCO.
- Easterly SID Option 5: CPT SID to the North of Luton and more direct MATCH route with improved CCO
- Easterly SID Option 6: Option 5 but with 2 sets of CPT/MATCH SIDs used in rotation with improved CCO
- Easterly Arrival Option 3: Vectors with improved CDA but without PBN route to shorter final
- Easterly Arrival Option 4: 2 x PBN arrival routes used in rotation with improved CDA but without PBN route to shorter final

Options discontinued

- All the Do Nothing Options: They do not align with the AMS or offer any safety, environmental, general aviation or capacity benefits.

- Westerly SID Option 3: Splitting the MATCH and CPT/OLY SIDs immediately is likely to increase population numbers experiencing adverse effects at very low altitude and offers no mitigation (multiple SIDs) or improvement to vertical climb performance on the CPT/MATCH SIDs.

- Westerly SID Option 7: Likely to increase the size (Km^2) of Luton's noise contours which would breach planning constraints. Would greatly increase population numbers experiencing adverse effects at very low altitude.

- Westerly SID Option 8: Option is likely to increase the size (Km^2) of Luton's noise contours which would breach planning constraints. Would increase population numbers experiencing adverse effects at very low altitude and significantly increase miles (CO_2) of MATCH departures.

- Easterly SID Group 2: Replicating MATCH and CPT deliver insufficient benefit. Implementing a new OLY SID that still requires routing vectors and with a centreline over increased population not progressed.

- Easterly Arrival 2: A shorter RNP-AR arrival route would only be available at night and would require more Controlled Airspace in a very busy piece of airspace, which we would not be successful with given the limited use of the route.

Next steps

Next steps

- All our Stage 2 documentation will be available on the CAA Airspace Change Portal early March.
- The Stage 2 CAA Gateway is 25th March 2022 and the portal will be updated with a decision early April.
- If Luton is allowed to progress to Stage 3, those options which are dependent on changes to routes to/from other airports will be 'paused' until adjacent airports (Heathrow, London City and Northolt) are into Stage 3.
- Those options which are not dependent on changes to routes to/from other airports will be refined in greater detail and taken through the Full Options Appraisal. Those preferred options which deliver sufficient benefit and can be integrated into the existing airspace network without constraining the wider FASI ACPs will be taken to Public Consultation for an early deployment ahead of the wider changes.
- We will update you more on timescales later this year.