Demo note:

This presentation has notes in text like this, adding some narrative.

Presentations similar to this were given to all our participating stakeholder groups, generally delivered in person with a corresponding talk-through of the contents, fully interactively. It acted as the framework around which the presenters and all participants based their two-way discussions. The engagement was a “live” Q&A around these slides with context being provided at each step, which is not easily representable on a static document such as this.

Each presentation is tailored to the known interests of each stakeholder. Some presentations concentrated on the upper regions, others the lower, others on different aviation technical aspects. Not every stakeholder was presented with every option for that reason, plus some options fell out of the feedback received from these stakeholder engagement activities.

Sometimes additional information was requested, so we added orange slides to the version we sent with the minutes, making it clear these slides were extra. Some examples are included.

The majority of stakeholders are the same as those we engaged for Stage 1 of this proposal.

Airspace Change SAIP AD6

Stakeholder Engagement:

Typical Presentation

Date

CAP1616 Stage 2

Typical Agenda

Introductions and scene setting “why are we here?”, background to AD6

Airspace change process, the role of stakeholders, Design Principles (recap)

Today’s situation in the region (recap)

Progress to date, illustrations of concepts for consideration

Impacts on, and potential mitigations for, the interests of this stakeholder

Summarise discussions

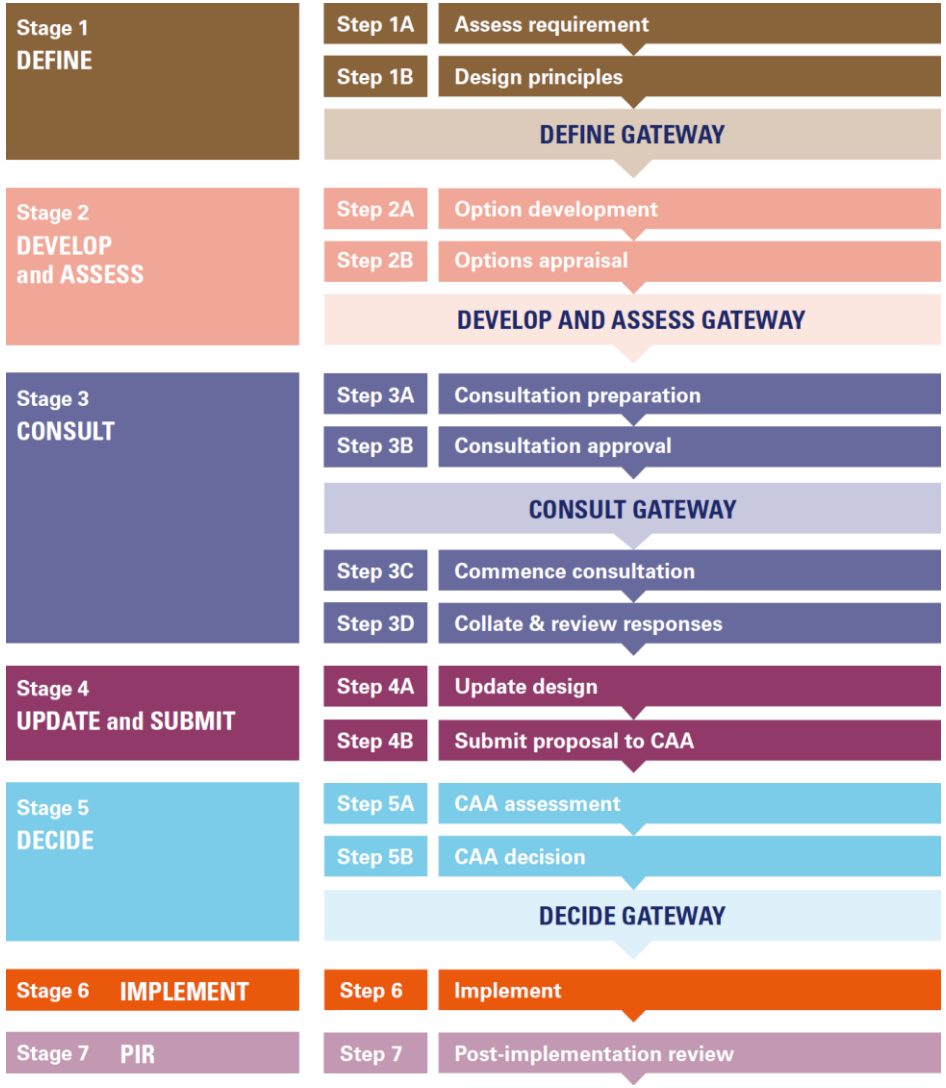
Process notes, conclusions and close

Why are we here? Background to AD6

- Joint NATS-LLA ACP
- Safety imperative identified – need to remove dependency of Luton arrivals on Stansted arrivals
- NATS has **already implemented** non-airspace-change, short-term remedial measures to manage safety
  - Examples: Staffing, coordination, monitoring, appropriate flow control
- SAIP AD6 airspace concepts to develop:
  - New hold for Luton
  - New CAS fillet for Luton arrivals
  - Paths to final approach, with our co-sponsor LLA – possibly transitions
- Constraints exist for both the “upper options” (en route, towards the new hold) and “lower options” (from the hold towards the runways)

Demo note:
Some stakeholders are primarily interested in the upper region, some in the lower region, some in both. This demo shows both upper and lower.

Airspace change process CAP1616



Complete, 15x DPs published – recap of DPs follows

We are here – stakeholder engagement on design concepts

CAP1616 role of stakeholders…

Stakeholders who may be impacted by airspace change will normally (and subject to the terms of the applicable process set out in this guidance) have the opportunity to discuss with change sponsors the principles underlying the airspace change and the development of options for the change. They will normally be consulted formally on a proposal and be able to submit information and views on all aspects of the process, in some cases directly to the CAA at a Public Evidence Session held after the final proposal has been submitted to the CAA. They will have access to all relevant documentation, except for commercially (or national security) sensitive material, on the online portal.[10]

ACP Statement of Need (SoN) summary

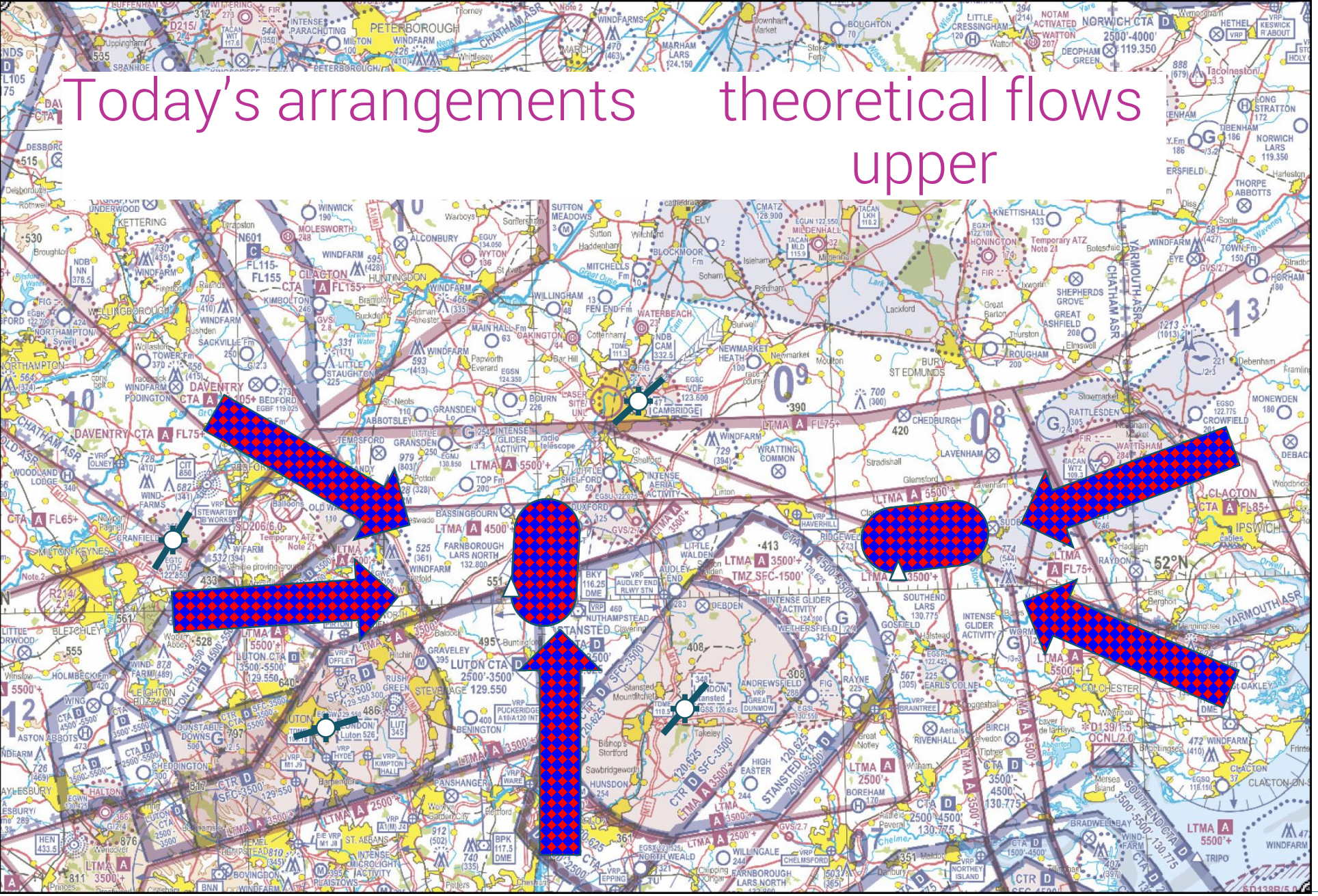
- Current situation – Luton and Stansted traffic use the same arrival routes and holding capacity which causes increased complexity as traffic levels increase. (Growth is still anticipated at each airport).
- NATS has conducted an internal safety survey on the TC Essex Sector and has identified some latent risk which has been shared with the CAA.
- NATS is exploring options to address the safety issues and work with co-sponsor, London Luton Airport, to improve capacity within the TC Essex sector.
- Desired outcome – To improve complexity, workload and delays in relation to arrival traffic at Luton and, as a consequence, Stansted.

Design Principles

Priority	Ref	Design Principle
1	1	Safety is the highest priority - Optimise the complexity of the TC Essex sector within the scope of this project
2	2	Environmental – Must meet the 3 aims of the NPSE, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof
	3	Technical – Minimise impacts on MoD USAFE Lakenheath operations to a level acceptable to MoD
3	4	Operational – Should not constrain the airport's capacity, providing the environmental objectives/ requirements have been met
	5	Technical – Minimise dependency of LLA's arrivals on those of Stansted Airport.
	6	Operational – Increase the predictability of LLA's arrivals
	7	Environmental – Should enable continuous descent from at least 7,000ft & facilitate continuous descent above that
4	8	Environmental – Minimise the requirement to change future low altitude arrival flows within the next ten years
	9	Technical – There must be agreement between stakeholder ANSPs that the design concept being progressed suits all operations. MoD (other than USAFE Lakenheath), MoD (USAFE Lakenheath), Stansted Airport, Cambridge Airport, Cardington Airport
	10	Environmental – Should provide equitable distribution of traffic where possible, through e.g. use of multiple routes, new route structures, options/mechanisms for respite
5	11	Economic – Reduce fuel burn
	12	Economic – Minimise potential increases in fuel burn
6	13	Environmental – Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7,000ft
7	14	Operational – Should minimise tactical intervention by ATC below 7,000ft
8	15	Technical – Minimise negative impact on other airspace users by keeping CAS requirements to a minimum, investigating potential release of existing CAS, keeping new airspace boundaries simple where possible, and FUA if possible

Demo note: Often, we highlight and explore the DPs which we believe are of most interest to the specific stakeholder, and agree that these should be the main focus of the discussions. We also clarify that focusing on certain DPs **does not** preclude discussion/feedback on any DP topic at any time.

Today's arrangements theoretical flows upper

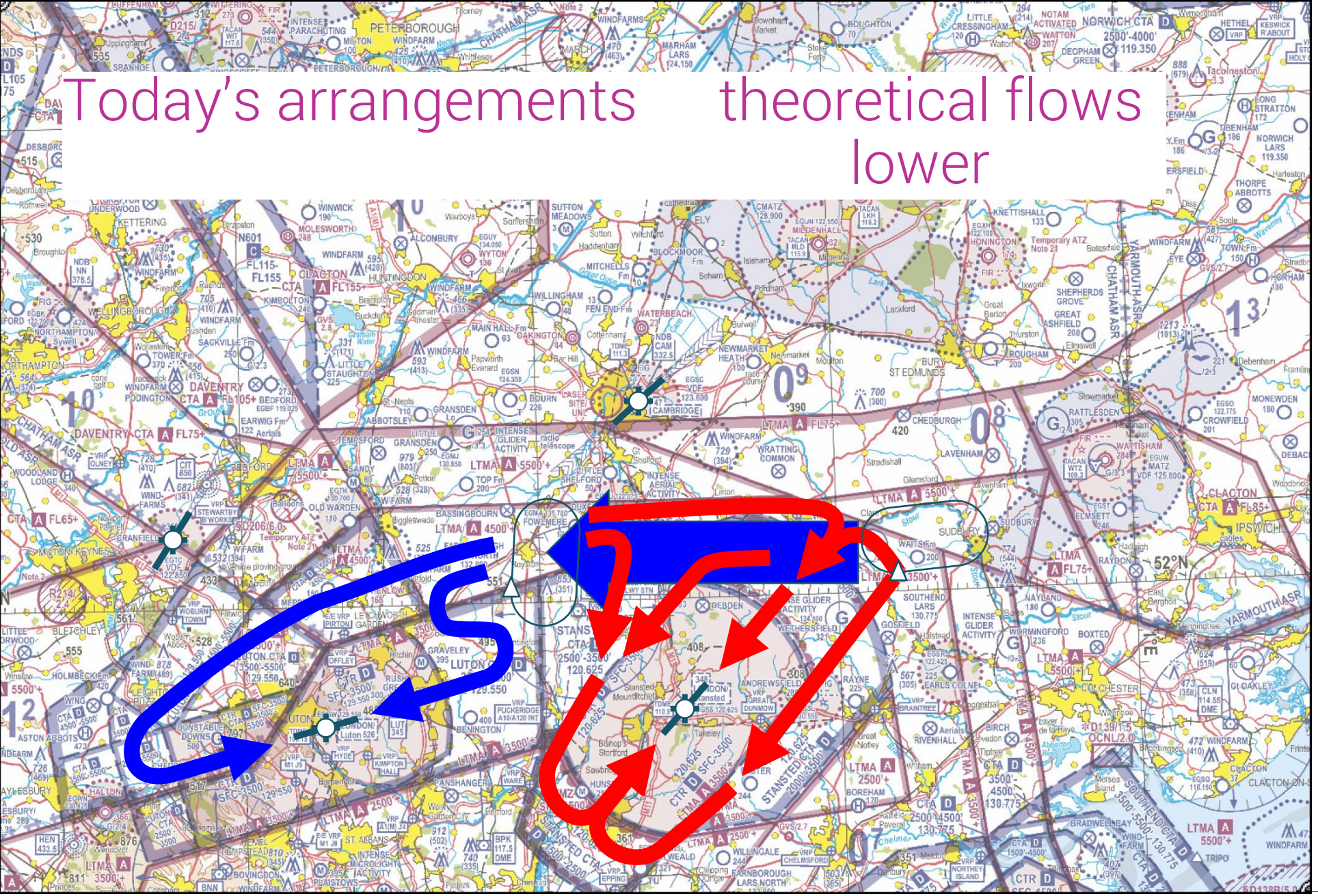


Luton arrivals
Stansted arrivals

Safety imperative:
Complex interactions
Growth at both airports
Small area, constrained
Manageable for now
Must be resolved soon

Demo note:
This is usually animated to illustrate movement

Today's arrangements theoretical flows lower



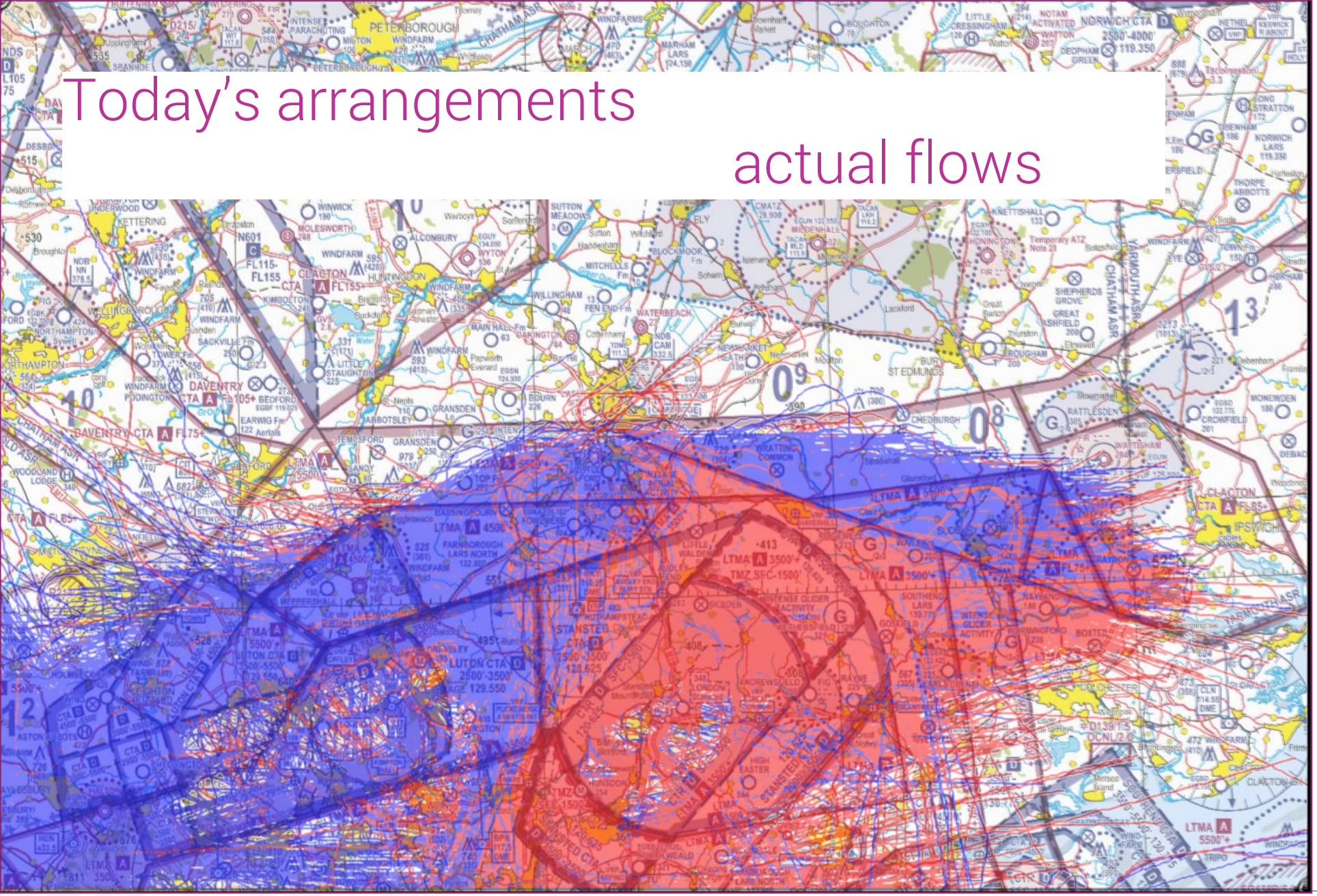
Luton arrivals
Stansted arrivals

Safety imperative:
Complex interactions
Growth at both airports
Small area, constrained
Manageable for now
Must be resolved soon

Demo note:
This is usually animated to illustrate movement

Today's arrangements

actual flows



Luton arrivals
Stansted arrivals

June 2018, all **Luton** and **Stansted** arrivals from FL90 to runway

Safety imperative:
Complex interactions
Growth at both airports
Small area, constrained
Manageable for now
Must be resolved soon

Additional Slide

Most Luton aircraft fall into the "125-180 seat single-aisle twin jet" family, similar types with similar noise, i.e. Airbus A320 and Boeing 737 versions. The table below is reproduced from NATS' webpage, illustrating typical noise at different heights.
Link: https://www.nats.aero/environment/aircraft-noise/representative-aircraft-lmax-data/

Arrival noise Lmax dBa by aircraft grouping (measurements stop at 55dBa as not reliable below that level)								
Height (ft)	Turboprop	50 seat regional jet	70-90 seat regional jet	**125-180 seat single-aisle 2-eng jet**	250 seat twin-aisle 2-eng jet	300-350 seat twin-aisle jet	400 seat 4-eng jet	500 seat 4-eng jet
1000-2000	79-70	73-63	77-67	**77-69**	84-74	83-73	86-77	85-78
2000-3000	70-66	63-56	67-61	**69-64**	74-68	73-67	77-71	78-72
3000-4000	66-64	56-55	61-57	**64-61**	68-64	67-63	71-67	72-68
4000-5000	64-62		57-56	**61-59**	64-60	63-60	67-64	68-65
5000-6000	62-61		56-55	**59-57**	60-58	60-57	64-61	65-62
6000-7000	61-59			**57-56**	58-56	57-56	61-59	62-60
7000-8000	59-57			**56-55**	56-55	56-56	59-57	60-58
8000-9000	57-57					56-55	57-56	58-56
9000-10000	57-56						56-56	56-55
10000-11000	56-55						56-55	
11000-12000								

Table of comparisons, reproduced from NATS' webpage Link: https://www.nats.aero/environment/aircraft-noise/

Typical sound	Approximate noise level Lmax dBa
Pneumatic Drill 7m away	95
Heavy diesel lorry at 40kmh, 7m away	85
Medium aircraft descending at 1000ft	70
Busy general office	60
Quiet office	50
Quiet bedroom, library	35
Threshold of audible sound	0

Both websites contain caveats and some explanatory background on the measurements.

Demo note: This orange slide is an example of a slide added to the presentation after the meeting, and included in the version sent with the minutes, in order to answer a question asked at the event itself.

Additional Slide

In 2018 there were between c.150-210 arrivals per day based on monthly arrival figures.
In July 2019 it was 216 per day on average.

A single arrival route could see these numbers of overflights at present traffic levels.

The prevailing wind in the UK is from the west.

Typically, Luton's runway 08 (easterly runway) is used c.30% of the time, runway 26 (westerly) c.70% of the time.

This is a long term average – there may be extended periods where this is not the case, entirely weather dependent. Sometimes the runway changes ends during the day, occasionally more than once.

Fundamental design concepts and constraints

- Fundamental concept: Split the Luton arrival flows from the Stansted arrival flows
- Constraints:
  - Design principles: Earlier slide
  - Relative geography & scope:
    Stansted flows cannot be moved north
    Existing congested areas cannot accept new flows
    Cannot move existing flows
    Luton arrival flows can be moved, but only to the north
    New Luton hold must be as close as possible to the airport
- Upper constrains lower:
  Geography constrains flows to the hold
  Hold area constrains the start of descent
  Start of descent constrains where lower flightpaths can go
  Final approach to runways is fixed
- Time: Cannot wait for FASI-S

Concepts for consideration

- Do nothing - Not an option
  - Likewise, waiting for FASI-S not an option

- Point merge
  - Future concept design which requires enlarged areas of controlled airspace and large scale redesign of existing route network (not shown here)

- Westerly sited holding area
  - Development simulation and discussions with current TC North controllers make this option non-viable with present day operations

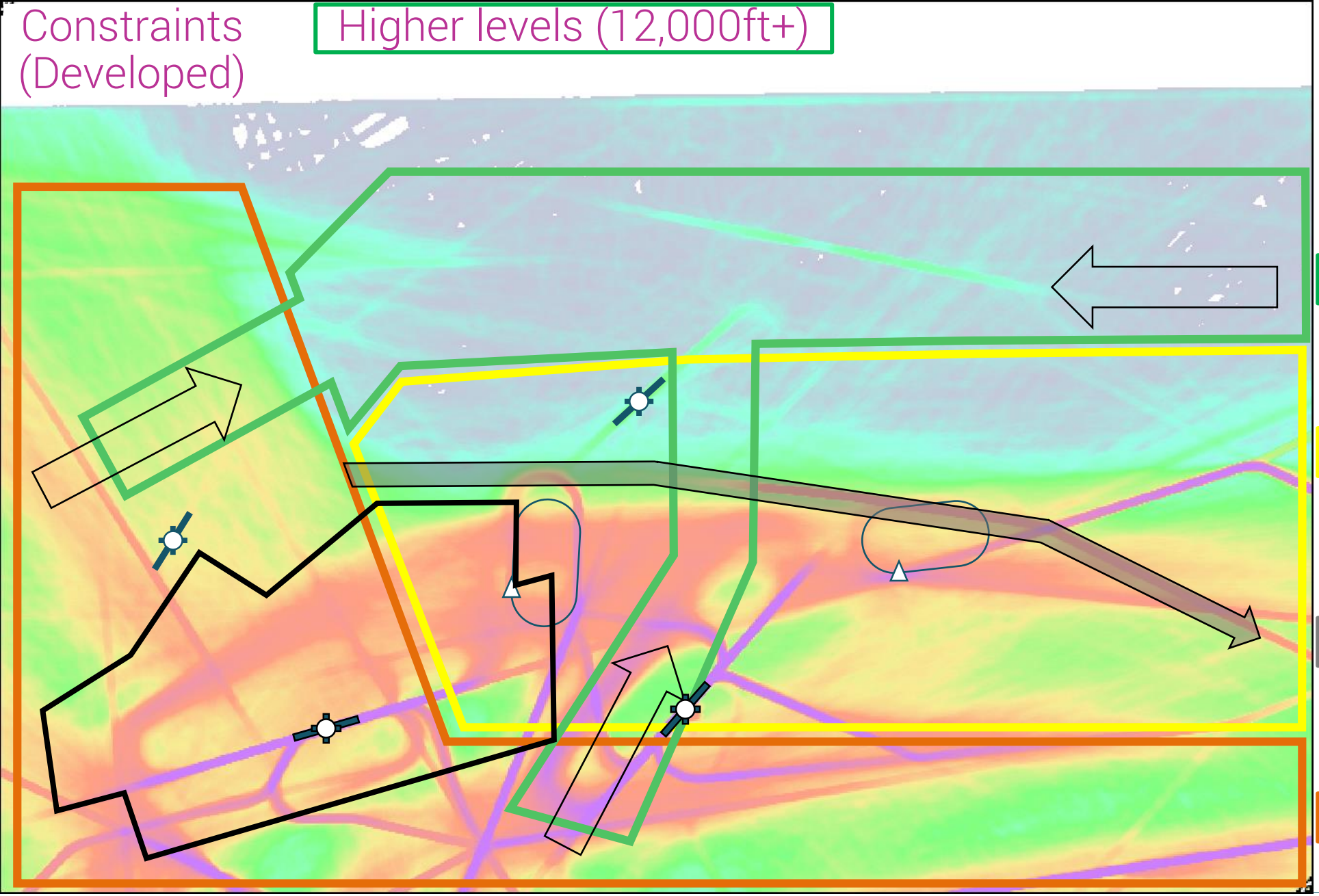
- North-easterly sited holding area
  - Within the present day London TMA operation, this is the only viable area identified for a new Luton holding area.

- Draft name for Luton hold “NUHAT”

Demo note: Even though the westerly hold option was considered non-viable, we wanted to ensure stakeholders had the opportunity to understand why, hence its inclusion in Step 2a

Constraints (Developed)

Higher levels (12,000ft+)



Proposed LTN flow

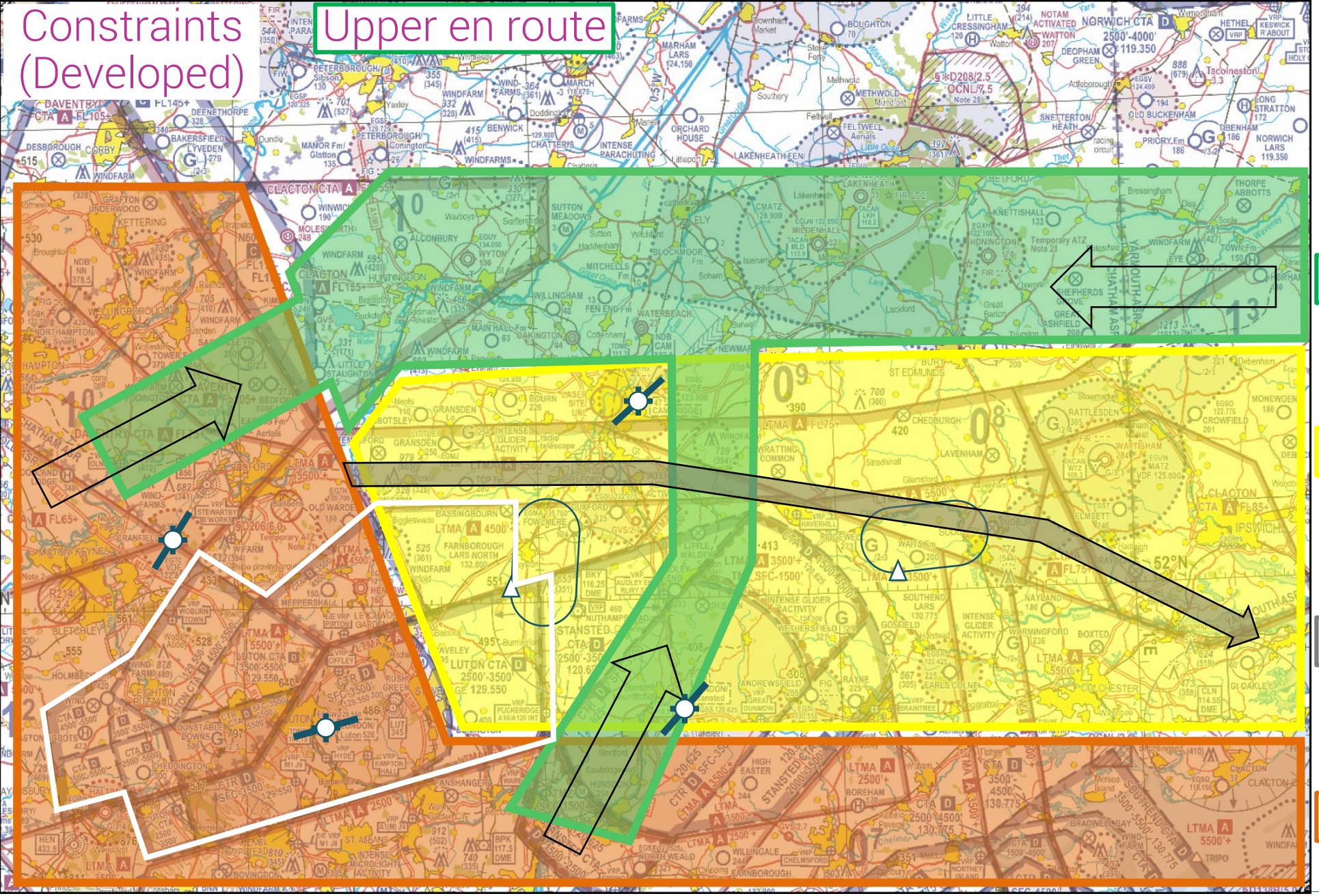
Stansted complex

London City flow

Major flows

Constraints (Developed)

Upper en route



Proposed LTN flow

Stansted complex

London City flow

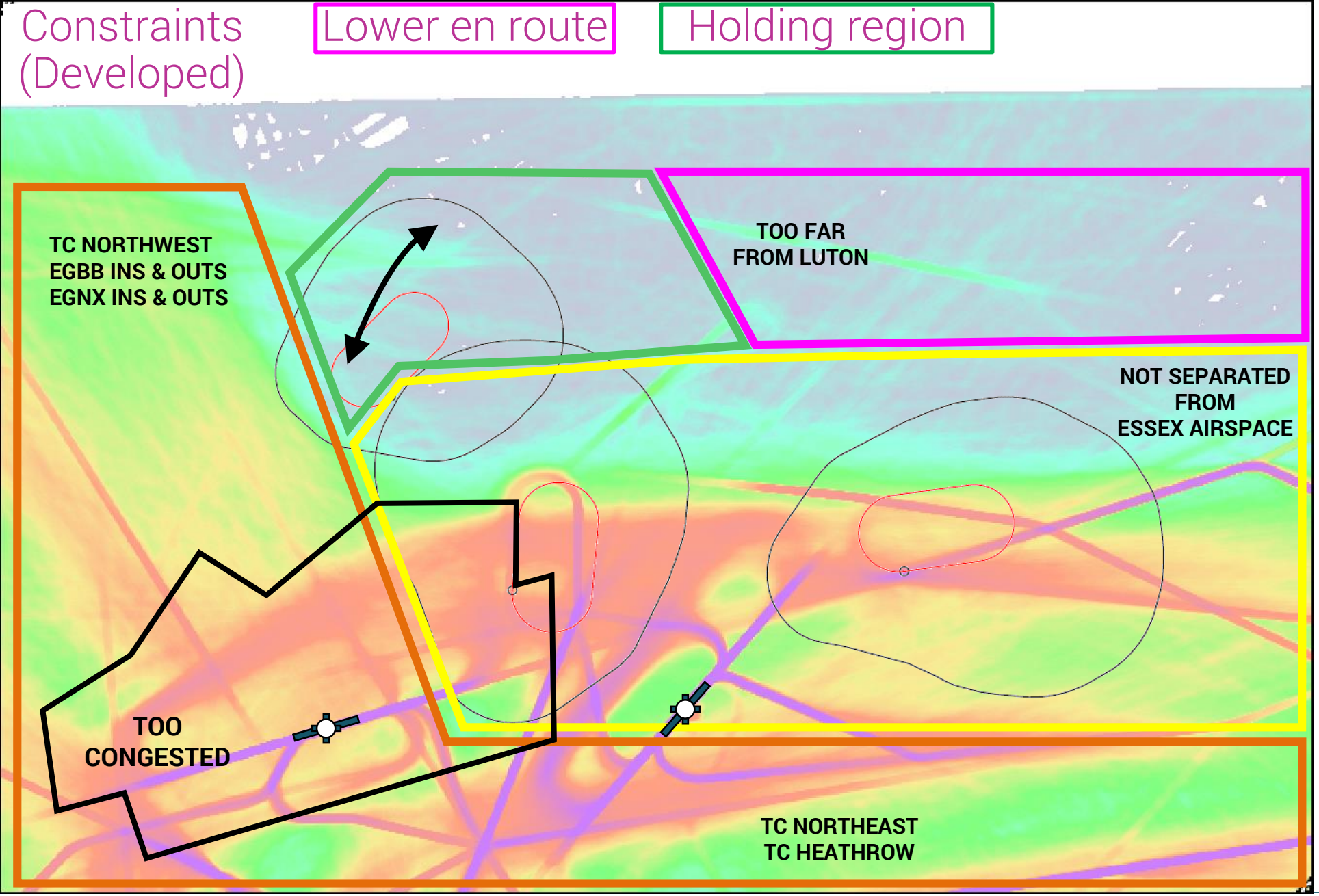
Major flows

Demo note: This is usually animated to illustrate how the constraints apply in combination.
It is the basis of Figure 3 in Document 2A(i)

Constraints (Developed)

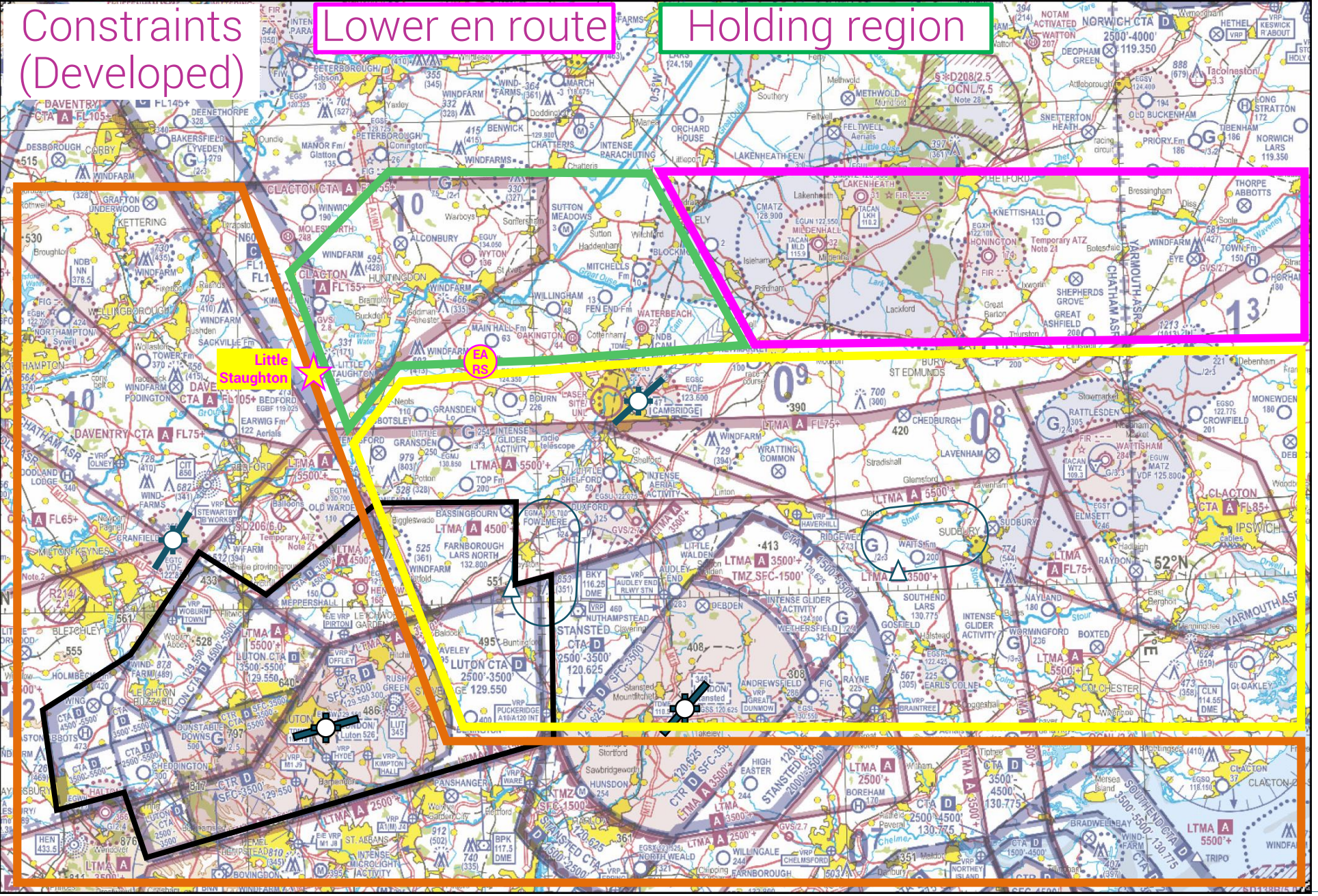
Lower en route

Holding region



Demo note: This is usually animated to illustrate how the constraints apply in combination. The green holding region shows an example racetrack for illustrative purposes.

Constraints (Developed)

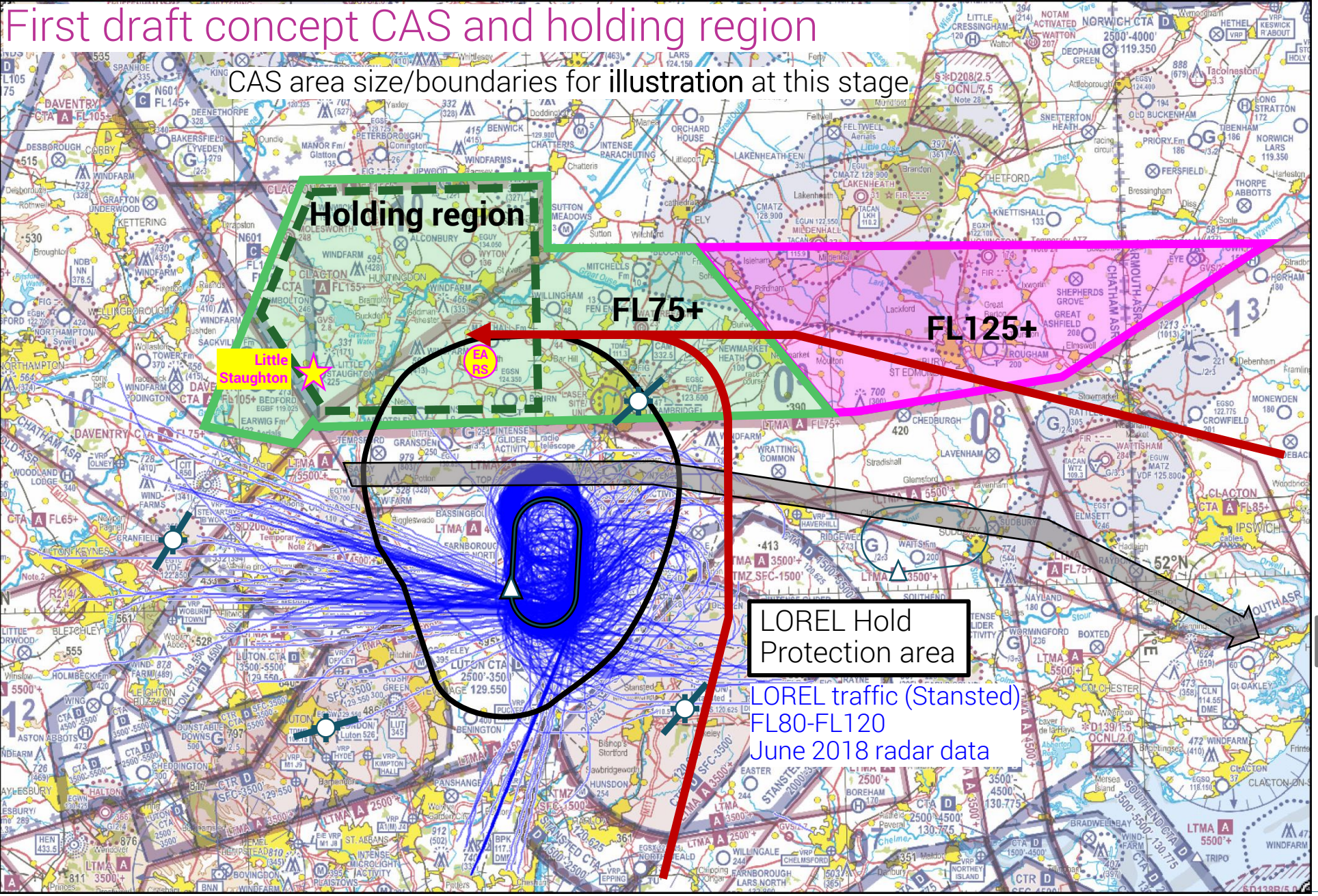


USAF Lakenheath and Mildenhall

Little Staughton para drop zone and East Anglian Rocketry Society (separately engaged)

Demo note: This demo was based on aviation stakeholders, illustrating their relationship to some of the constraints

First draft concept CAS and holding region



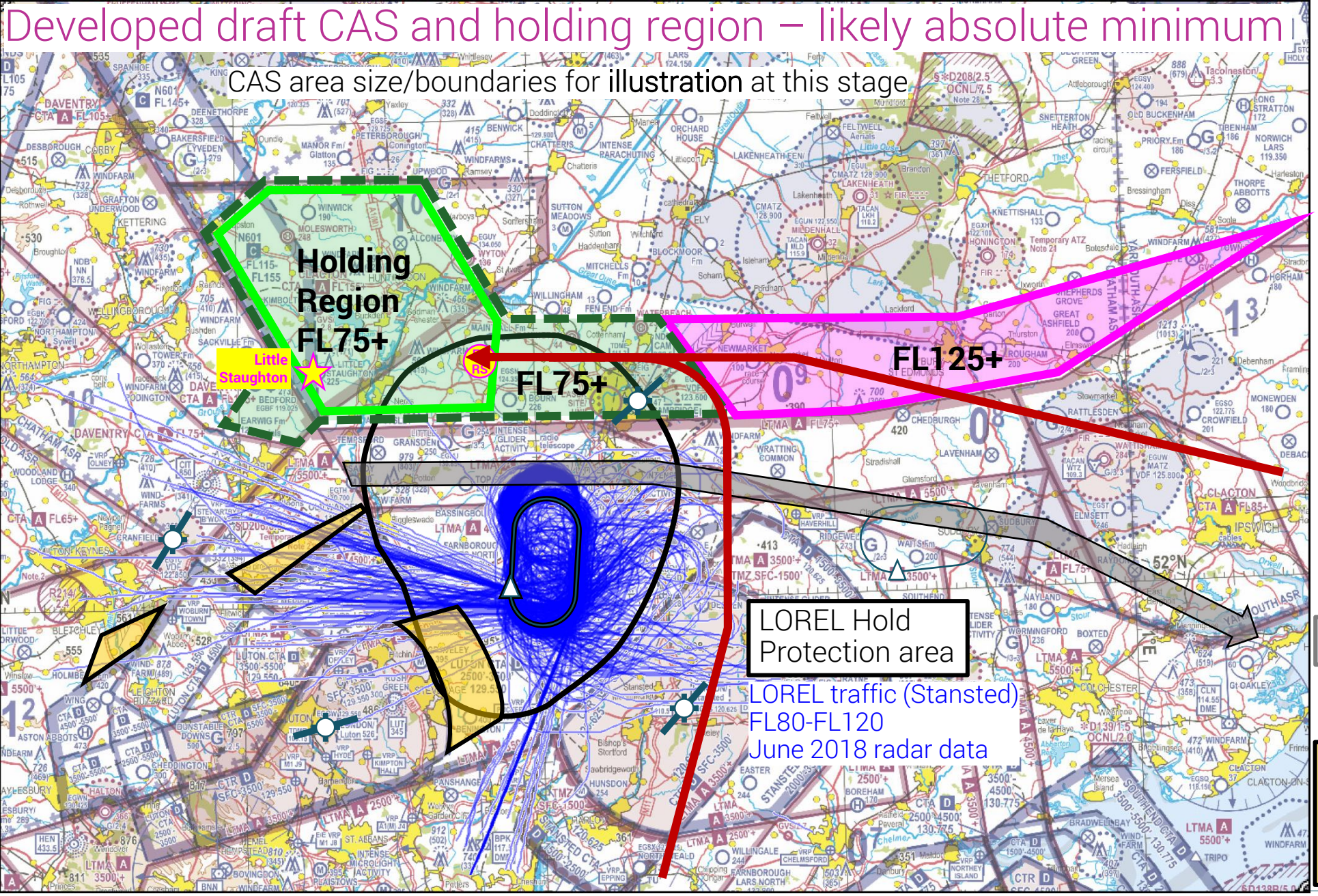
USAF Lakenheath and Mildenhall (separately engaged)

Little Staughton para drop zone and East Anglian Rocketry Society (separately engaged)

London City flow

Demo note:
This slide demonstrates an earlier concept

Developed draft CAS and holding region – likely absolute minimum



USAF Lakenheath and Mildenhall (separately engaged)

Little Staughton para drop zone and East Anglian Rocketry Society (separately engaged)

London City flow

Possible CAS volumes Depends on ***specific*** routes (details later)

Demo note:
This slide demonstrates a developed version of the same concept

Options Below 7,000ft

Process notes – NATS-LLA's approach to SAIP AD6

- We are building a group of "upper options" (above 7,000ft), and a group of "lower options" (from the hold to the runway) as part of the comprehensive options list required by CAP1616 Step 2A

- This session is to explain the process we have gone through in arriving at a comprehensive list of technically viable options for the handling of traffic from the new "upper" arrival routes to the runway ends from c.6-7000ft down to the existing final approach at c.3,000ft.

- We will also show you the comprehensive list as it stands. This list is subject to change as we progress through the ACP.

- We will take on board your feedback from this session and ask that any further feedback is received by the **DATE**. At this point, we may amend existing options or create new ones.

- Next steps will be that the comprehensive list of options will be evaluated against the Design Principles from Stage 1, the options least fitting the DPs will be rejected, leaving a shortlist of viable options taken through to Step 2B.

- Under Step 2B, the shortlisted number of viable options are assessed relative to each other to understand the merits of each option. This is known as the Initial Options Appraisal.

Joining the existing final approach (5/6,000ft – 3,000ft)

- We first looked at the art of the possible for joining the final approach

- We explored concepts that adhered to, and challenged, existing constraints such as:
  - Noise Abatement Requirements
  - Instrument Flight Procedure design criteria
  - The Luton Approach Radar Manoeuvring Area (RMA)
  - Controlled airspace boundaries
  - The requirement to avoid overflight of Leighton Buzzard (Runway 08)

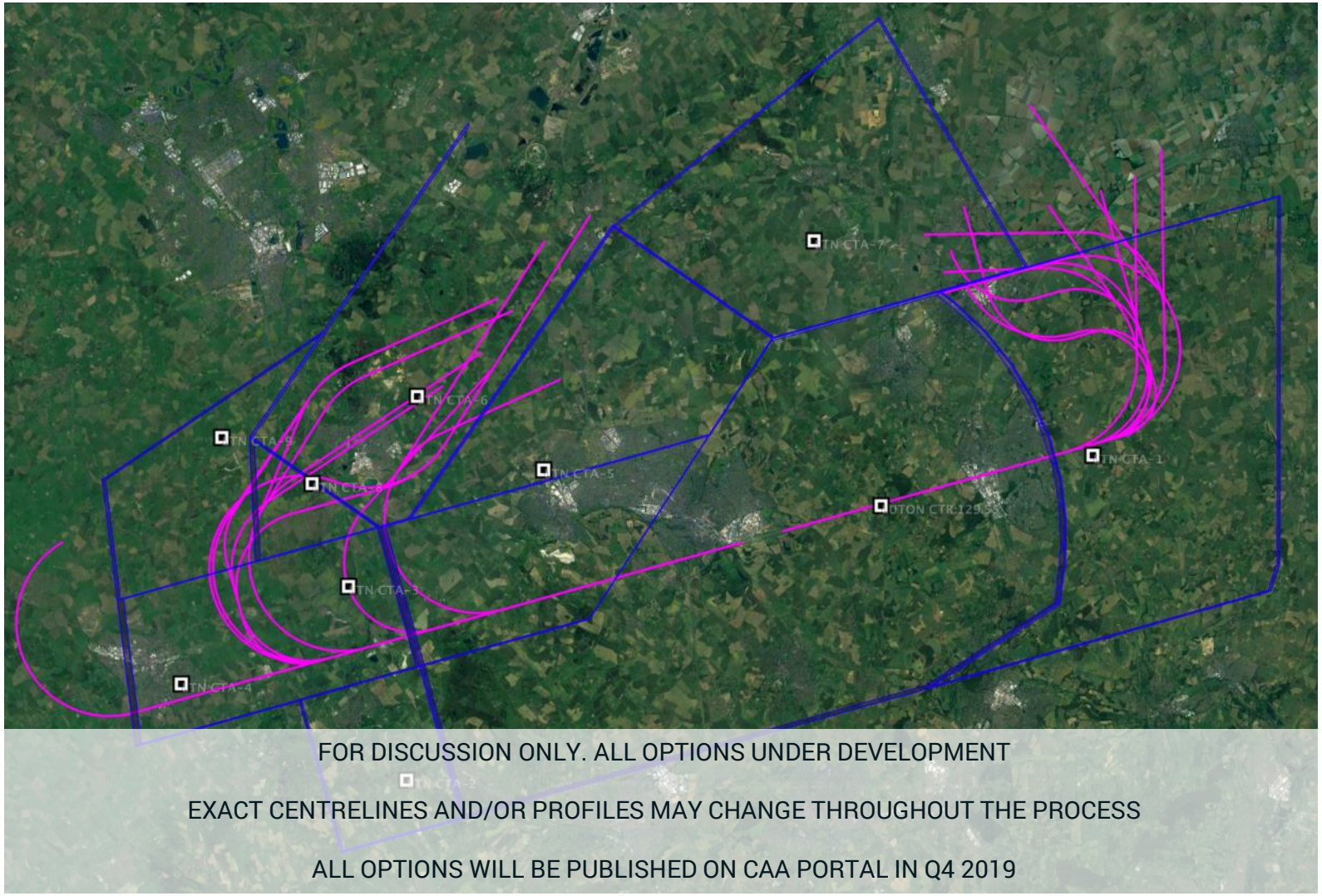
- We designed multiple different concepts using different specifications of navigational (PBN) capability

- This resulted in 12 different concepts for joining final approach on each runway end

Demo note:
This sets out the fact that a lot of prototype possibilities were considered under the art of the possible, only those technically viable were taken forward as “options”.

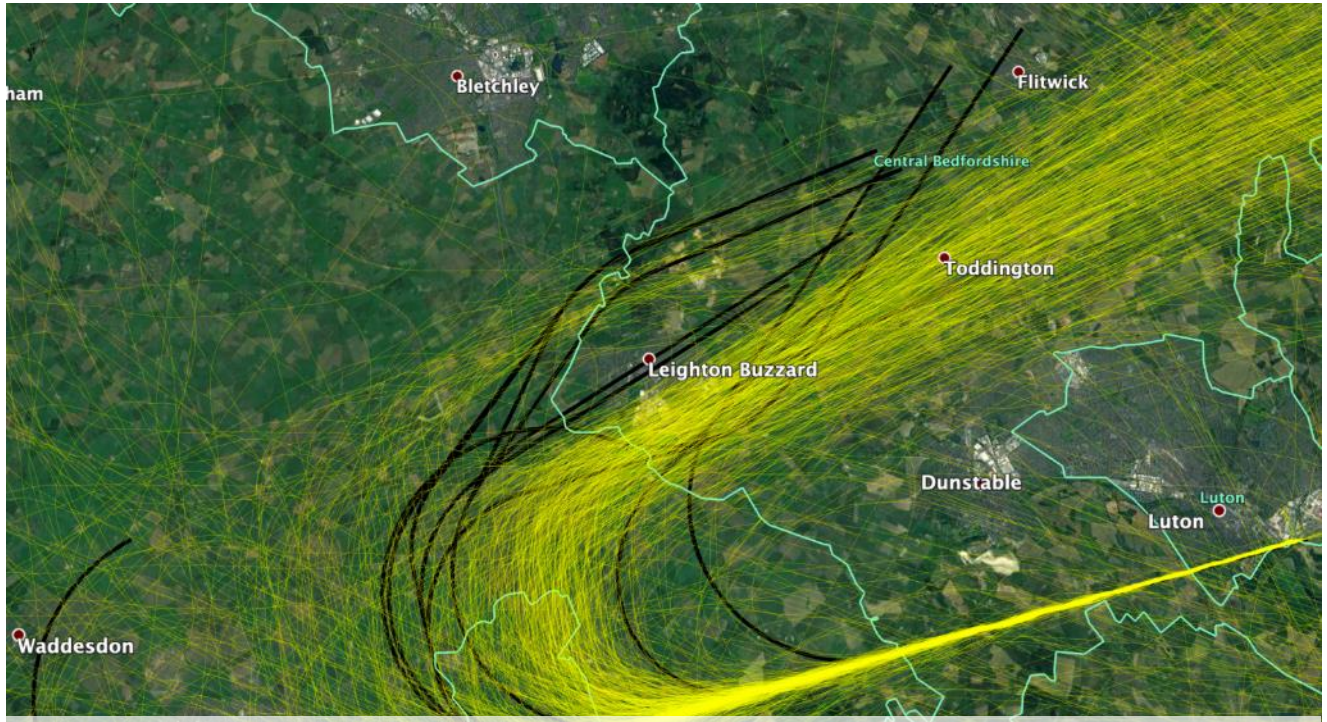
All Easterly and Westerly concepts (5/6,000ft – 3,000ft)

Joining the existing final approach (5/6,000ft – 3,000ft)



Joining the existing final approach (5/6,000ft – 3,000ft)

Easterly (Runway 08) concepts

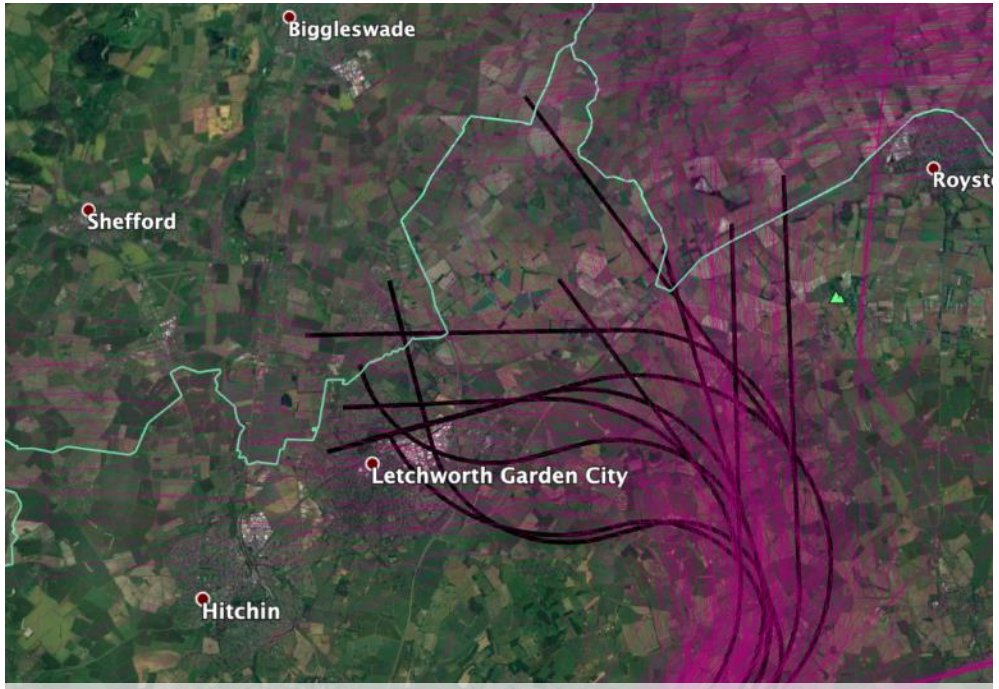


FOR DISCUSSION ONLY. ALL OPTIONS UNDER DEVELOPMENT

EXACT CENTRELINES AND/OR PROFILES MAY CHANGE THROUGHOUT THE PROCESS

ALL OPTIONS WILL BE PUBLISHED ON CAA PORTAL IN Q4 2019

Westerly (Runway 26) concepts



FOR DISCUSSION ONLY. ALL OPTIONS UNDER DEVELOPMENT

EXACT CENTRELINES AND/OR PROFILES MAY CHANGE THROUGHOUT THE PROCESS

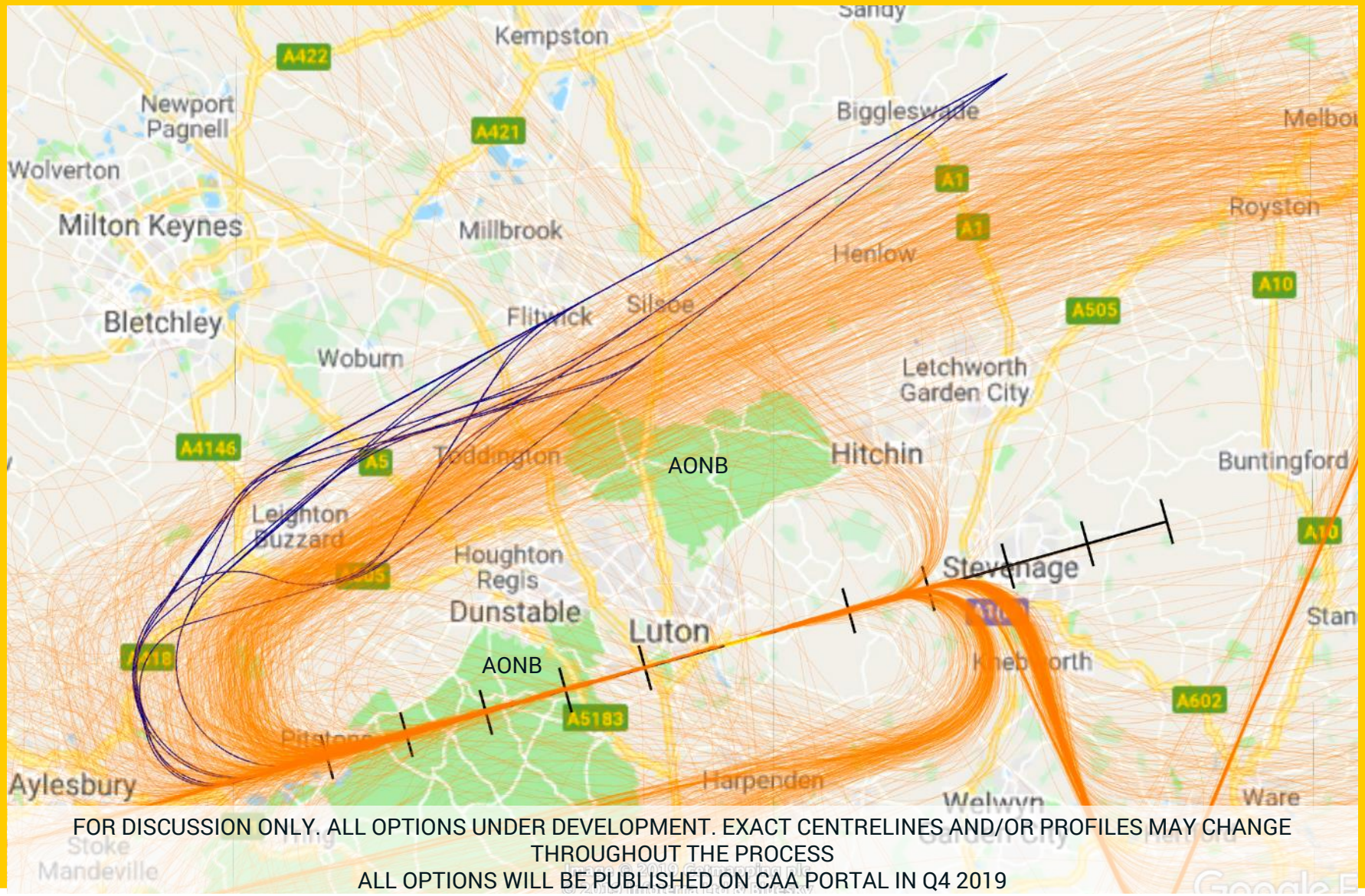
ALL OPTIONS WILL BE PUBLISHED ON CAA PORTAL IN Q4 2019

The black lines indicate the PBN concepts, the coloured lines signify the existing arrival flows of Luton arrivals

Initial Comprehensive List of Options – easterly operations

London Luton Airport

Additional Slide



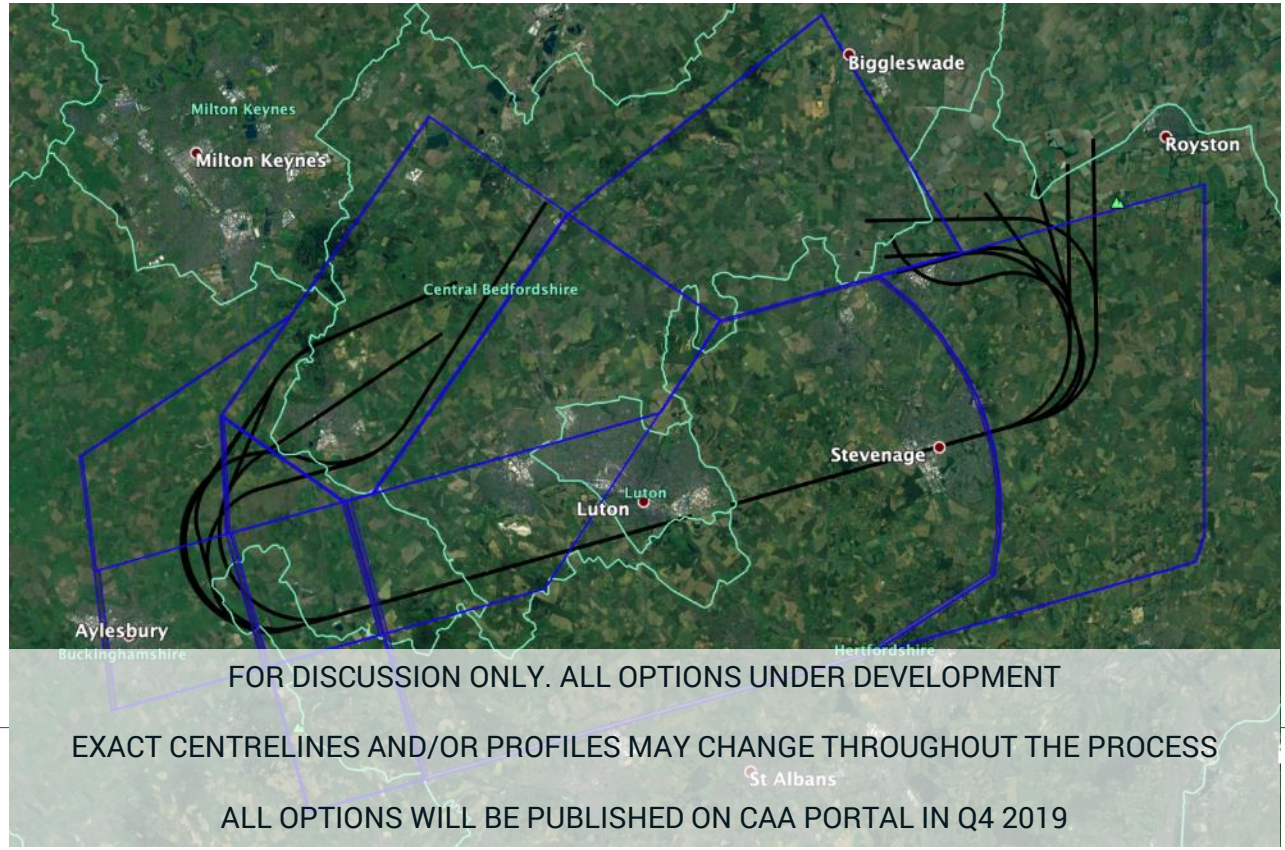
FOR DISCUSSION ONLY. ALL OPTIONS UNDER DEVELOPMENT. EXACT CENTRELINES AND/OR PROFILES MAY CHANGE THROUGHOUT THE PROCESS
ALL OPTIONS WILL BE PUBLISHED ON CAA PORTAL IN Q4 2019

Demo note: Another example of a new slide added post-meeting, this time to make map reading easier, following a request for additional clarity

Joining the existing final approach (5/6,000ft – 3,000ft)

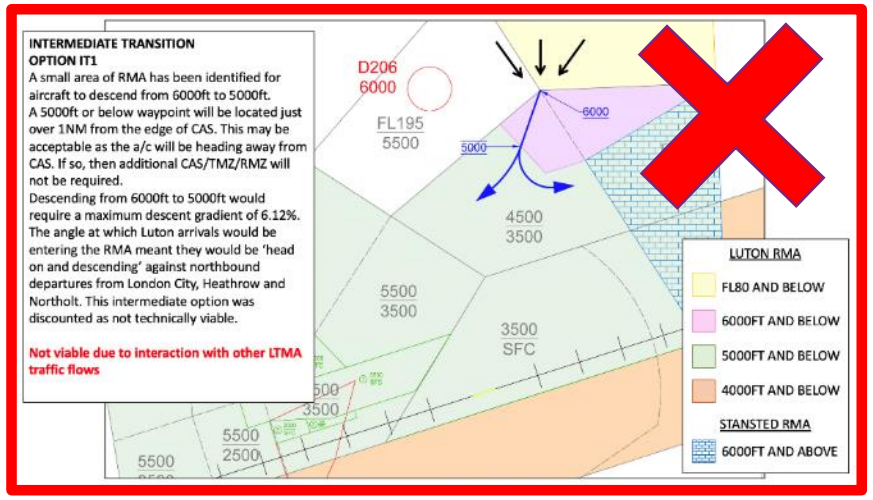
- We then started to add in other constraints and ruled out any options that would not be technically viable due to:
  - Other flows of traffic within the airspace
  - IFP design criteria
  - Unlikely to be 'flyable'. For example, due to descent gradients being too steep

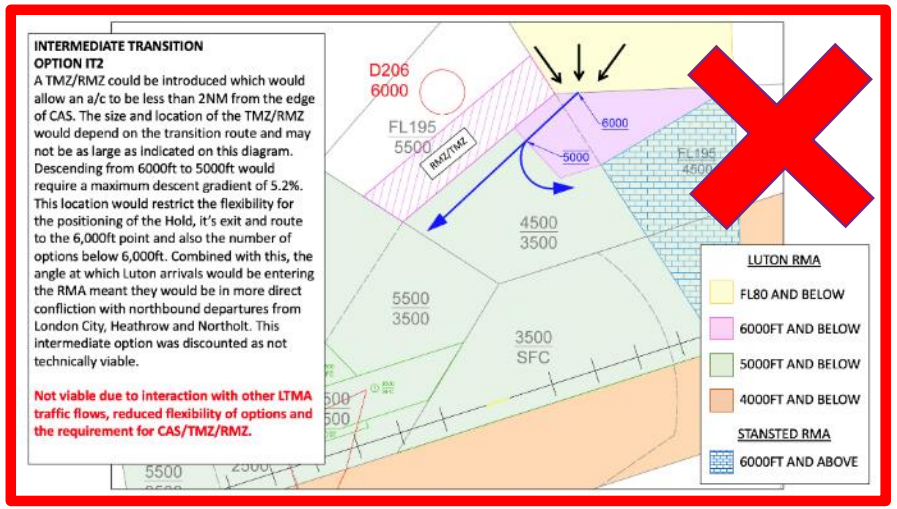
- As a result, we were left with 7 technically viable concepts for easterly operations (runway 08) and 8 for westerly operations (runway 26)

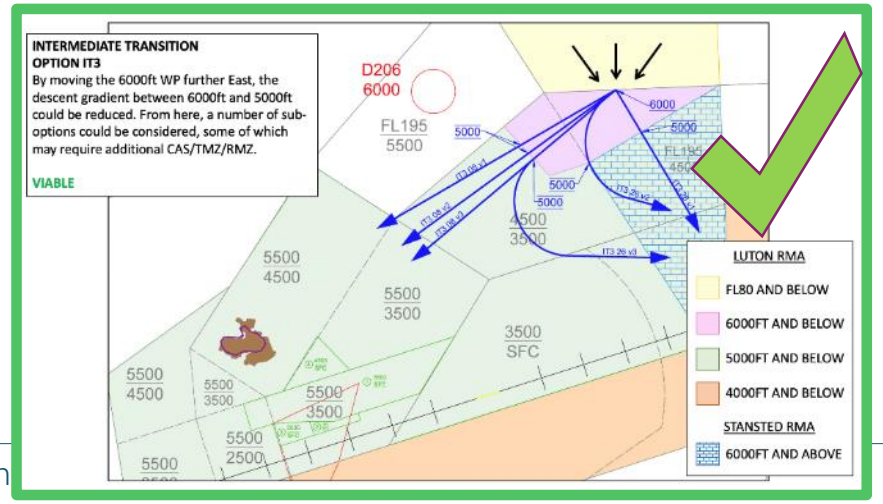


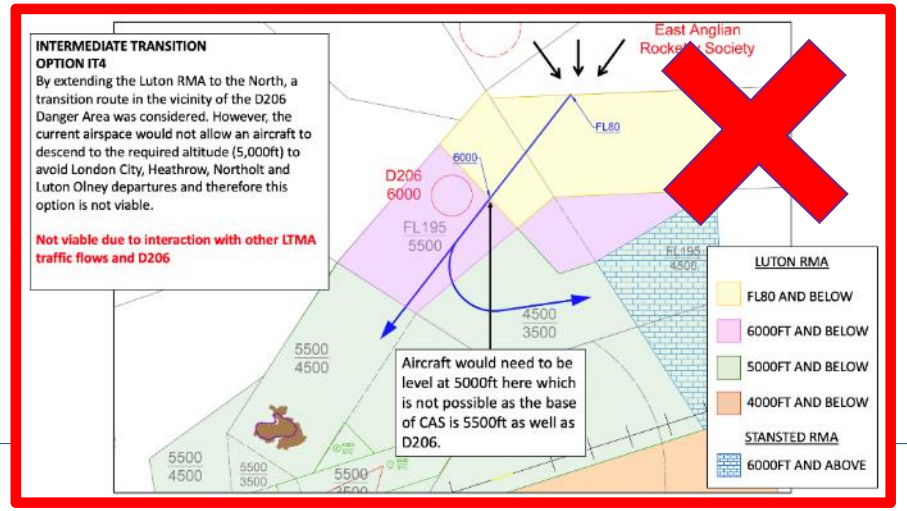
Intermediate concepts (8,000ft – 5,000ft)

- We explored concepts for how the proposed “upper” route concepts could safely enter Luton Airspace whilst avoiding other flows of traffic to and from other airports.





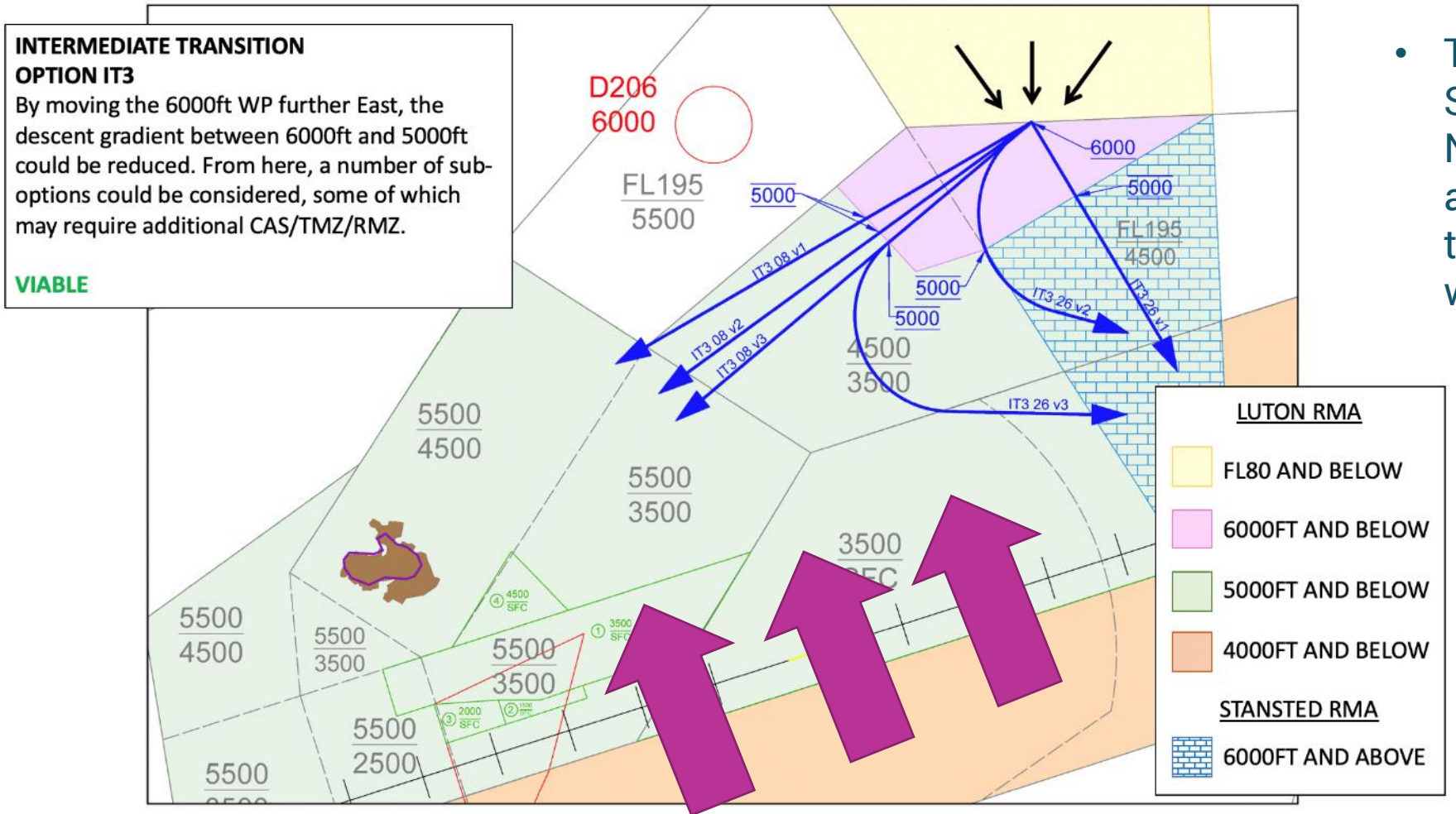




Demo note: Shows how non-viable prototypes were considered at this stage

Intermediate concepts (8,000ft – 5,000ft)

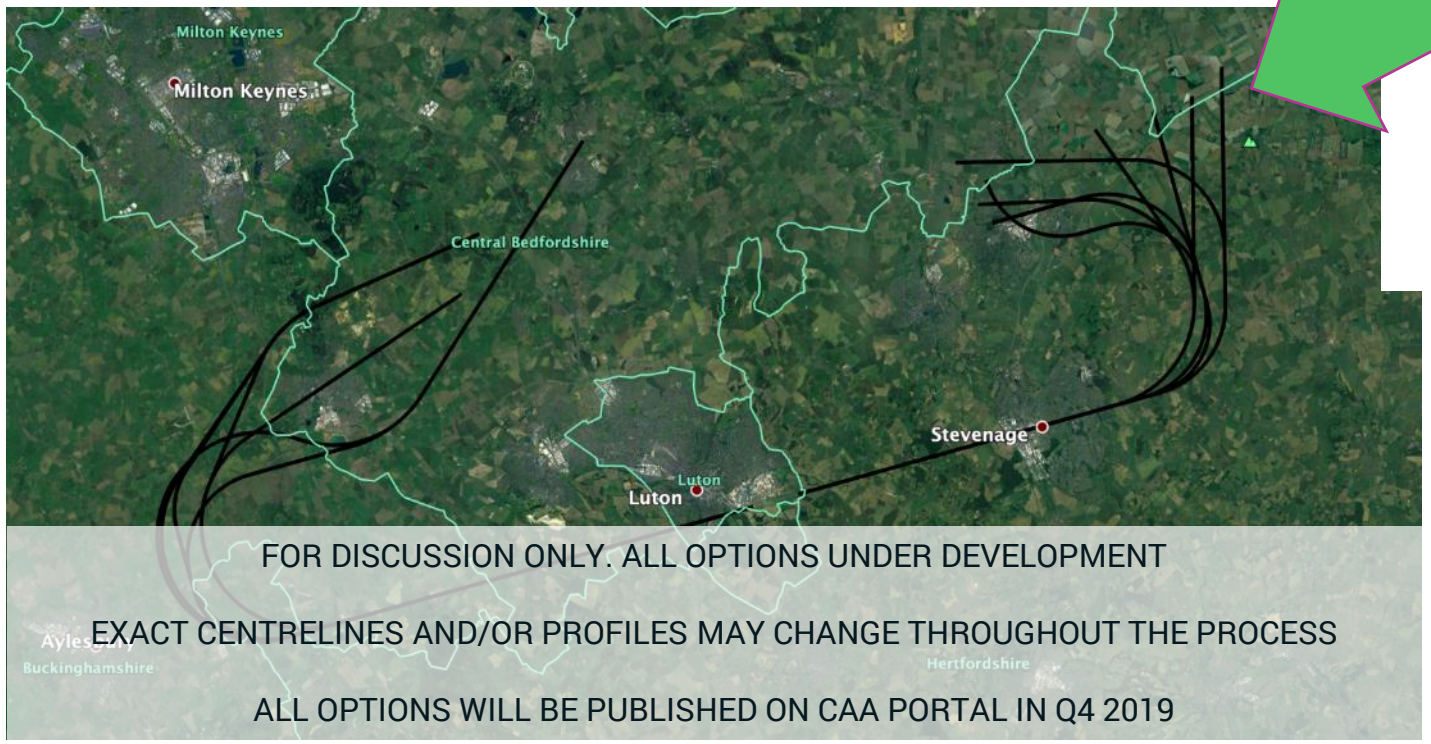
- This assessment determined that the Luton arrivals from the “upper” concepts had to be channelled through a specific volume of airspace to give sufficient space for the aircraft to descend to 5000ft by another specific airspace volume, whilst avoiding departures from Heathrow, Northolt and London City.



- The traffic into and out of Stansted, London City, Northolt and Heathrow airports means that the only technically viable option was “IT3”.

Other LTMA traffic flows

Connecting ‘IT3’ to the concepts below 5/6,000ft



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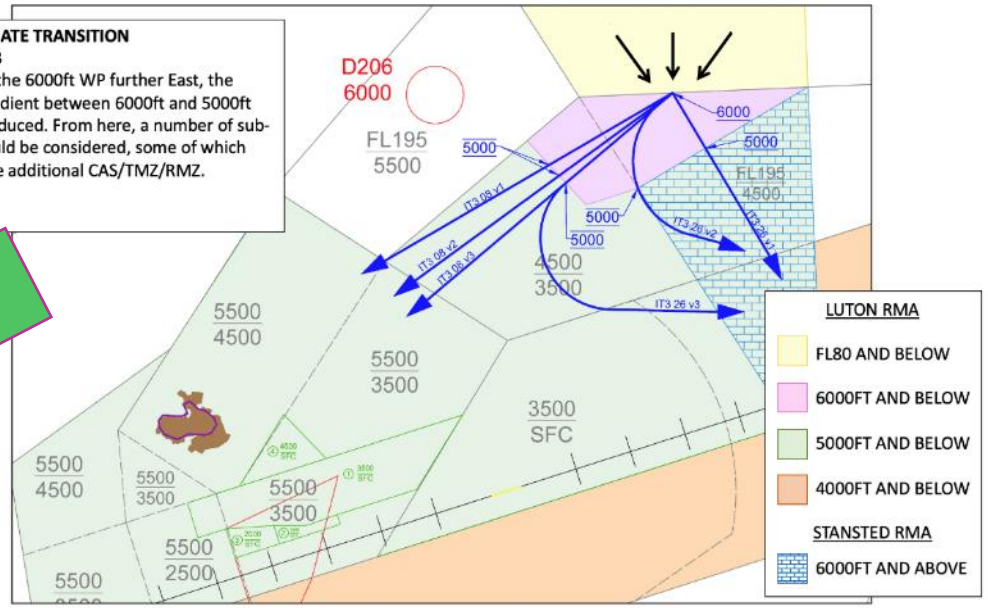
ALL OPTIONS WILL BE PUBLISHED ON CAA PORTAL IN Q4 2019

INTERMEDIATE TRANSITION
OPTION IT3
By moving the 6000ft WP further East, the descent gradient between 6000ft and 5000ft could be reduced. From here, a number of sub-options could be considered, some of which may require additional CAS/TMZ/RMZ.

VIABLE



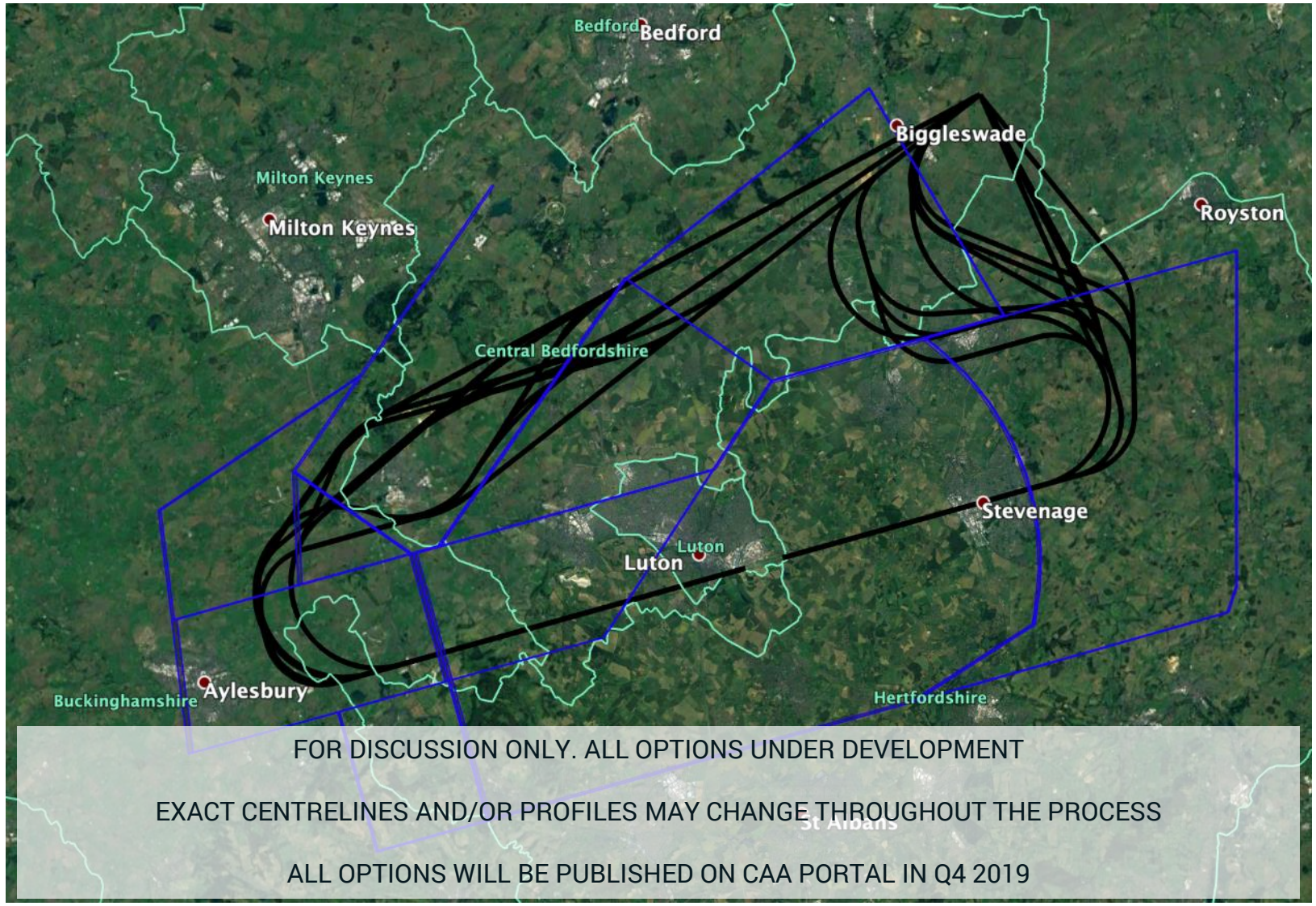
Demo reminder: The presenter talked through how the prototypes were constructed before they become “options”

Connecting ‘IT3’ to the concepts below 5/6,000ft

- We then looked at connecting the Intermediate concepts (IT3) at 6/7,000ft to the lower concepts and onto final approach
- We attempted to design 3 options from IT3 to each of the lower concepts whilst adhering to Instrument Flight Procedure design criteria
- The output from this exercise is our initial comprehensive list of options from c.6/7,000ft down to final approach
- The result is 10 technically viable options for westerly operations (runway 26) and 21 for easterly operations (runway 08)

Initial Comprehensive List of Options

Initial Comprehensive List of Options - all



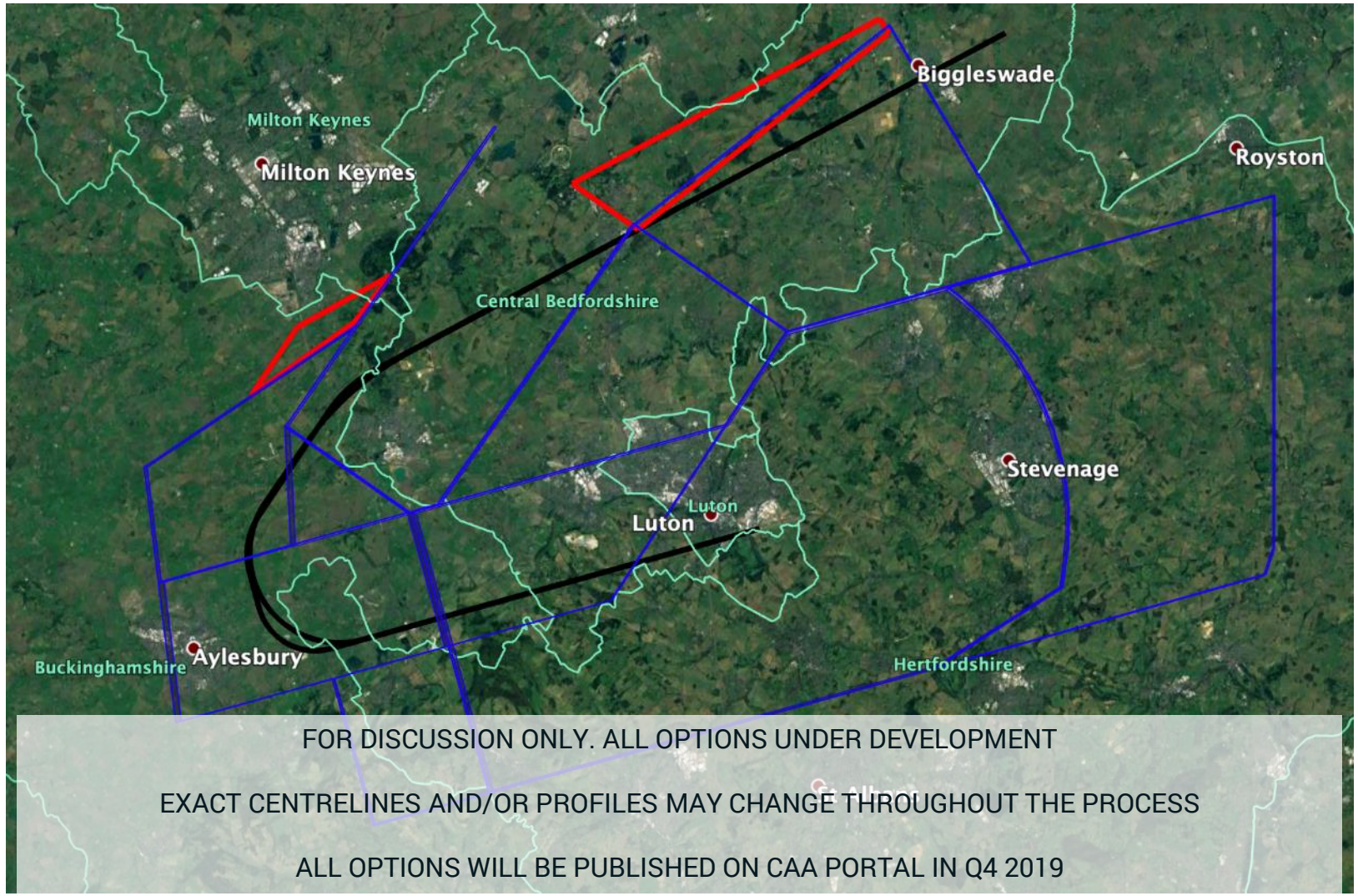
Demo note: There was commentary throughout this presentation, walking the participant through the complexities of airspace development and discussing feasibility etc.

Initial Comprehensive List of Options - all

- The CAA Airspace Controlled Airspace Containment Policy states:

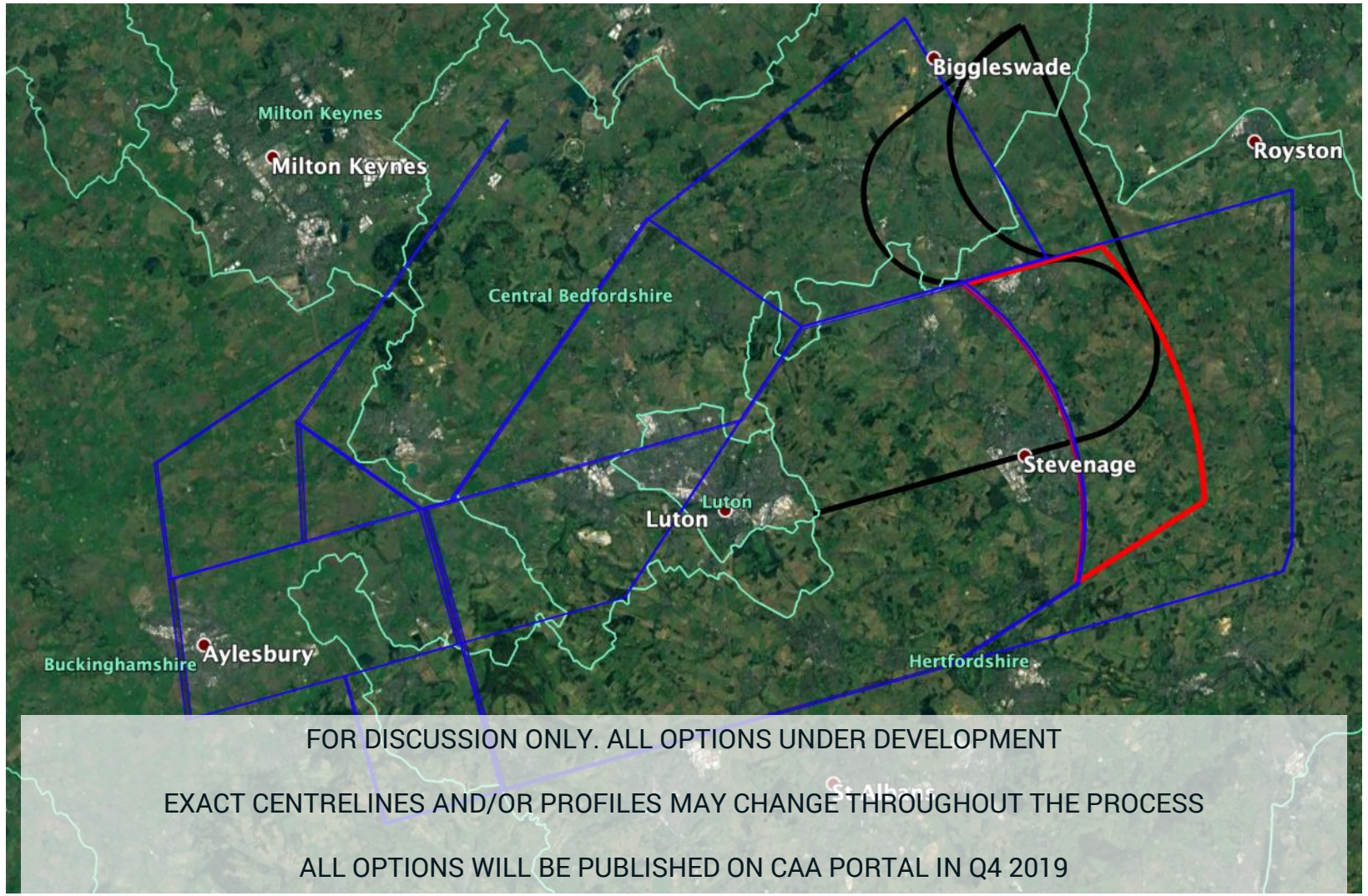
"The lateral dimensions of Terminal CTAs associated with CTRs (as opposed to en-route CTAs) are to be sufficient to permit the effective integration of flights to and from any adjoining route structure where appropriate or the containment of published terminal, holding and instrument approach procedures where necessary. Containment of such procedures should in the first instance be predicated upon primary obstacle clearance areas used in the design. Where competing airspace requirements preclude containment by primary area, containment of the nominal track defined by the procedure may be less than that afforded by the primary area but shall normally not be less than 3NMs from the edge of CAS. In exceptional circumstances, proposals for procedures resulting in less than 3NMs may be acceptable, but such proposals must be completely justified and supported by a safety case."

Initial Comprehensive List of Options (those with CAS requirements)



- The red areas indicated on this image show controlled airspace volumes that would be required to ensure these specific options are wholly contained within CAS by 2nm.
- We feel there is justification for an argument of just 2nm taking into account the PBN specification and geometry or the procedures to the edge of existing CAS.
- Bases of CAS in these areas would need to be lowered from 5,500ft to 4,500ft.

Initial Comprehensive List of Options (those with CAS requirements)



- Any RNP+RF options to Runway 26 requires a redesign of the existing ILS approach procedure.
- The FAF could move from 3000ft at D7.7 to 2000ft at D4.5. An IF, with a procedure altitude of 2000ft, would be required at D6 to be PANS OPS compliant.
- To protect the aircraft in the descent from 5000ft to 2000ft, additional airspace would be required between 1500ft and 3500ft as shown in the diagram.

Initial Comprehensive List of Options (those with CAS requirements)

OPTION IT3 26 v2 RNP26DEF

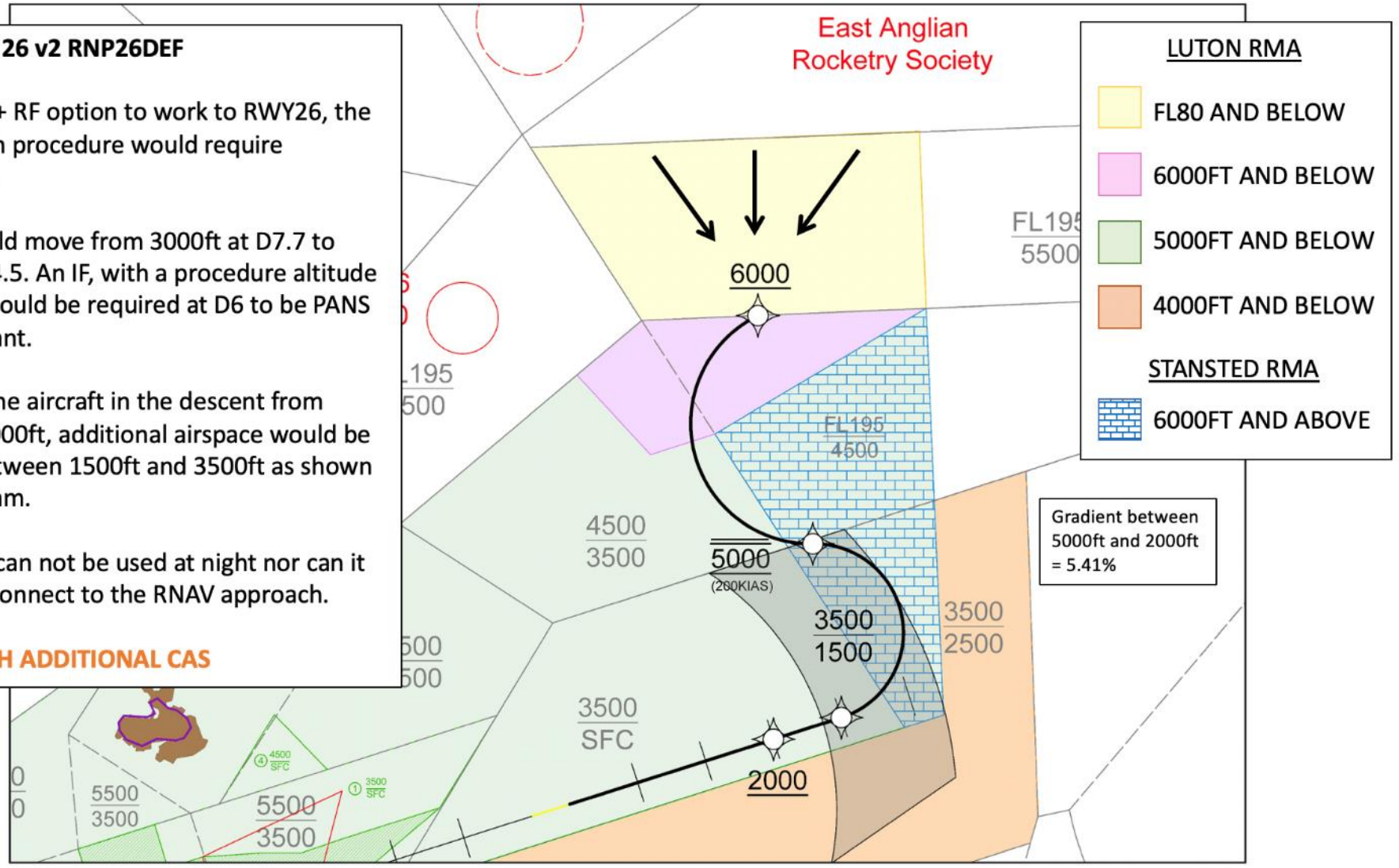
For an RNP + RF option to work to RWY26, the ILS approach procedure would require redesigning.

The FAF could move from 3000ft at D7.7 to 2000ft at D4.5. An IF, with a procedure altitude of 2000ft, would be required at D6 to be PANS OPS compliant.

To protect the aircraft in the descent from 5000ft to 2000ft, additional airspace would be required between 1500ft and 3500ft as shown in the diagram.

This option can not be used at night nor can it be used to connect to the RNAV approach.

VIABLE WITH ADDITIONAL CAS



What happens next?

- Formal engagement record
  - What was discussed today
  - Your feedback (by **DATE** if possible)
  - Written and sent asap, for you to review/agree

- NATS-LLA considers your feedback
  - Written response, with reasons
  - Final engagement under CAP1616 Stage 2
  - Two way engagement has been effected:
    - We asked, you said, we did, we checked back with you

- Stage 2 Timeline
  - Late Aug-Mid Sept, collate all stakeholder engagement feedback
  - Build a comprehensive list of options (possibly in groups of upper and lower)
  - Late Sept, evaluate comprehensive list against design principles
  - Oct, finalise the shortlist and complete the initial options appraisal (quantitative analysis if proportional, qualitative otherwise)
  - Nov, submit documents to CAA for Stage 2 Assessment

Demo note: This is the concluding slide. Discussions with participants, including the recording of feedback "in the room", occurred during the chart illustrations.

Questions?

AOB?

Thank you

NATS

London Luton Airport