Round 1 – July 2022

ACP Stage 2 Stakeholder Workshop

Leeds Bradford Airport FASI(N) ACP

Section 1 - Overview

ACP Stage 2 Options Development

- Design Principles
- Methodology
- Departures
- Arrivals
- What We Need From You
- Questions

Leeds Bradford Airport Final Design Principles Summary Table

DP Number	Design Principle	DP Number	Design Principle
1	Importance of Safety – The airspace design and its operation must maintain or where possible, enhance current levels of safety.	7	Technical Requirements – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.
2	Noise - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.	8	Systemisation – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the Instrument Approach Procedures (IAPs), deconflict with the departure procedures, reducing the requirement for tactical coordination.
3	Tranquillity - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONB's.	9	Operational Cost – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency
4	Emissions and Air Quality – The proposed design should minimise CO2 emissions per flight.	10	AMS Realisation – This ACP must serve to further, and not conflict with, the realisation of the AMS.
5	Airspace Dimensions – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.	11	PBN – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.
6	Airspace Complexity – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.		

Options Development Methodology

- The Options have been conceived with no pre conceptions
- The Options developed for the departures are swathes. The areas within which a final departure or arrival nominal track might ultimately be designed.
- The Options developed for the arrivals are general directions of travel based on a variety of different hold and transition options.

NOTE - This workshop is not a consultation on final routes, but an assessment of high-level concepts against the Design Principles you helped us develop.

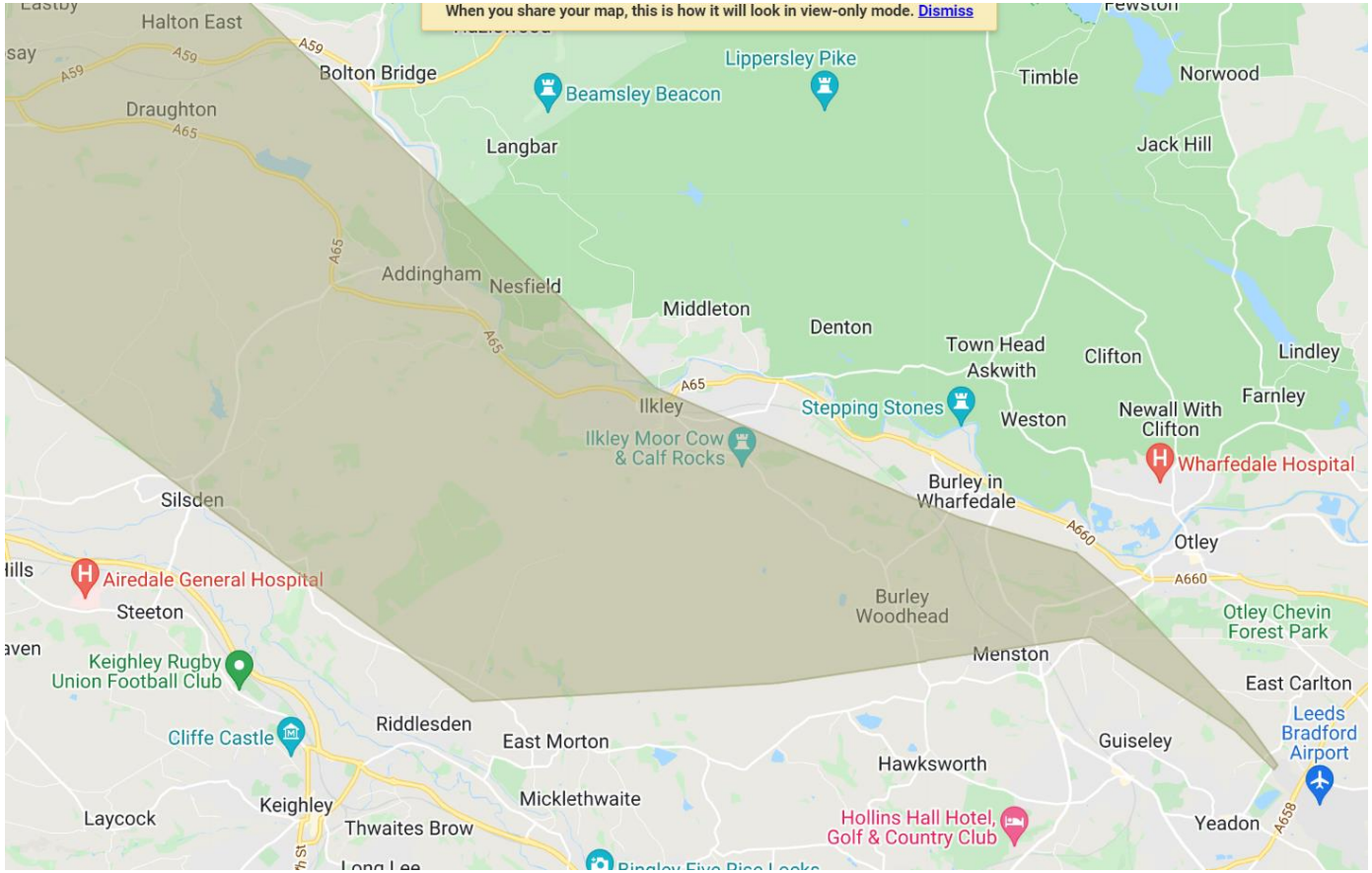
Departures

Runway 32 – North West

Runway 32 – North West

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
32NW-A											

Runway 32 – North West



Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
32NW-A											

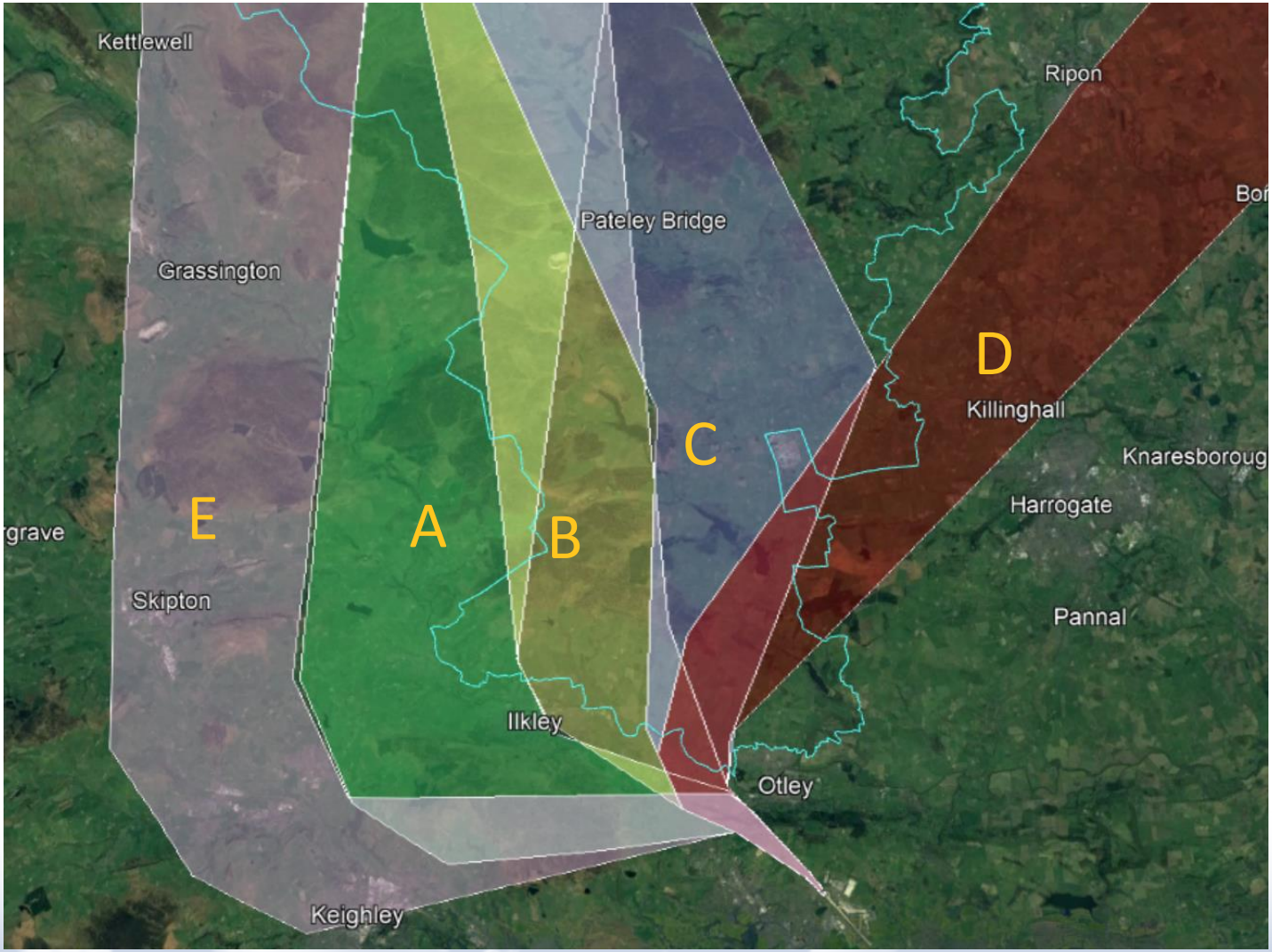
Runway 32 – North West

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
32NW-A											

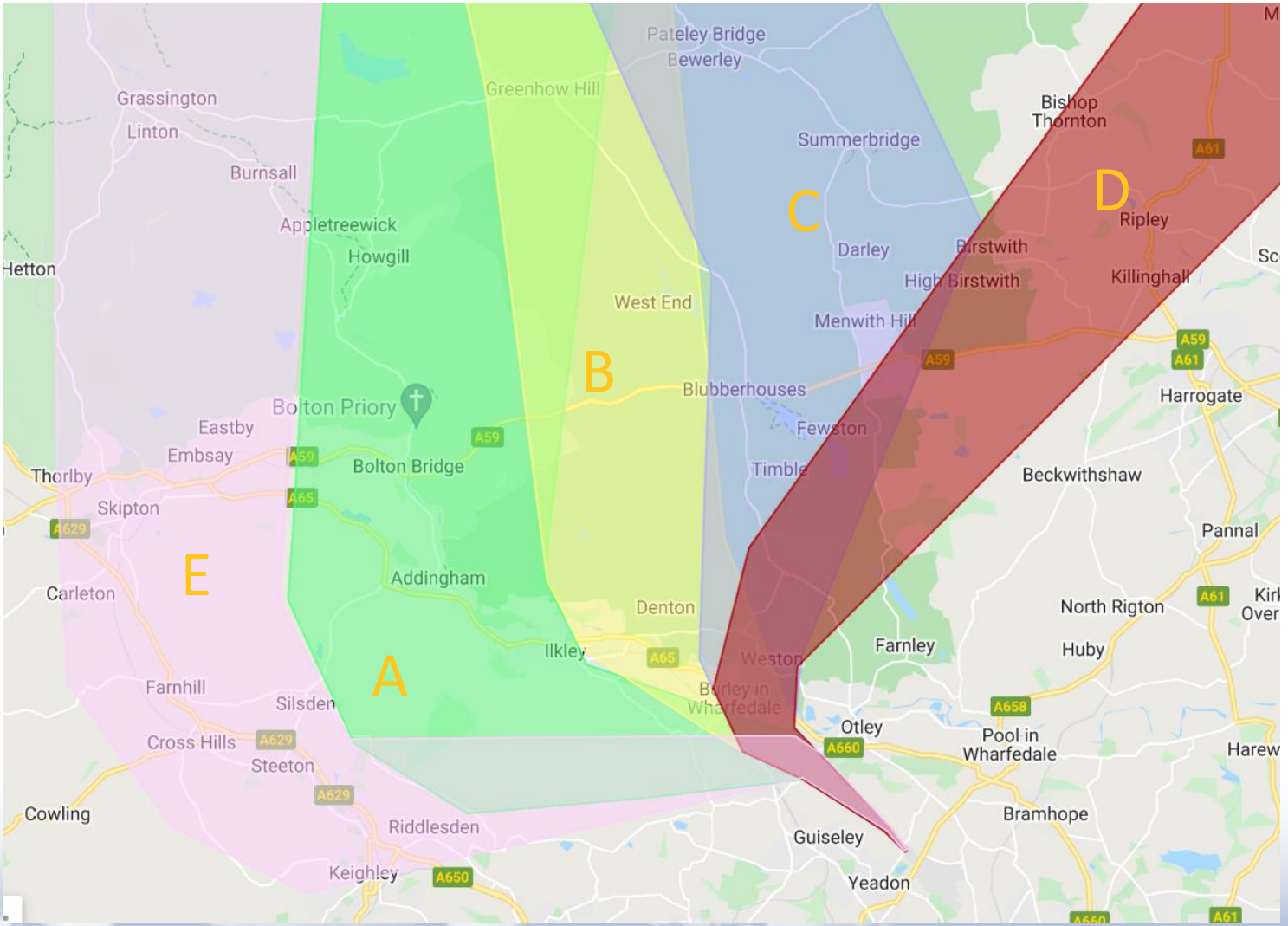
Runway 32 – North East

Departures to the North-East off RW32, turn after adherence to the Noise Abatement Procedures (NAPs) towards GASKO.

Runway 32 – North East



Runway 32 – North East



Runway 32 – North East

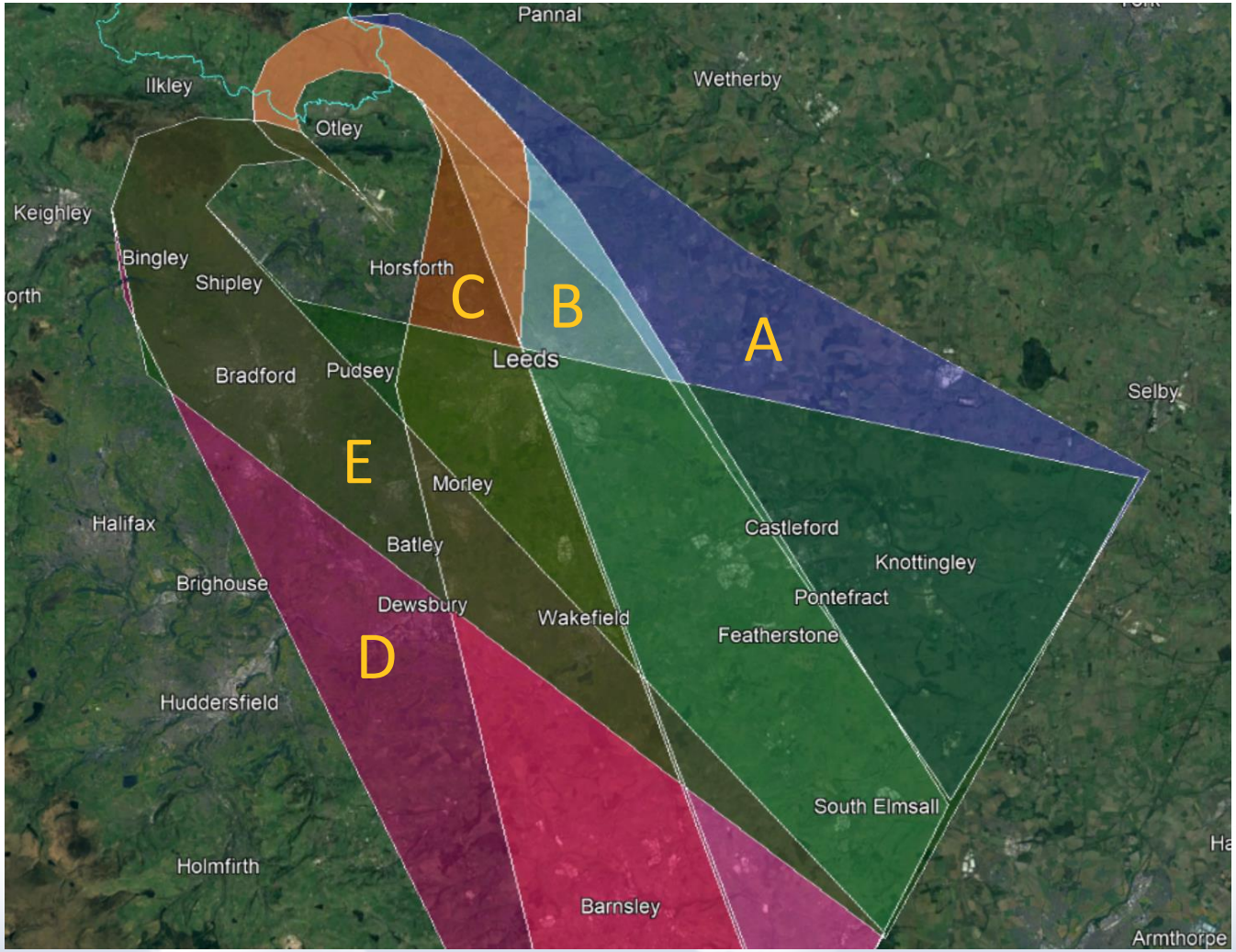
32 North East Deps DP Evaluation

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
32NE-A											
32NE-B		Overflies Ilkley									
32NE-C	Currently class G Area of IAA with multiple Fast Jet operations	Burley in Wharfedale			Would potentially require a greater volume of CAS to be established						
32NE-D	Currently class G Area of IAA with multiple Fast Jet operations	Burley in Wharfedale			Would require a greater volume of CAS to be established						
32NE-E											

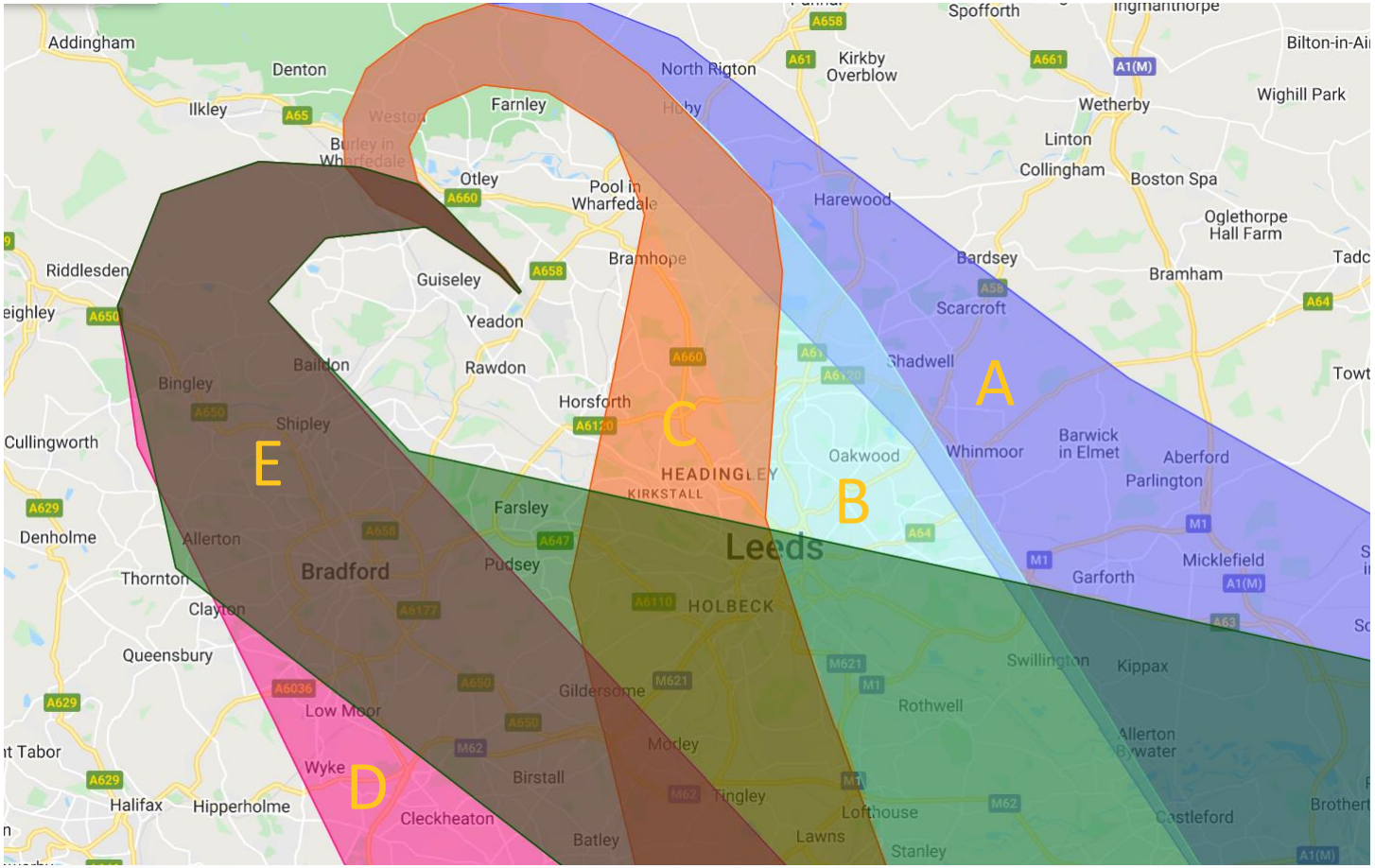
Runway 32 – South East

Existing departures to the South-East off RW32 turn left once they have adhered to the NPRs and route towards DOPEK and LAMIX.

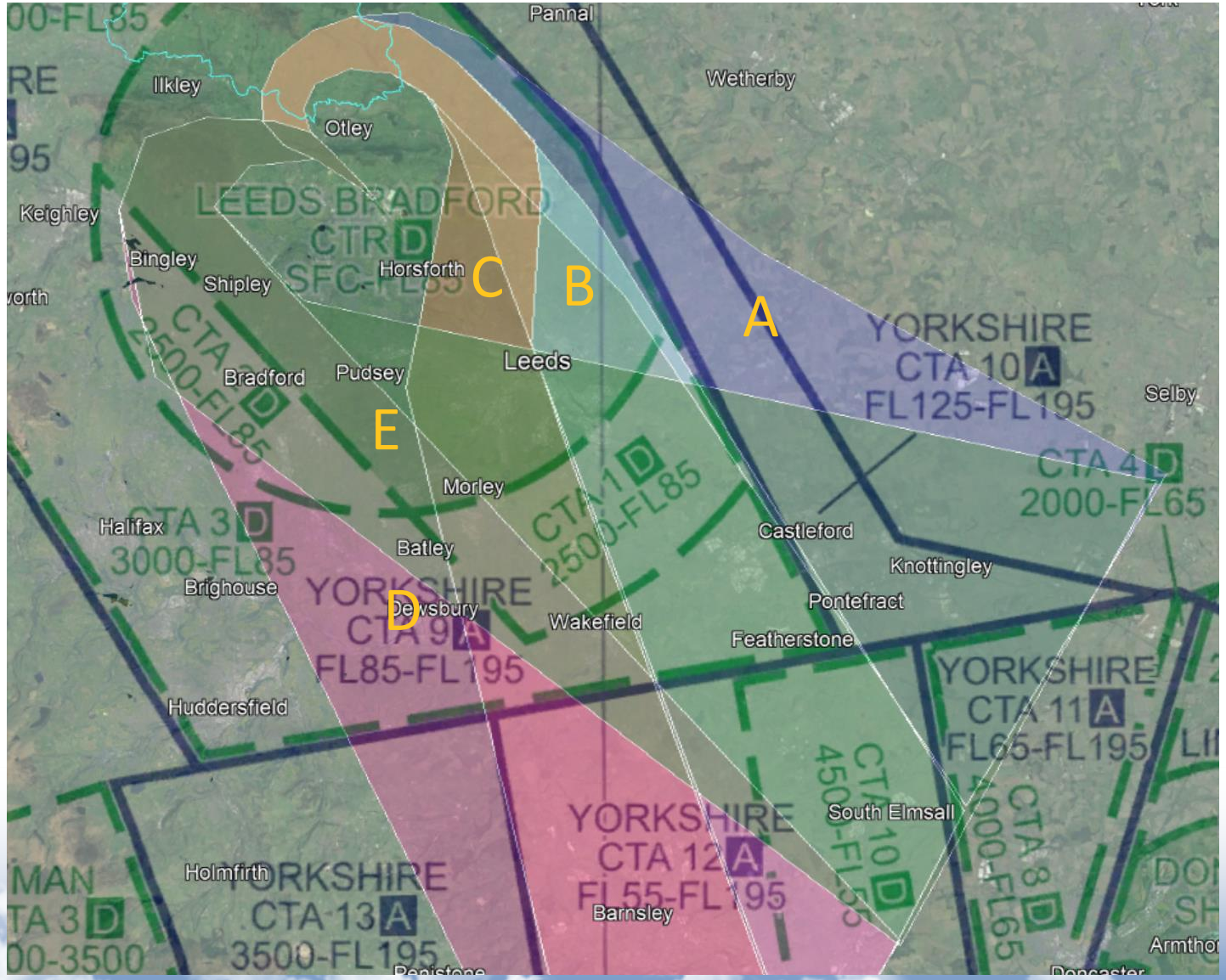
Runway 32 – South East



Runway 32 – South East



Runway 32 – South East



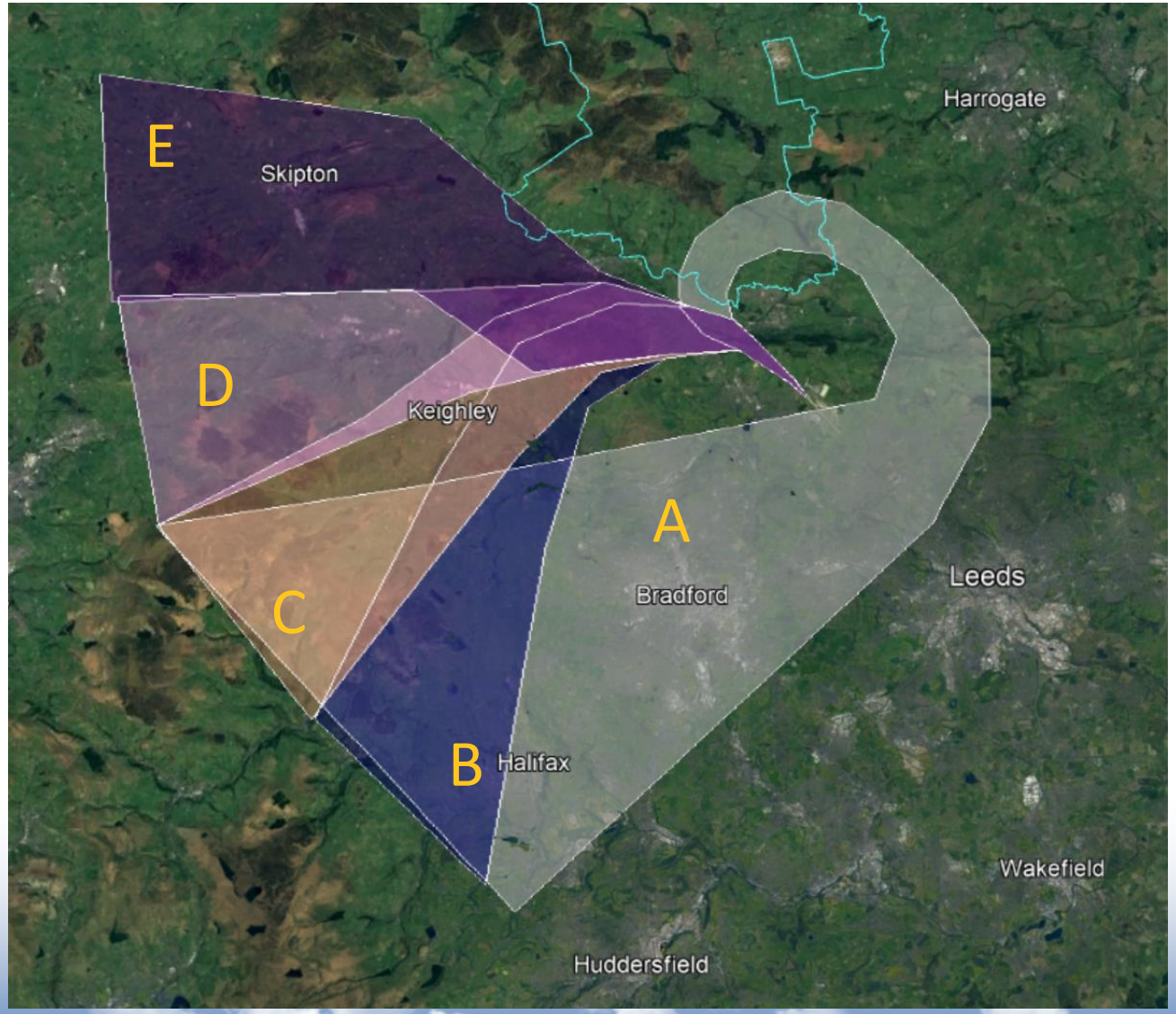
32 South East Deps DP Evaluation

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
32SE-A	Currently no CAS to contain	Baseline affects less people at lower levels than this option- Burley in Warfedale/ Bramhope	Overflies Lindley Wood Res.		Would require a greater volume of CAS to be established						
32SE-B	Currently no CAS to contain	Baseline affects less people at lower levels than this option- Burley in Warfedale/ Bramhope	Overflies Lindley Wood Res.		Would require a greater volume of CAS to be established						
32SE-C	Currently no CAS to contain	Baseline affects less people at lower levels than this option- Burley in Warfedale/ Bramhope	Overflies Lindley Wood Res.		Would require a greater volume of CAS to be established						
32SE-D											
32SE-E											

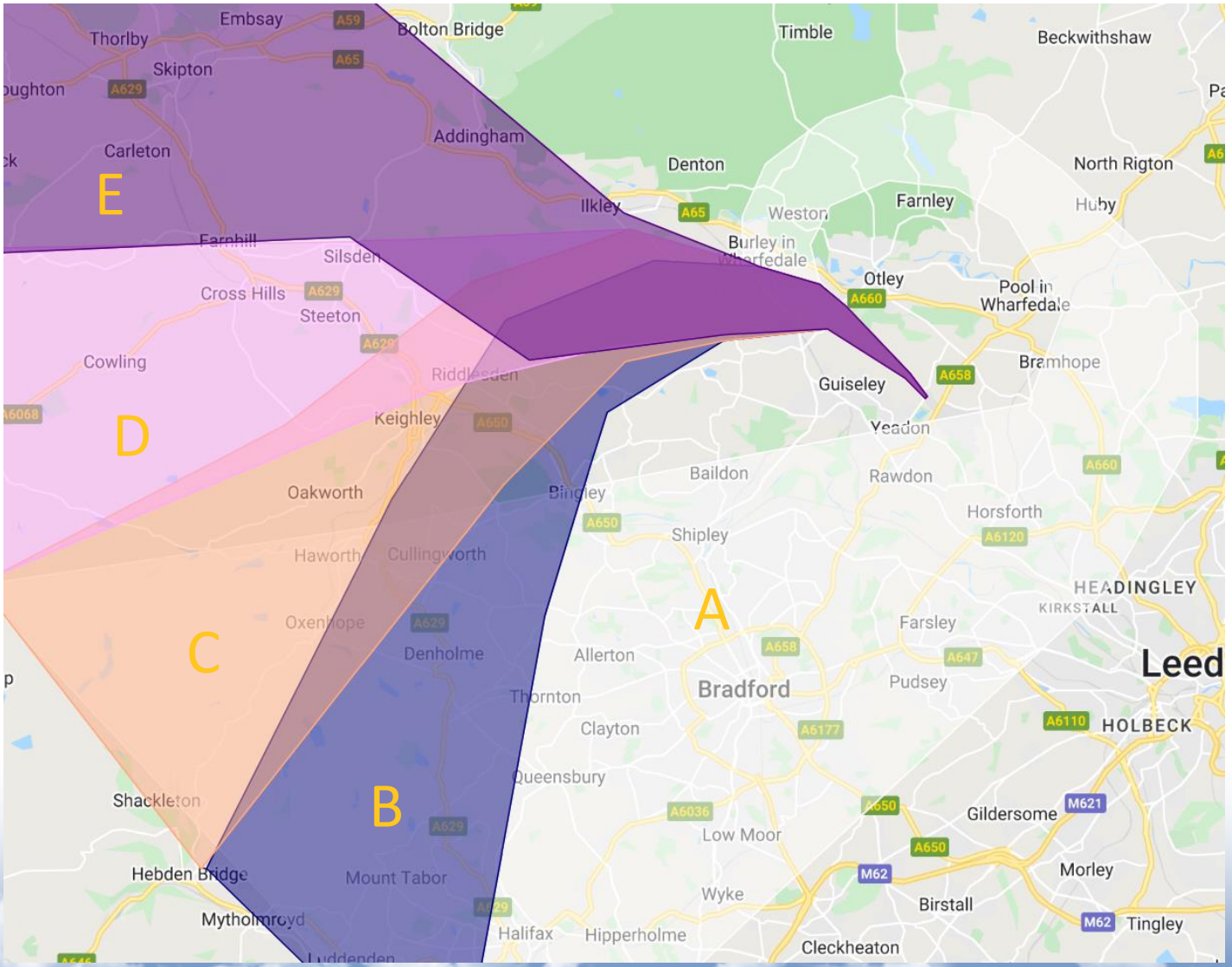
Runway 32 – South and West

Existing departures bound for the South and West off RW32 turn west in adherence to the NPR and end at NELSA; this is replicated in Option C (32S&WC).

Runway 32 – South and West



Runway 32 – South and West



Runway 32 – South and West

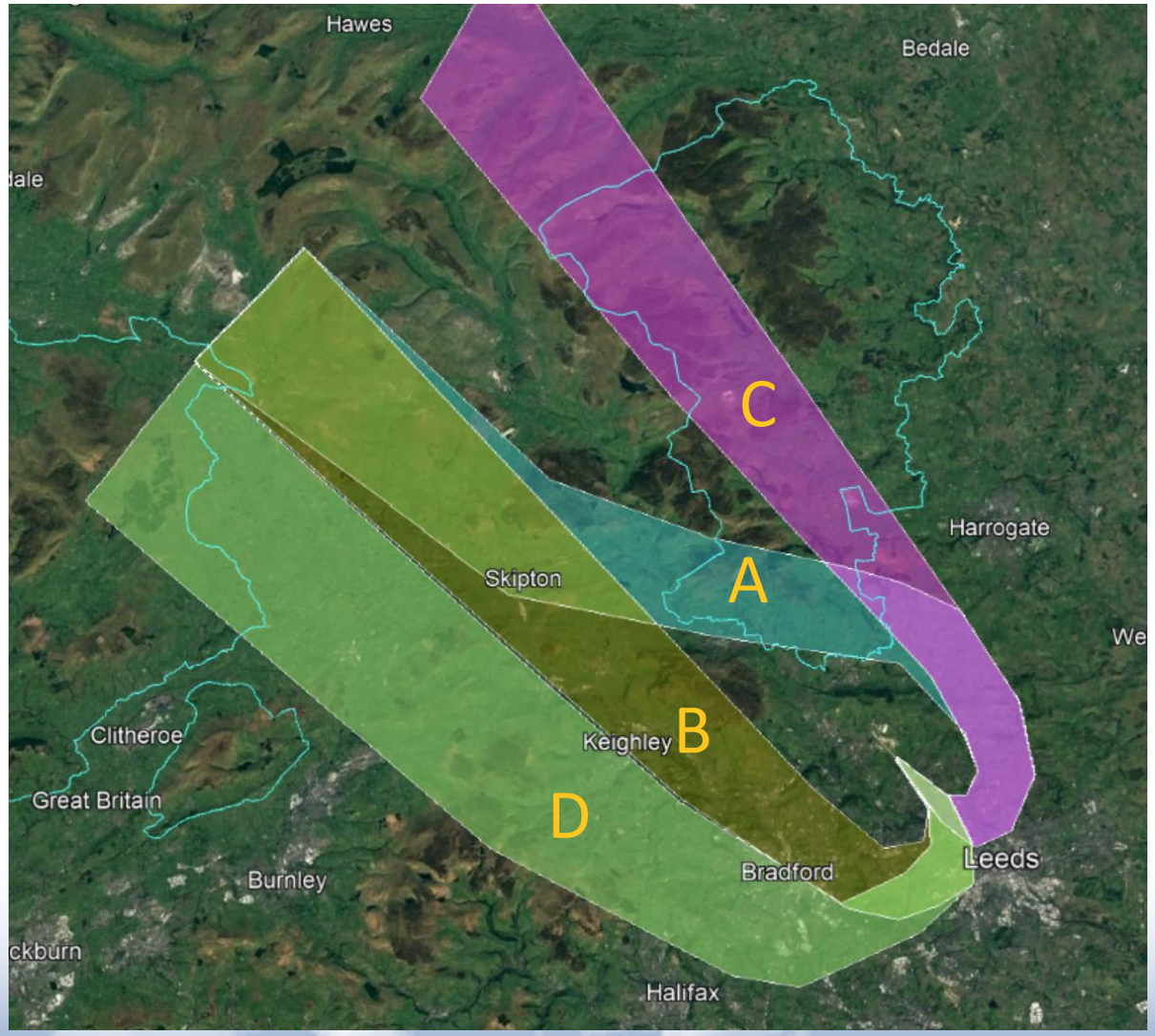
32 South & West Deps DP Evaluation

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
32S&W-A	The current airspace would not contain this SID	Baseline affects less people at lower levels than this option- Burley in Warfedale/ Bramhope	Overflies Lindley Wood Res.	More track miles	Would require a greater volume of CAS to be established				Extra track miles		
32S&W-B											
32S&W-C											
32S&W-D											
32S&W-E	The current airspace would not contain this SID		Overfly Ilkley Moor	More track miles	Would potentially require a greater volume of CAS to be established- due to higher CAS base				Extra track miles		

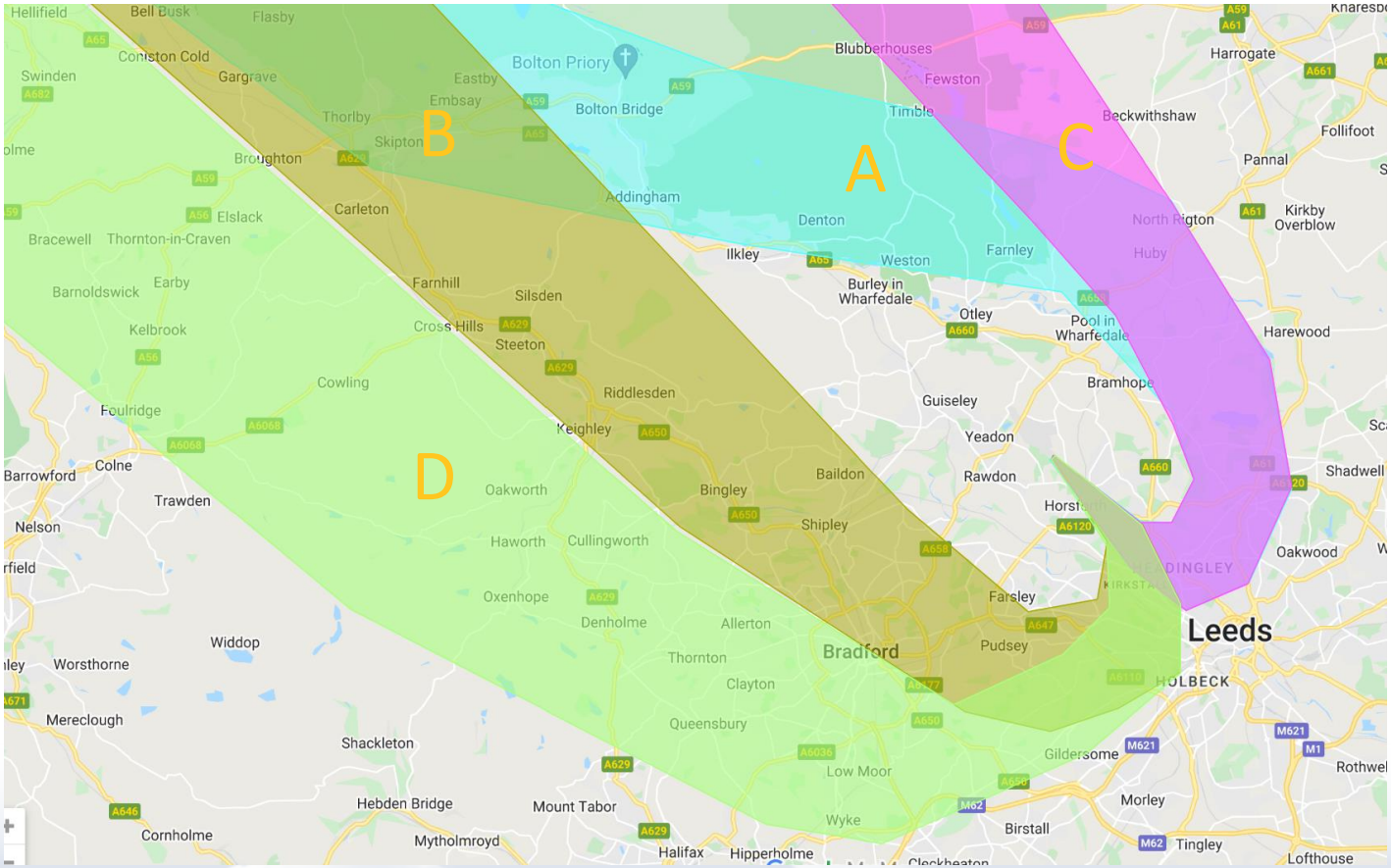
Runway 14 – North West

Existing departures to the North-West off RW14 turn on adherence to the NPR.

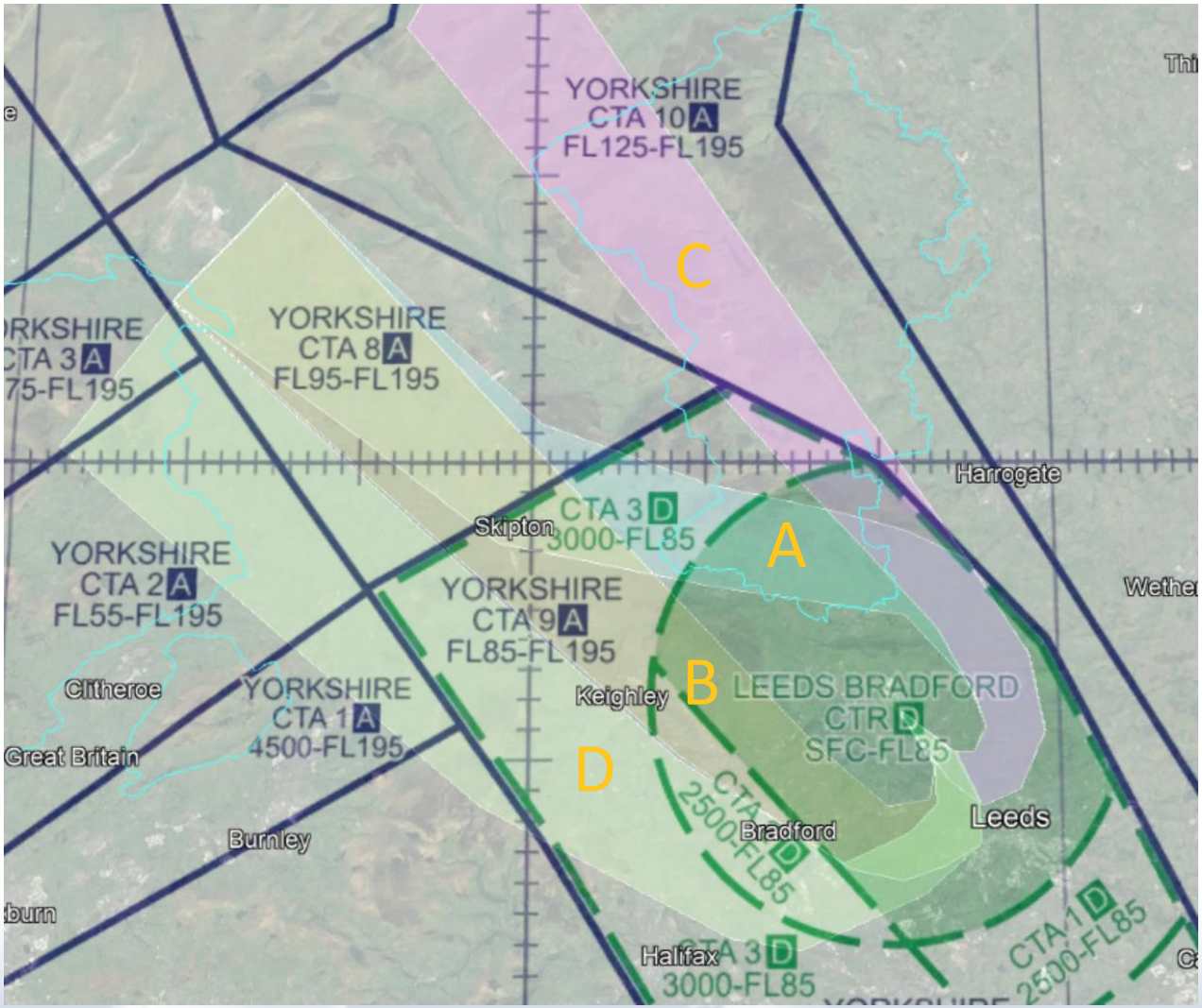
Runway 14 – North West



Runway 14 – North West



Runway 14 – North West



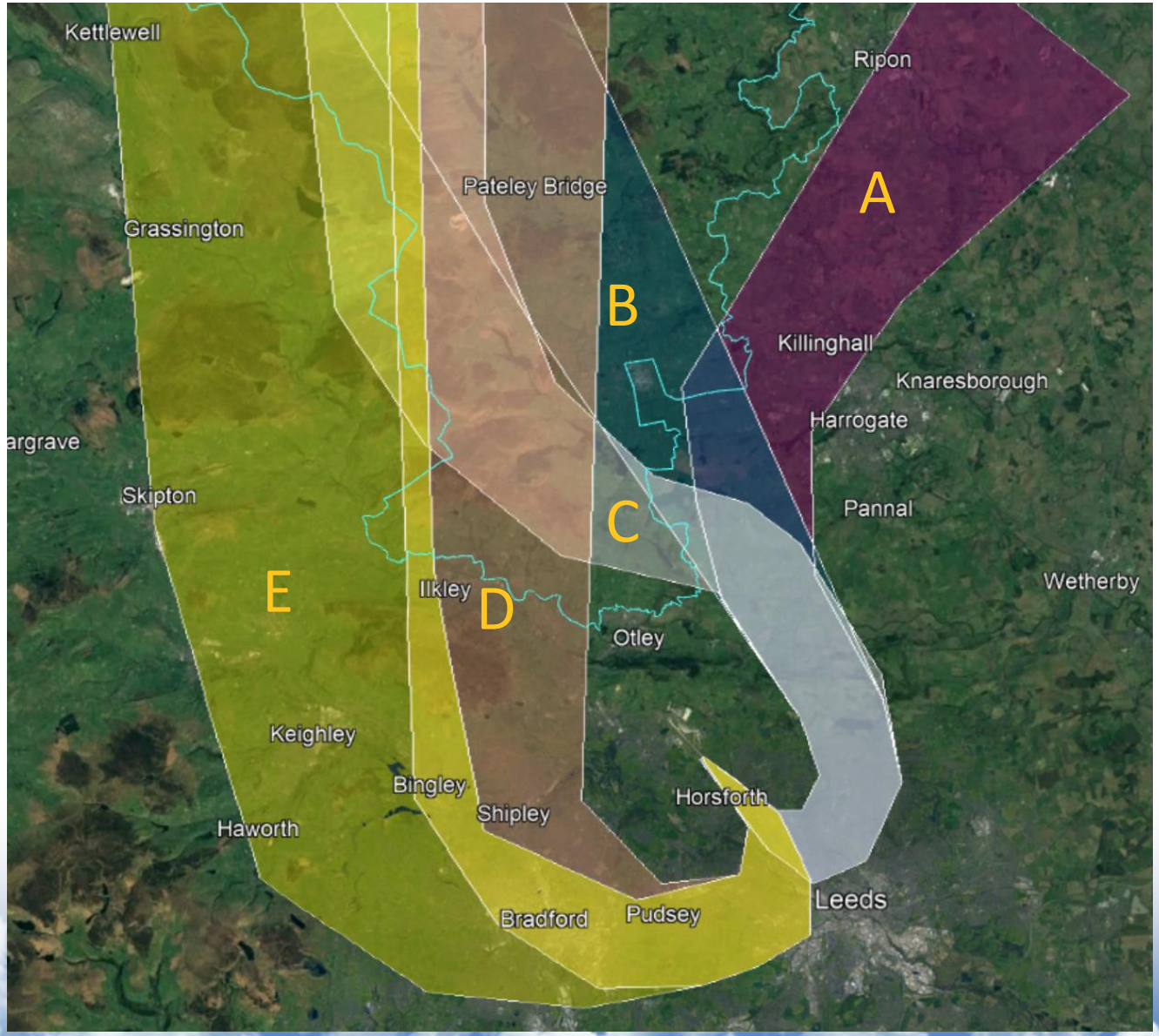
14 North West Deps DP Evaluation

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
14NW-A	Currently no CAS to contain				Currently no CAS to contain	Potential conflict with inbounds					
14NW-B		Bradford									
14NW-C	Currently no CAS to contain				Currently no CAS to contain						
14NW-D											

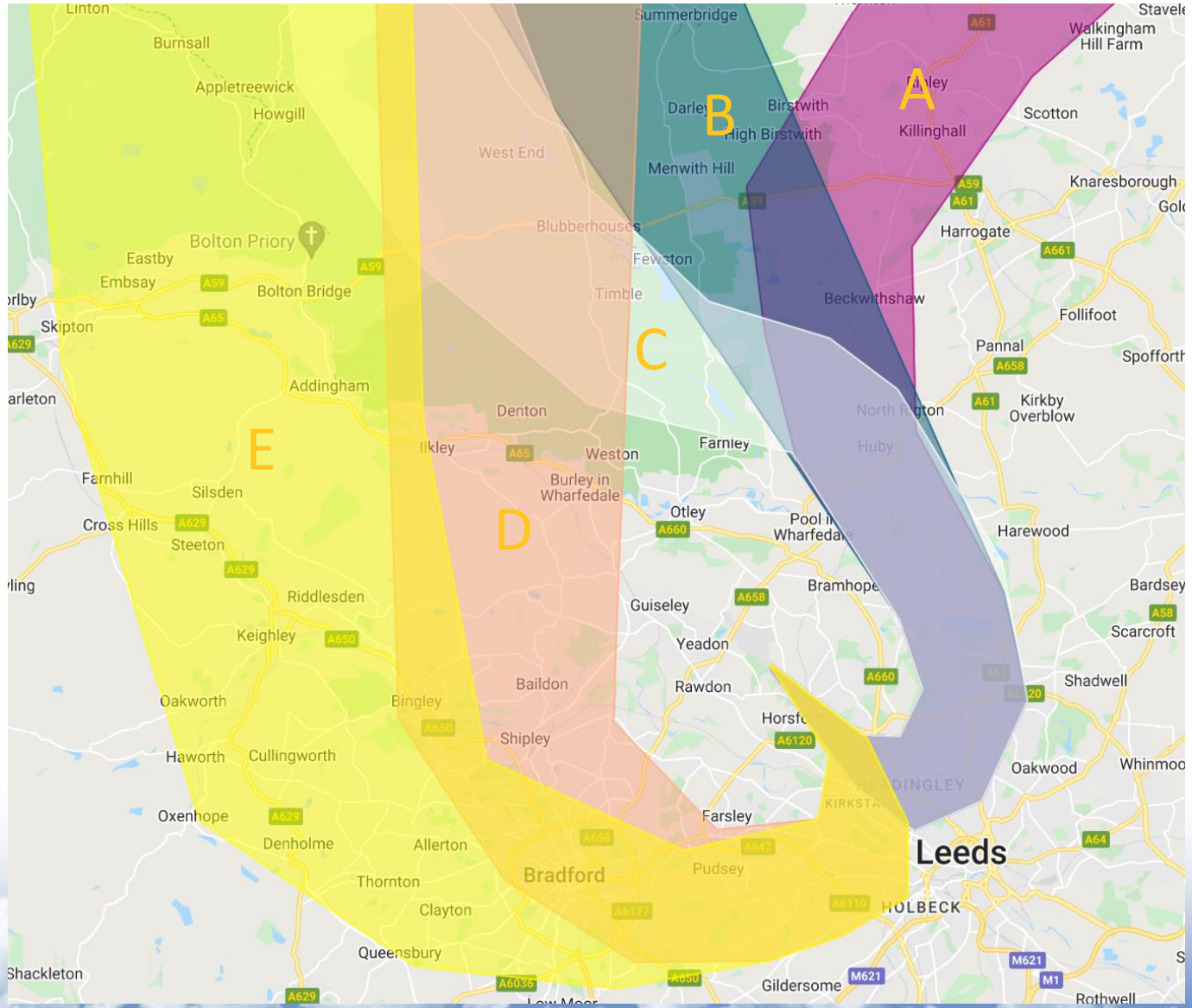
Runway 14 – North East

Existing departures to the North-East off RW14 turn West before turning North towards GASKO upon adherence to the NPRs. Option D (14NED) seeks to replicate this.

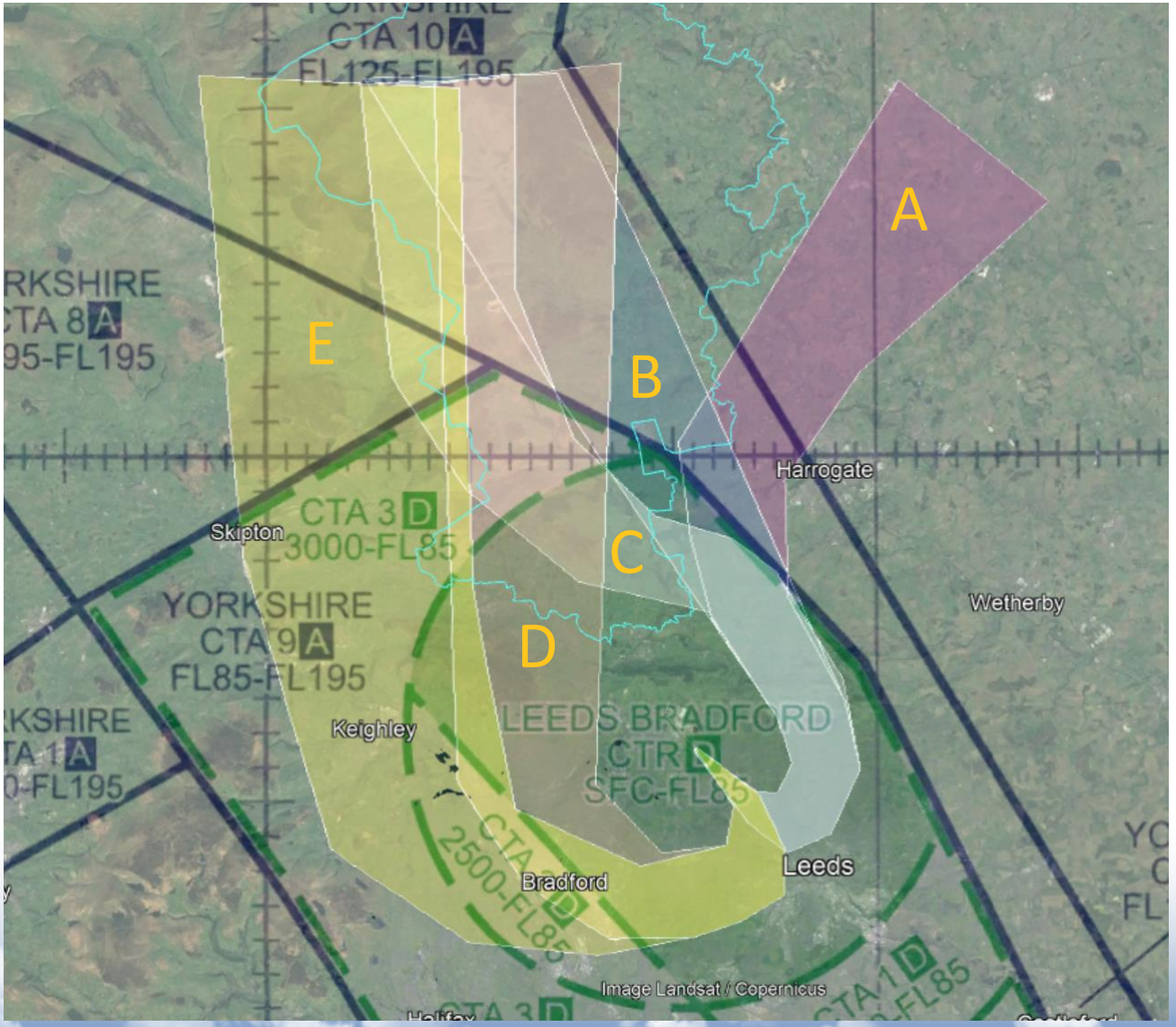
Runway 14 North East



Runway 14 North East



Runway 14 North East



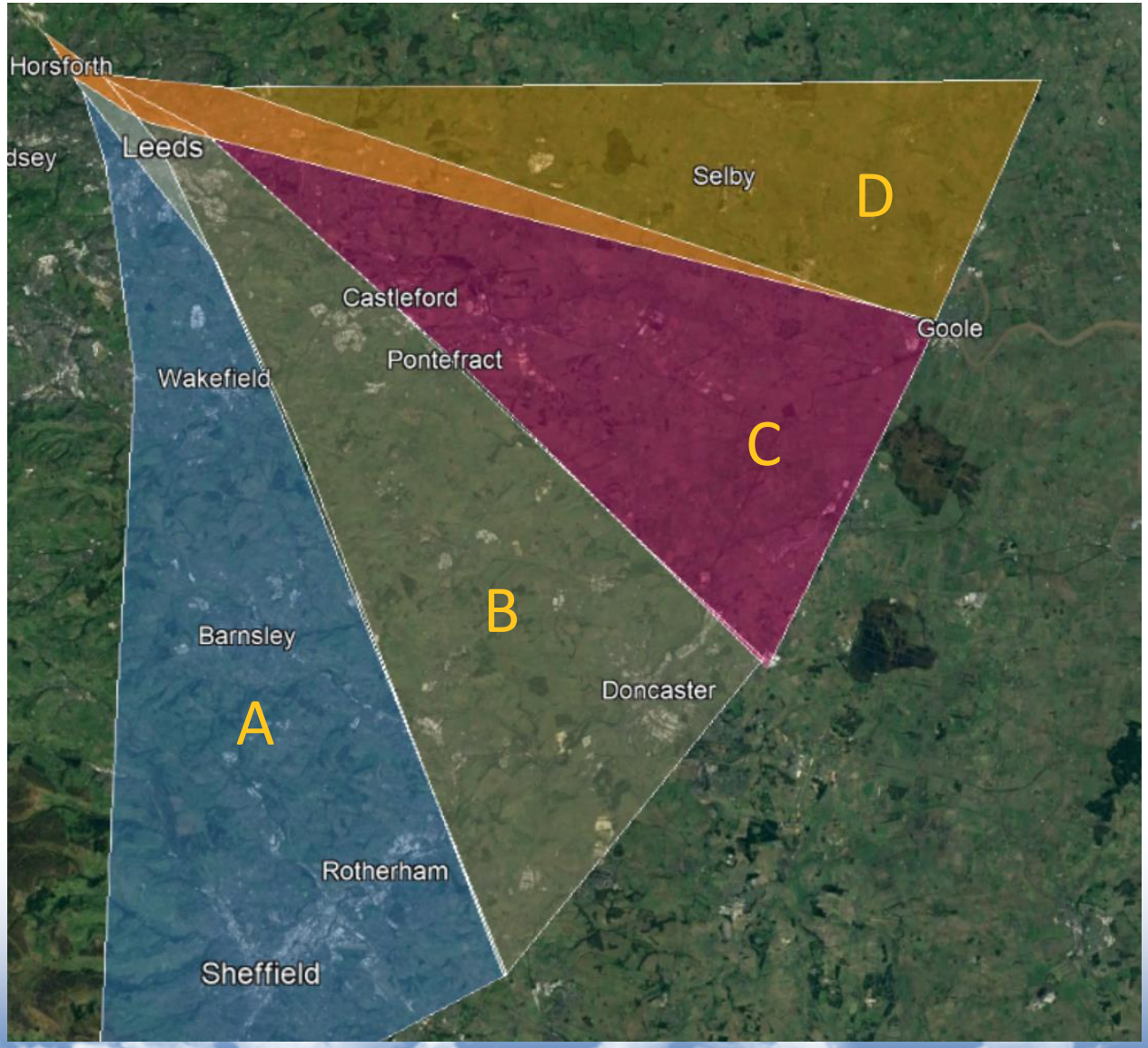
14 North East Deps DP Evaluation

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
14NE-A	Currently class G Area of IAA with multiple Fast Jet operations	Overflight of populated areas…			Currently class G Area of IAA with multiple Fast Jet operations						
14NE-B	Currently no CAS to contain				Currently no CAS to contain	Potential conflict with inbounds					
14NE-C	Currently no CAS to contain				Currently no CAS to contain	Potential conflict with inbounds					
14NE-D	Currently no CAS to contain				Currently no CAS to contain	Potential conflict with inbounds					
14NE-E											

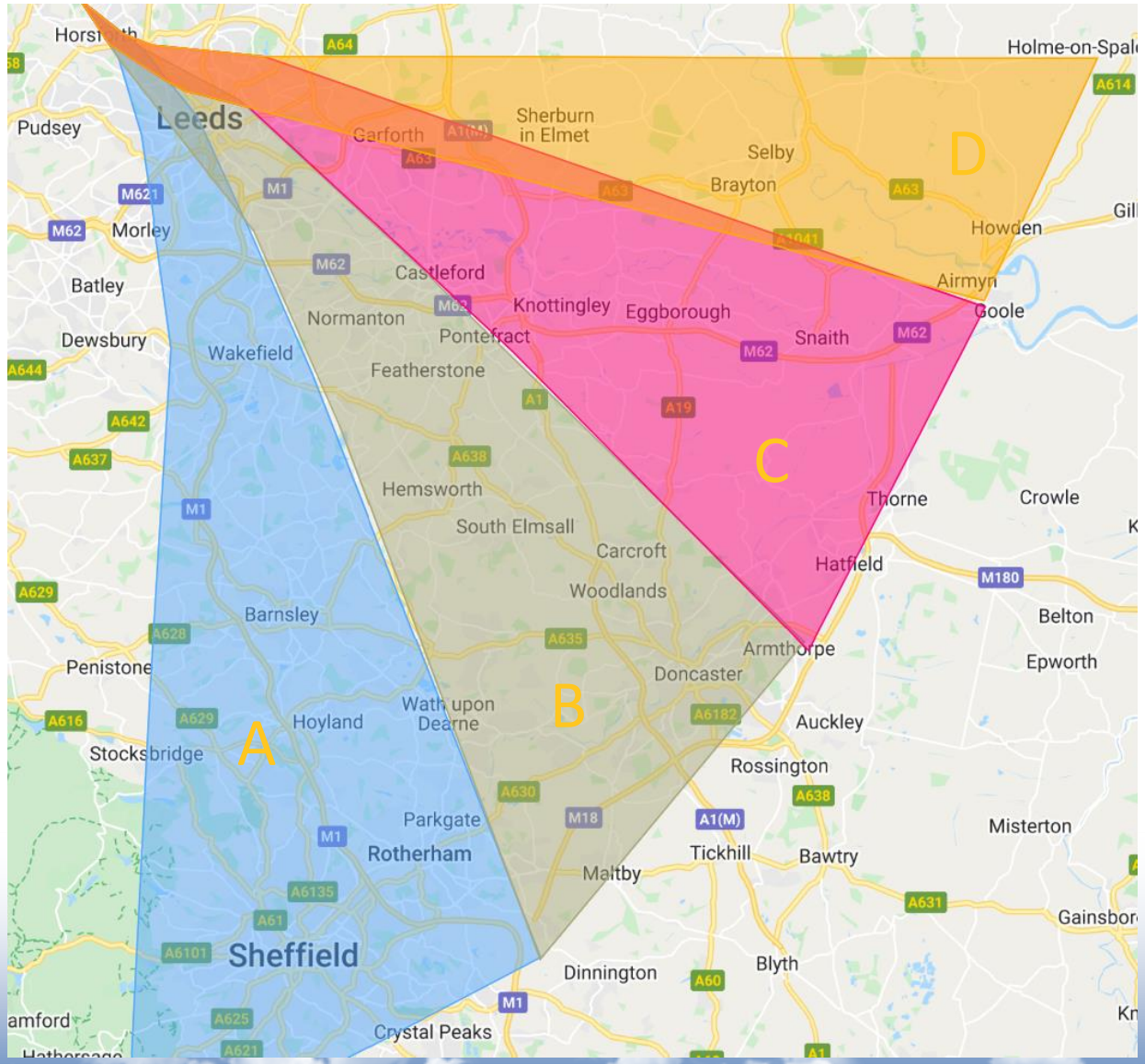
Runway 14 – South East

Existing departures to the South-East off RW14 route almost straight ahead in adherence to the NPRs before turning for DOPEK and LAMIX. Option B (14SEB) seeks to replicate this.

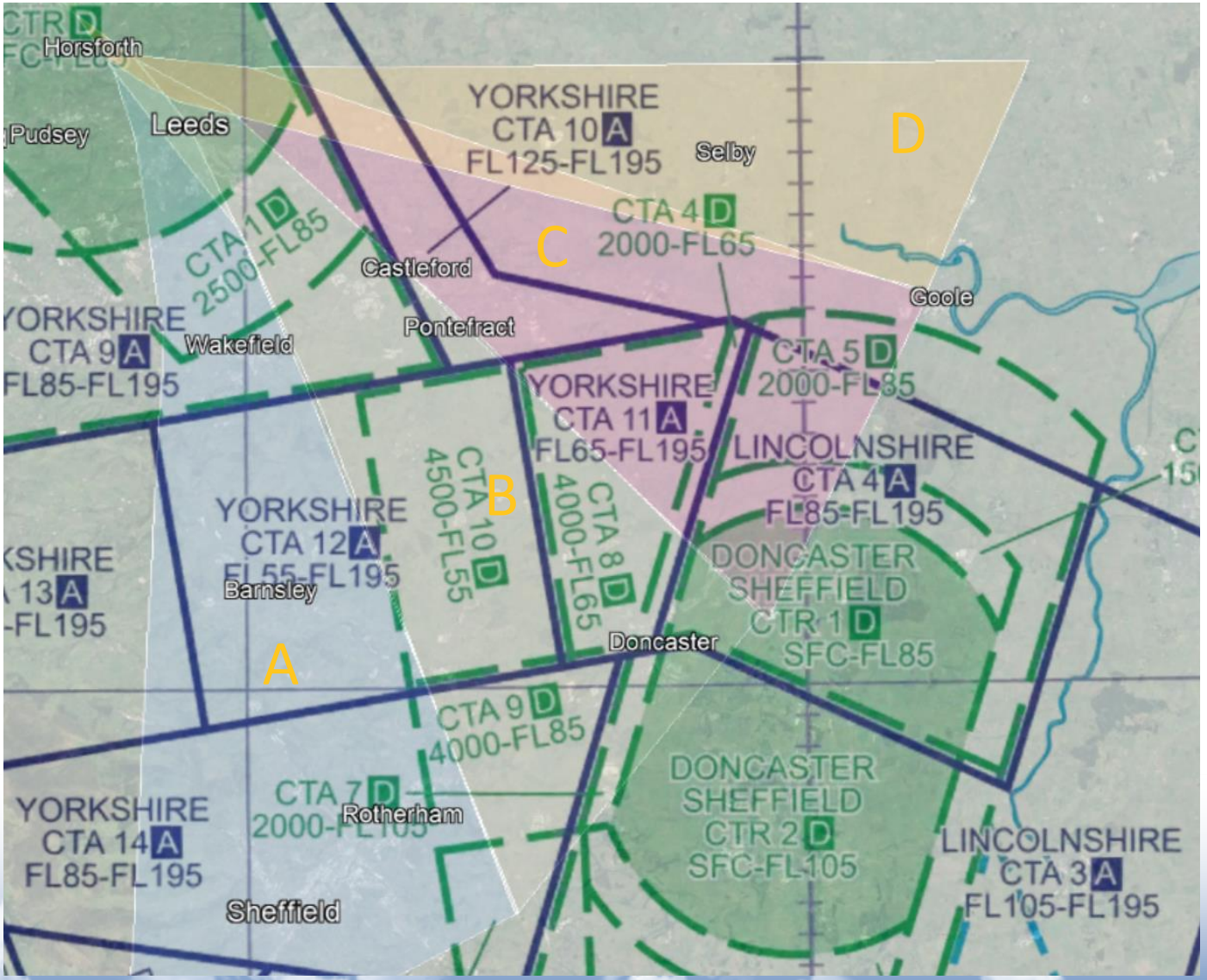
Runway 14 South East



Runway 14 South East



Runway 14 South East



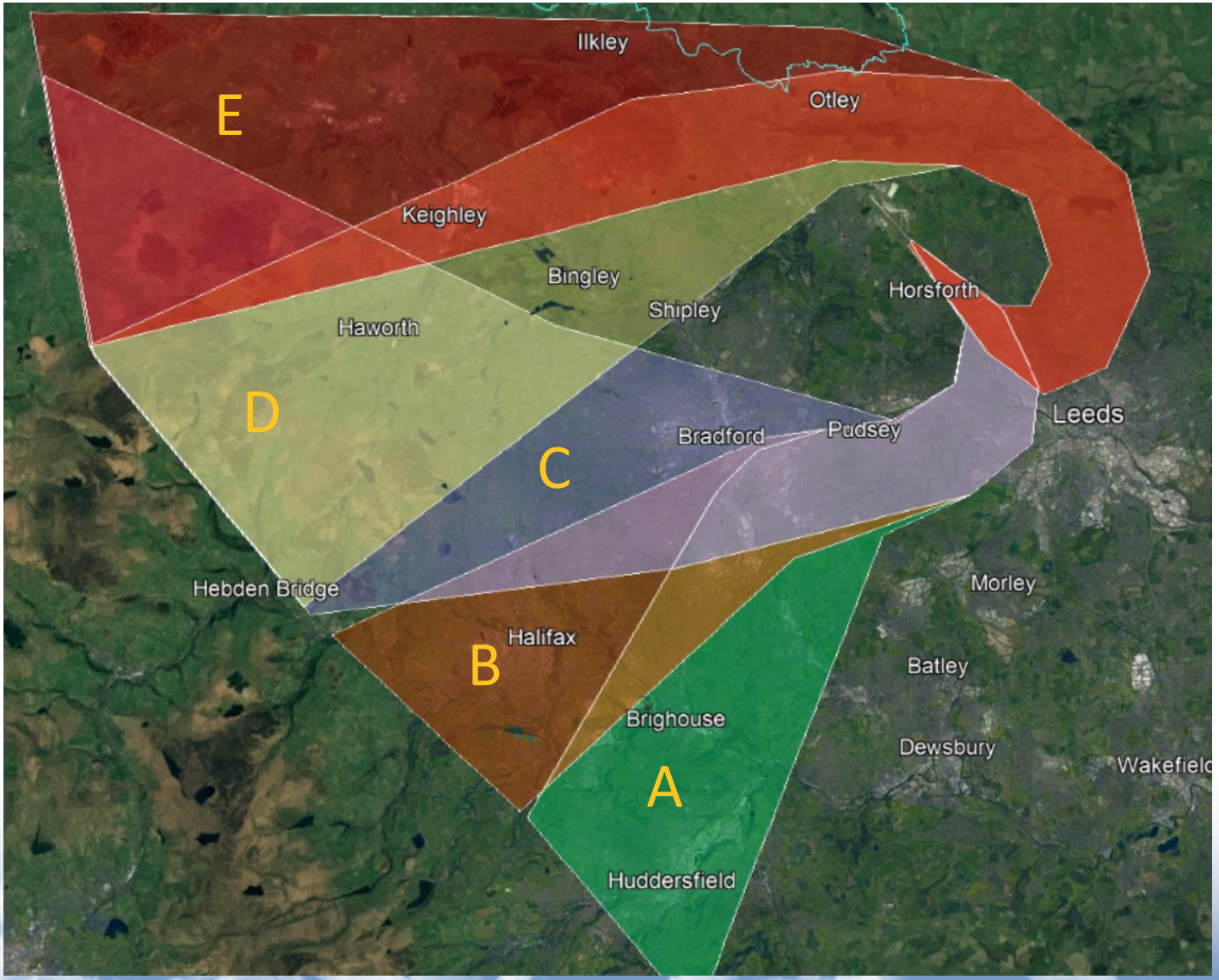
14 South East Deps DP Evaluation

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
14SE-A									Extra track miles		
14SE-B											
14SE-C	The current airspace would not contain this SID				The current airspace would not contain this SID						
14SE-D	The current airspace would not contain this SID				The current airspace would not contain this SID						

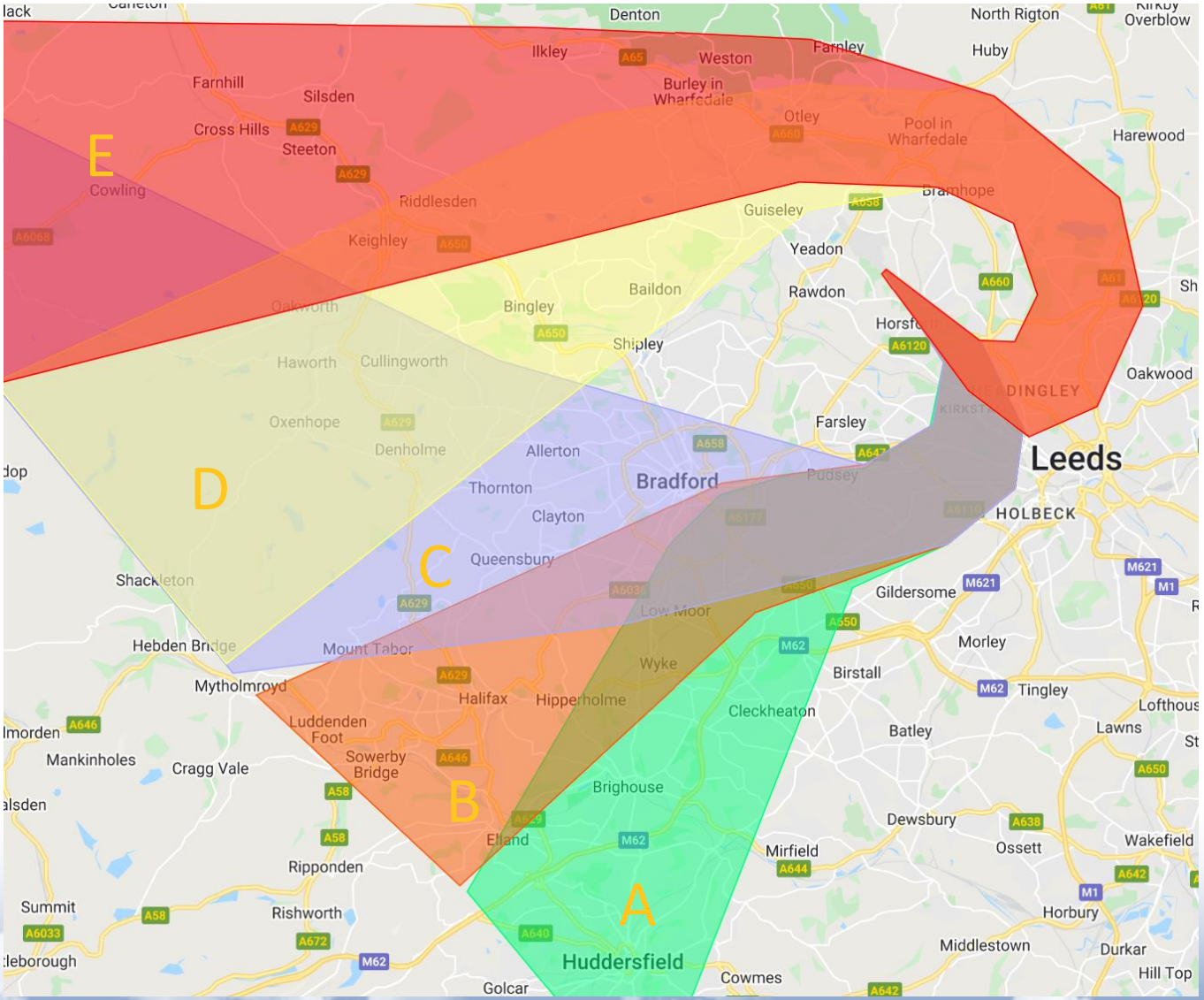
Runway 14 – South and West

Existing departures to the South and West off RW14 turn West towards POL. Option D (14NED) seeks to replicate this.

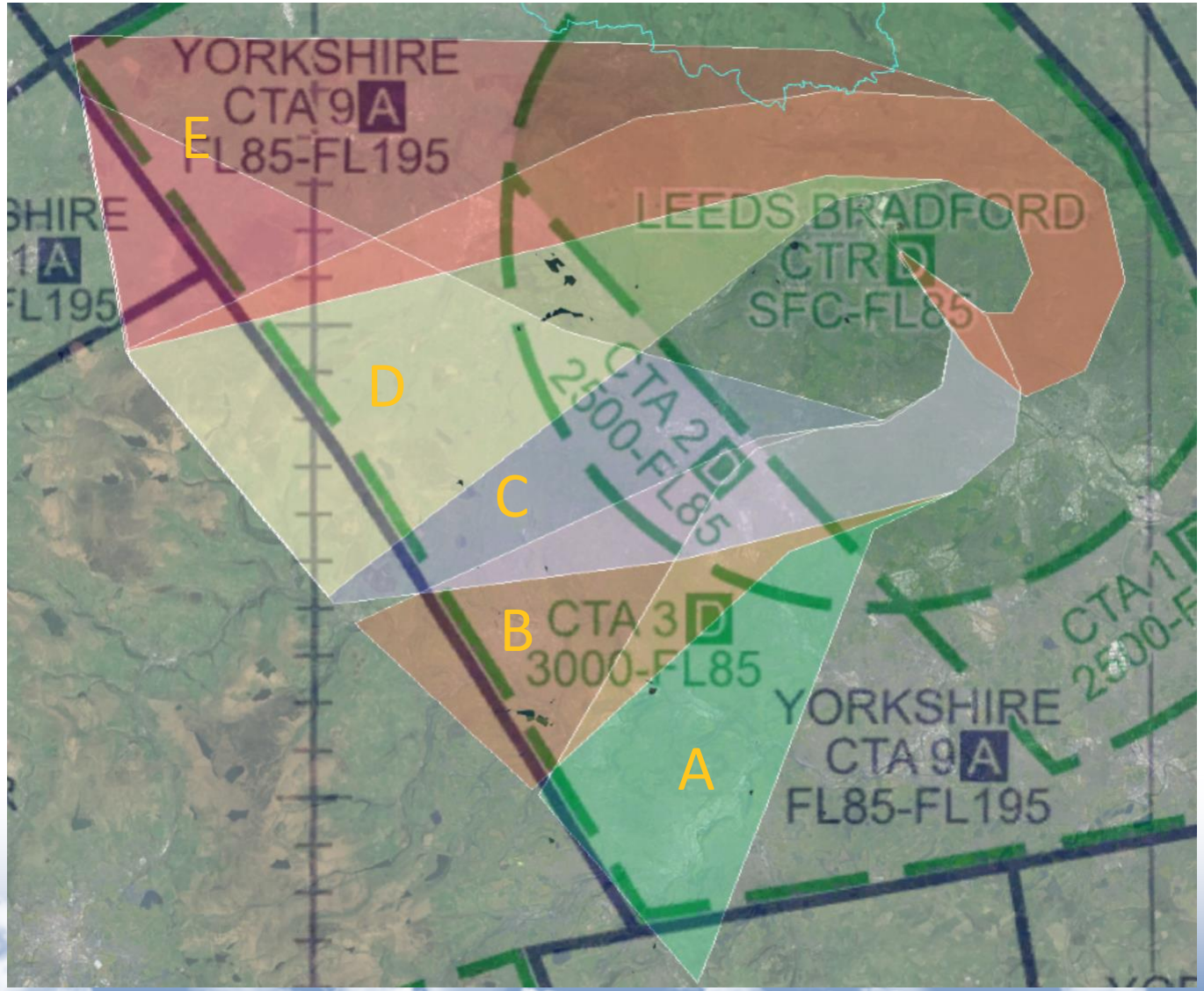
Runway 14 South and West



Runway 14 South and West



Runway 14 South and West

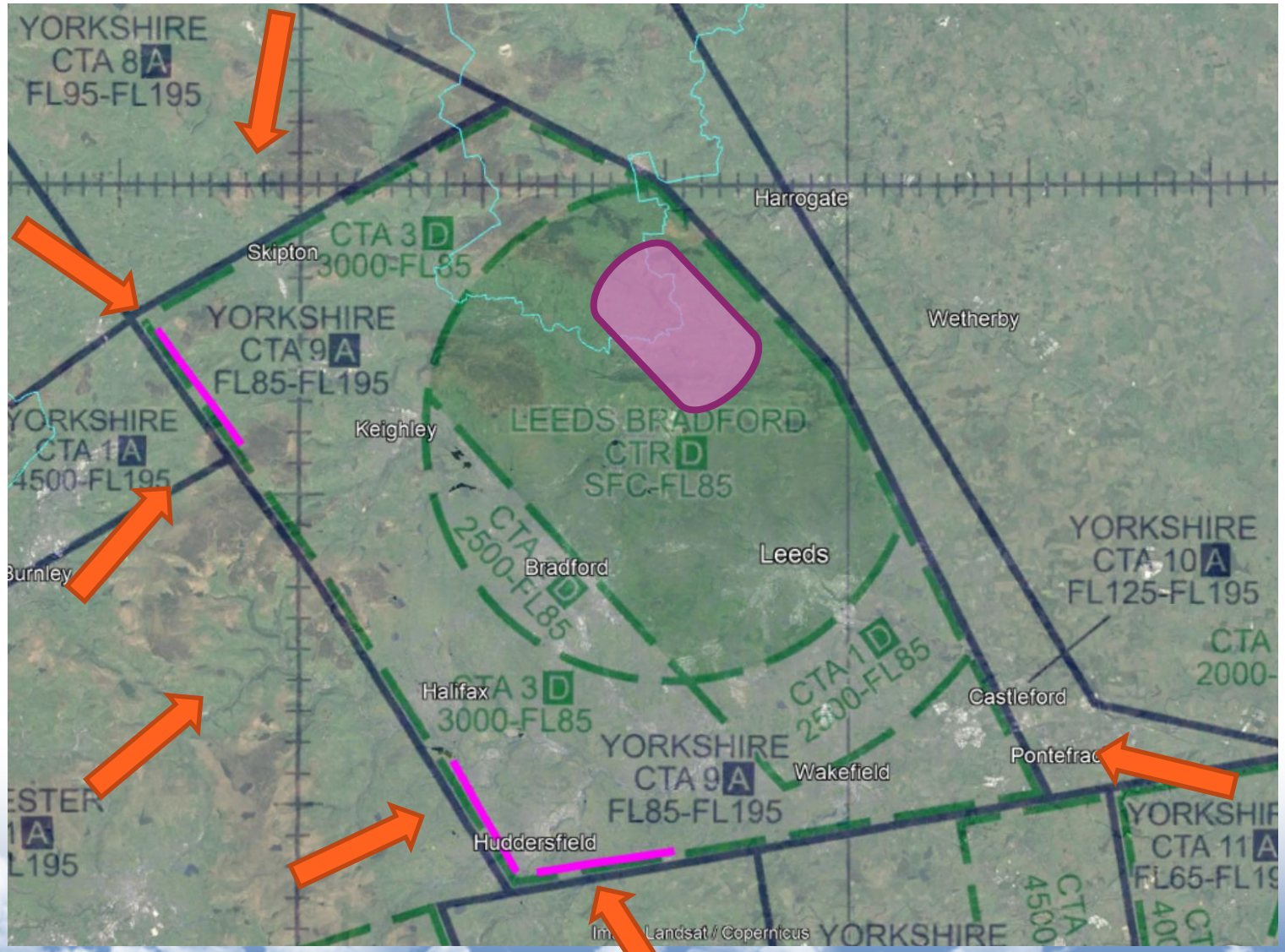


14 South & West Deps DP Evaluation

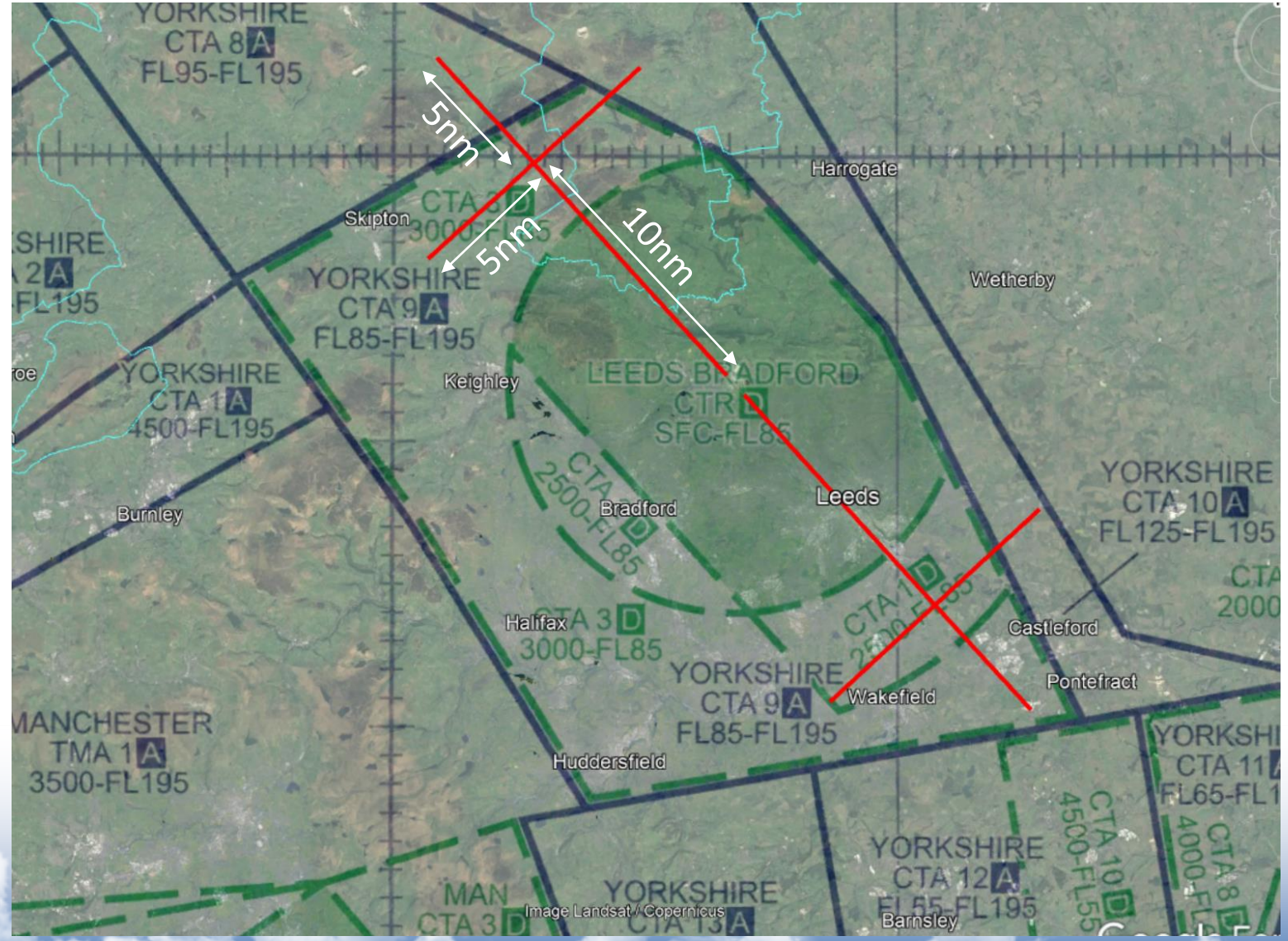
Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
14S&W-A				More track miles if going West							
14S&W-B											
14S&W-C											
14S&W-D		Potential increase in noise for more people		More track miles	Would require a greater volume of CAS to be established	Potential conflict with inbounds			More track miles		
14S&W-E		Potential increase in noise for more people		More track miles	Would require a greater volume of CAS to be established	Potential conflict with inbounds			More track miles		

Arrivals

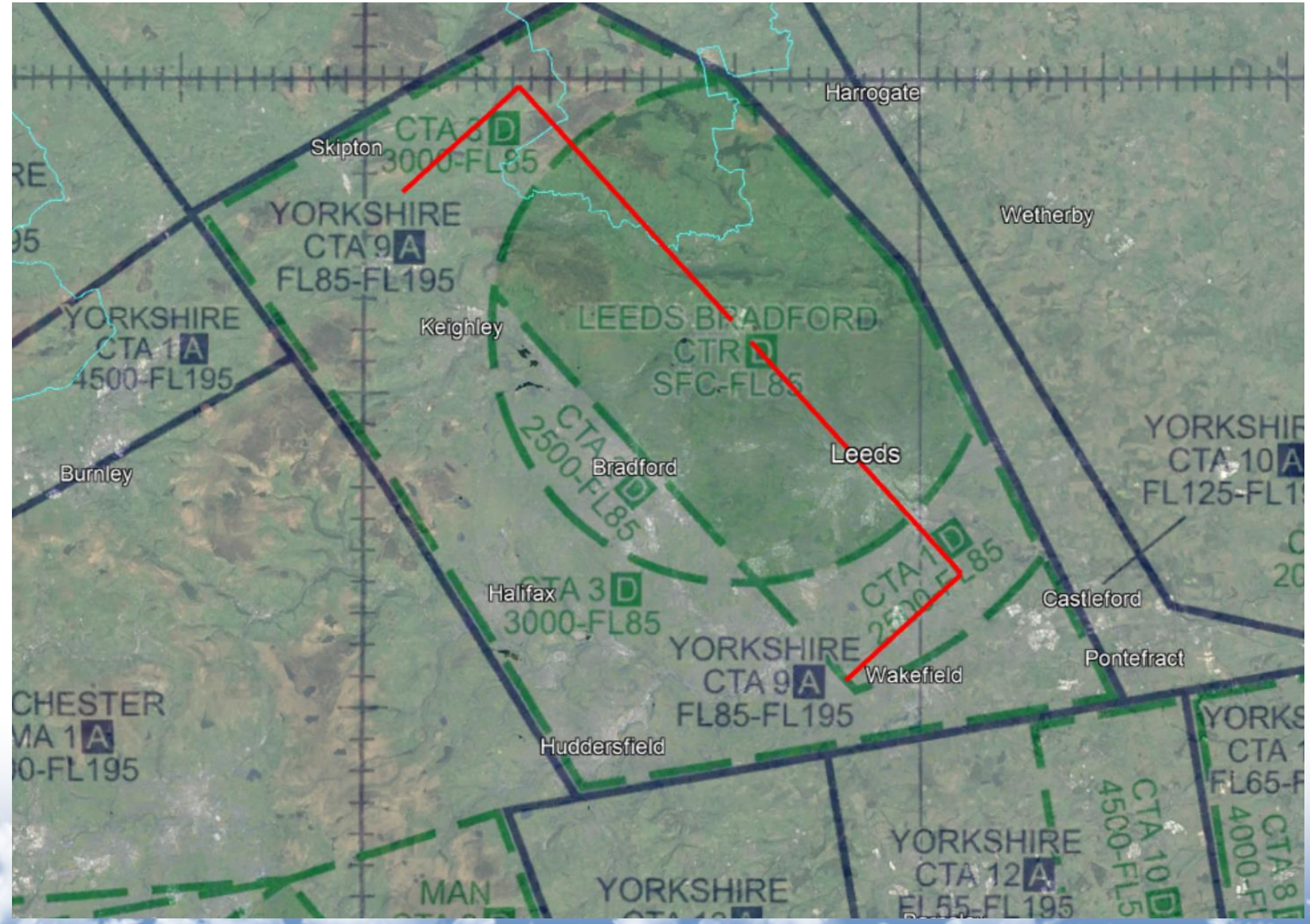
Existing Arrival Routings with Gates



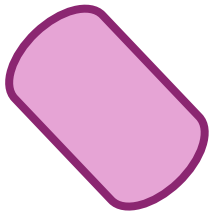
Standard RNAV T-Bars



Amended RNAV T-Bars

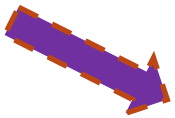


Key

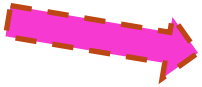


Hold

NERL Inbound track



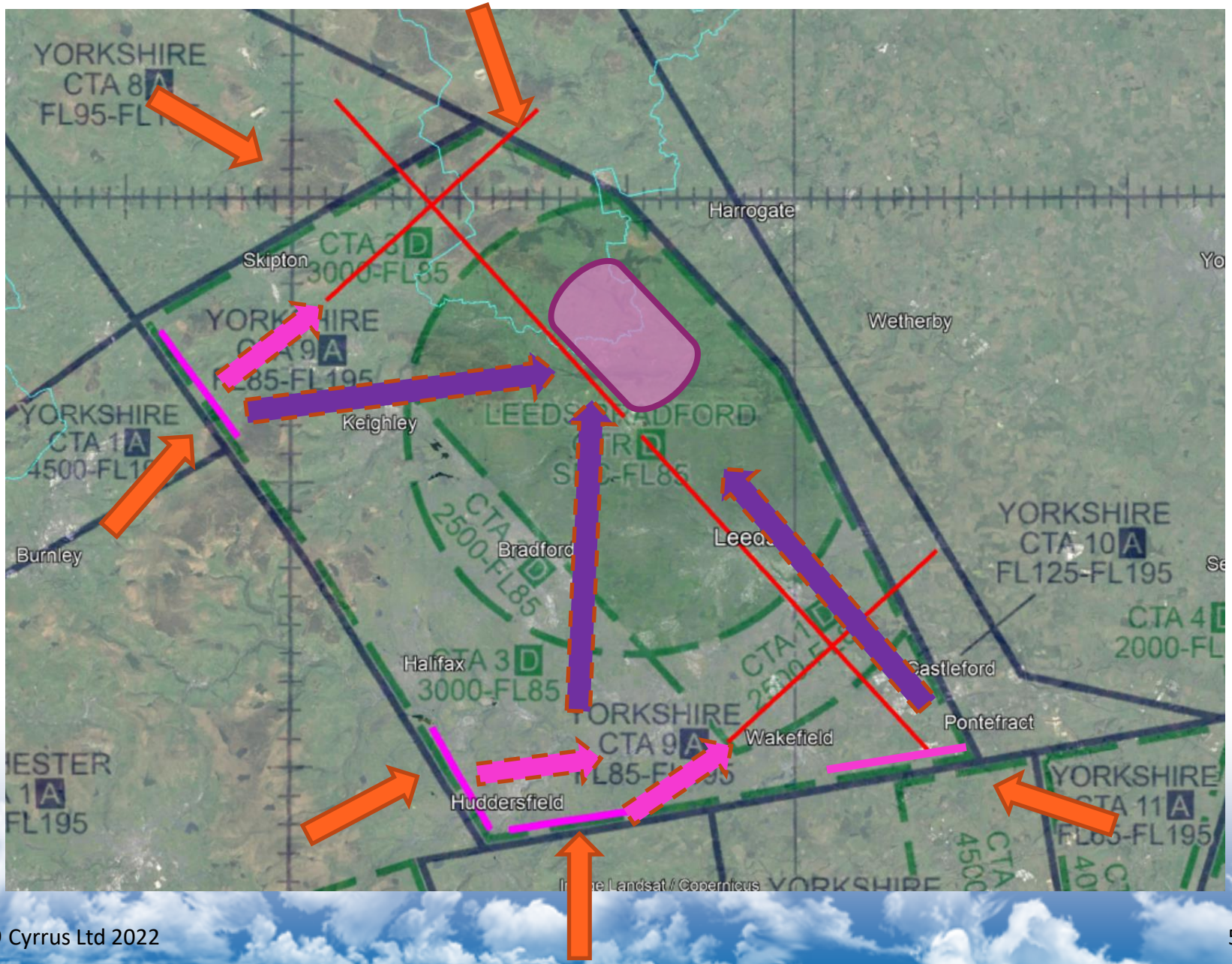
Towards a hold in LBA airspace



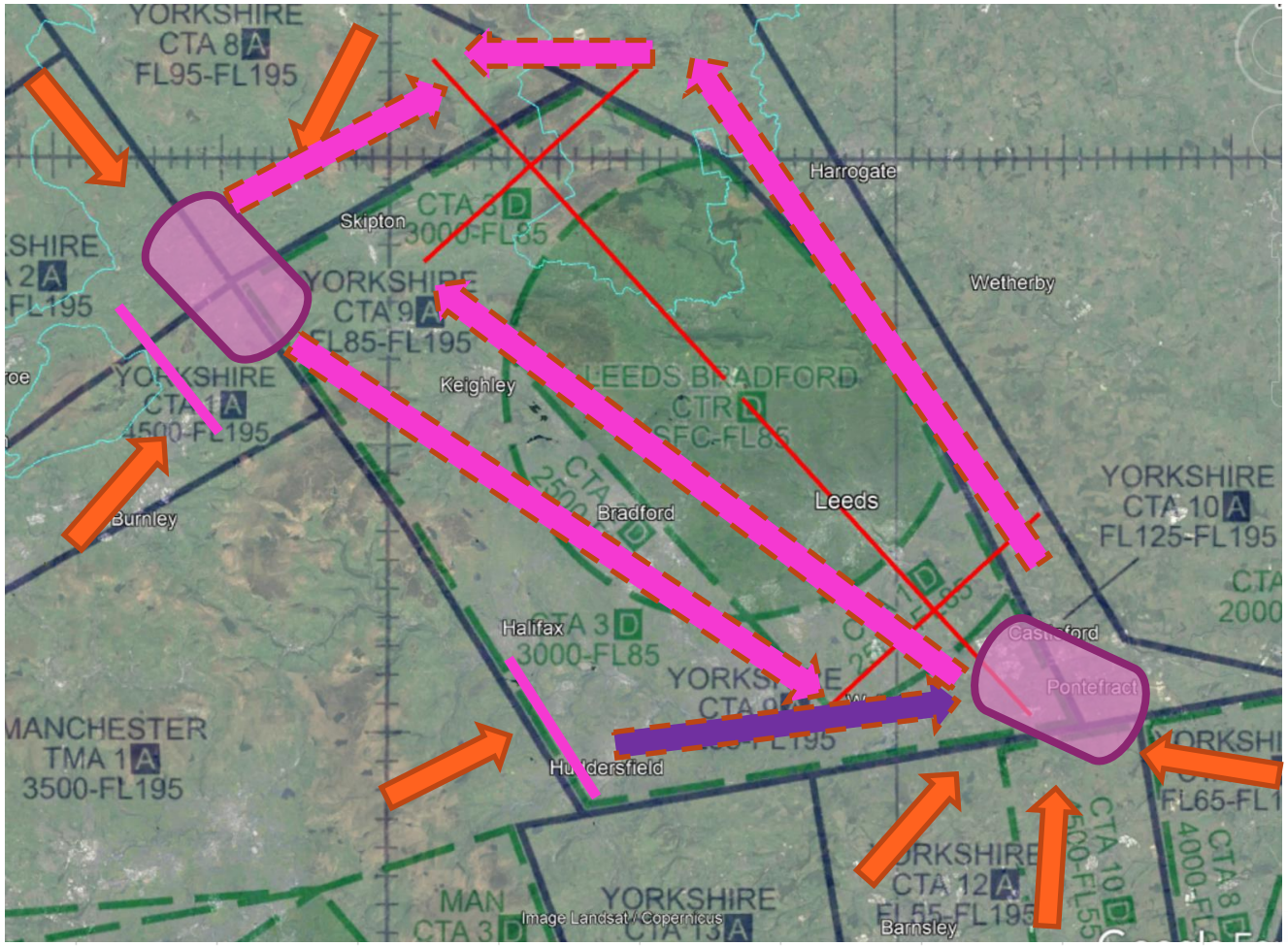
Arrival transition or RMA (vectored)

Gate

Option A – Gate System & Single Hold

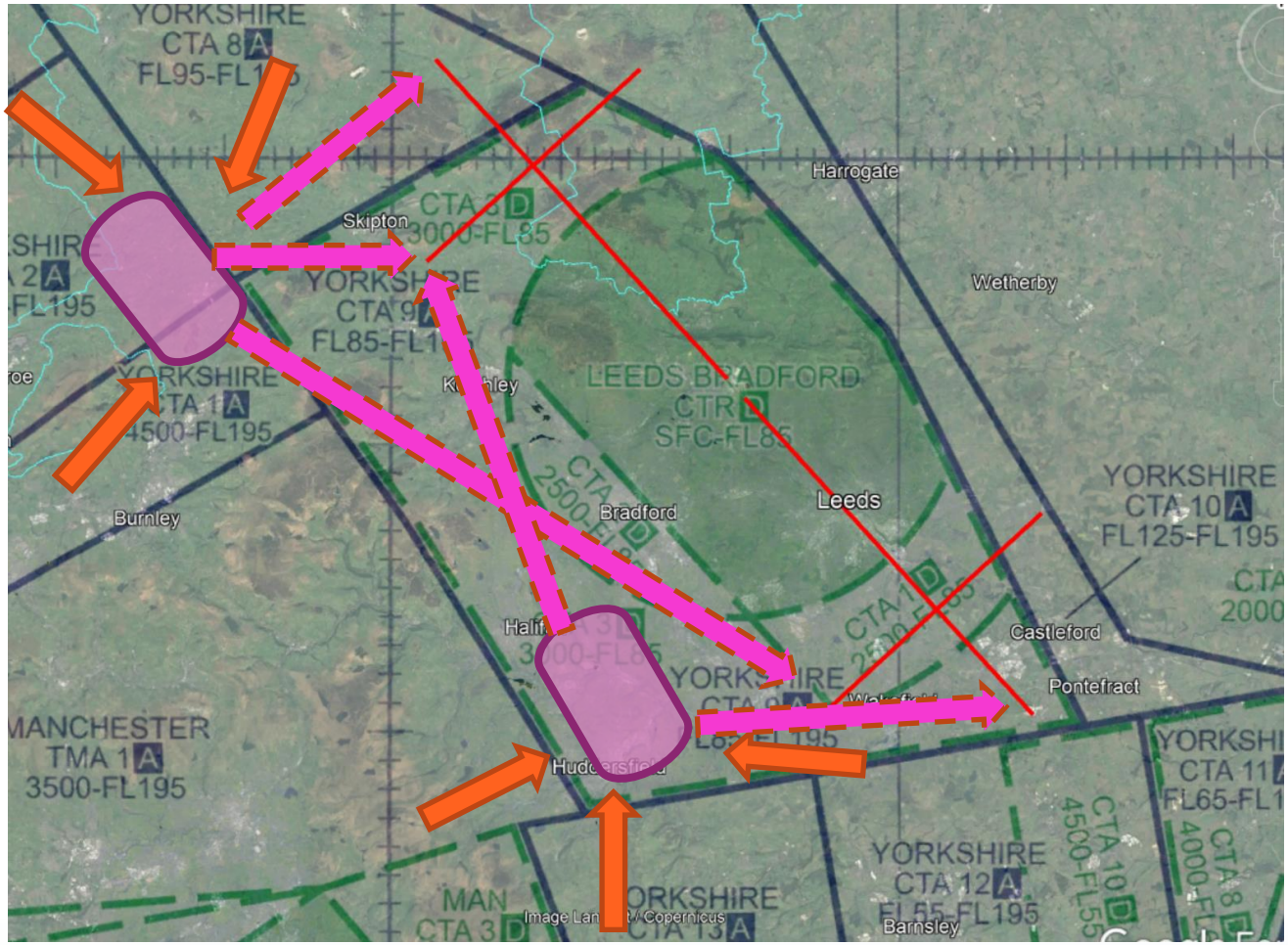


Option B – NW and SE Holds with Gates



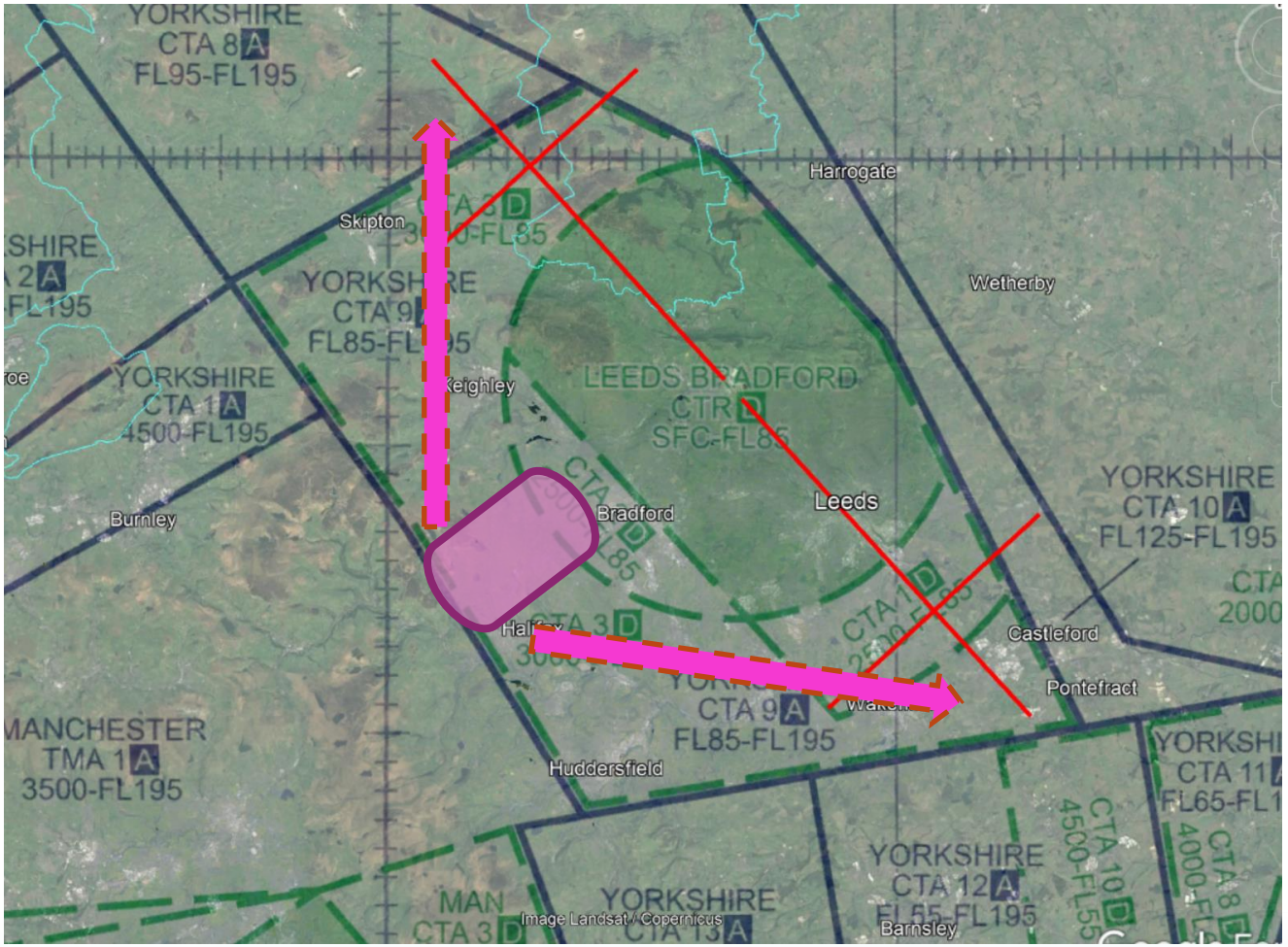
Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
Arrival Option B	Proposed route could take traffic outside of current controlled airspace	Potential for different communities to be overflown		Potential for extra track miles if holding at the alternate end to landing	Could require additional airspace to the East and North				Potential for extra track miles if holding at the alternate end to landing		

Option C – NW and SW Holds



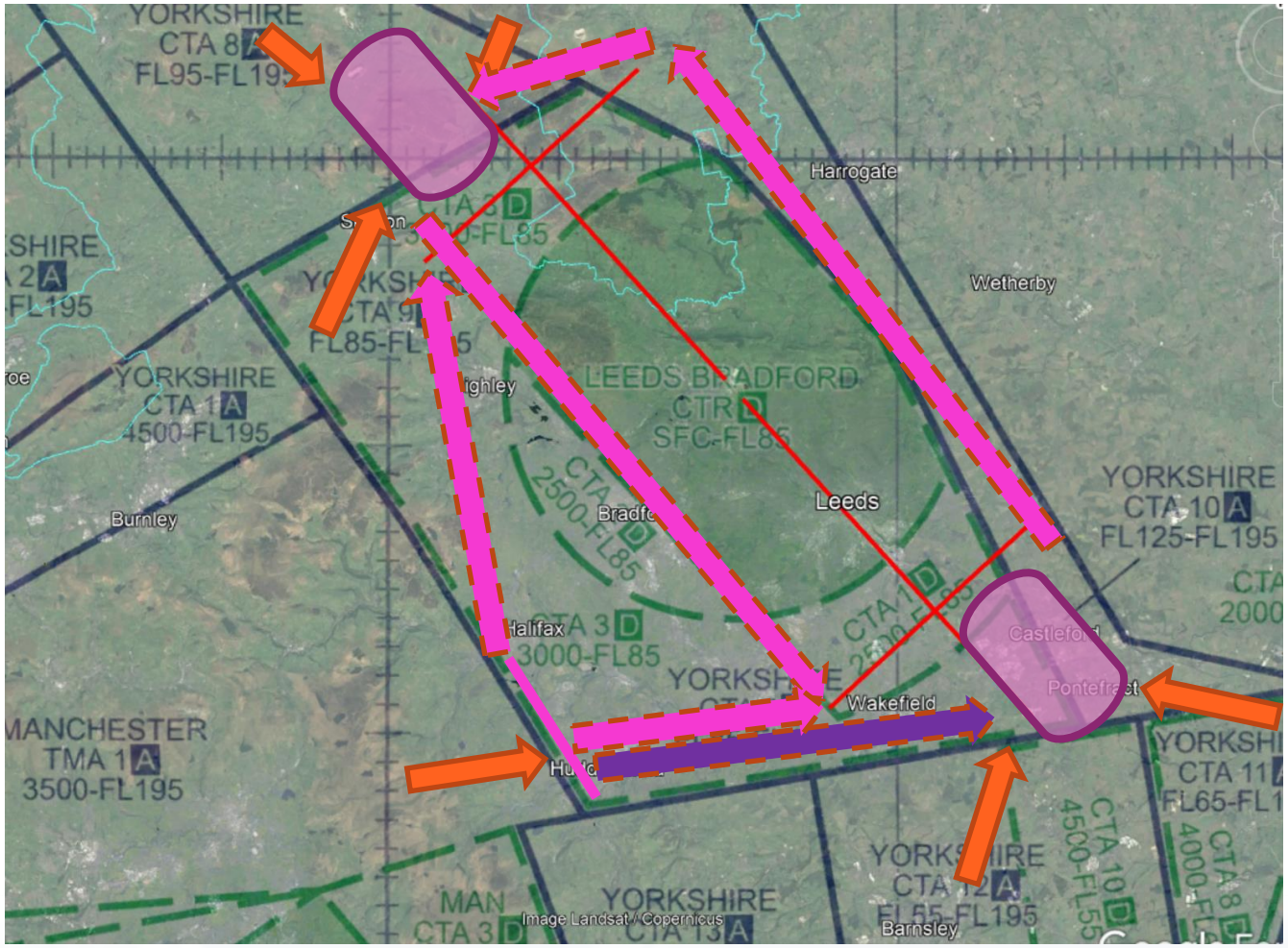
Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
Arrival Option C		Potential for different communities to be overflown						Potential for conflictions with departures			

Option D – Single Hold West



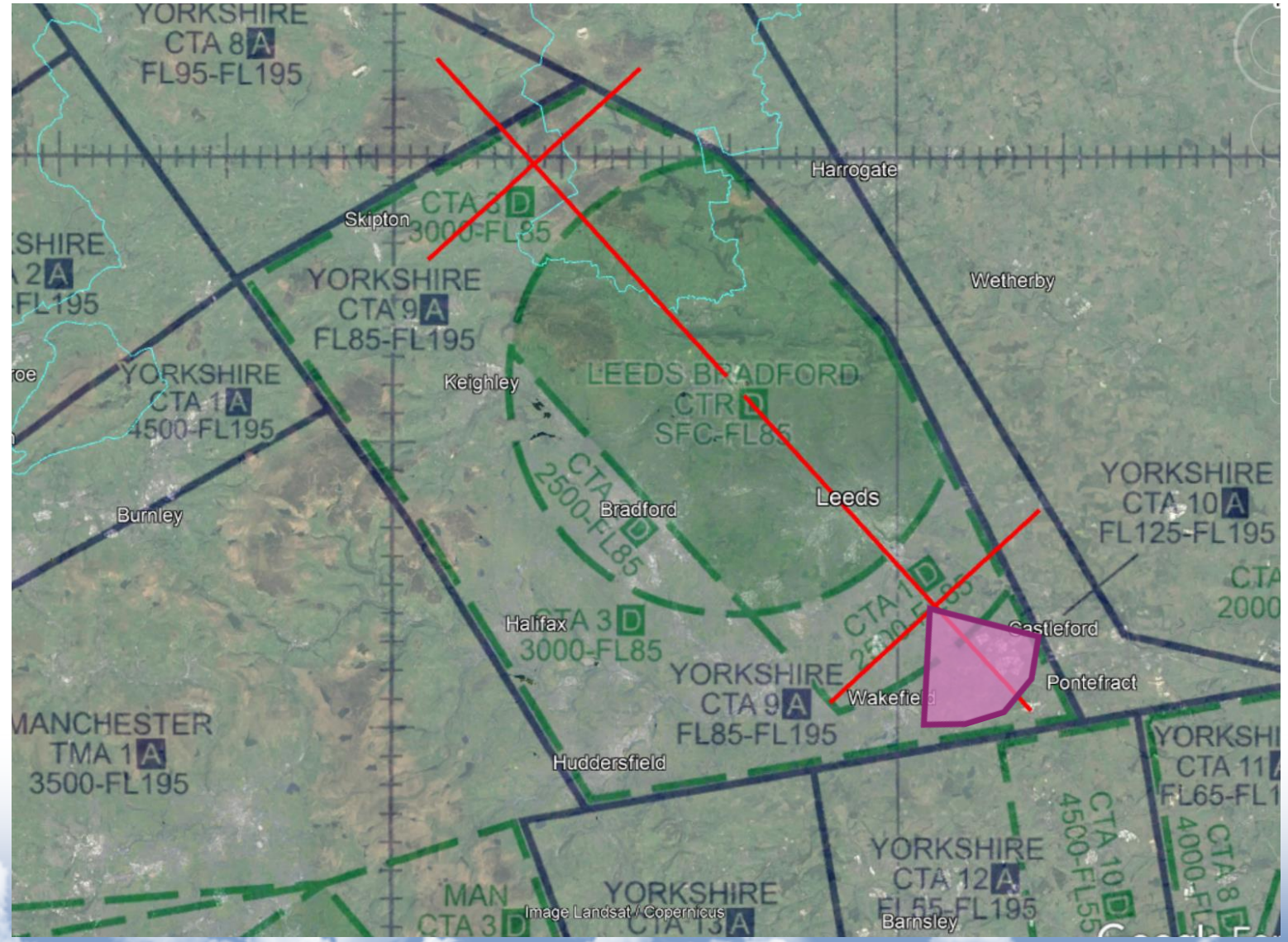
Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
Arrival Option D		Potential for different communities to be overflown						Potential for conflictions with departures			

Option E – Holds on extended CLs

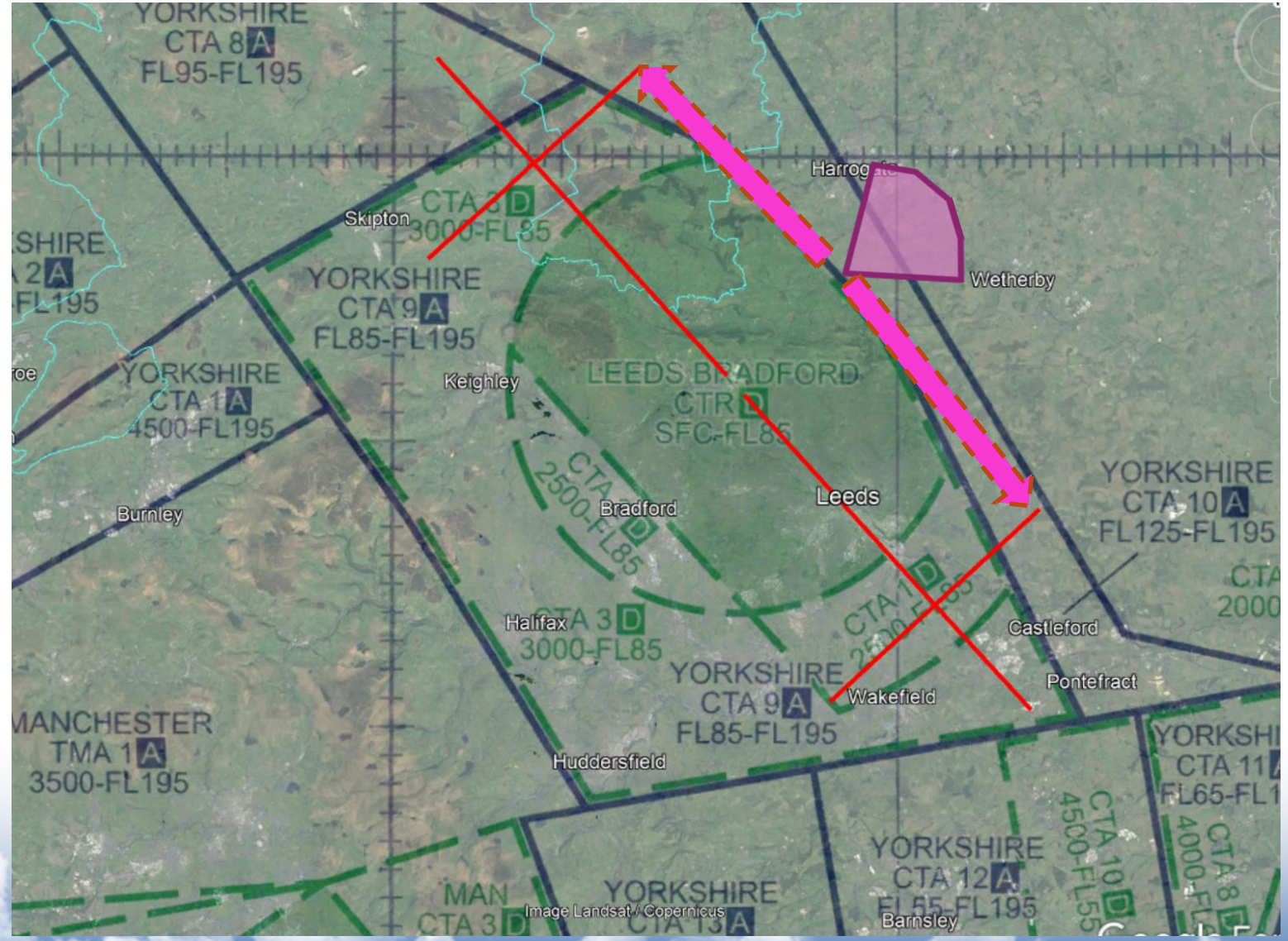


Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11
Arrival Option E	Proposed route could take traffic outside of current controlled airspace	Potential for different communities to be overflown		Potential for extra track miles if holding at the alternate end to landing	Could require additional airspace to the East and North				Potential for extra track miles if holding at the alternate end to landing		

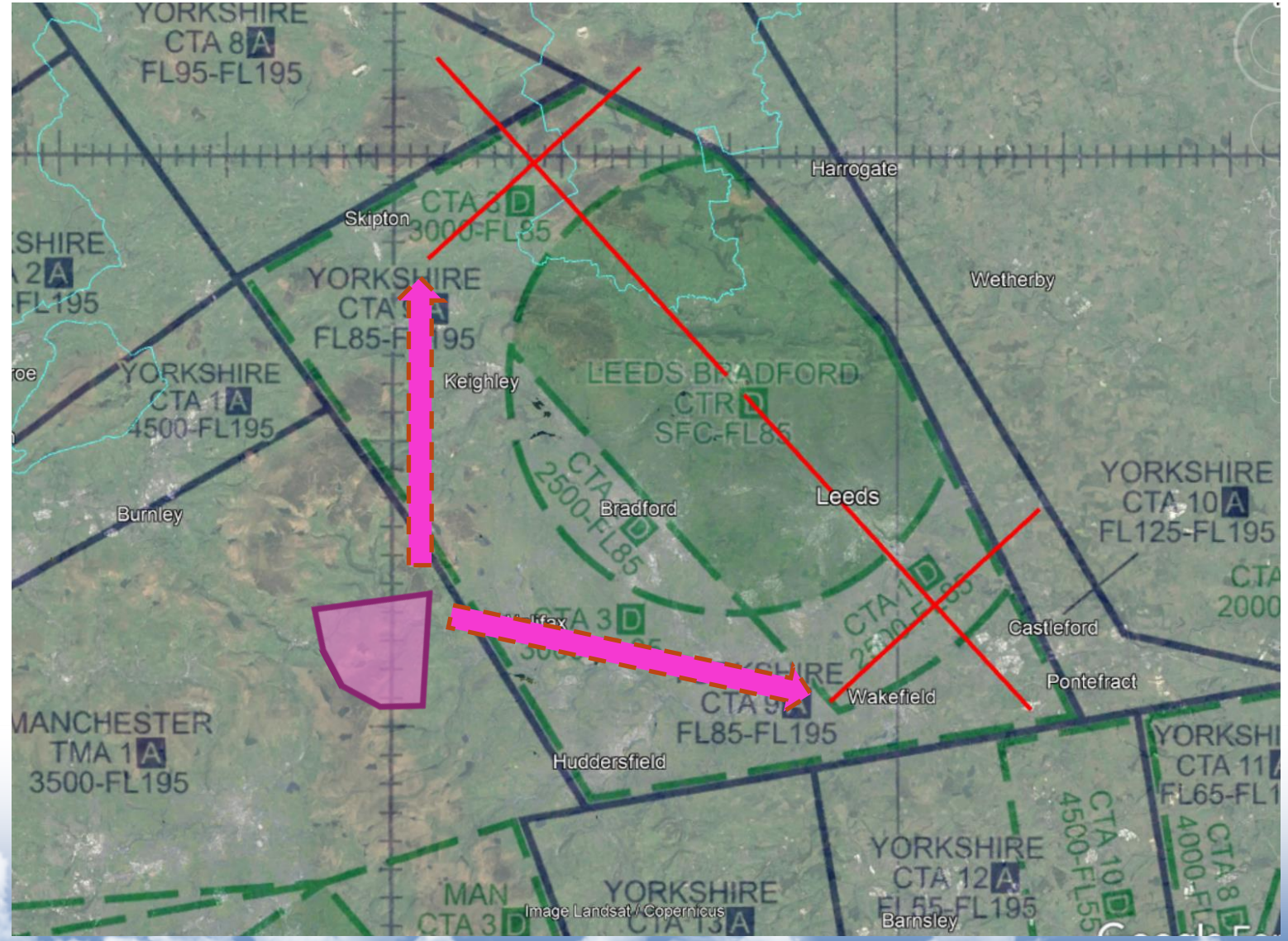
Option F1 – Point Merge South



Option F2 – Point Merge East



Option F3 – Point Merge West



Next Steps

A link to an online survey, and a copy of the presentation will be sent shortly.

In the survey you will be asked if you agree with the Design Principle assessment for each option. If the answer is NO, then there will be a free text field for you to include the DP in question and your assessment.

This feedback will then be integrated with our own DP assessment, shown here today, and a full Design Principle evaluation completed.

This final evaluation will include acceptance and rejection criteria and will form part of our Stage 2a submission.

The final evaluation will be sent out to all stakeholders, prior to submission, for their review.

Thank you for your time are there any Questions?

Round 2 – April 2023

Leeds Bradford Airport Future Airspace

Step 2a – Design Option Update Brief – April 23

Leeds Bradford®
Yorkshire's Airport

CYRRUS

Purpose

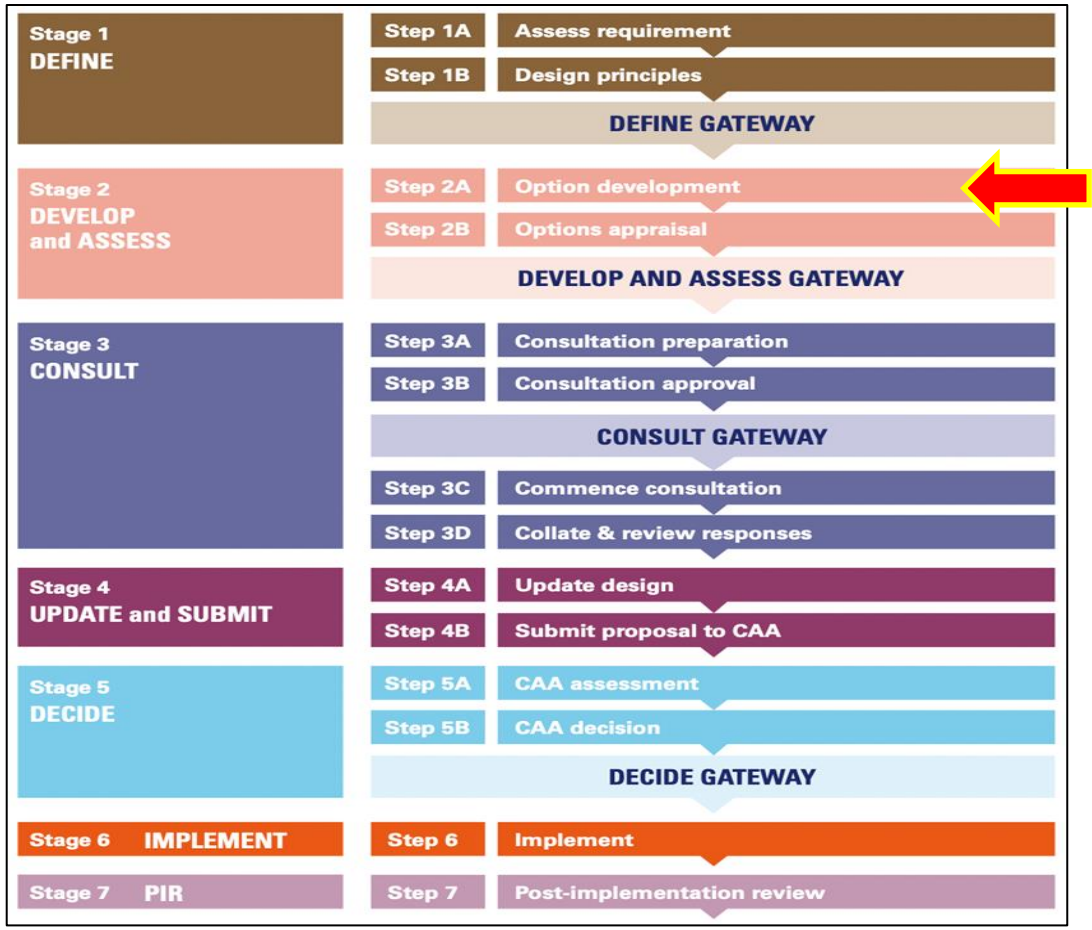
Following a period of reflection, it was deemed necessary to develop some additional Design Options (DOs) to ensure all options had been explored.

These DOs require 'Evaluation' against the agreed Design Principles (DPs) and an Initial Options Appraisal (IOA) before a submission is made to the CAA to progress beyond Stage 2 of the CAP1616 process.

As valued stakeholders in this process, the Airport is now seeking your views on the additional DOs and to what extent they meet the agreed DPs.

Please remember to complete the attached survey by 1700hrs on 28 April 23. If you have any further queries please address them to Airspace Change. We are very grateful for your assistance.

CAP 1616 Process



Abbreviations

ACP	Airspace Change Proposal
AMS	Airspace Modernisation Strategy
ATC	Air Traffic Control
CAA	Civil Aviation Authority
CAS	Controlled Airspace
DfT	Department for Transport
DO	Design Option
DP	Design Principle
DPE	Design Principle Evaluation
FASI(N)	Future Airspace Strategy Implementation (North)
IAP	Initial Approach Procedure
IOA	Initial Options Appraisal
LBA	Leeds Bradford Airport
MAP	Missed Approach Procedure
NATS	National Air Traffic Services
NERL	National Air Traffic Services En-Route Limited
PBN	Performance Based Navigation
RNAV	Area Navigation
RW	Runway
SID	Standard Instrument Departure
STAR	Standard Arrival

Agreed Design Principles (DPs)

DP #	Design Principle
1	**Importance of Safety** – The airspace design and its operation must maintain or where possible, enhance current levels of safety.
2	**Noise** - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.
3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONB's.
4	**Emissions and Air Quality** – The proposed design should minimise CO2 emissions per flight.
5	**Airspace Dimensions** – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.
6	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.
7	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.
8	**Systemisation** – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the Instrument Approach Procedures (IAPs), deconflict with the departure procedures, reducing the requirement for tactical coordination.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.
11	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.

What's New?

Departures

Why? Main driver was need for an option of straight ahead to circa 4.5nm for each direction of travel as it was requested by some Stakeholders during the previous Stage 2 engagement.

What has changed? Some additional departure options conceived off Runway 32 (RW32) to the North-West, West, South and South-East.

May be no requirement for the Option of a Standard Instrument Departure (SID) to the North-East due to minimal demand – may be possible to use the North-West SID and then turn towards GASKO.

Nothing new developed off RW14.

Arrivals

Why? The DOs previously conceived were insufficiently detailed to make an adequate qualitative assessment and they did not 'meet the need' set out in the Statement of Need. The Airport is keen to modernise/systemise (in keeping with the Airspace Modernisation Strategy (AMS)) as opposed to simply sticking with the status quo.

What has changed? Conceived a variety of hold options at the end of the Standard Arrivals (STARs) including some outside of the existing LBA delegated airspace at GOLES and NELSA respectively. These are complemented with Arrival Transitions to various T/Y-Bar options.

The existing Missed Approach Procedure (MAP) does not work well; it needs controller intervention and so something different is required – various options developed.

Departures

Additional DOs for the following:

- RW32 South-East – 2 new options;
- RW32 South & West – 3 new options; and
- RW32 North-West – 1 new option.

Revised Design Principle Evaluation (DPE) taking into account some Stakeholder feedback and new options.

Remainder of the Departure options and associated revised DPE shown for completeness including the options for RW14.

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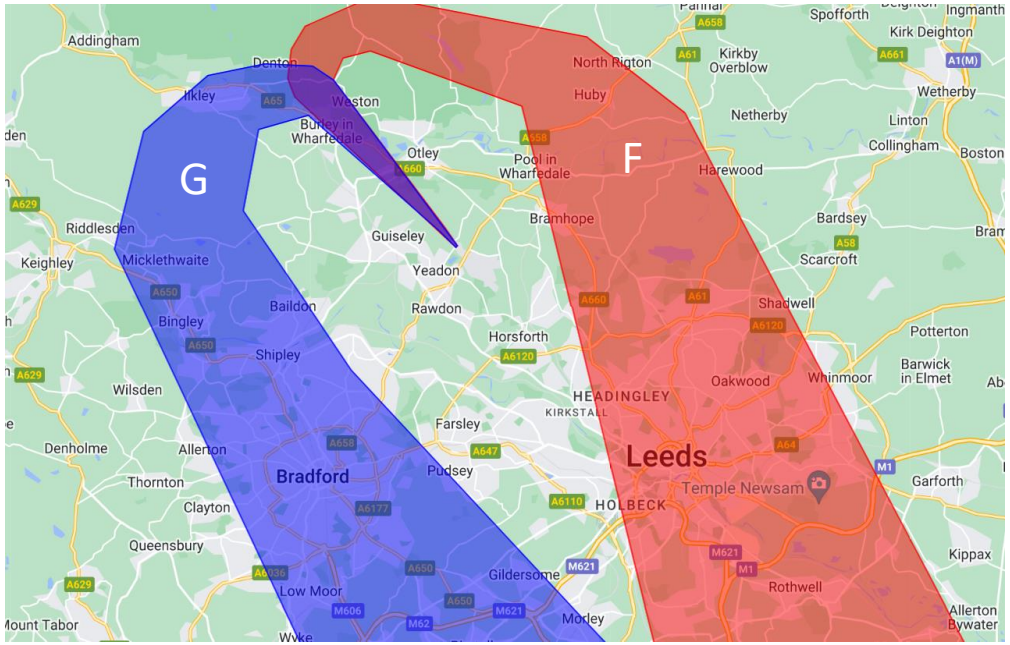
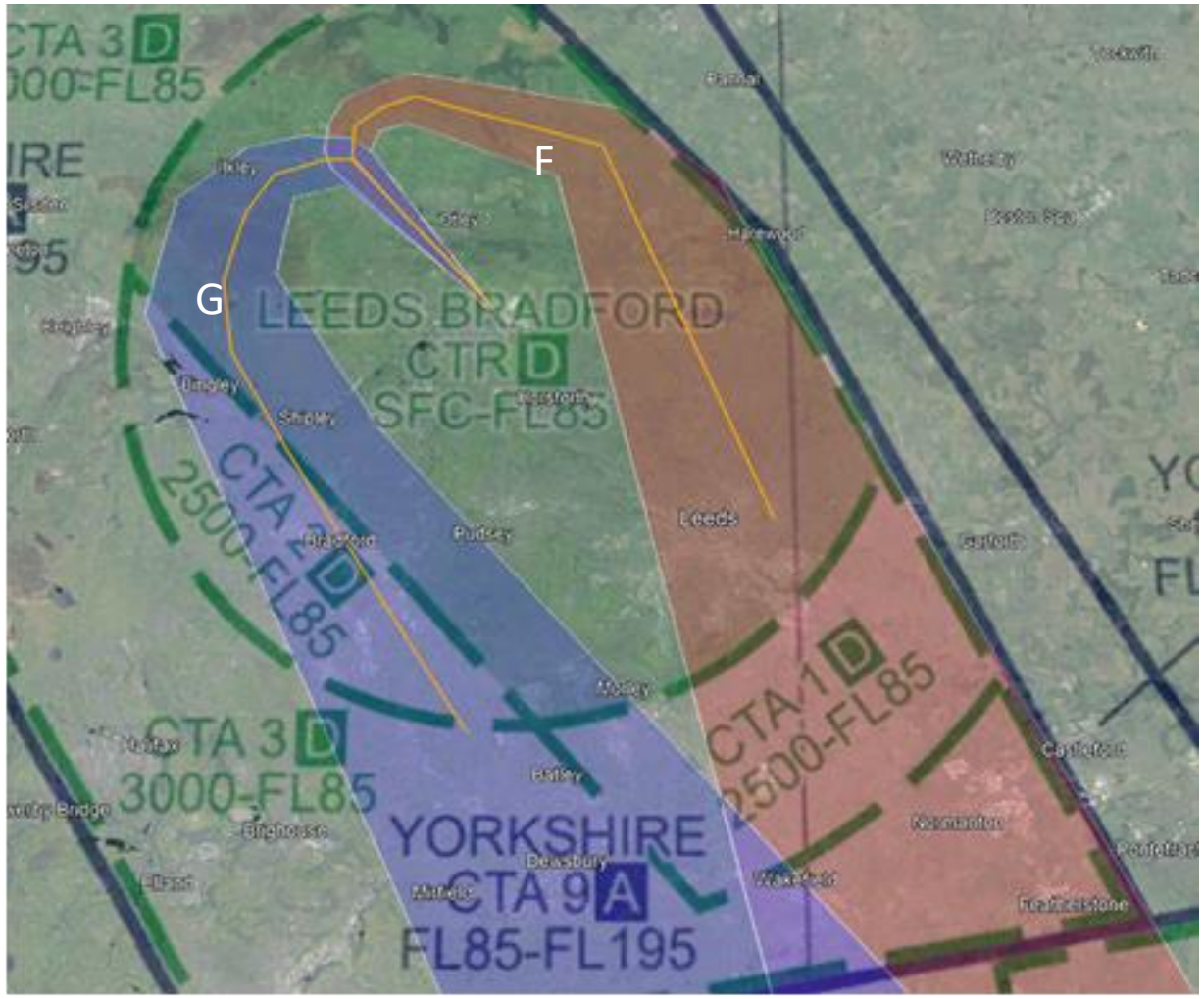
RW32 - South-Easterly Departures - MAMUL

Two new options developed:

- Both turn at circa 4.5nm;
- One left (Option G) and one right (Option F);

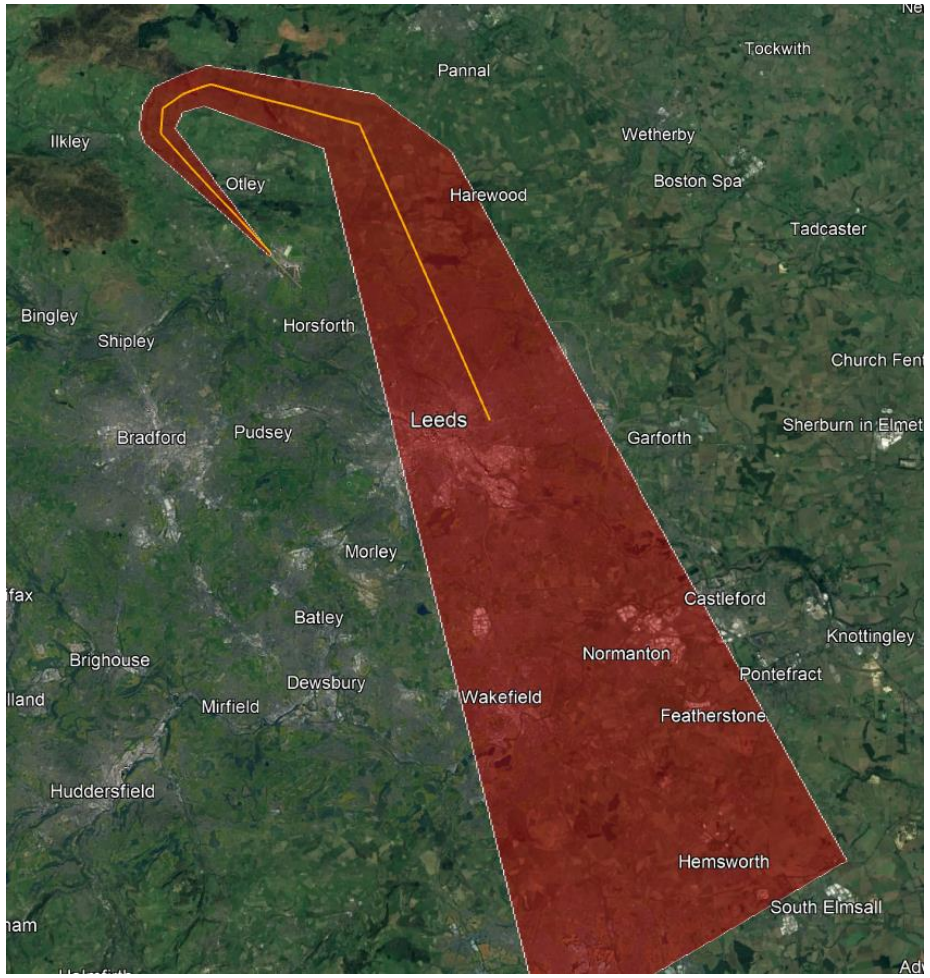




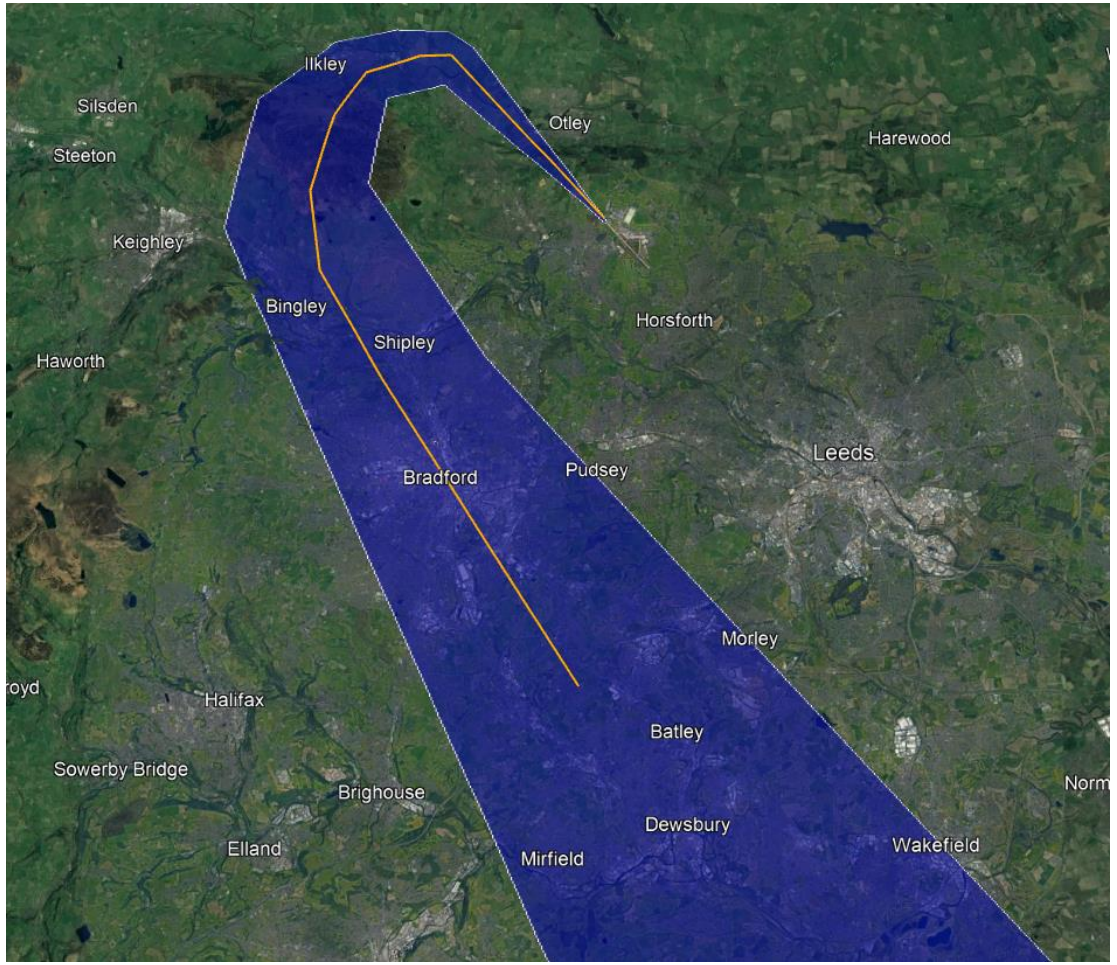
Note: The yellow lines are simply an indicator of where aircraft are likely to reach 7,000ft if climbing on a 6% climb gradient

RW32 - South-Easterly Departures - MAMUL

Option F – 32SEF



Option G – 32SEG



Note: The yellow lines are simply an indicator of where aircraft are likely to reach 7,000ft if climbing on a 6% climb gradient

RW32 - South-Easterly Departures - MAMUL

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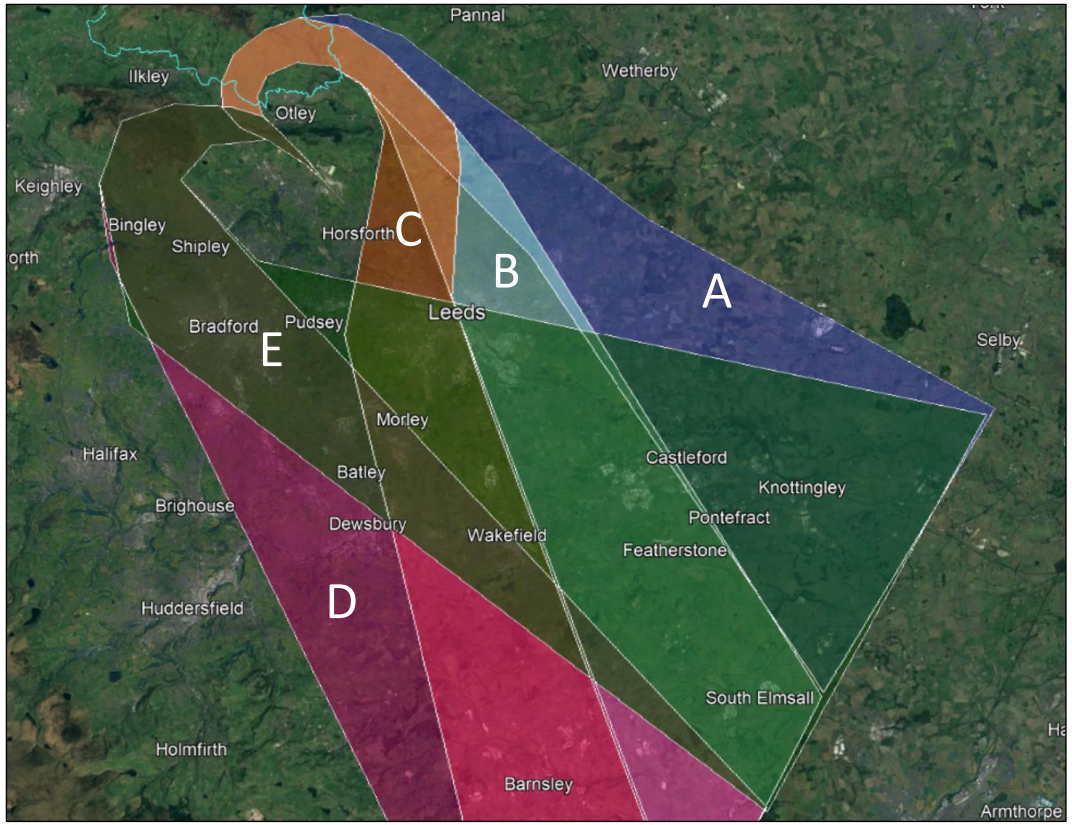
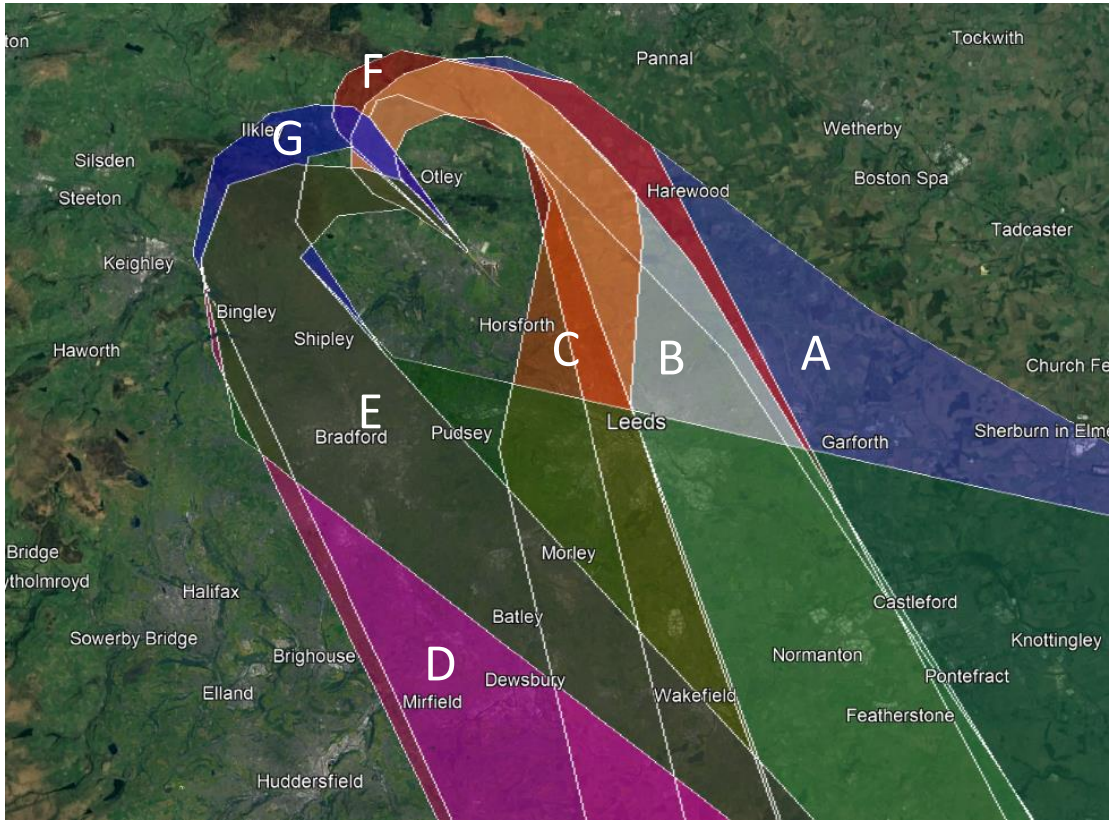
Previous Options



All Options



RW32 - South-Easterly Departures – MAMUL - DPE

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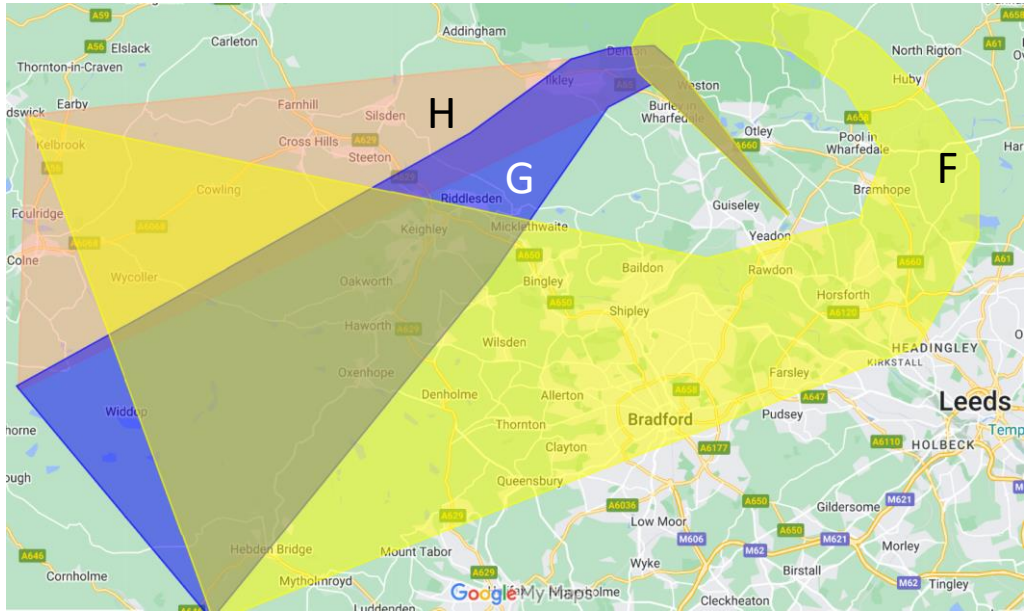
Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32SEA	Lack of airspace containment and potential conflict with inbounds	May affect different people than baseline at low level	Nidderdale AONB		May require more CAS	Potential conflict with arrivals through GOLES					
32SEB	Lack of airspace containment	May affect different people than baseline at low level	Nidderdale AONB		May require more CAS						
32SEC	Lack of airspace containment	May affect different people than baseline at low level	Nidderdale AONB		May require more CAS						
32SED			Ilkley Moor								
32SEE	Potential conflict with inbounds		Ilkley Moor			Potential conflict with arrivals through GOLES					
32SEF	Lack of airspace containment	May affect different people than baseline at low level	Nidderdale AONB		May require more CAS						
32SEG		Overflies Ilkley	Nidderdale AONB								

RW32 – South & West Departures – POL/NELSA

Three new options developed:

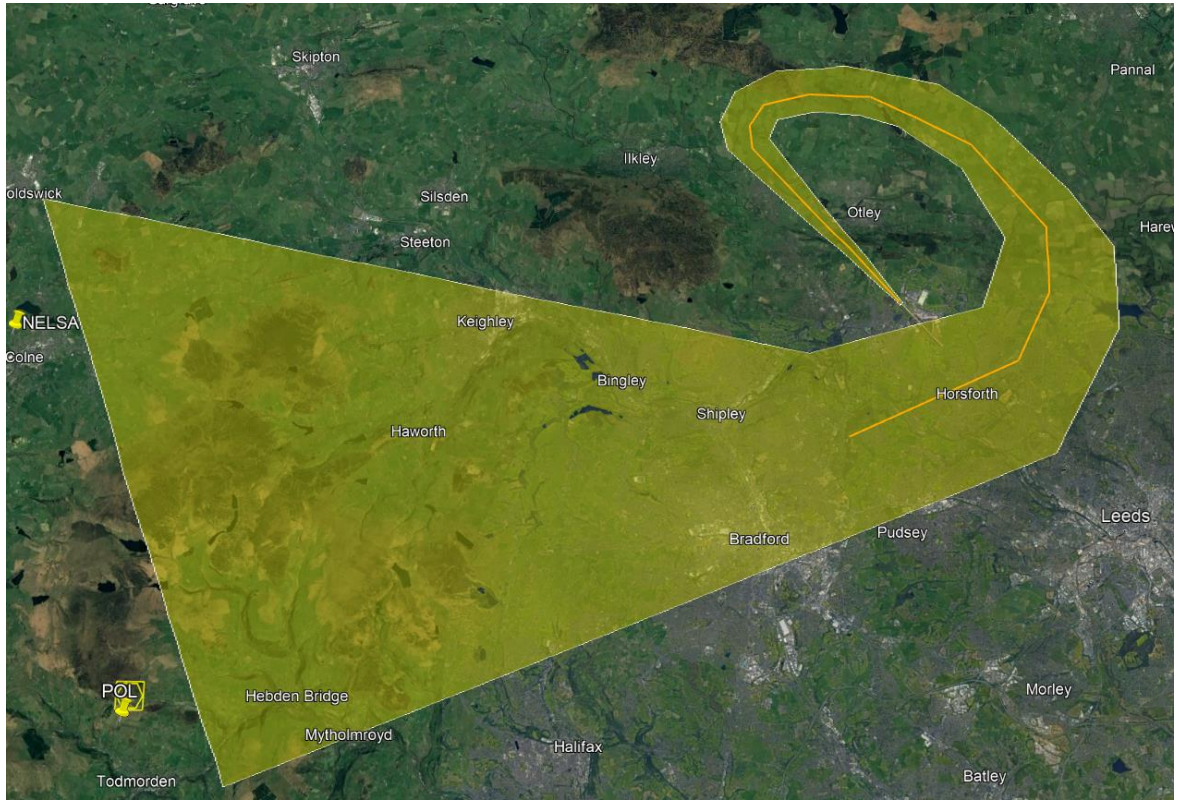
- Options F (Yellow), G (Blue) & H (Peach).
- Option H targets NELSA, Option G targets POL whilst the right-turn out Option F targets either NELSA or POL.



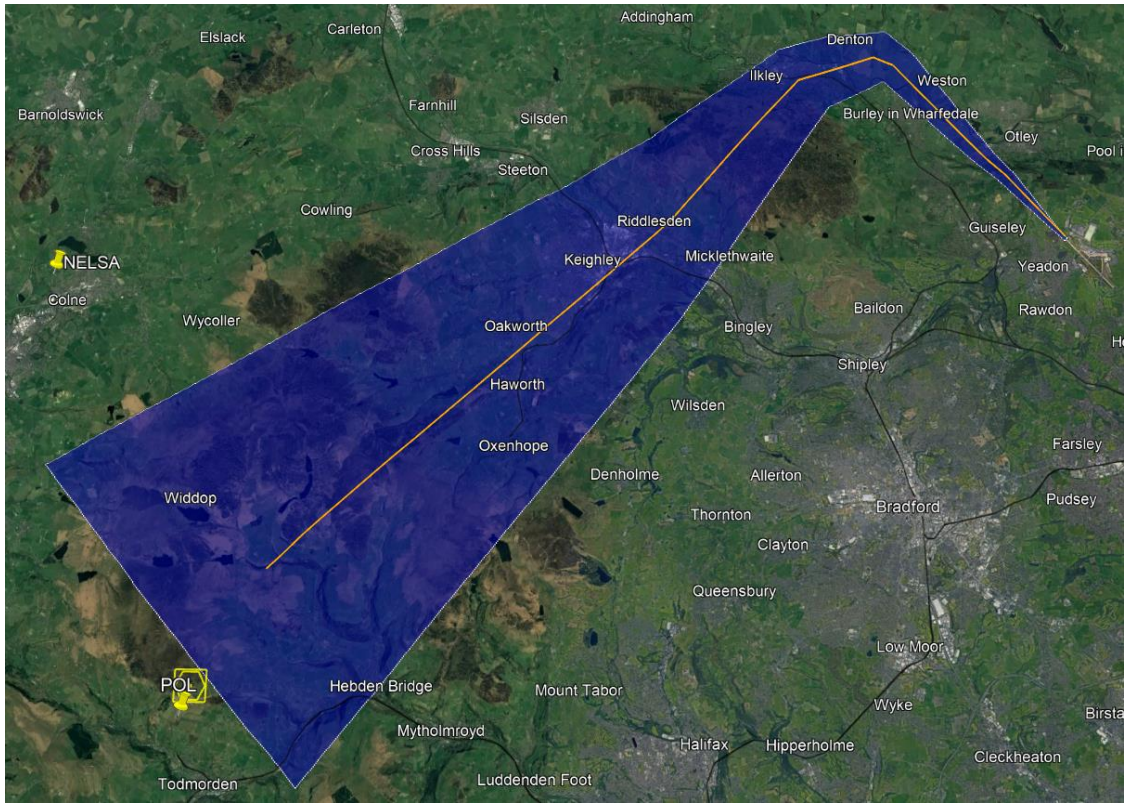
Note: The yellow lines are simply an indicator of where aircraft are likely to reach 7,000ft if climbing on a 6% climb gradient

RW32 – South & West Departures – POL/NELSA

Option F – 32S&WF



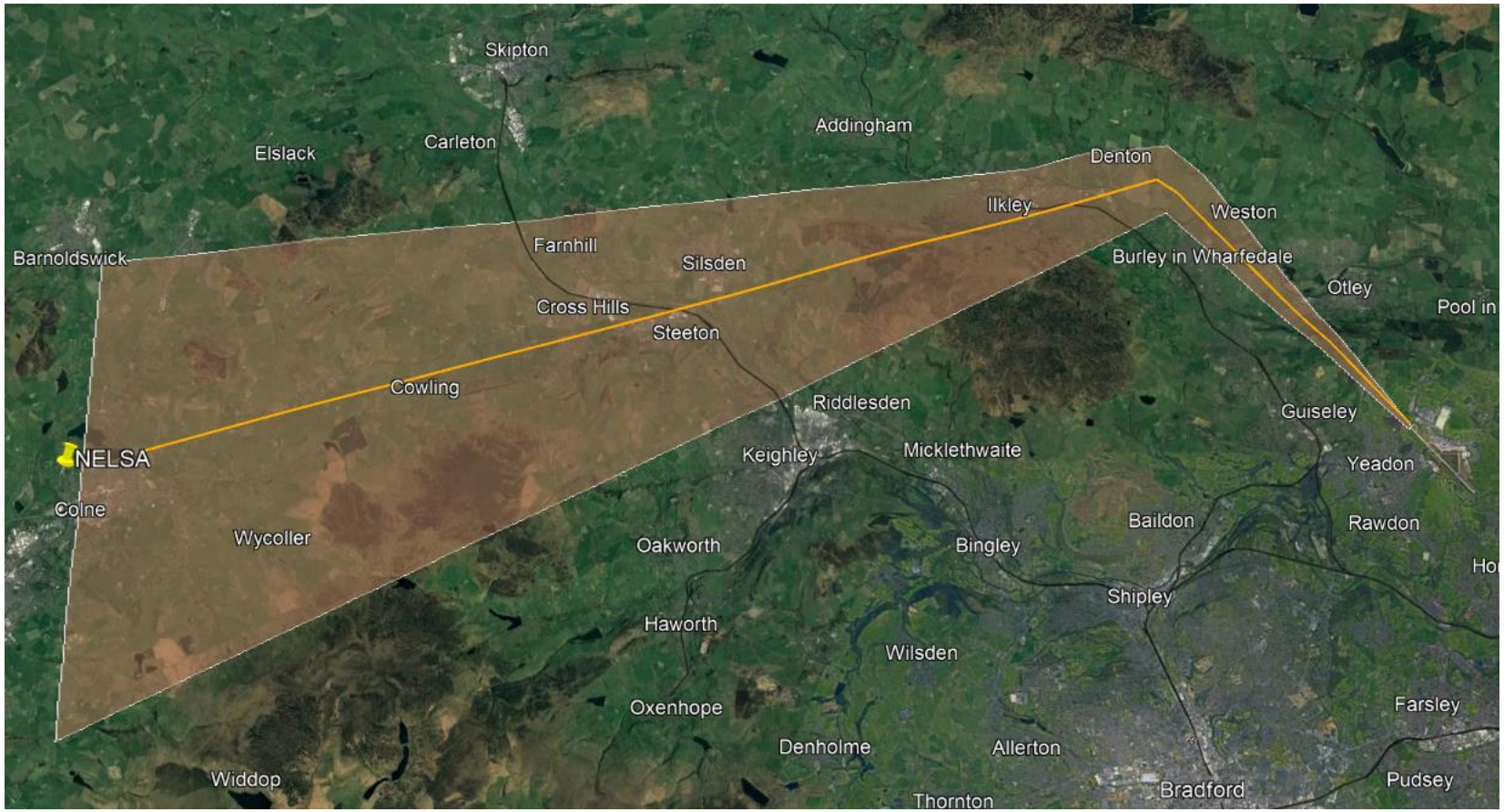
Option G – 32S&WG



Note: The yellow lines are simply an indicator of where aircraft are likely to reach 7,000ft if climbing on a 6% climb gradient

RW32 – South & West Departures – POL/NELSA

Option H – 32S&WH



Note: The yellow lines are simply an indicator of where aircraft are likely to reach 7,000ft if climbing on a 6% climb gradient

RW32 – South & West Departures – POL/NELSA

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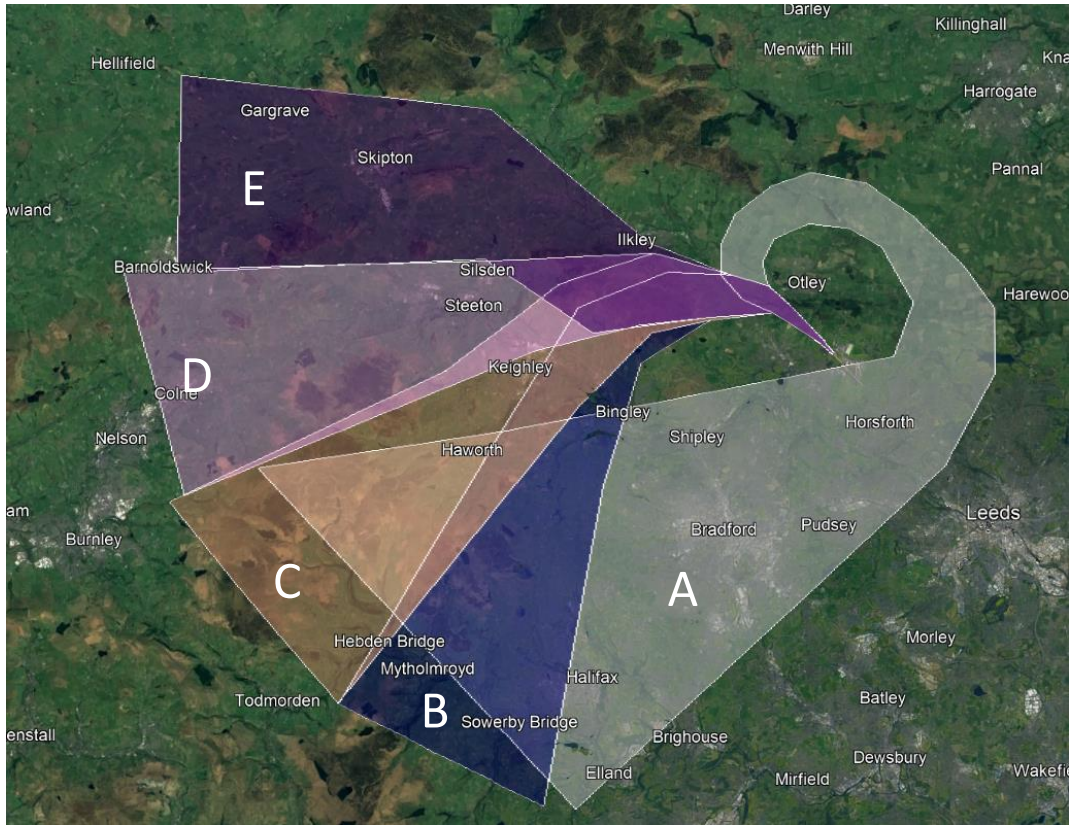
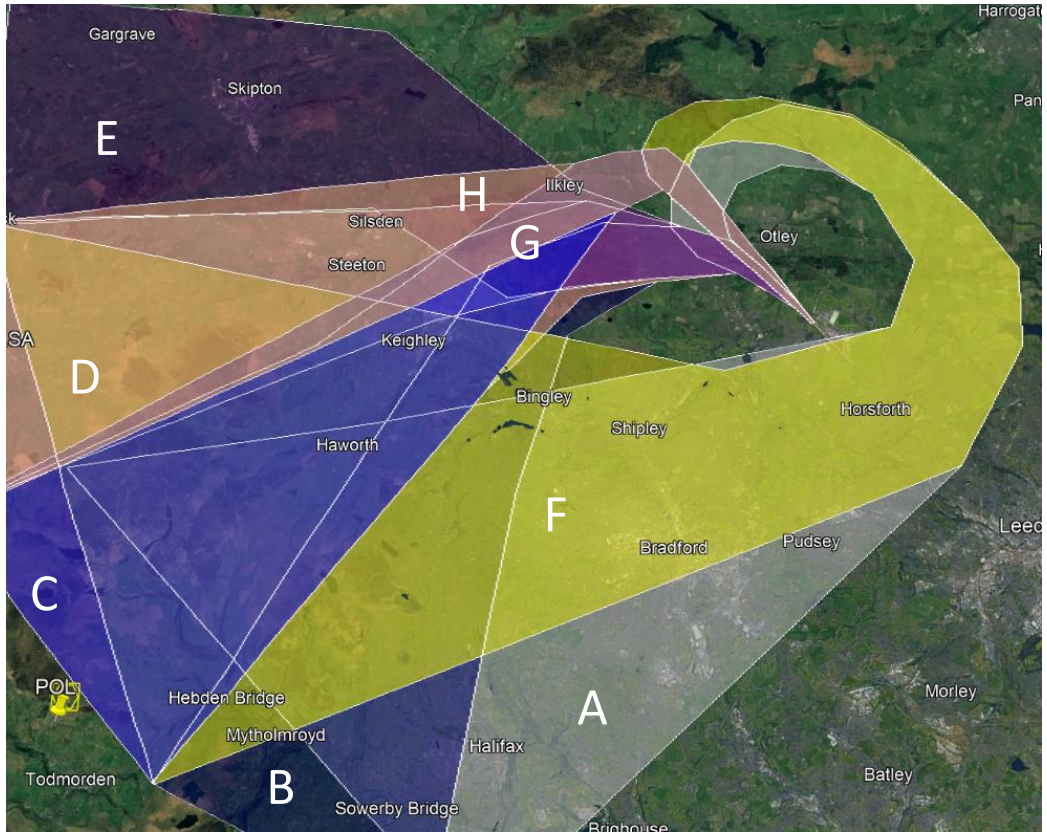
Previous Options



All Options



RW32 – South & West Departures – POL/NELSA - DPE

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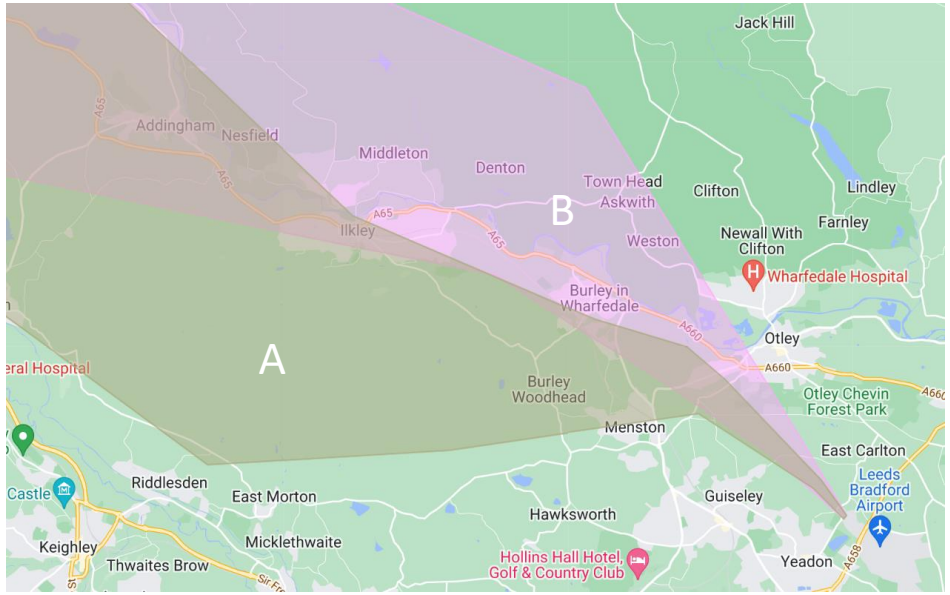
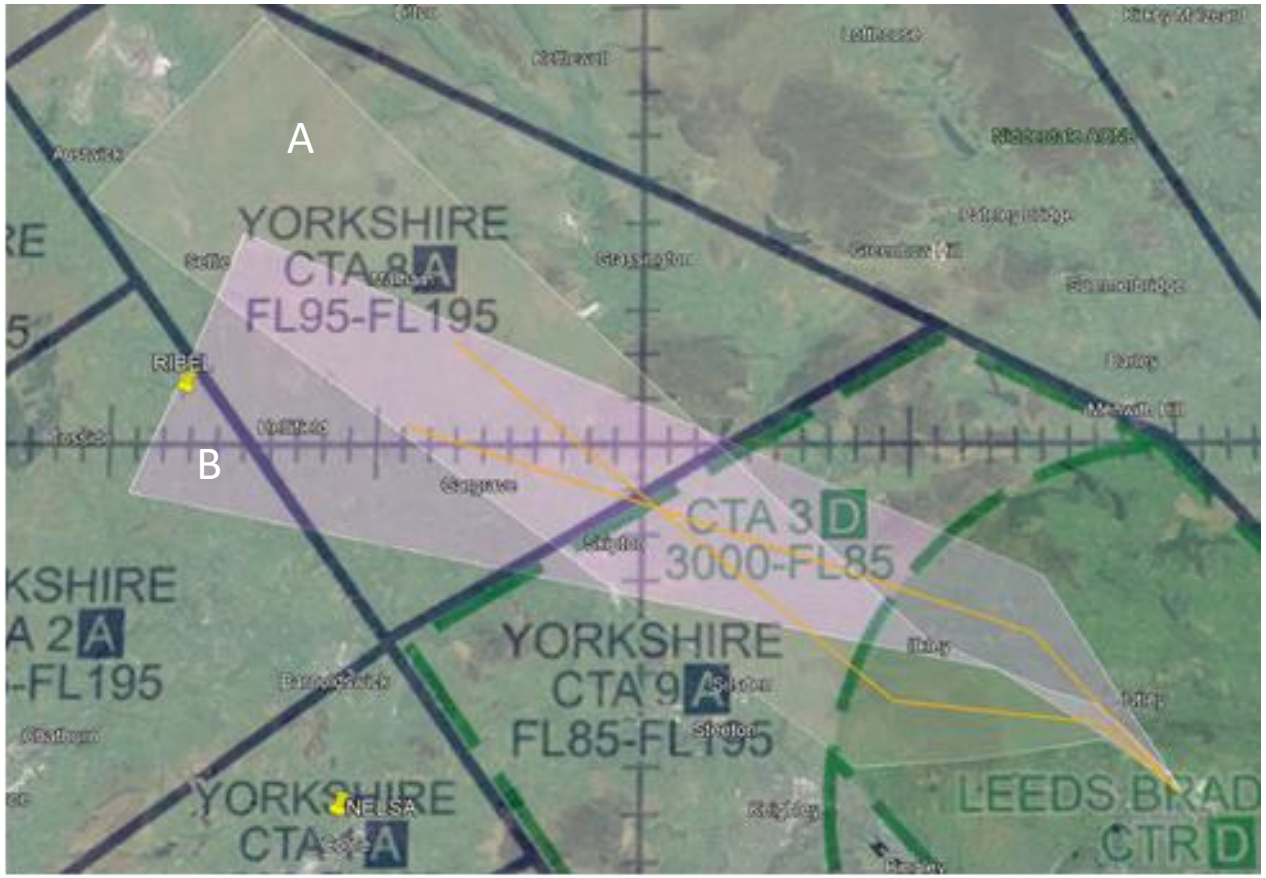
Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32S&WA	Procedure not contained in existing CAS	May affect different people than baseline at low level	Nidderdale AONB	More track miles	Additional CAS required				Extra track miles flown		
32S&WB			Ilkley Moor								
32S&WC			Ilkley Moor								
32S&WD			Ilkley Moor								
32S&WE	Procedure may not be contained in existing CAS		Ilkley Moor	More track miles	Potential for additional CAS to be required				Extra track miles flown		
32S&WF		May affect different people than baseline at low level	Nidderdale AONB	More track miles					Extra track miles flown		
32S&WG		Overflies Ilkley	Ilkley Moor								
32S&WH		Overflies Ilkley	Ilkley Moor								

RW32 – North-Westerly Departures - RIBEL

Two options:

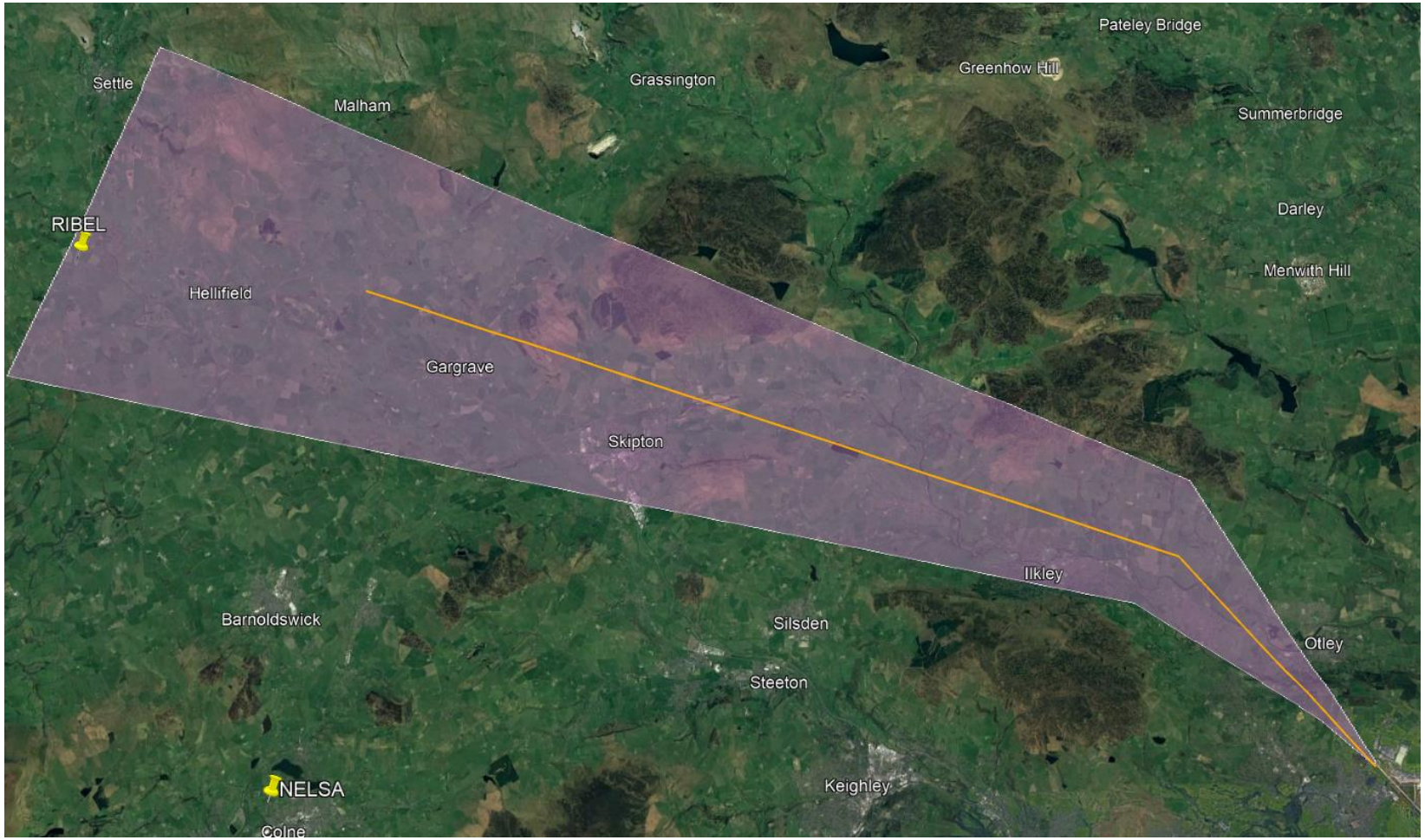
- Options A remains.
- Option B conceived - straight ahead to 4.5nm then left turn towards RIBEL.





RW32 – North-Westerly Departures - RIBEL

Option B – 32NWB



Note: The yellow lines are simply an indicator of where aircraft are likely to reach 7,000ft if climbing on a 6% climb gradient

RW32 – North-Westerly Departures - RIBEL

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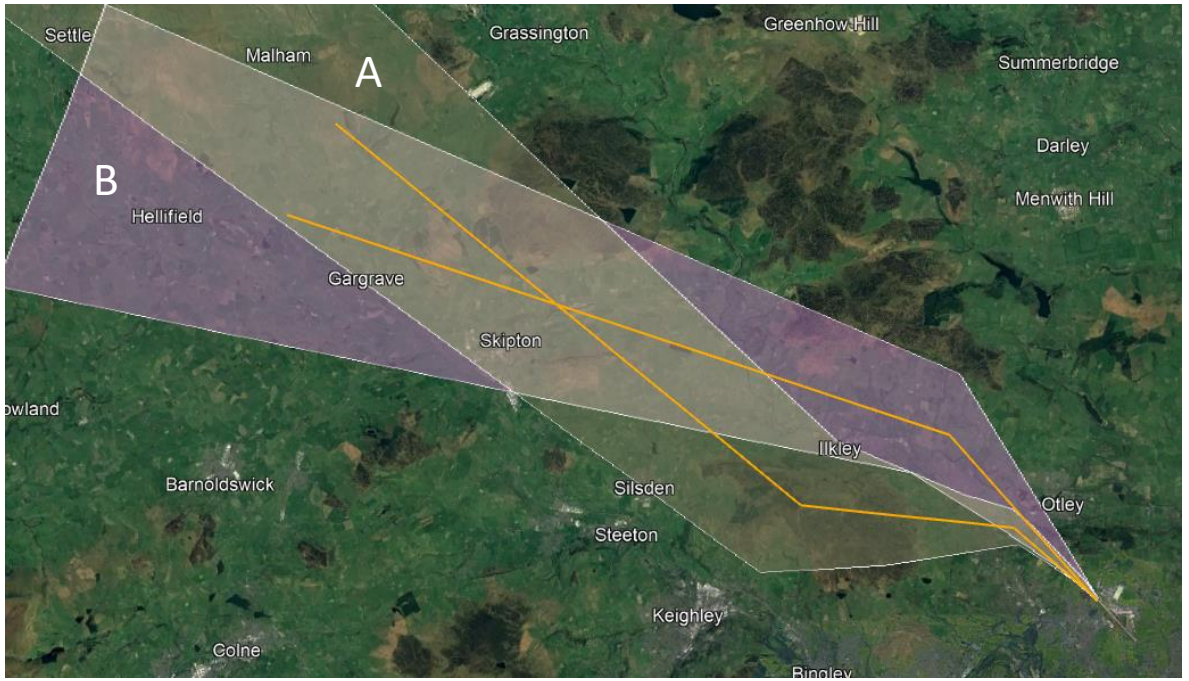
Yorkshire's Airport

Previous Options

All Options



Note: The yellow lines are simply an indicator of where aircraft are likely to reach 7,000ft if climbing on a 6% climb gradient

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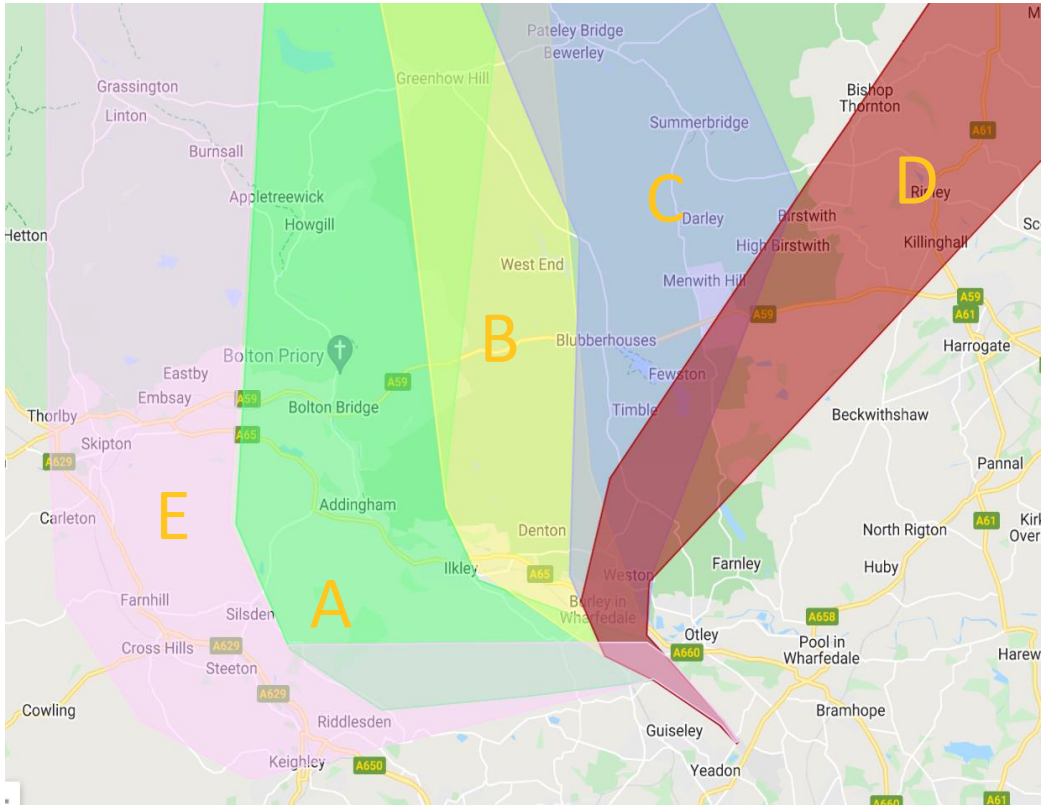
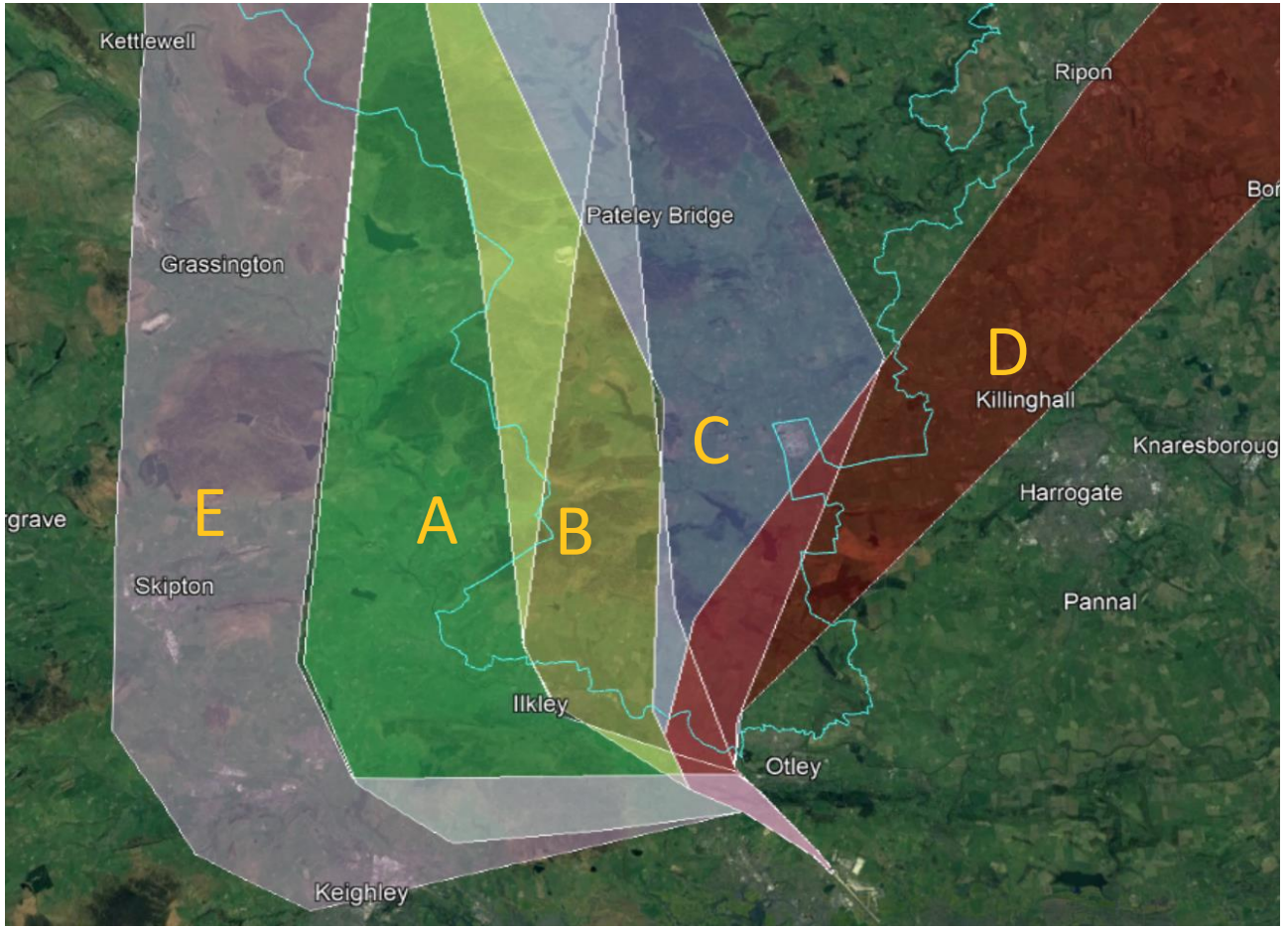
RW32 – North-Westerly Departures – RIBEL - DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32NWA		Potentially overflies Ilkley	Ilkley Moor								
32NWB		Potentially overflies Ilkley	Nidderdale AONB								

RW32 – North-Easterly Departures - GASKO

No new options and the requirement for a SID in this direction may not be valid





RW32 – North-Easterly Departures - GASKO

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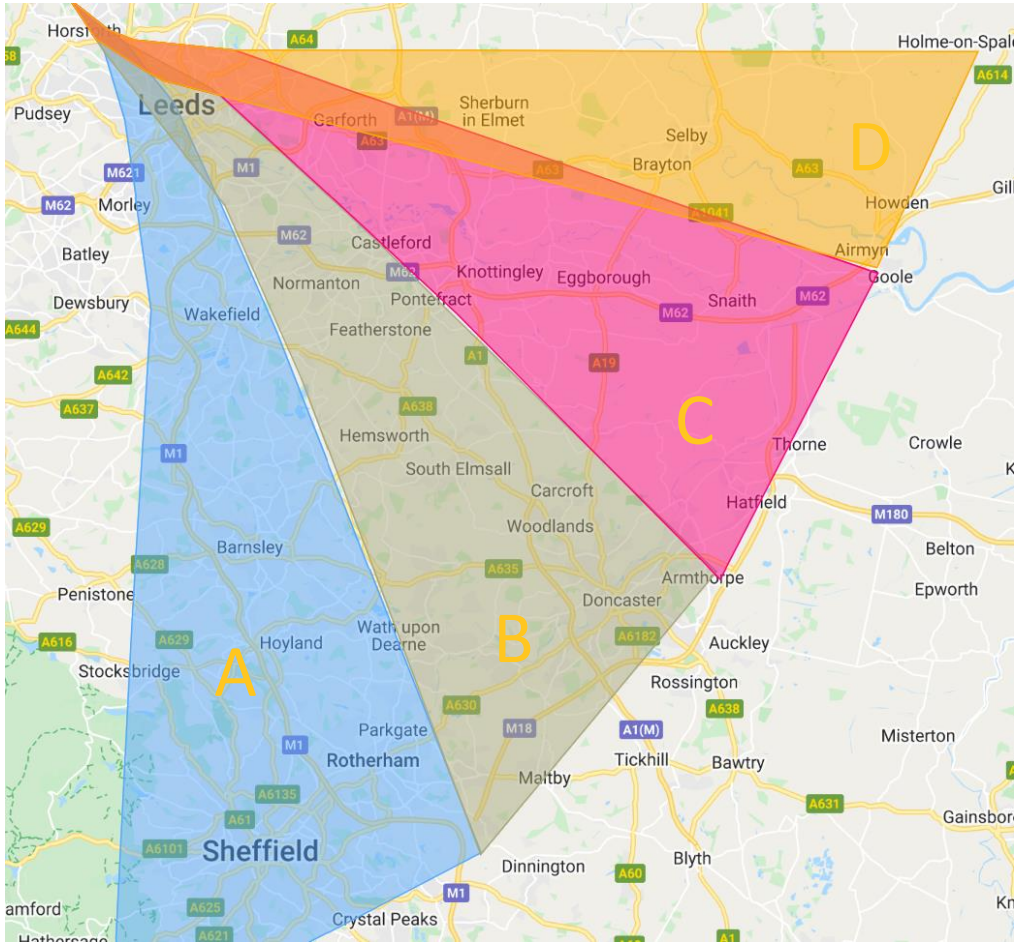
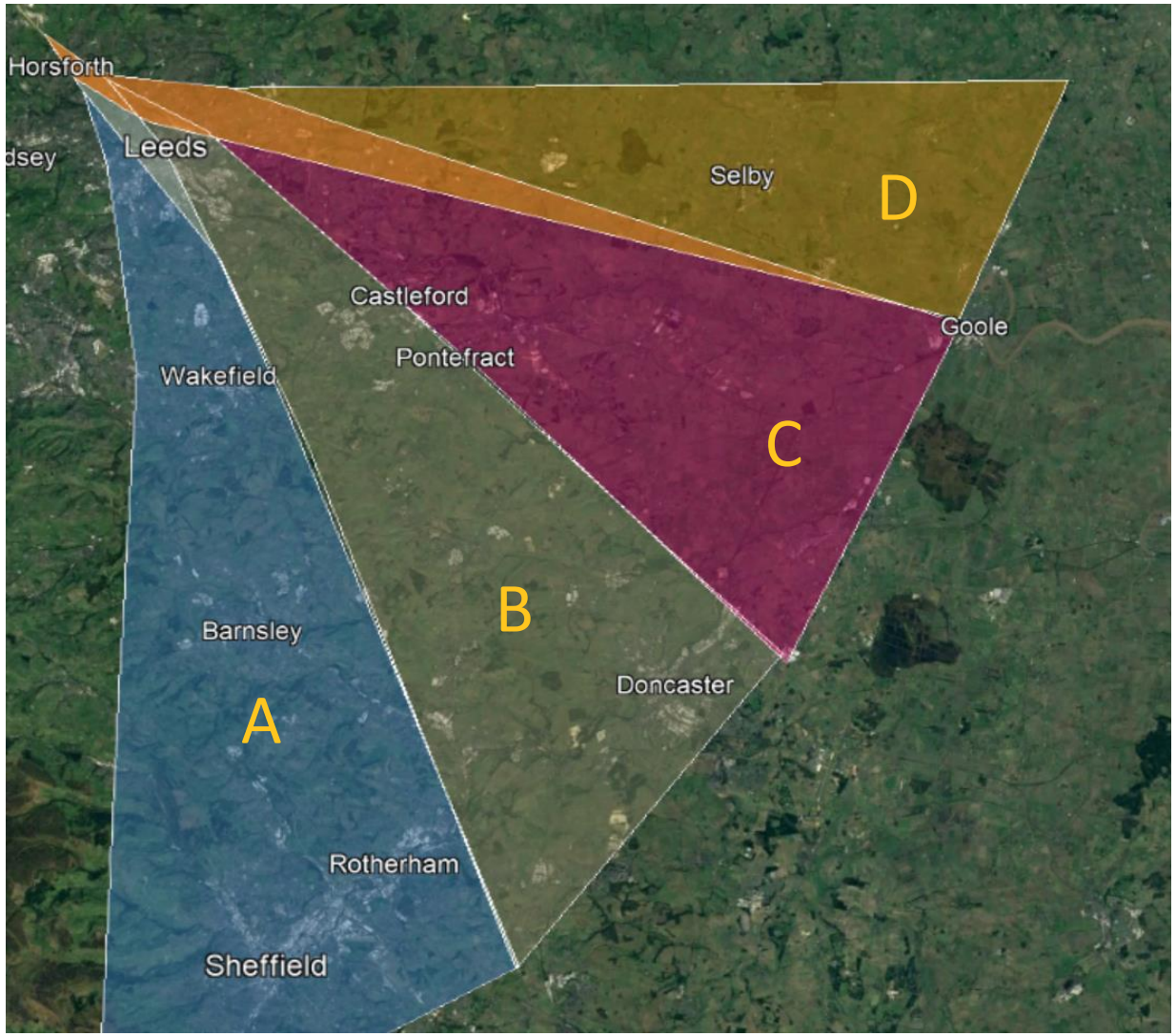
Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32NEA	Insufficient CAS for containment	May overfly Ilkley	Ilkley Moor		More CAS required						
32NEB	Insufficient CAS for containment	May overfly Ilkley & Burley-in-Wharfedale	Nidderdale AONB		More CAS required						
32NEC	Vale of York AIAA & TRA(G)	May overfly Burley-in-Wharfedale	Nidderdale AONB		Considerably more CAS required	Unnecessarily complicating the Vale of York and TRA (G) area					
32NED	Vale of York AIAA & TRA(G)	May overfly Burley-in-Wharfedale	Nidderdale AONB	Does not point in the correct direction	Considerably more CAS required	Unnecessarily complicating the Vale of York and TRA (G) area			Considerably more miles		
32NEE	Insufficient CAS for containment	May overfly Keighley	Ilkley Moor and Yorkshire Dales NP	More track miles	More CAS required				More track miles		

RW14 – South-Easterly Departures - MAMUL

No new options



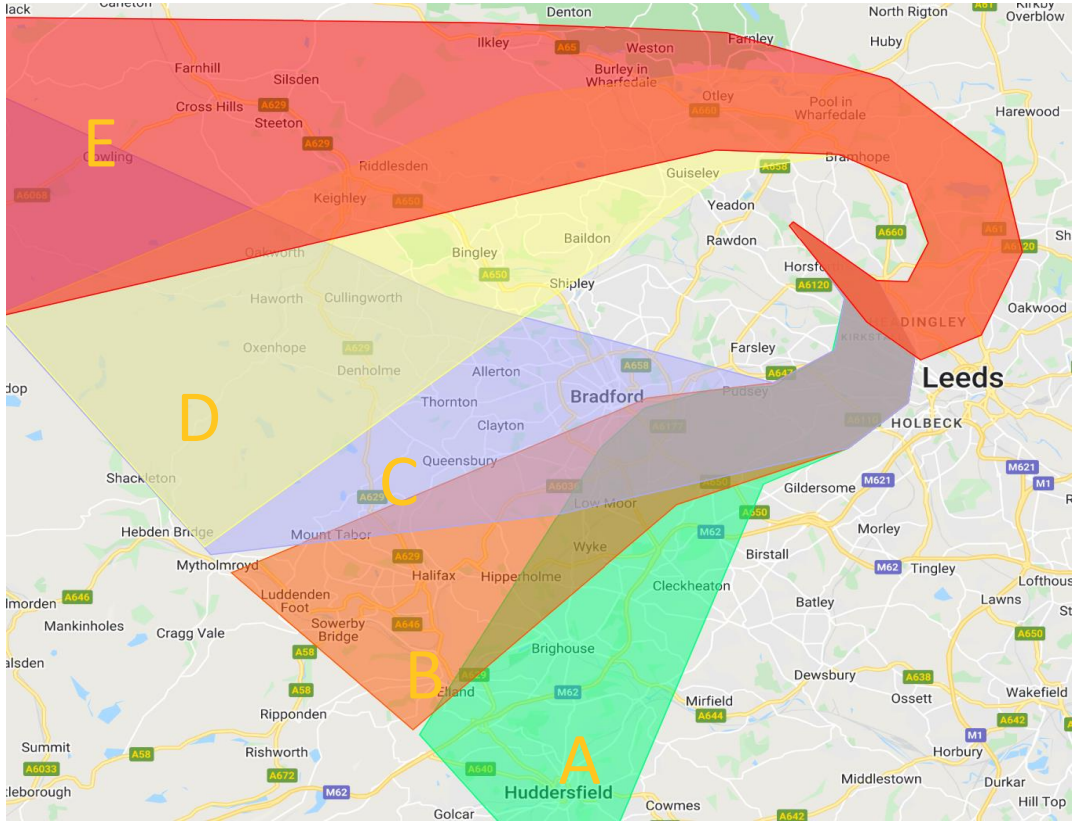


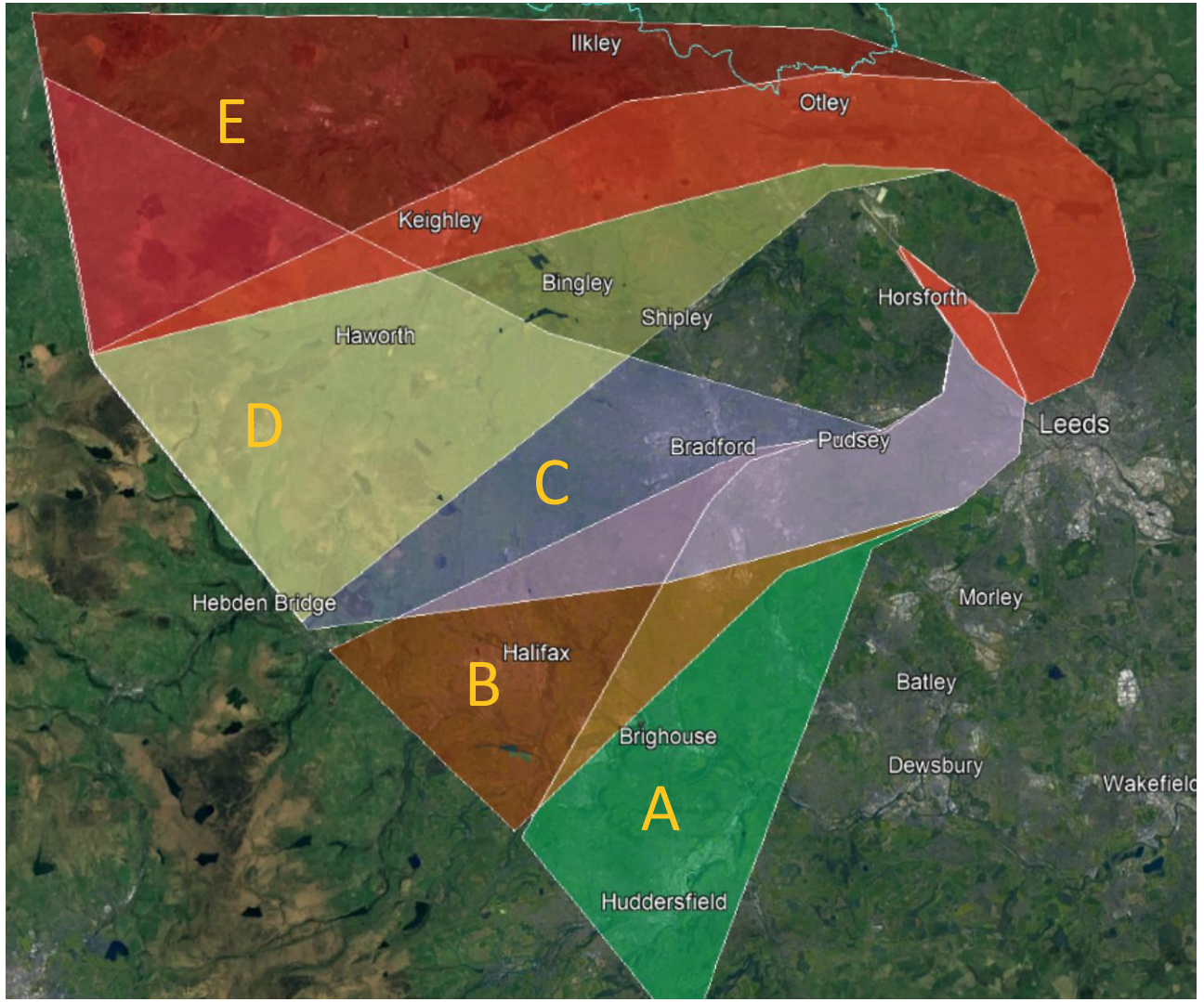
RW14 – South-Easterly Departures - MAMUL

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14SEA			Peak District NP						More track miles		
14SEB											
14SEC	Insufficient CAS for containment and conflict with inbound stream				More CAS required						
14SED	Insufficient CAS for containment and conflict with inbound stream				More CAS required						

RW14 – South & West Departures – POL/NELSA

No new options



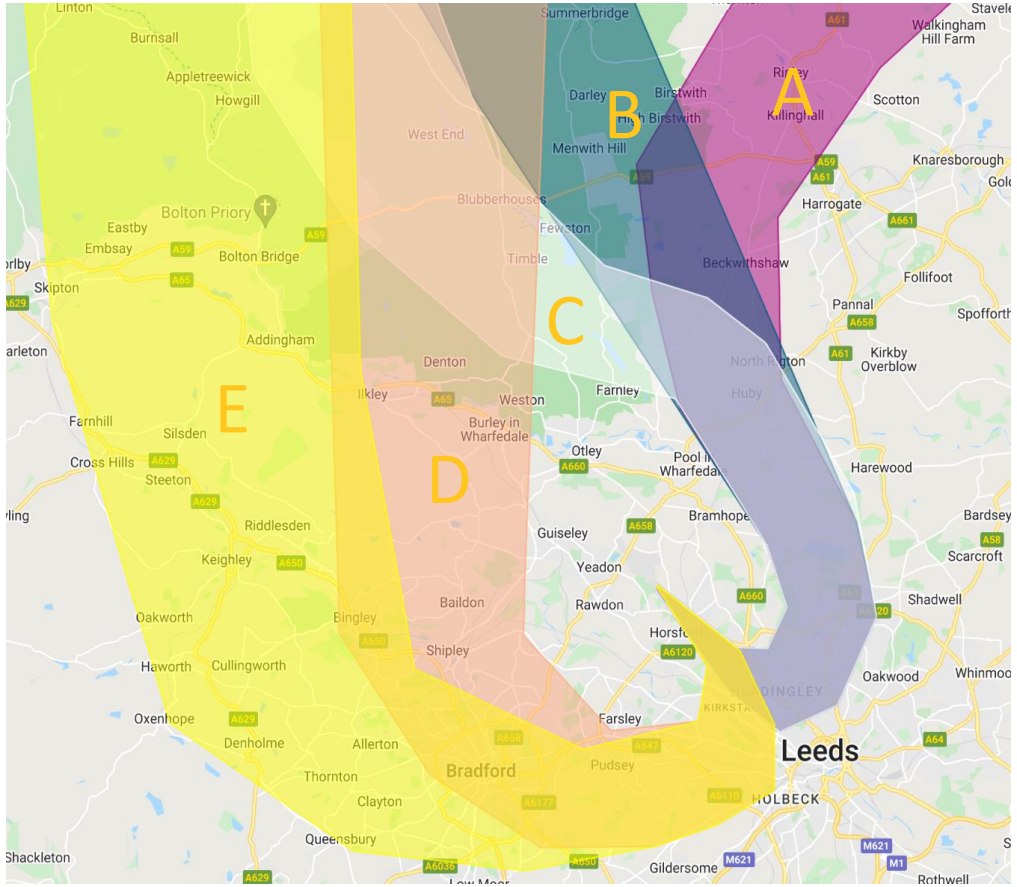


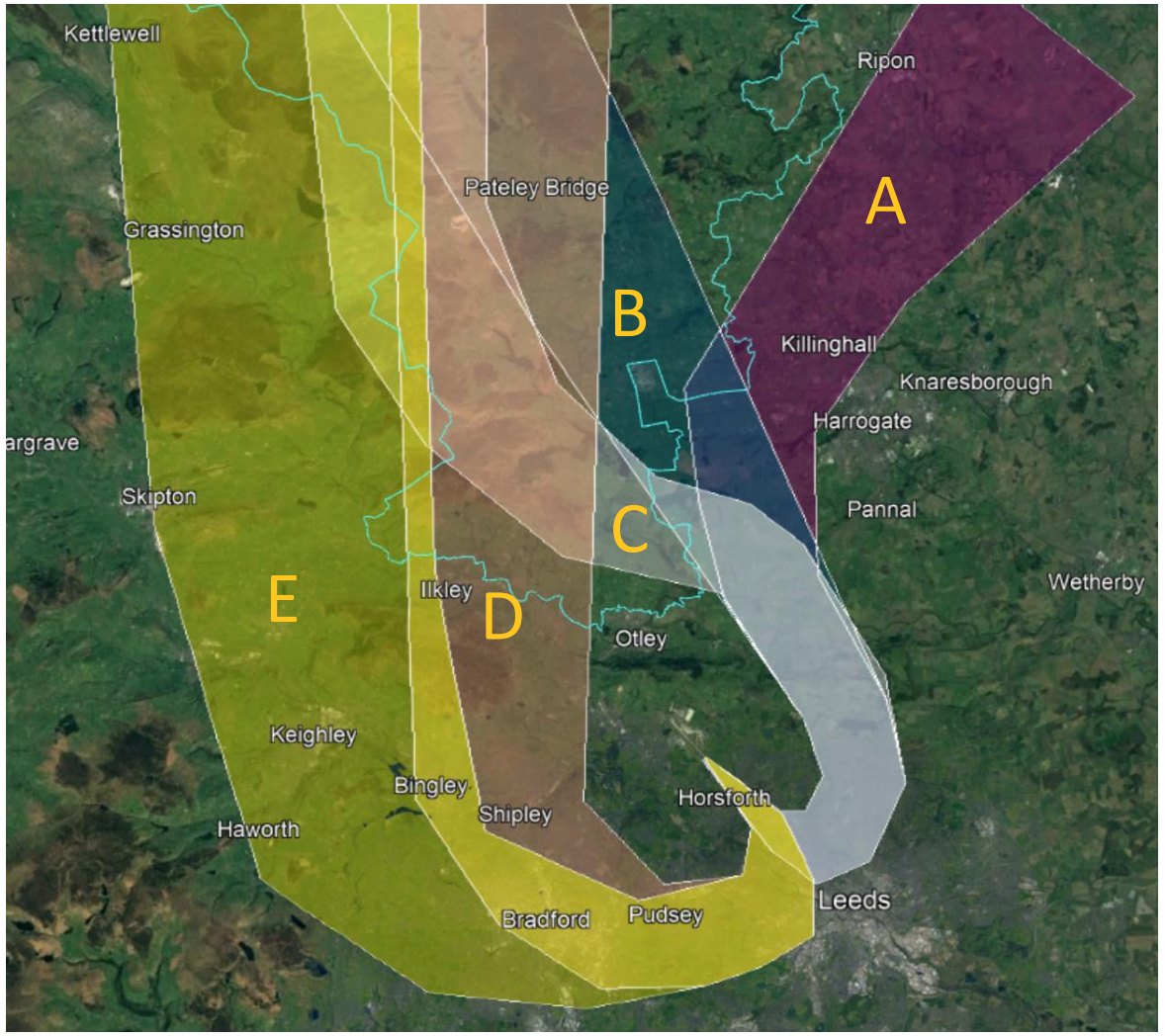
RW14 – South & West Departures – POL/NELSA

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14S&WA				More track miles if going west		Potential conflict with inbounds via POL					
14S&WB						Potential conflict with inbounds via POL					
14S&WC											
14S&WD		Potential increase in noise for different people		More track miles	Potential for more CAS to be required	Potential conflict with inbounds via NELSA			More track miles		
14S&WE		Potential increase in noise for different people		More track miles	Potential for more CAS to be required	Potential conflict with inbounds via NELSA			More track miles		

RW14 – North-Easterly Departures - GASKO

No new options and the requirement for a SID in this direction may not be valid



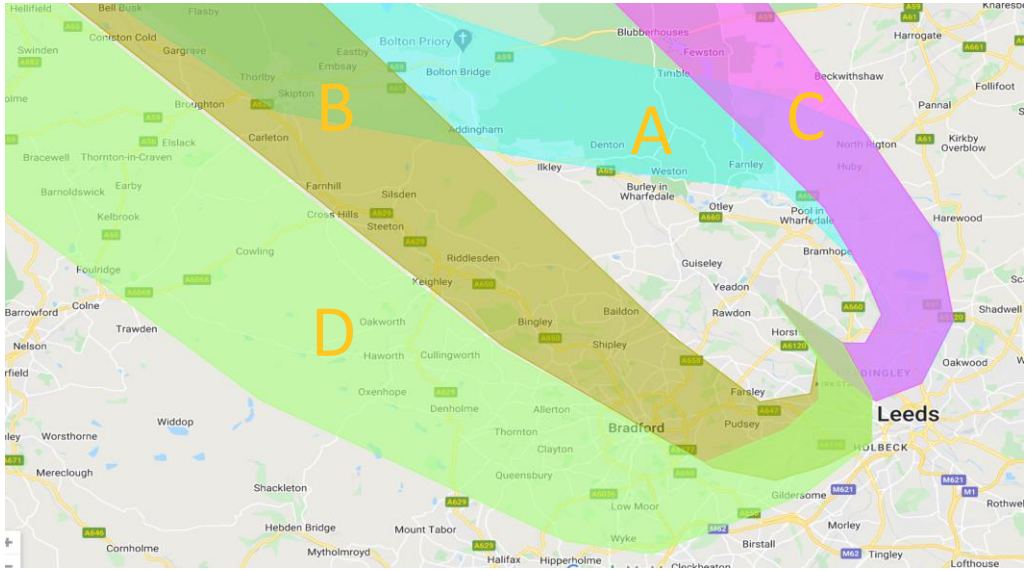


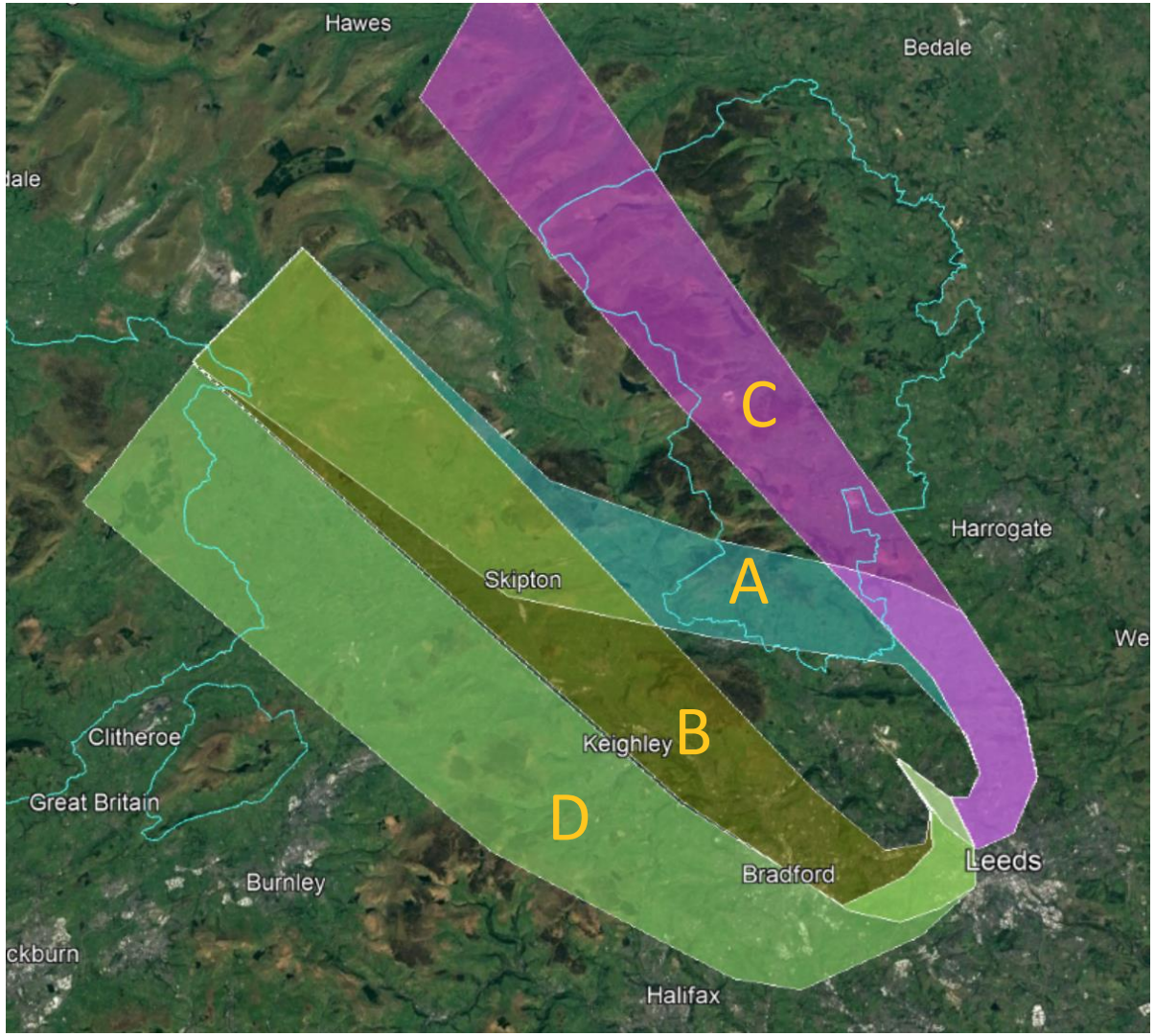
RW14 – North-Easterly Departures - GASKO

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14NEA	Vale of York AIAA & TRA(G) and no CAS	Overflight of newly affected populated areas (North Leeds)		Does not point in the correct direction	Considerably more CAS required	Unnecessarily complicating the Vale of York and TRA (G) area					
14NEB	Vale of York AIAA & TRA(G) and no CAS	Overflight of newly affected populated areas (North Leeds)	Nidderdale AONB		Considerably more CAS required	Unnecessarily complicating the Vale of York and TRA (G) area					
14NEC	Vale of York AIAA & TRA(G) and no CAS	Overflight of newly affected populated areas (North Leeds)	Nidderdale AONB		More CAS required	Potential conflict with inbounds from the North					
14NED	Insufficient CAS		Nidderdale AONB/Yorkshire Dales NP		More CAS required	Potential conflict with inbounds from the North					
14NEE	Insufficient CAS		Yorkshire Dales NP		More CAS required						

RW14 – North-Westerly Departures - RIBEL

No new options





RW14 – North-Westerly Departures - RIBEL

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14NWA	Insufficient CAS	Overflight of newly affected populated areas (North Leeds)	Nidderdale AONB/Yorkshire Dales NP		Potentially more CAS required.	Potential conflict with inbounds from the North		Potential conflict with inbounds from the North			
14NWB		Bradford	Yorkshire Dales NP								
14NWC	Insufficient CAS. Potential conflict with inbounds from the North	Overflight of newly affected populated areas (North Leeds)	Nidderdale AONB/Yorkshire Dales NP		More CAS required	Potential conflict with inbounds from the North		Potential conflict with inbounds from the North			
14NWD		Bradford									

Arrivals

Previous Arrival DOs have evolved and greater detail applied following engagement with Technical Stakeholders. Now five DOs with pattern shown for each Runway Mode (Runways 32 and 14):

- Option 1 - 1 Hold – LBA
- Option 2 - 2 Holds – NELSA & GOLES
- Option 3 - 2 Holds – 'AIREY' & 'WORTH'
- Option 4 - 3 Holds – LBA, 'AIREY' & 'WORTH'
- Option 5 - 3 Holds – NELSA, GOLES & 'UDDER'

Remember that the holds are rarely used either for delays or weather or even for the Missed Approaches but they are a necessary part of the 'system'.

Note: Previous options included Point Merge. These were never appropriate for the traffic levels or the airspace available to the Airport and accordingly these have been removed. Further explanation will be contained in the Stage 2 documentation that will be posted on the ACP Portal.

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Hold, Missed Approach and Arrival Transition Depictions

Holds

Technically speaking, as the holding patterns form the end of the STARs and are above 7000ft, they are the domain of the en-route Air Traffic Service Provider (ANSP) NATS En-Route Limited (NERL).

The only difference to this is a Hold that is used for the Missed Approach Procedure (MAP). Such a hold may require a lowest holding altitude of 5000ft.

The hold depictions are intended to give stakeholders an idea of how the system might work. These are drawn within blue circles/lozenges surrounding them as the final location is not determined.

The LBA Hold already exists and this is depicted as it exists today.

Arrivals Transitions and Missed Approaches

The lines depicting the Arrival Transitions and the Missed Approach Procedures are not intended to show definitive tracks over the ground. These are purely intended to provide an indication of how such a system would work. The final procedures would be refined through the consultation process should a given option progress beyond Stage 2 of the process.

Arrivals – Option 1 - 1 Hold – LBA – RW32 (Status Quo with PBN)

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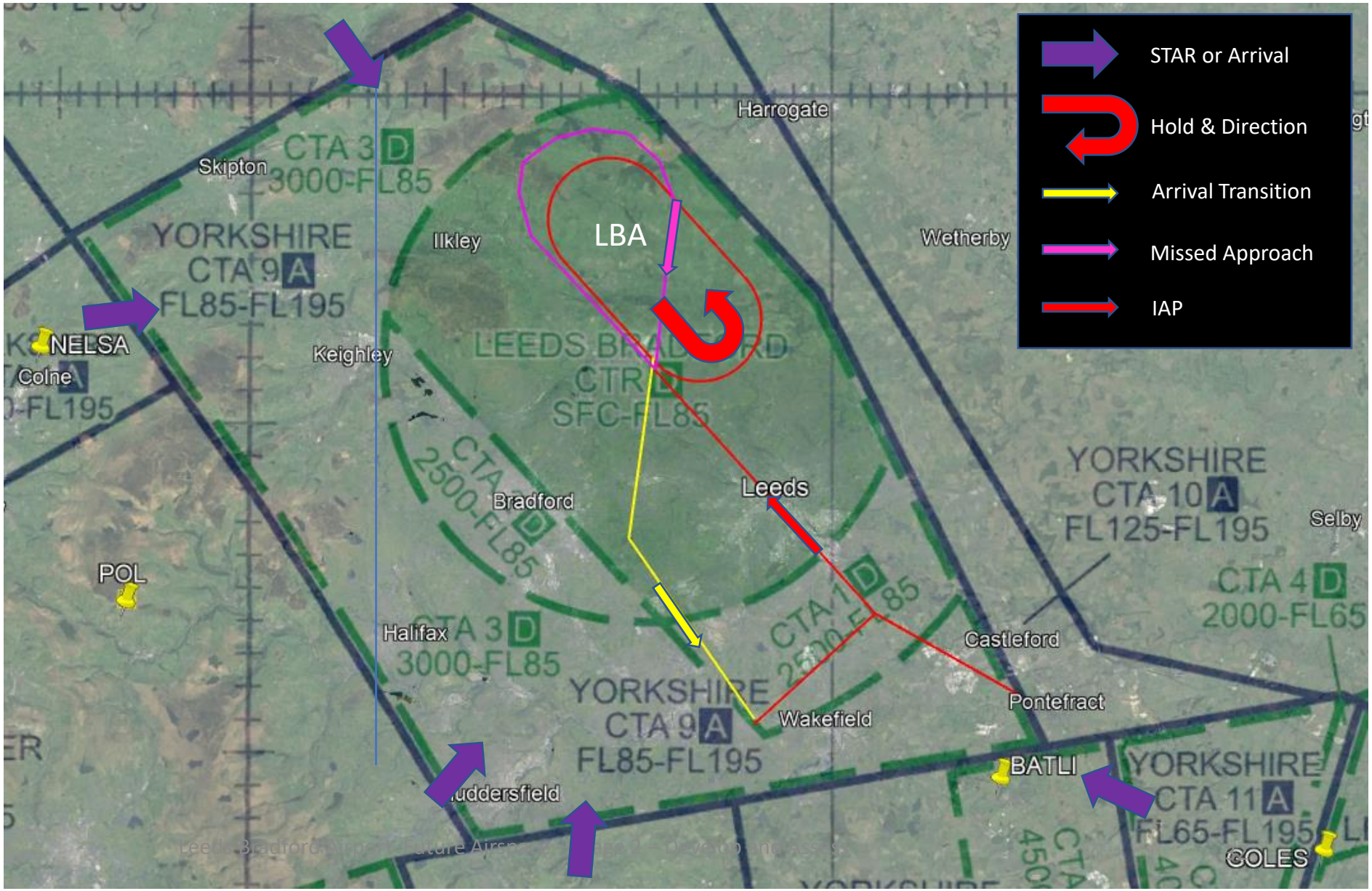
LBA Hold retained

One-sided T-Bar or Y-Bar?

MAP same as existing

Limited flexibility with hold still in overhead

Traffic from the South might be being routed towards BATLI/GOLES by NERL



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Arrivals – Option 1 - 1 Hold – LBA – RW14 (Status Quo with PBN)

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LBA Hold retained

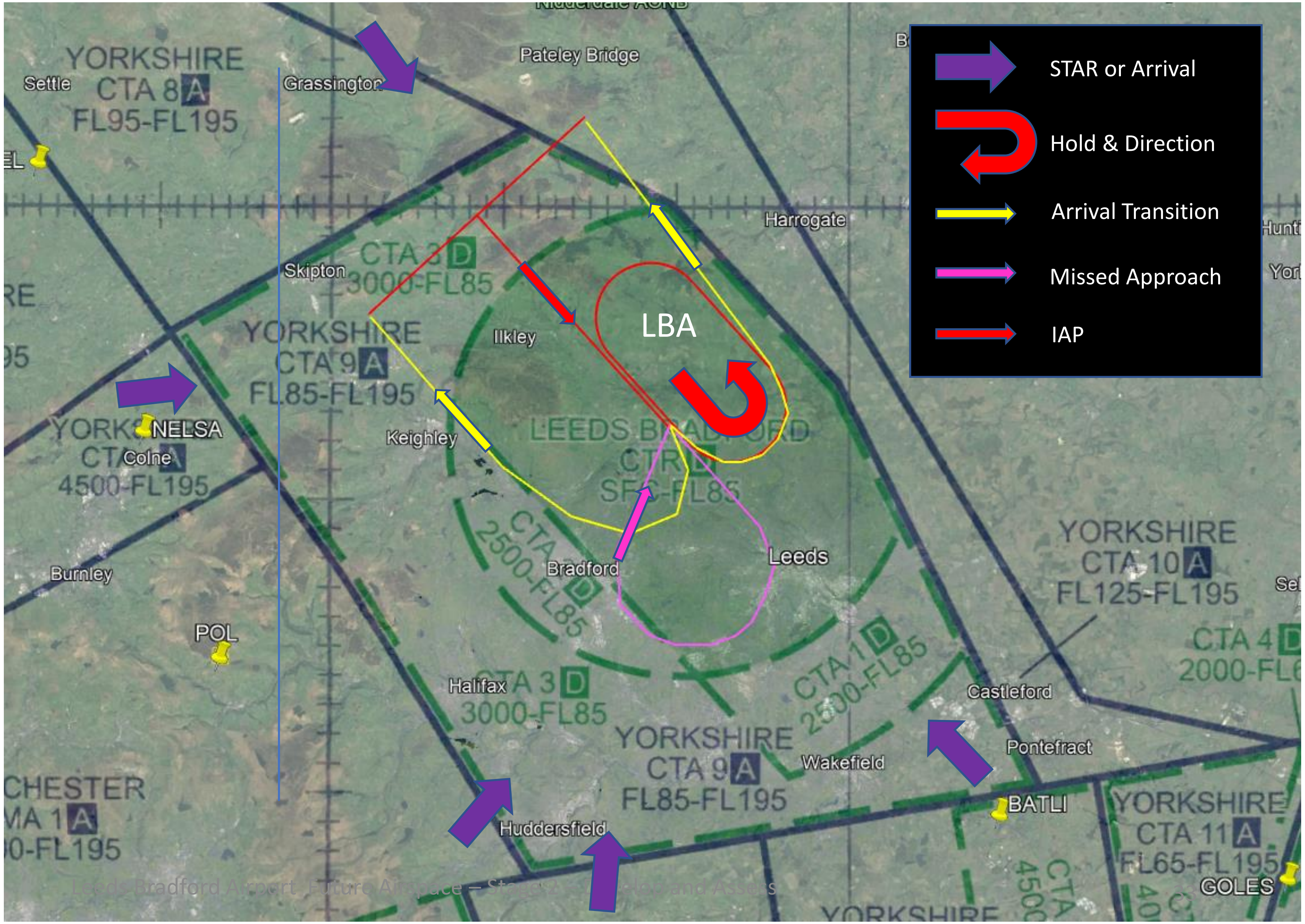
Choice of 2 Arrival Transitions

Eastern T & Arrival Transition needs additional CAS

MAP same as existing

Limited flexibility with hold still in overhead

Traffic from the South might be being routed towards BATLI/GOLES by NERL



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Arrivals – Option 1 - 1 Hold – LBA (Status Quo with PBN)

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 1	MAP requires controller intervention	Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 affects Nidderdale AONB	Potentially less expeditious than other options	Eastern T-Bar RW14 requires more CAS			Hold in the overhead can limit Continuous Climb Operations		Not really a modernisation of the LBA operation	

Arrivals – Option 2 - 2 Holds - NELSA/GOLES – RW32

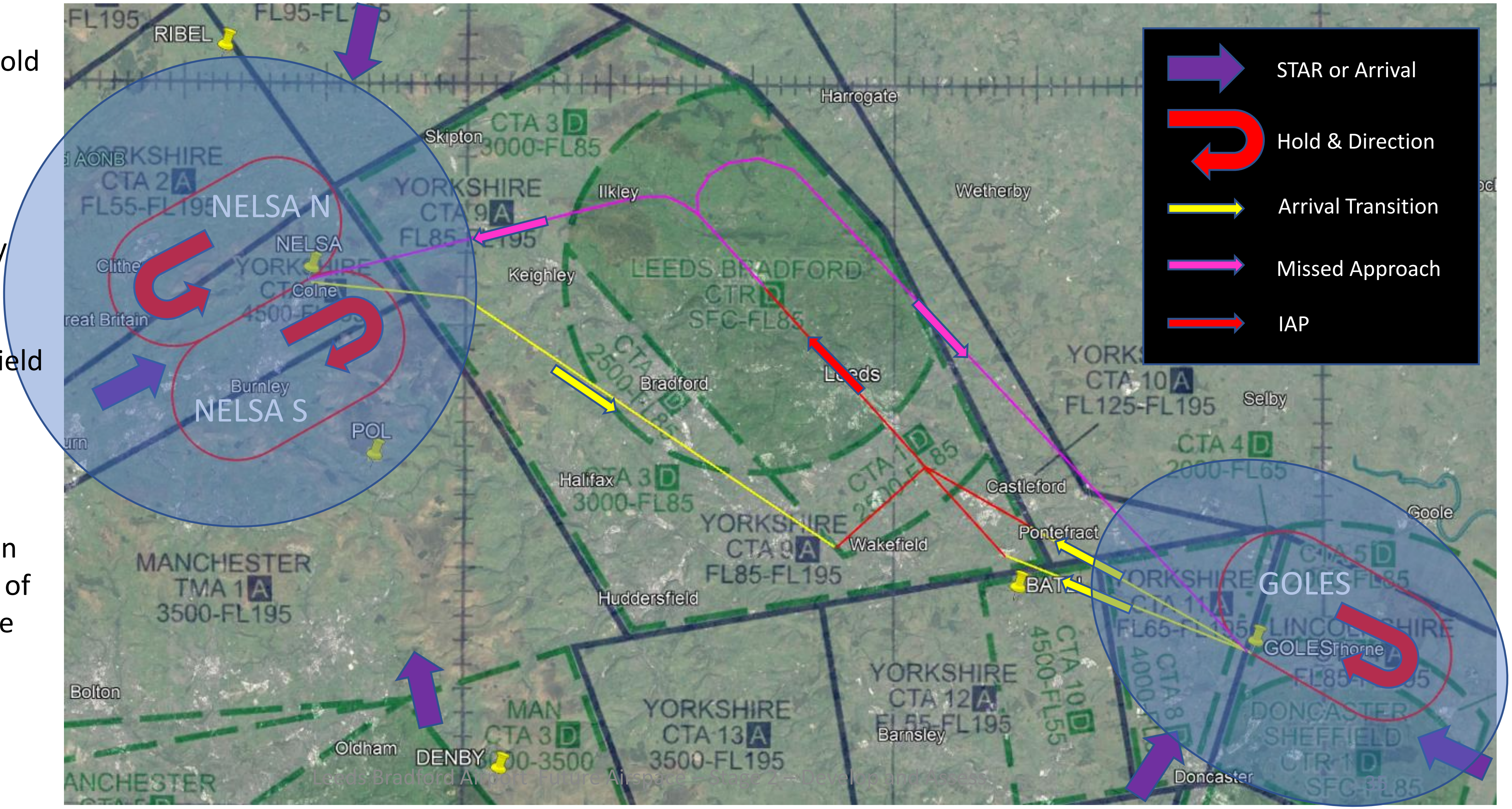
Either NELSA North (LH) or NELSA South (RH) - potential Arrival/MAP Hold from 5000ft

Traffic from the South might be being routed towards BATLI/GOLES by NERL

What if Doncaster Sheffield Airport re-opens?

T-Bar or Y-Bar?

GOLES more likely just an Arrival Hold with a base of FL80 and likely to require additional CAS



Arrivals – Option 2 - 2 Holds - NELSA/GOLES – RW14

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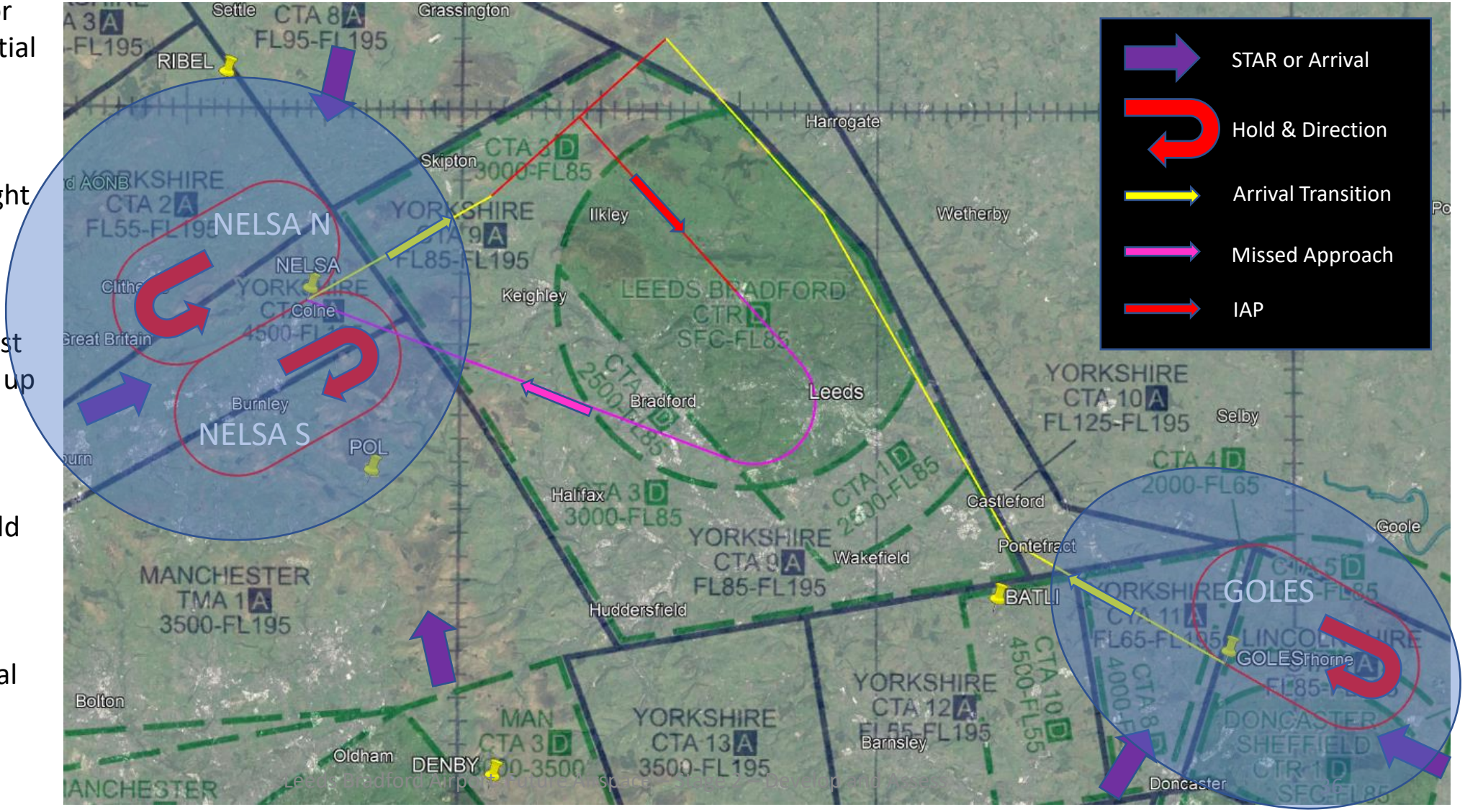
Either NELSA North (LH) or NELSA South (RH) - potential Arrival/MAP Hold from 5000ft

Traffic from the South might be being routed towards BATLI/GOLES by NERL

GOLES Hold more likely just an Arrival Hold from FL80 up and likely to require additional CAS

What if Doncaster Sheffield Airport re-opens?

Additional CAS will be required for eastern Arrival Transition and T-Bar



CYRRUS

Arrivals – Option 2 - 2 Holds - NELSA/GOLES

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 2		Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 affects Nidderdale AONB		Potential requirement for additional CAS for GOLES/NELSA holds	What happens if DSA re-opens?					

Arrivals – Option 3 - 2 Holds – 'AIREY' & 'WORTH' – RW32

Leeds Bradford® Yorkshire's Airport

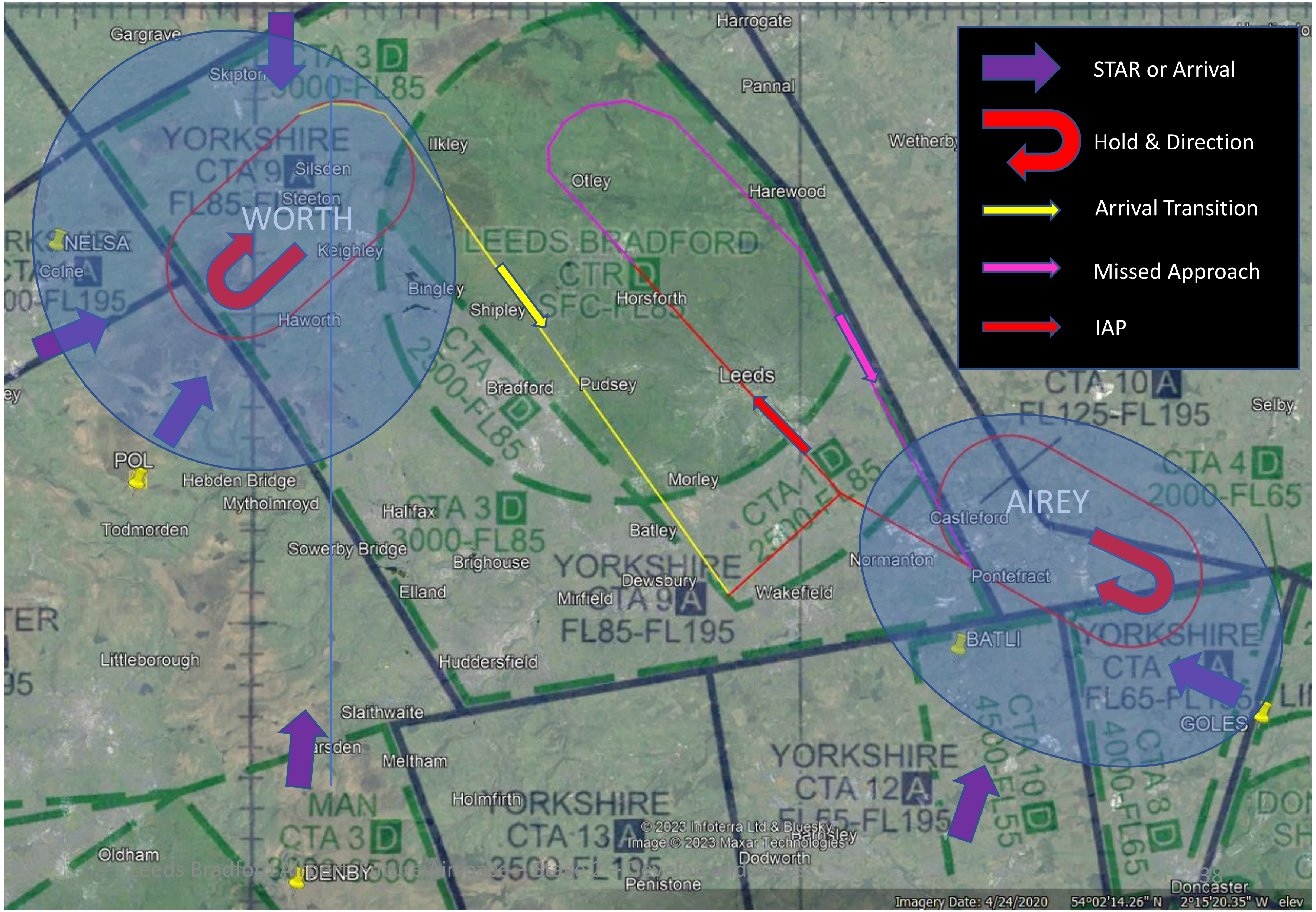
WORTH too close and limiting deps?

AIREY needing additional CAS

T/Y-Bar angle – closer to BATLI? SIE/Leeds East/Burn GC to consider

MAP to AIREY as WORTH in conflict with deps? (Hold base circa 5000ft)

Traffic from the South might be being routed towards BATLI/GOLES by NERL



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Arrivals – Option 3 - 2 Holds – 'AIREY' & 'WORTH' – RW14

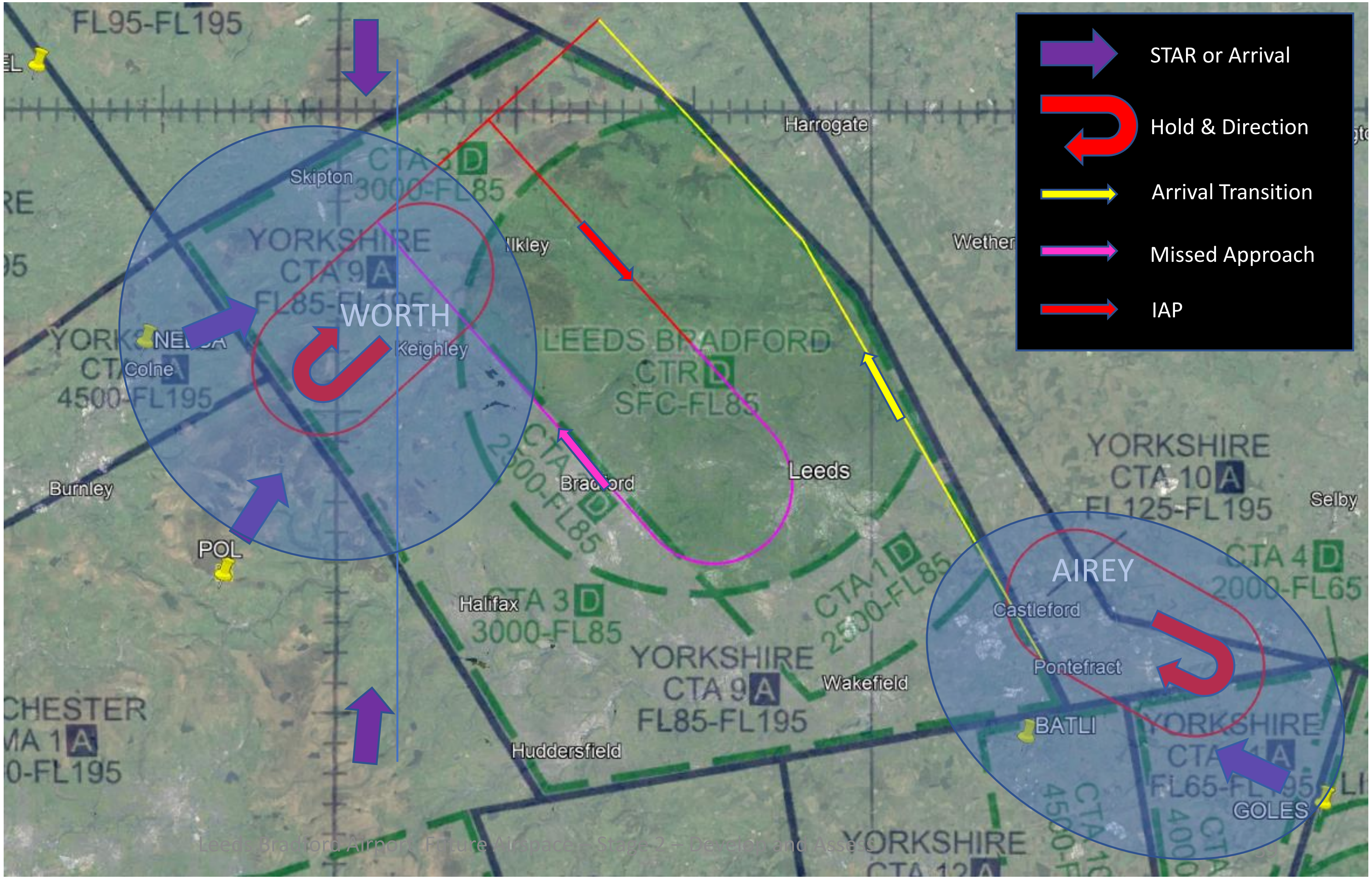
Leeds Bradford
Yorkshire's Airport

WORTH too close and limiting deps?

AIREY needing additional CAS and unlikely due to SIE/Leeds East/Burn GC

MAP to WORTH (Hold base circa 5000ft)

Traffic from the South might be being routed towards BATLI/GOLES by NERL



CYRRUS

Arrivals – Option 3 - 2 Holds – 'AIREY' & 'WORTH'

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 3	Proximity of AIREY hold to Sherburn and Leeds East and Burn Gliders	Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 affects Nidderdale AONB	WORTH hold likely to result in Continuous Climbs off RW32 being stepped.	Definite need for additional CAS for AIREY Hold	What happens if DSA re-opens?		WORTH hold likely to result in Continuous Climbs off RW32 being stepped.			

Arrivals – Option 4 - 3 Holds – LBA with 'AIREY' & 'WORTH' – RW32

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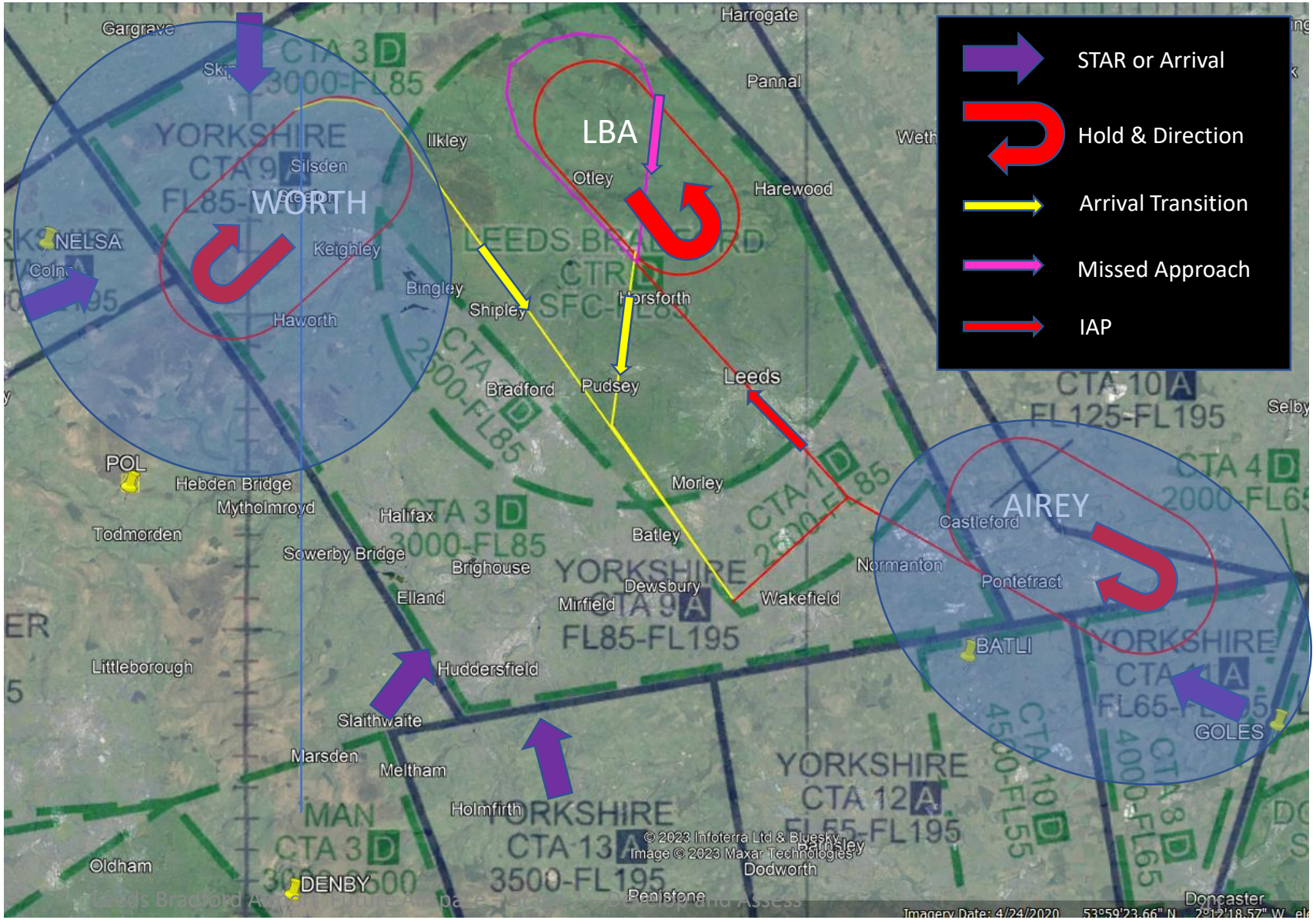
WORTH too close and limiting deps?

AIREY needing additional CAS and unlikely due to SIE, Leeds East and Burn GC.

T/Y-Bar angle – closer to BATLI?

MAP for LBA or AIREY?



Arrivals – Option 4 - 3 Holds – LBA with ‘AIREY’ & ‘WORTH’ – RW14

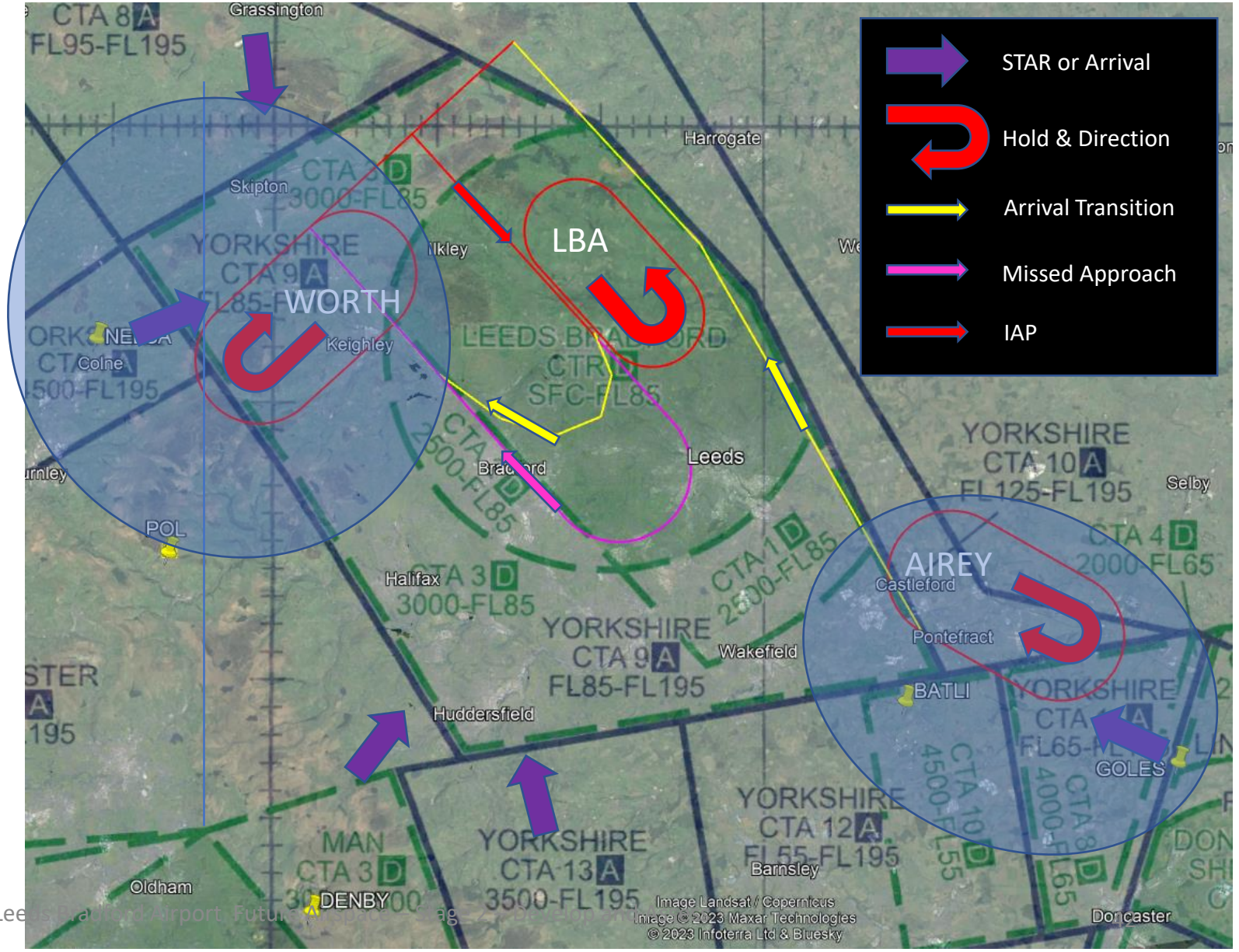
Leeds Bradford
Yorkshire’s Airport

WORTH too close and limiting deps? Precludes LT out to West and NW off RW14

AIREY needing additional airspace and unlikely due to Leeds East, Burn Gliders etc.

T/Y-Bar angle – closer to BATLI?

MAP for LBA or AIREY?



Arrivals – Option 4 - 3 Holds – LBA with 'AIREY' & 'WORTH'

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 4	Proximity of AIREY hold to Sherburn and Leeds East and Burn Gliders	Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 affects Nidderdale AONB	WORTH and LBA hold likely to result In impact to Continuous Climbs	Definite need for additional CAS for AIREY Hold	What happens if DSA re-opens?		WORTH and LBA hold likely to result In impact to Continuous Climbs			

Arrivals – Option 5 - 3 Holds – NELSA/'UDDER'/GOLES – RW32

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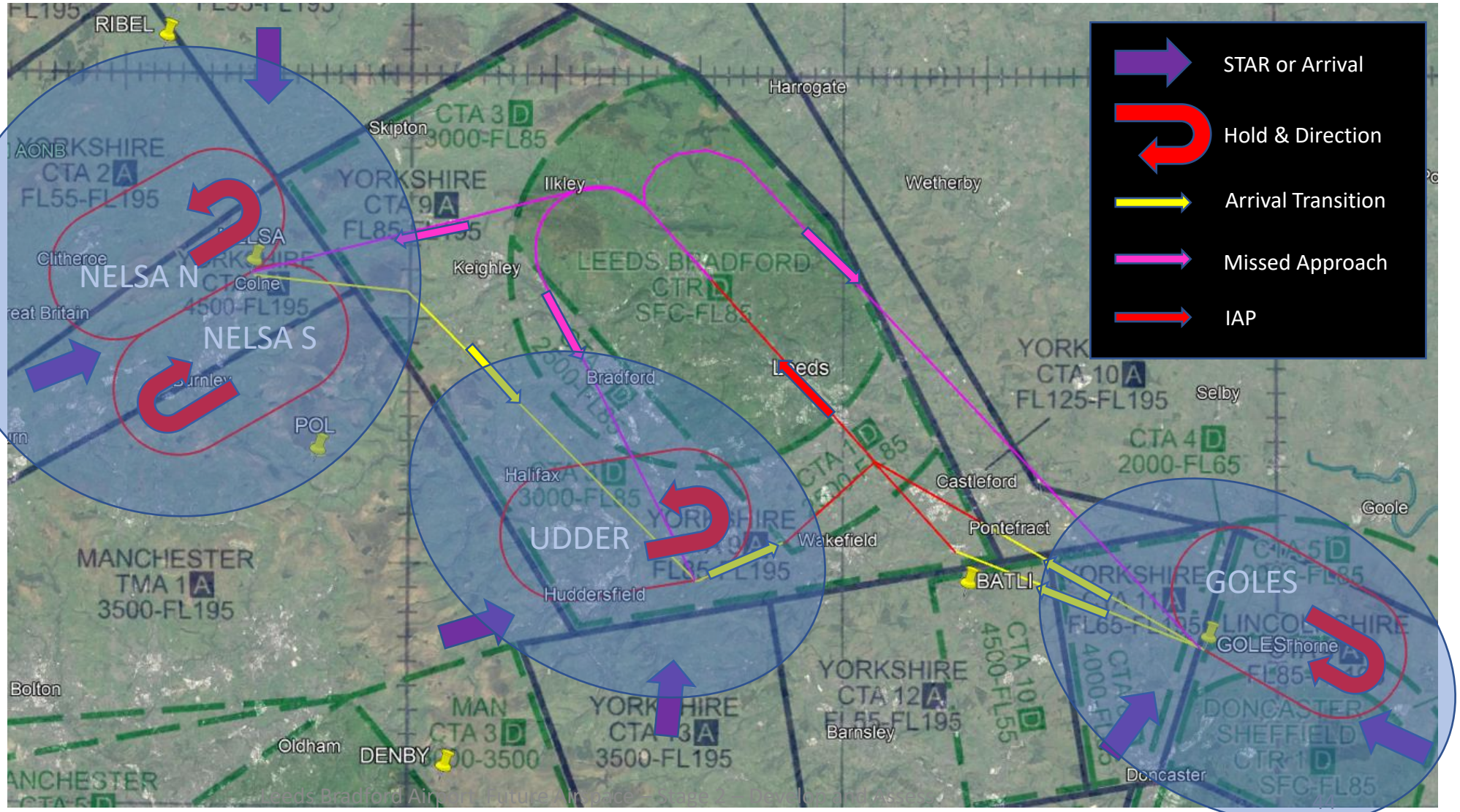
Either NELSA North (LH) or NELSA South (RH) – potential Arrival/MAP Hold from 5000ft

Arrivals from the south now have 'UDDER' option (Note: this traffic might be being routed towards BATLI/GOLES by NERL)

'UDDER' – Potential conflict with deps to SE off RW32

GOLES additional CAS required and what about DSA?

GOLES & UDDER Arrival Holds FL80 upwards



Arrivals – Option 5 - 3 Holds – NELSA/'UDDER'/GOLES – RW14

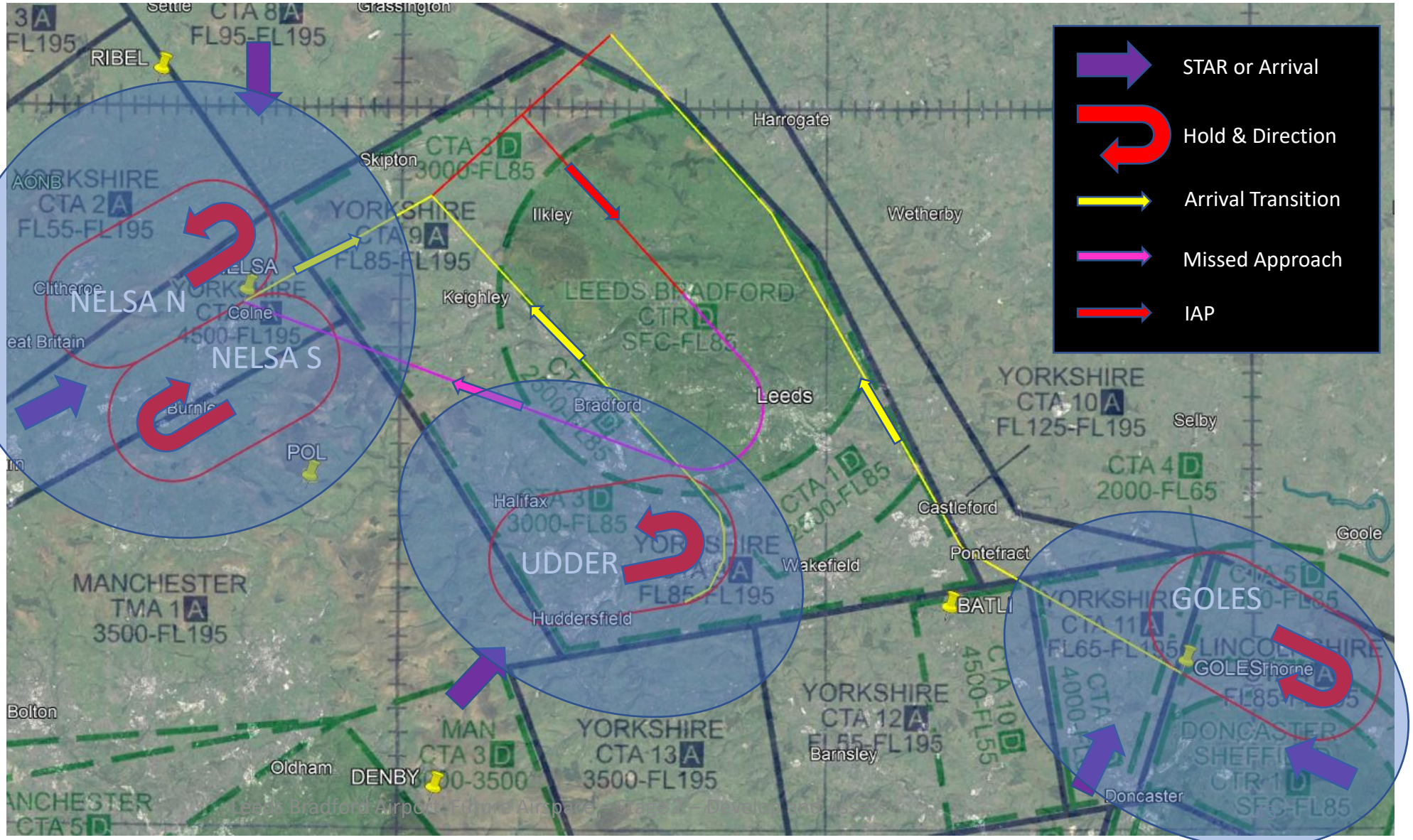
Either NELSA North (LH) or NELSA South (RH) - potential Arrival/MAP Hold from 5000ft

Arrivals from the south now have 'UDDER' option (Note: this traffic might be being routed towards BATLI/GOLES by NERL)

'UDDER' – Potential conflict with deps to South and West off RW14

GOLES additional CAS required and what about DSA?

GOLES & UDDER Arrival Holds FL80 upwards



Arrivals – Option 5 - 3 Holds – NELSA/'UDDER'/GOLES

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 5		Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 affects Nidderdale AONB	UDDER hold may impact RW14 departures	Potential requirement for additional CAS for GOLES/NELSA holds	What happens if DSA re-opens?		UDDER hold may impact RW14 departures			

Arrival Options

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 1	MAP requires controller intervention	Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 affects Nidderdale AONB	Potentially less expeditious than other options	Eastern T-Bar RW14 requires more CAS			Hold in the overhead can limit Continuous Climb Operations		Not really a modernisation of the LBA operation	
Option 2		Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 affects Nidderdale AONB		Potential requirement for additional CAS for GOLES/NELSA holds	What happens if DSA re-opens?					
Option 3	Proximity of AIREY hold to Sherburn and Leeds East and Burn Gliders	Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 affects Nidderdale AONB	WORTH hold likely to result in Continuous Climbs off RW32 being stepped.	Definite need for additional CAS for AIREY Hold	What happens if DSA re-opens?		WORTH hold likely to result in Continuous Climbs off RW32 being stepped.			
Option 4	Proximity of AIREY hold to Sherburn and Leeds East and Burn Gliders	Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 affects Nidderdale AONB	WORTH and LBA hold likely to result In impact to Continuous Climbs	Definite need for additional CAS for AIREY Hold	What happens if DSA re-opens?		WORTH and LBA hold likely to result In impact to Continuous Climbs			
Option 5		Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 affects Nidderdale AONB	UDDER hold may impact RW14 departures	Potential requirement for additional CAS for GOLES/NELSA holds	What happens if DSA re-opens?		UDDER hold may impact RW14 departures			

What's Next?

What we need from you?

Please consider the new options, in particular, and how they meet the DPs (or otherwise).

Please use the survey to comment on our initial DPE for these new options and, should you feel that the revised DPE of the previous options has not taken onboard previous stakeholder feedback, then feel free to add further comment on these.

Please feedback all comments by 1700hrs on Friday 28 April 2023.

What we will do with that information

The DPE will be finalised based upon stakeholder feedback and an Initial Options Appraisal (IOA) will be conducted and documented.

The intention is to have all Stage 2 materials submitted by 2 June 23 in time for the 30 June 23 CAA Gateway Assessment Meeting.

Should the Gateway be successfully passed, the project will move into Stage 3 of the CAP1616 process.

All associated documentation will be published on the CAA's ACP Portal. https://airspacechange.caa.co.uk/

Leeds Bradford Airport Future Airspace

Thank you for your time. We hope that you find this information on Leeds Bradford Future Airspace useful.

If you have any further queries, please address them to Airspace Change

We are very grateful for your assistance.

The Leeds Bradford ACP Team

Round 3 – Nov 2023

Leeds Bradford Airport (LBA) Future Airspace

Step 2a – Design Option Update Brief – Nov 23

Part 1: Departures

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IMPORTANT: This presentation is part of the LBA ACP Stage 2 Stakeholder Engagement on Design Options and Design Principle Evaluation, further information, background and context can be found in a document titled ‘CPJ-5692-DOC-034-LBA FASI(N) ACP Stakeholder Engagement Overview’ which has been sent out with this presentation (and another focused on ‘Arrivals’) and all of these will ultimately be available on the ACP portal.

Agreed Design Principles (DPs)

DP #	Design Principle
1	**Importance of Safety** – The airspace design and its operation must maintain or where possible, enhance current levels of safety.
2	**Noise** - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.
3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONBs.
4	**Emissions and Air Quality** – The proposed design should minimise CO2 emissions per flight.
5	**Airspace Dimensions** – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.
6	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.
7	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.
8	**Systemisation** – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the Instrument Approach Procedures (IAPs), deconflict with the departure procedures, reducing the requirement for tactical coordination.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.
11	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.

Design Principles Evaluation (DPE) Criteria

DP #	Design Principle		
DP1	**Importance of Safety** – The airspace design and its operation must maintain or where possible, enhance current levels of safety.		
Criteria	**Meets:** No safety issues identified that could not be overcome with similar levels of safety assurance to today's operation.	**Partially Meets:** Issues identified that would require a significantly more robust safety argument than today's operation to overcome.	**Does Not Meet:** Issues identified that could not be overcome without prohibitively restrictive safety mitigation.
DP2	**Noise** - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.		
Criteria	**Meets:** Limits or has the potential to reduce overall impacts of aircraft noise.	**Partially Meets:** Impacts of aircraft noise likely to be broadly similar in terms of the number of people affected. Some communities (possibly previously unaffected ones) may be affected more than others.	**Does Not Meet:** Has the potential to increase the overall impacts of aircraft noise on local communities.
DP3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONBs.		
Criteria	**Meets:** Limits effects on Noise Sensitive Areas and does not result in any overflight of an AONB or a NP below 7000ft.	**Partially Meets:** Does not result in overflight of a significant portion of an AONB or a NP but may result in overflight of other sensitive areas.	**Does Not Meet:** Results in direct and significant overflight of AONBs, NPs and/or various tranquil areas important to local communities.
4	**Emissions and Air Quality** – The proposed design should minimise CO_2 emissions per flight.		
Criteria	**Meets:** Has potential to burn less fuel and emit less CO_2 than other DOs.	**Partially Meets:** Is not the most fuel-efficient DO but is not significantly worse than other DOs.	**Does Not Meet:** Clearly an inefficient DO resulting in unnecessary and excessive fuel burn and therefore CO_2 emissions.

Design Principles Evaluation (DPE) Criteria

DP #	Design Principle		
5	**Airspace Dimensions** – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.		
Criteria	**Meets:** Allows for either a reduction in the volume of CAS required or does not require any additional CAS.	**Partially Meets:** May result in a need for small amounts of additional CAS but there may be potential to revert some CAS to Class G.	**Does Not Meet:** Large additional volumes of CAS are required to contain the proposed DO without the potential to revert some to Class G.
6	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.		
Criteria	**Meets:** Does not result in a complex CTA/CTR configuration.	**Partially Meets:** Results in changes to the CAS configuration that may cause other aviators some minor challenges.	**Does Not Meet:** Results in a highly complex CAS configuration.
7	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.		
Criteria	**Meets:** Is fully compliant and meets the technical capabilities of almost all airport operators.	**Partially Meets:** Is largely compliant but with reasonable justification for any non-compliance and meets the technical capabilities of most airport operators.	**Does Not Meet:** Has several non-compliances without reasonable justification and does not meet the technical capabilities of several airport operators.
8	**Systemisation** – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the Instrument Approach Procedures (IAPs), deconflict with the departure procedures, reducing the requirement for tactical coordination.		

Design Principles Evaluation (DPE) Criteria

DP #	Design Principle		
Criteria	**Meets:** Integrates seamlessly with the en-route network and is likely to reduce the need for tactical coordination and vectoring within the CTA/CTR.	**Partially Meets:** Integrates seamlessly with the en-route network but may not reduce the need for tactical coordination and vectoring within the CTA/CTR.	**Does Not Meet:** Does not integrate seamlessly with the en-route network and will increase the need for tactical coordination and vectoring within the CTA/CTR.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.		
Criteria	**Meets:** Fuel efficiency is optimal without an adverse impact on local communities.	**Partially Meets:** Fuel efficiency is marginally sub-optimal due to consideration to the impact on local communities.	**Does Not Meet:** Fuel efficiency is clearly not optimised, or it has been optimised at the expense of local communities.
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.		
Criteria	**Meets:** Generally aligned with the AMS.	**Partially Meets:** Partially aligned with the AMS.	**Does Not Meet:** Not aligned with the AMS.
11	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.		
Criteria	**Meets:** Designed to the latest navigation standards that do not require aircraft fleet upgrades.	**Partially Meets:** Designed to the latest navigation standards that may require aircraft fleet upgrades.	**Does Not Meet:** Fails to utilise the latest navigation standards.

What's New?

What has changed? Seven new Departure DOs have been developed, five for RW32 and two for RW14. These DOs share the same initial climb-out but then split in the required departure directions.

The requirement for SIDs towards the NW and NE has been reviewed and it was concluded there was insufficient demand. Accordingly, the NW and NE SID options have been removed from evaluation.

We have looked to recently improved procedure design and navigation techniques to try and avoid some of the communities closer to the Airport.

Many of these new DOs have been developed specifically to provide communities with respite or night-time noise relief

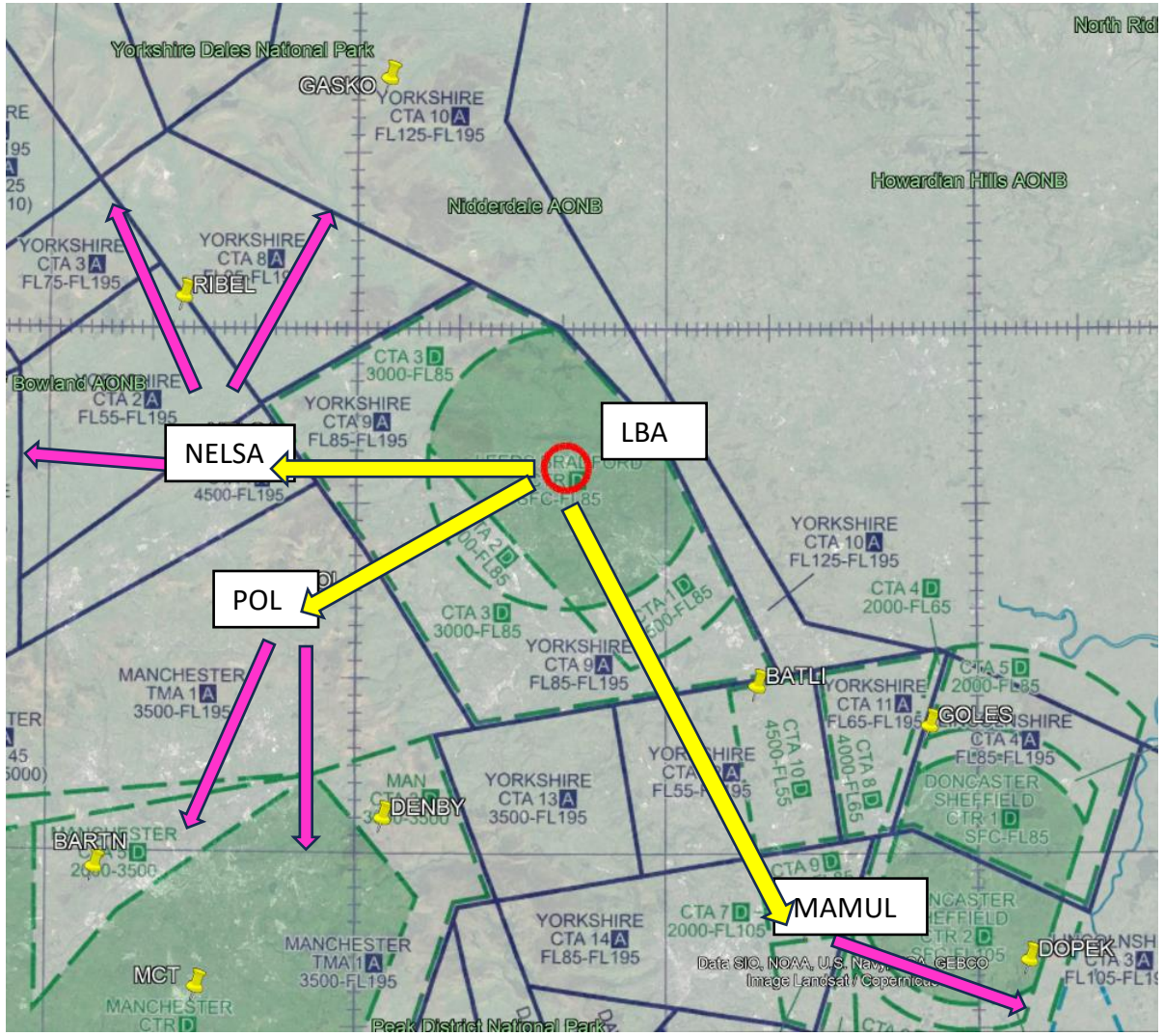
The DPE for all the Departure DOs has been revised post-CAA review. It was considered that the DPs had not been applied consistently to each DO and therefore a revised DPE is presented for comment.

Departures

Departure Directions and the Route Network Flow

NERL have expressed a preference to see departures from LBA to route via three gateways into the Route Network:

- W, NW and NE via NELSA
- S and SW via POL
- ESE via MAMUL

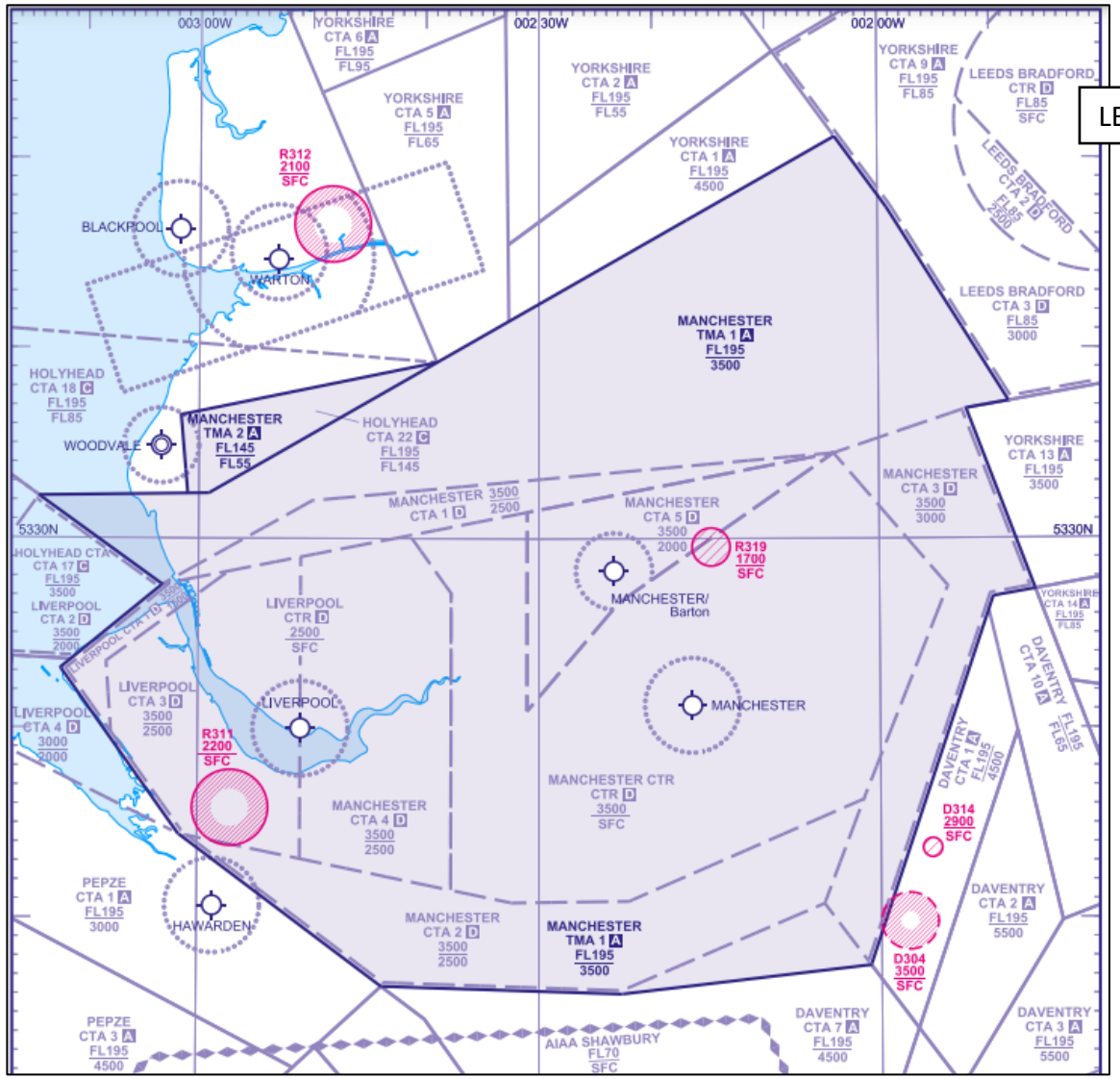


Important: Note that the arrows on this slide do not show flight paths, they show direction of travel from LBA. Flight paths off the two runways would look very different.

MTMA

The points on the previous slides are chosen as they best fit the overall flow of the Manchester Terminal Manoeuvring Area (MTMA) within which aircraft are climbing in and out of various airports, principally:

- Manchester;
- Liverpool;
- East Midlands; and
- Leeds Bradford.

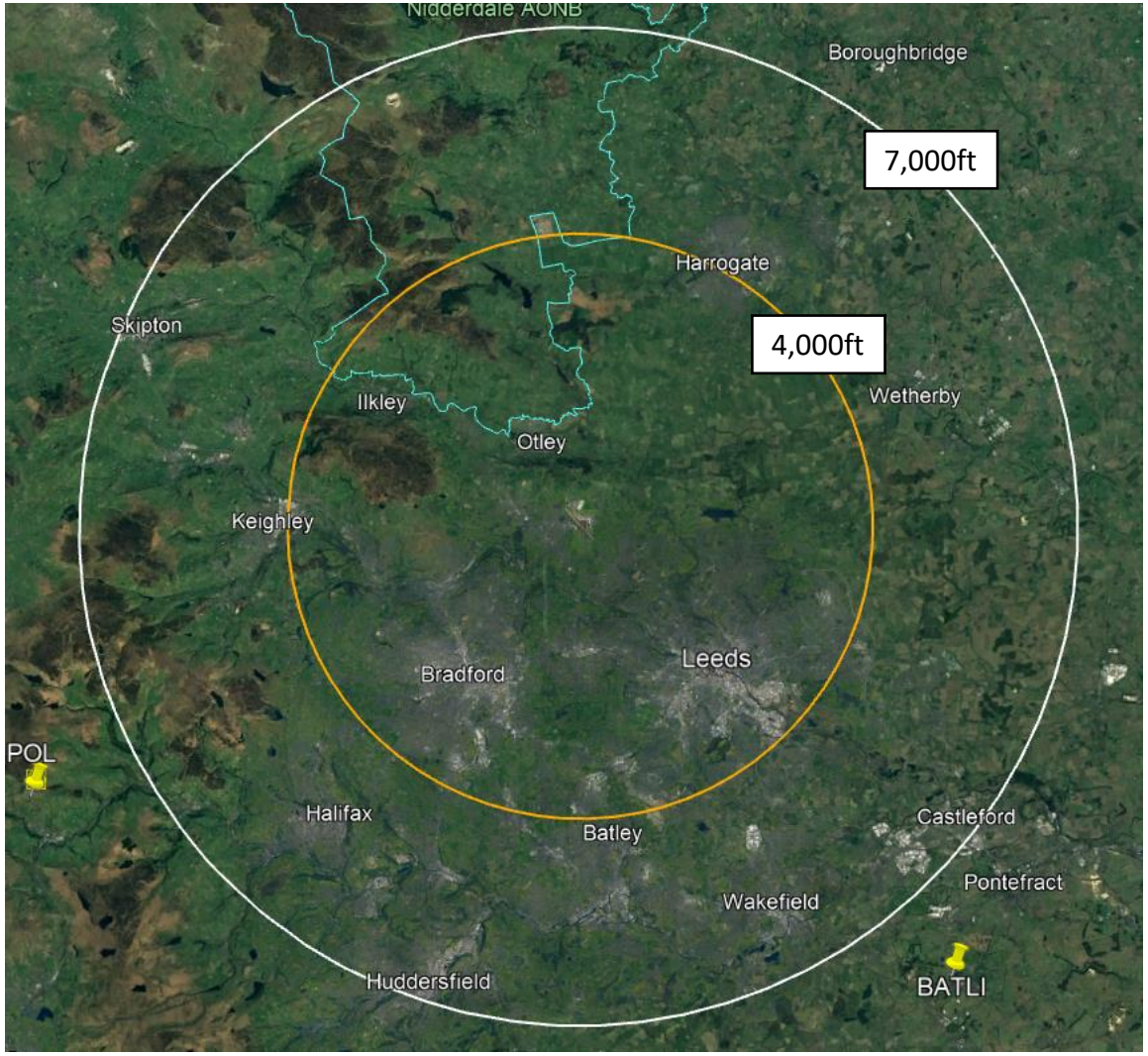


Climb Gradient Range Rings

This graphic shows two ranges from LBA where aircraft can realistically expect to achieve 4,000ft and 7,000ft on an 8% climb gradient.

This gradient has been routinely achieved and exceeded, even on the hottest days of the summer months.

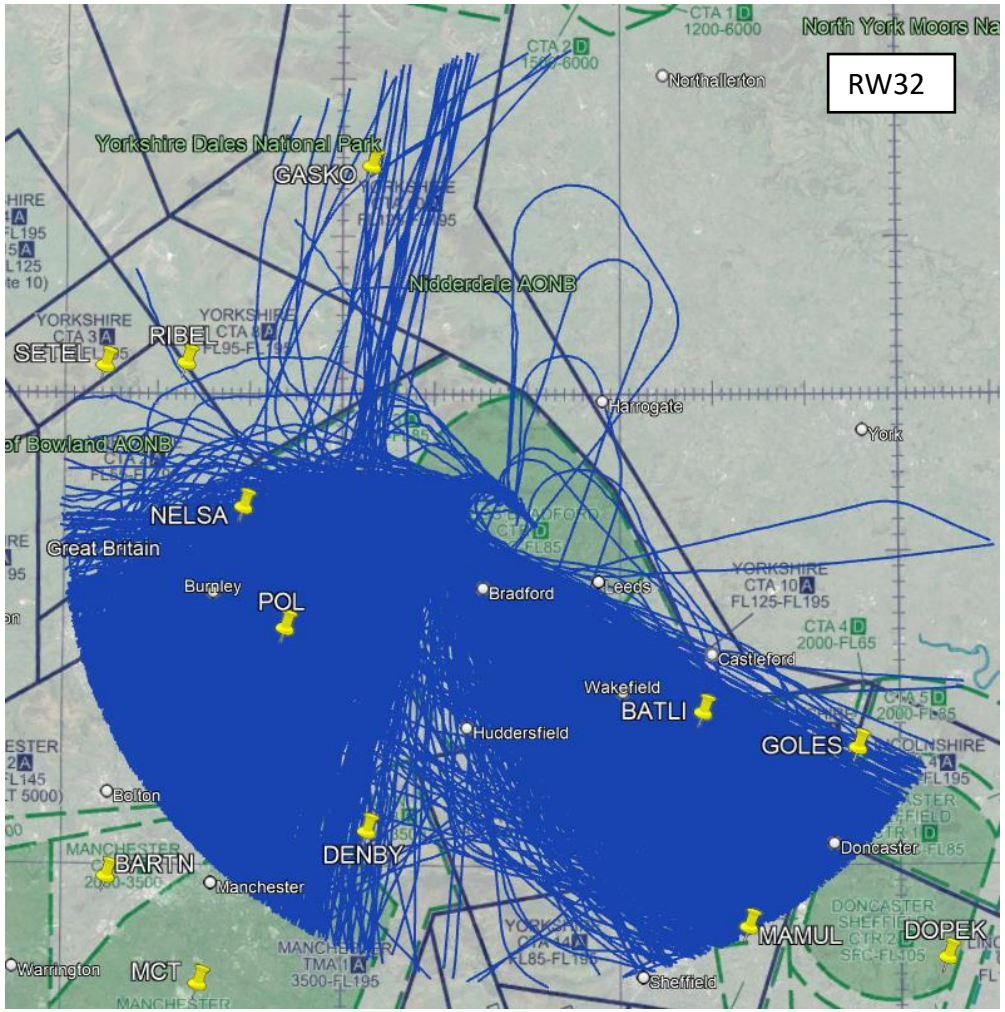
These range rings are presented on the departure option slides for perspective.

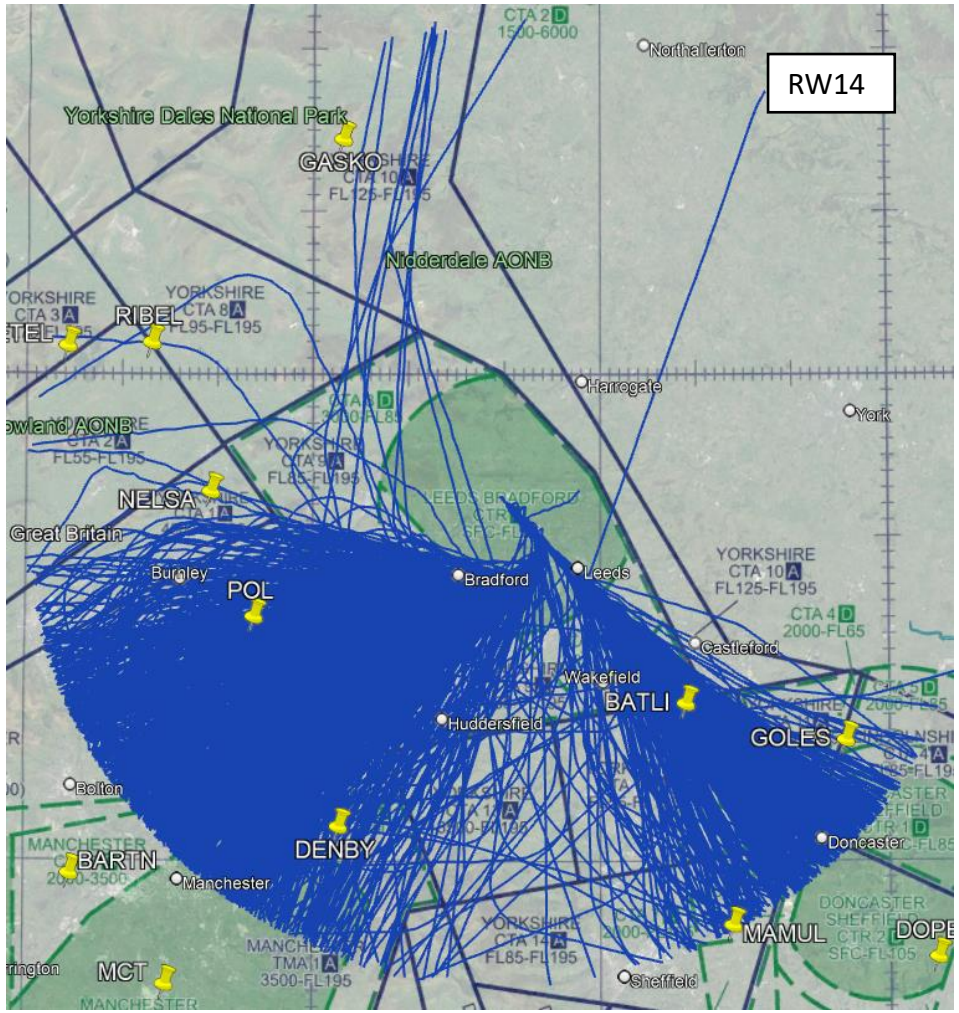


Baseline Swathe Development

LBA RW32 Baseline Departure Swathe Creation:

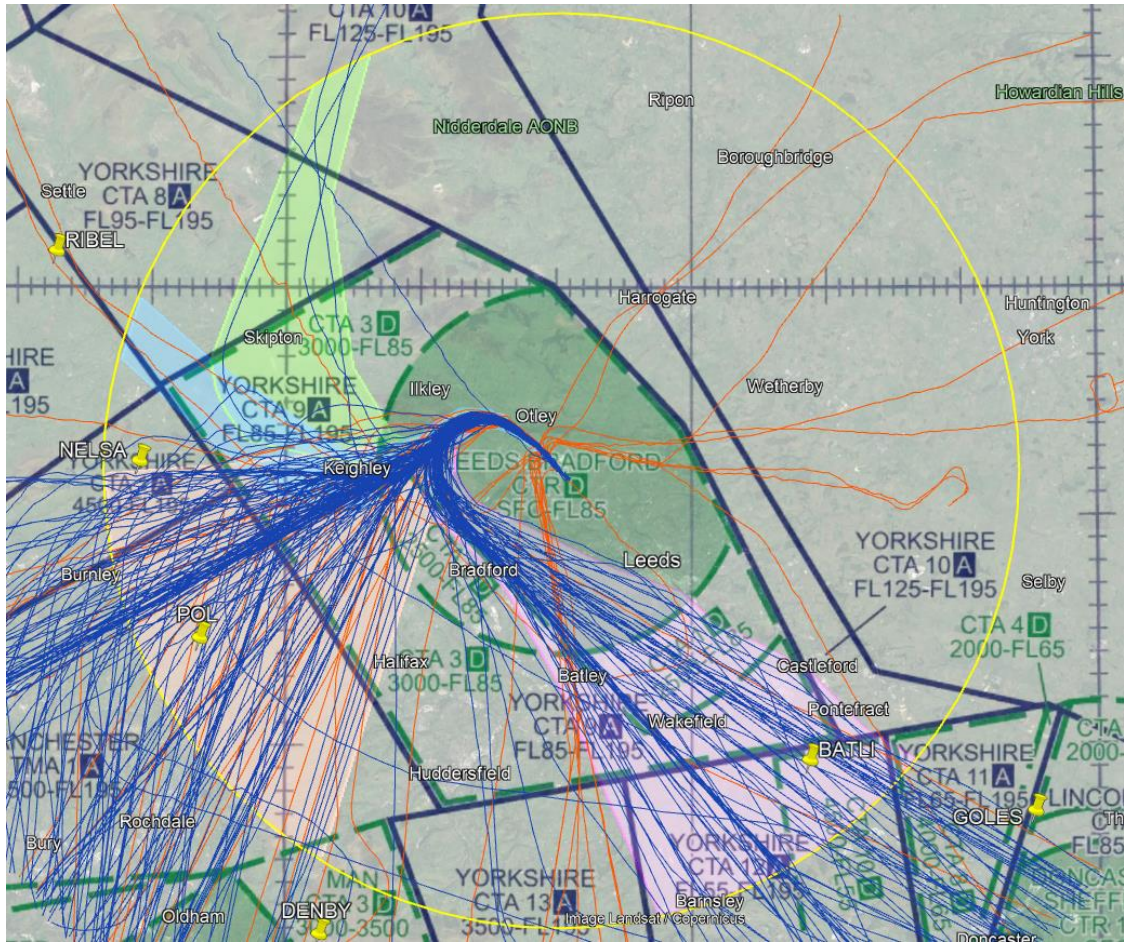
Too cluttered to make any sense over 92 days

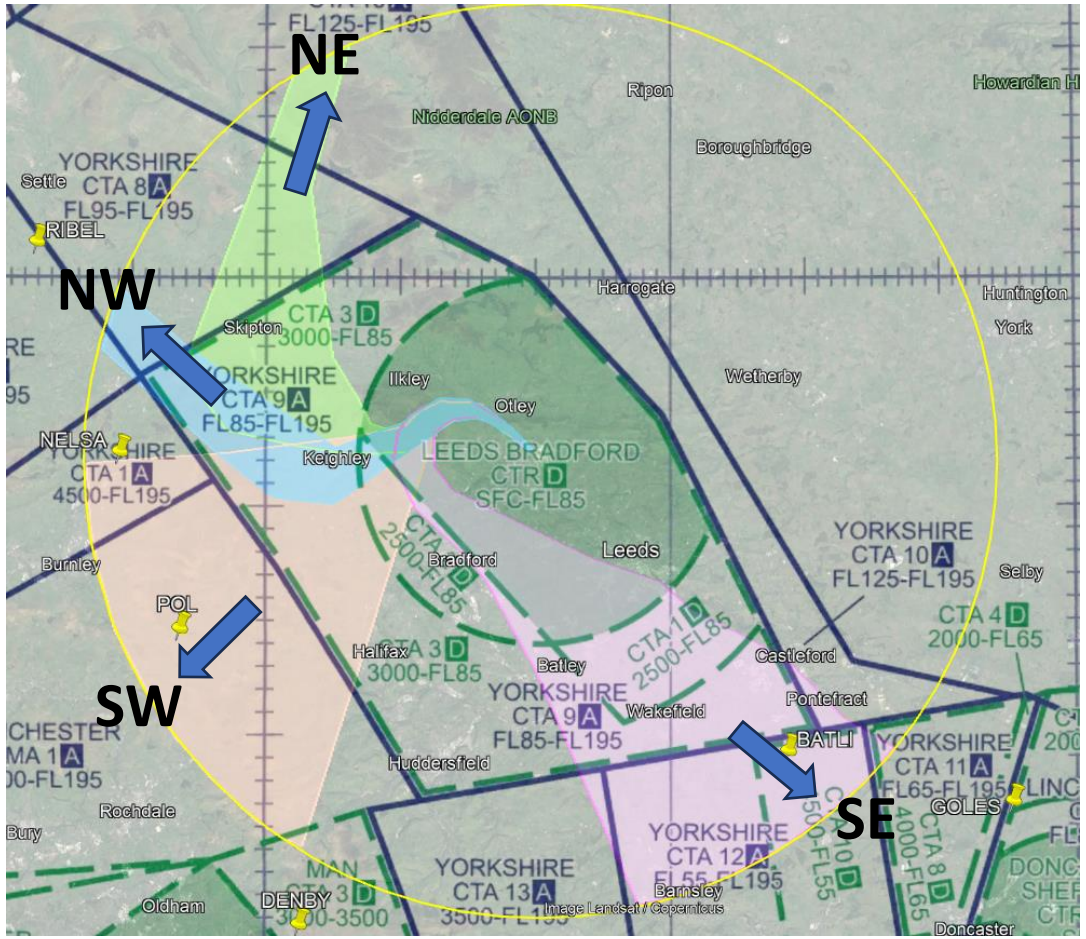




NTMS RW32 & RW14 Departures 92-day Summer 2022

LBA RW32 Baseline Departure Swathe Creation



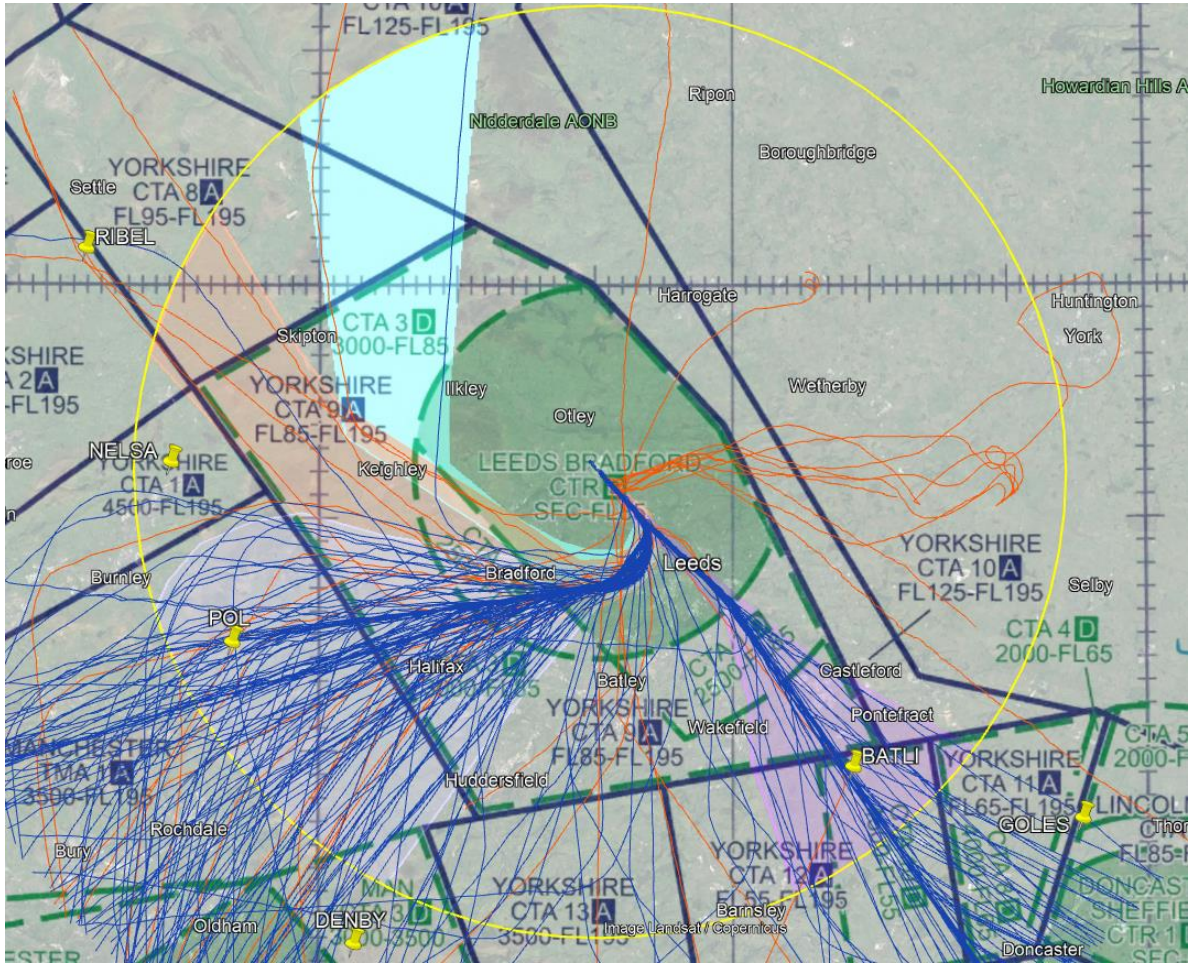


Blue = Commercial Traffic

Orange = Non-Commercial Traffic

NTMS RW32 Departure Data 3rd to 10th July 2022

LBA RW14 Baseline Departure Swathe Creation



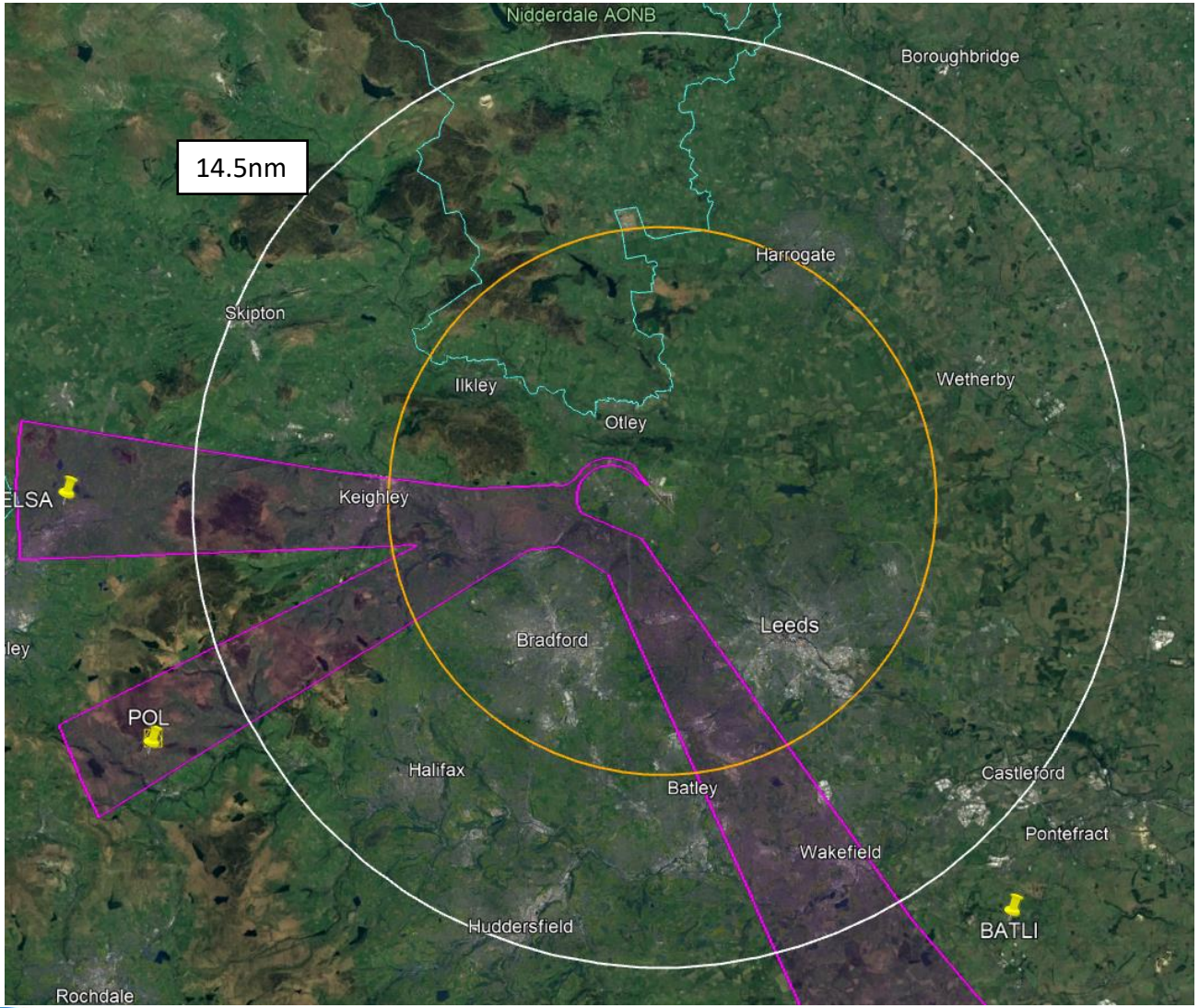
Blue = Commercial Traffic

Orange = Non-Commercial Traffic

NTMS RW14 Departure Data 3rd to 10th July 2022

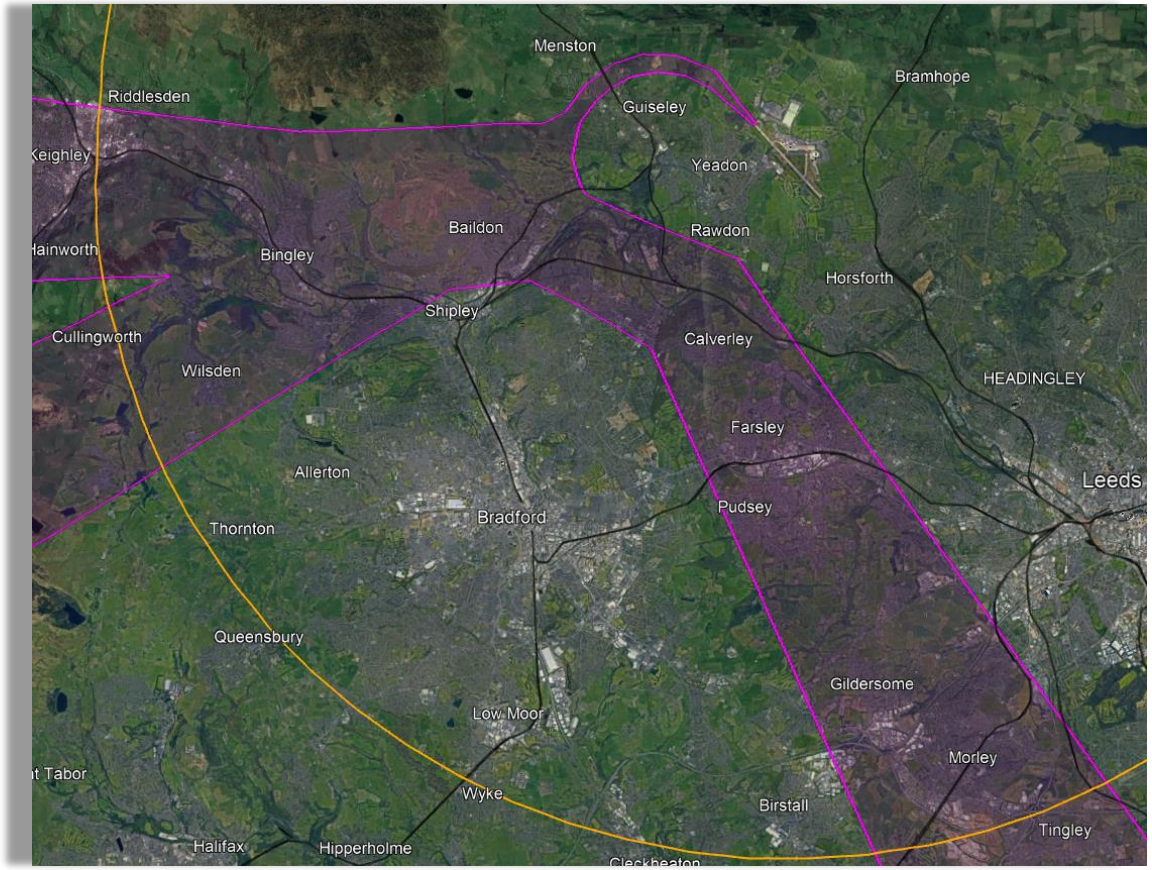
New Departure Options

RW32 – New Option A – Potential Respite Route

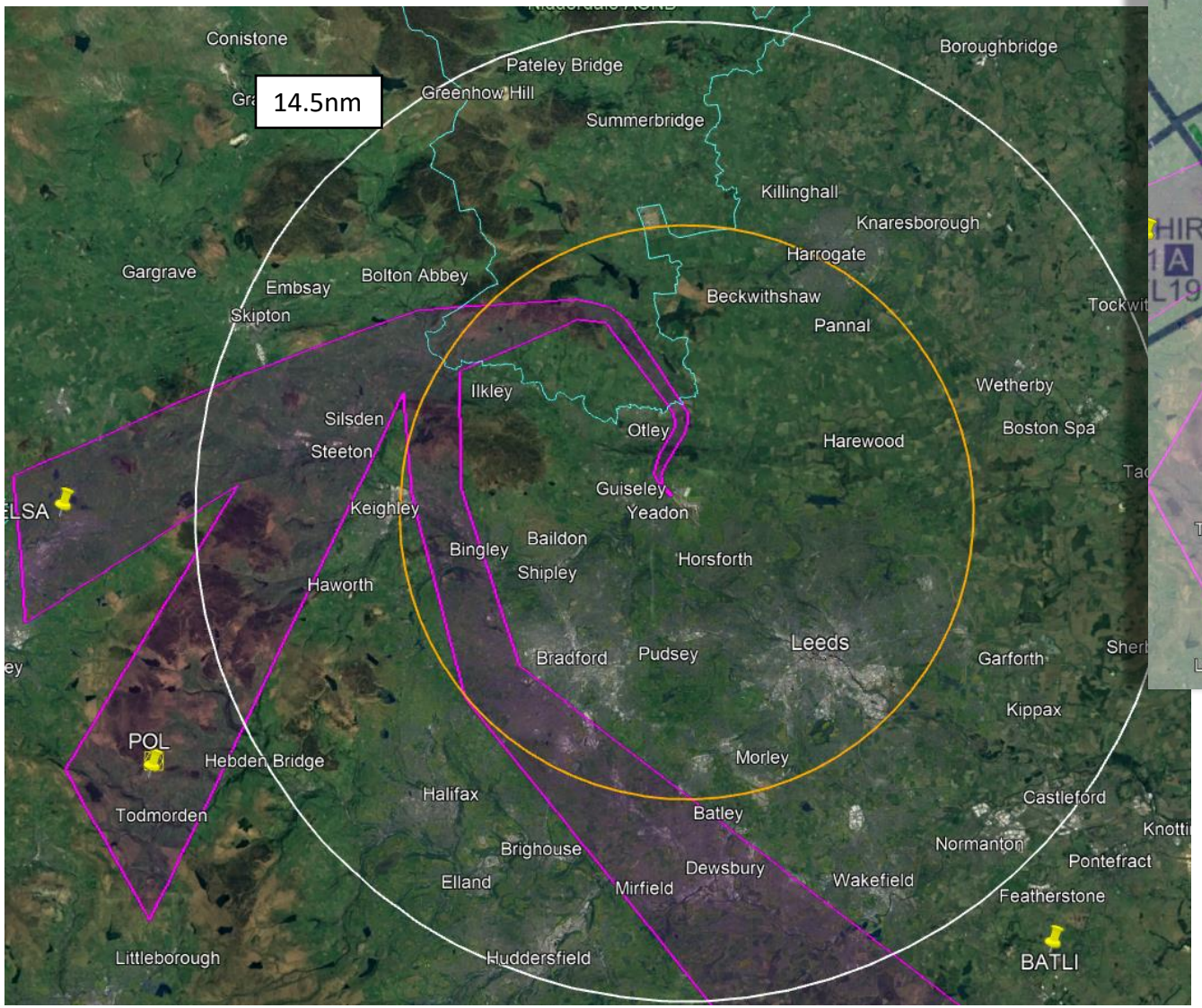


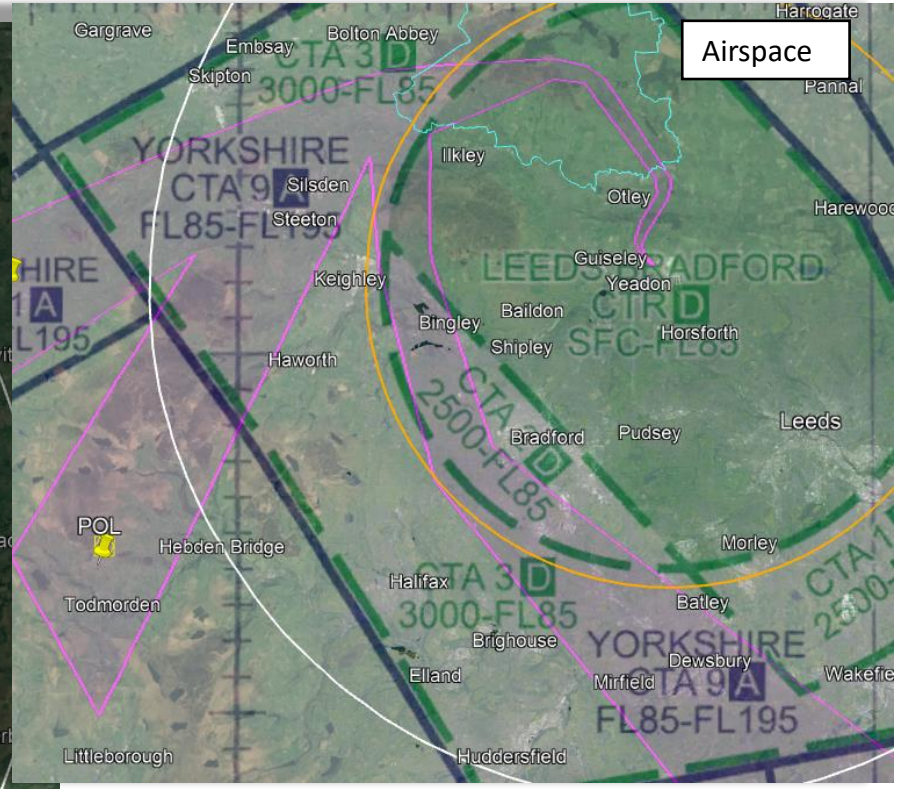
This option uses modern navigational techniques (Radius-to-Fix turns) to navigate over the fields between North Guiseley (Wetherby Whaler Restaurant area) and South Menston. The objective is to reduce the noise nuisance from the existing route over North Menston/South Burley by sharing the load between the two routes. Flight paths could be altered on a daily basis to share the noise between the two areas. As satellite navigational techniques are used, the flight tracks over the area will be accurate.

RW32 – New Option A – Zoomed in views



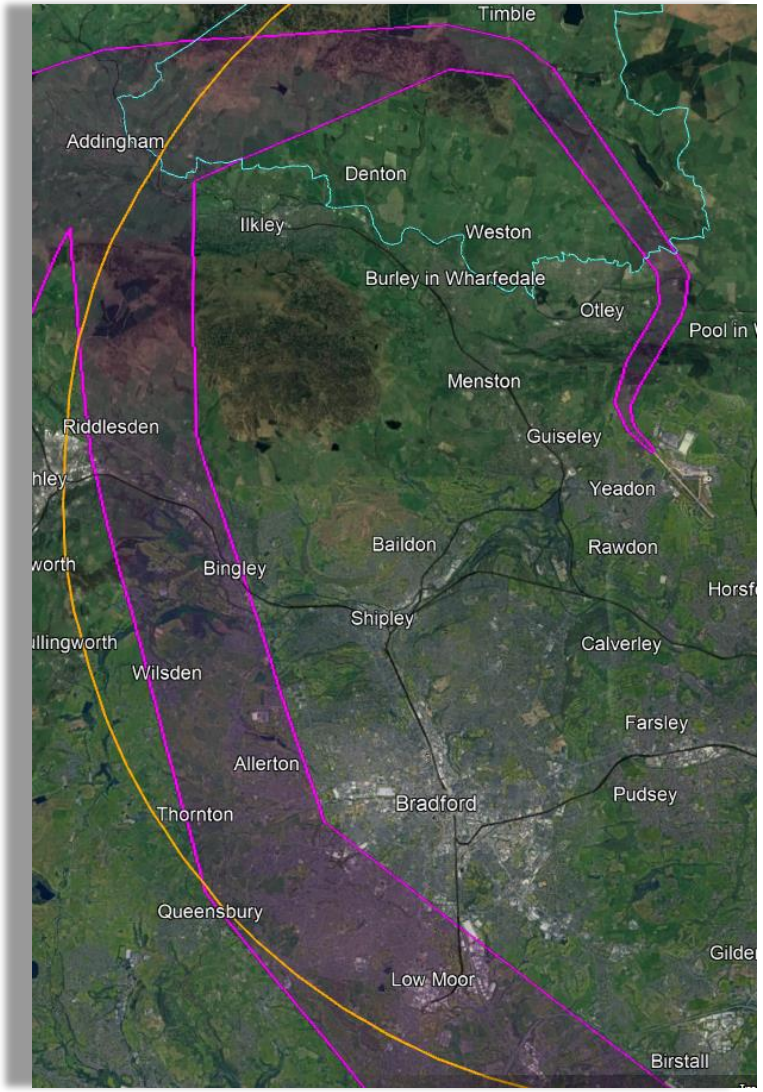
RW32 – New Option B – Potential Night Route

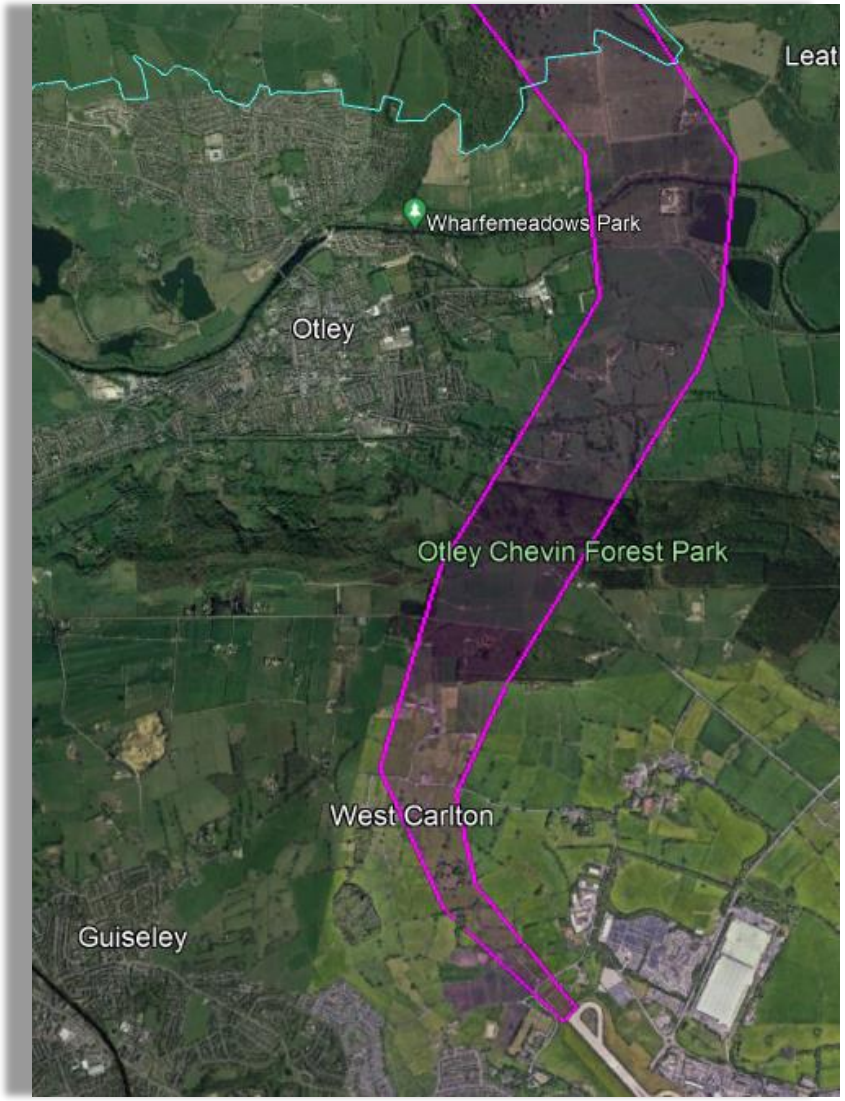




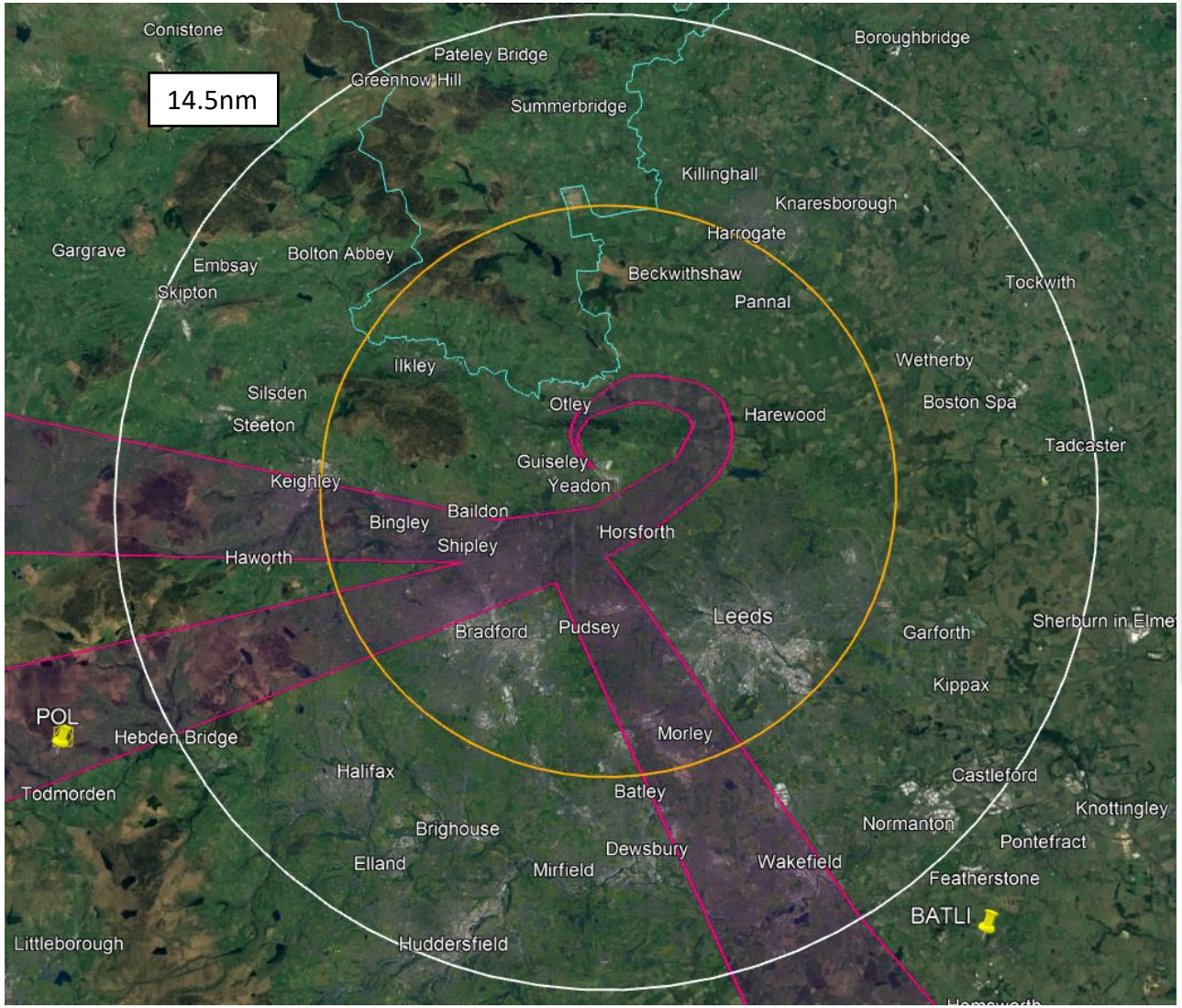
This option involves an early right turn over the Chevin followed by a left turn intended to route around the back of Otley and in so doing, reduce the populated areas overflown. The initial climb-out is then split in the three most in demand departure directions. The extra track distance makes less likely for regular use but instead as a night-time noise abatement route.

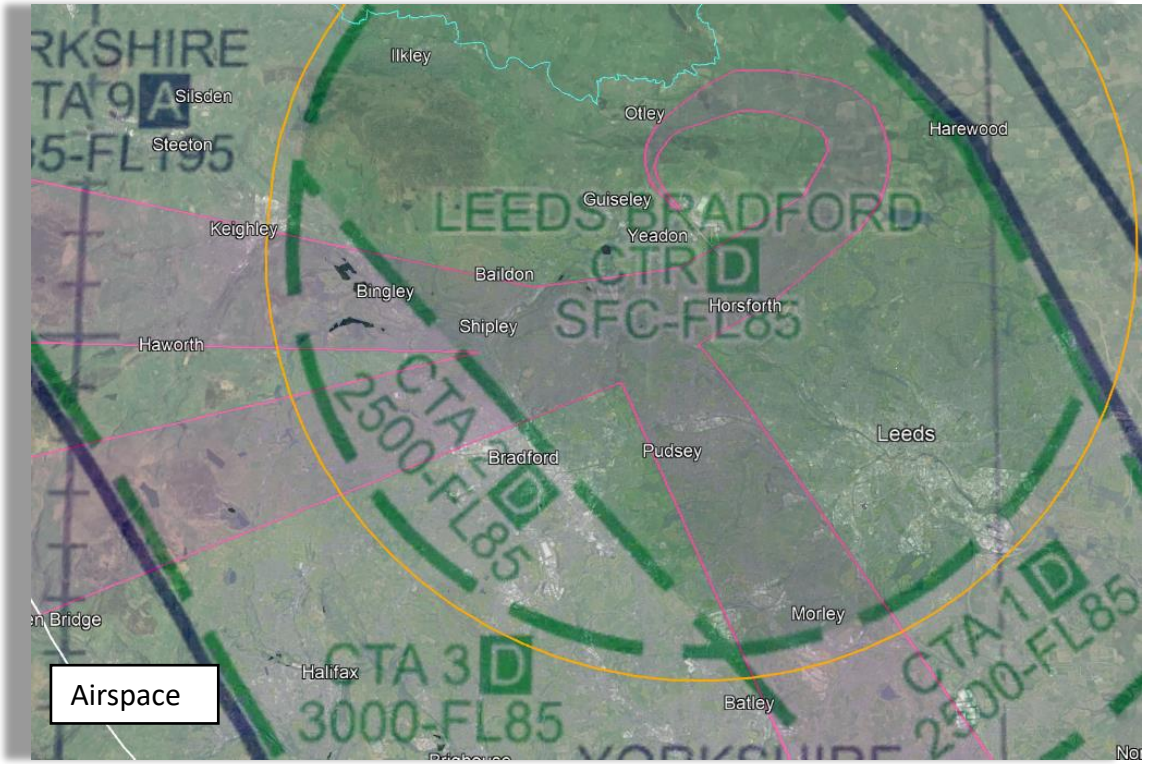
RW32 – New Option B – Zoomed in views





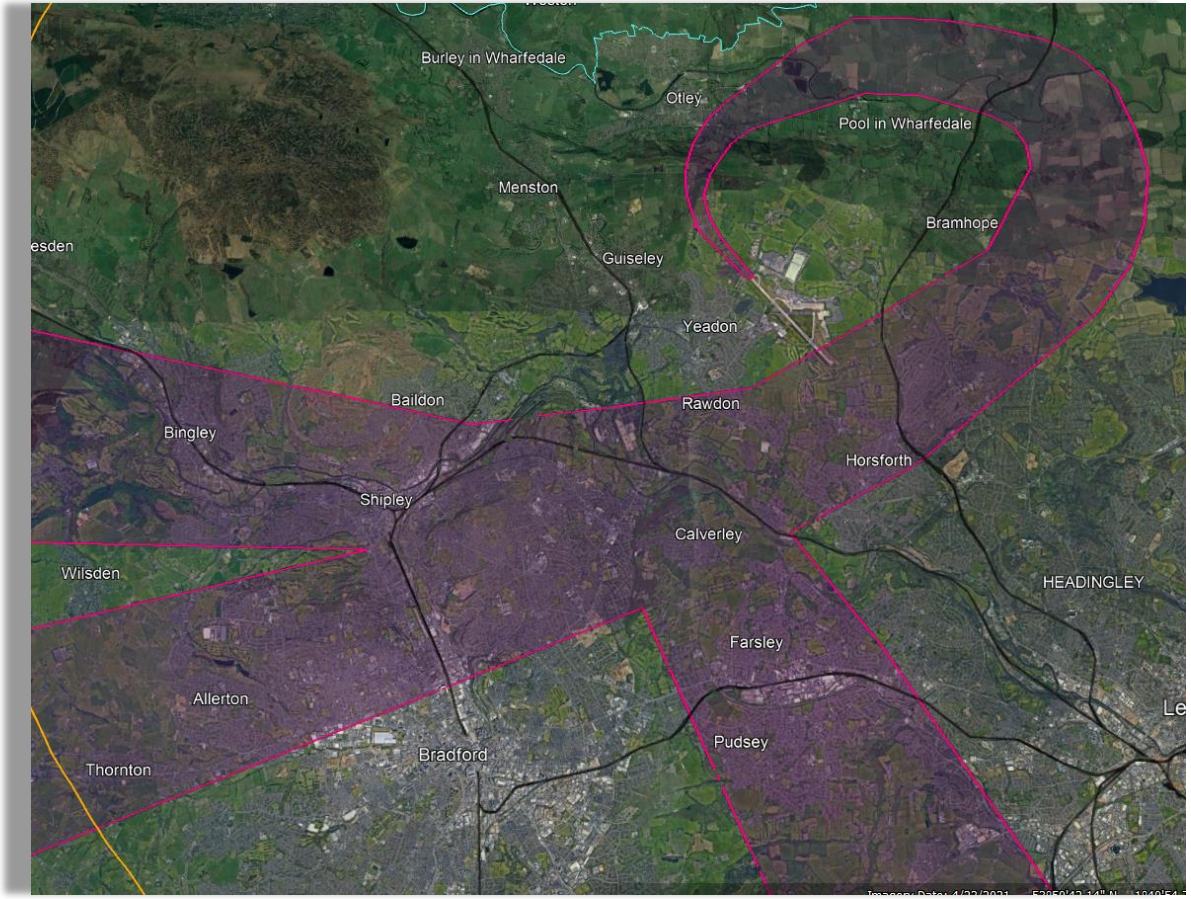
RW32 – New Option C - Potential Respite or Night Route

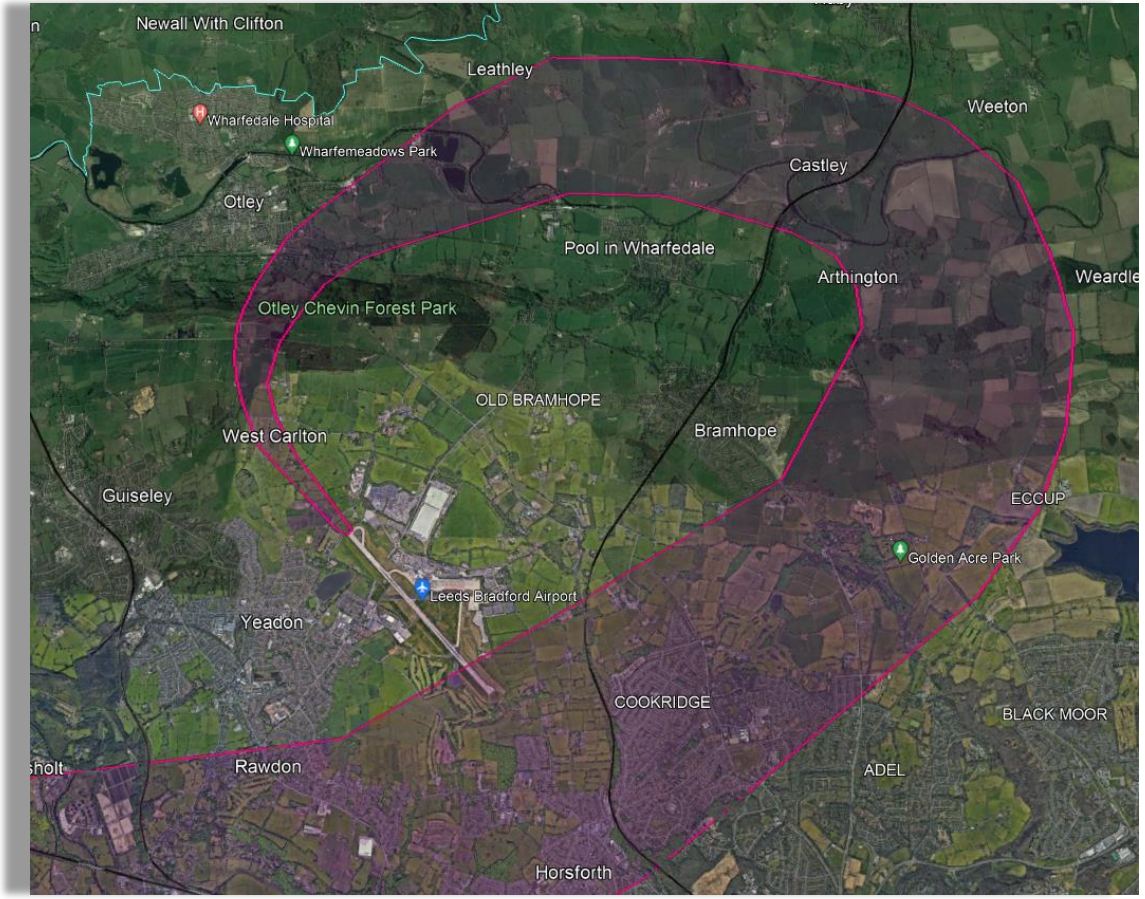




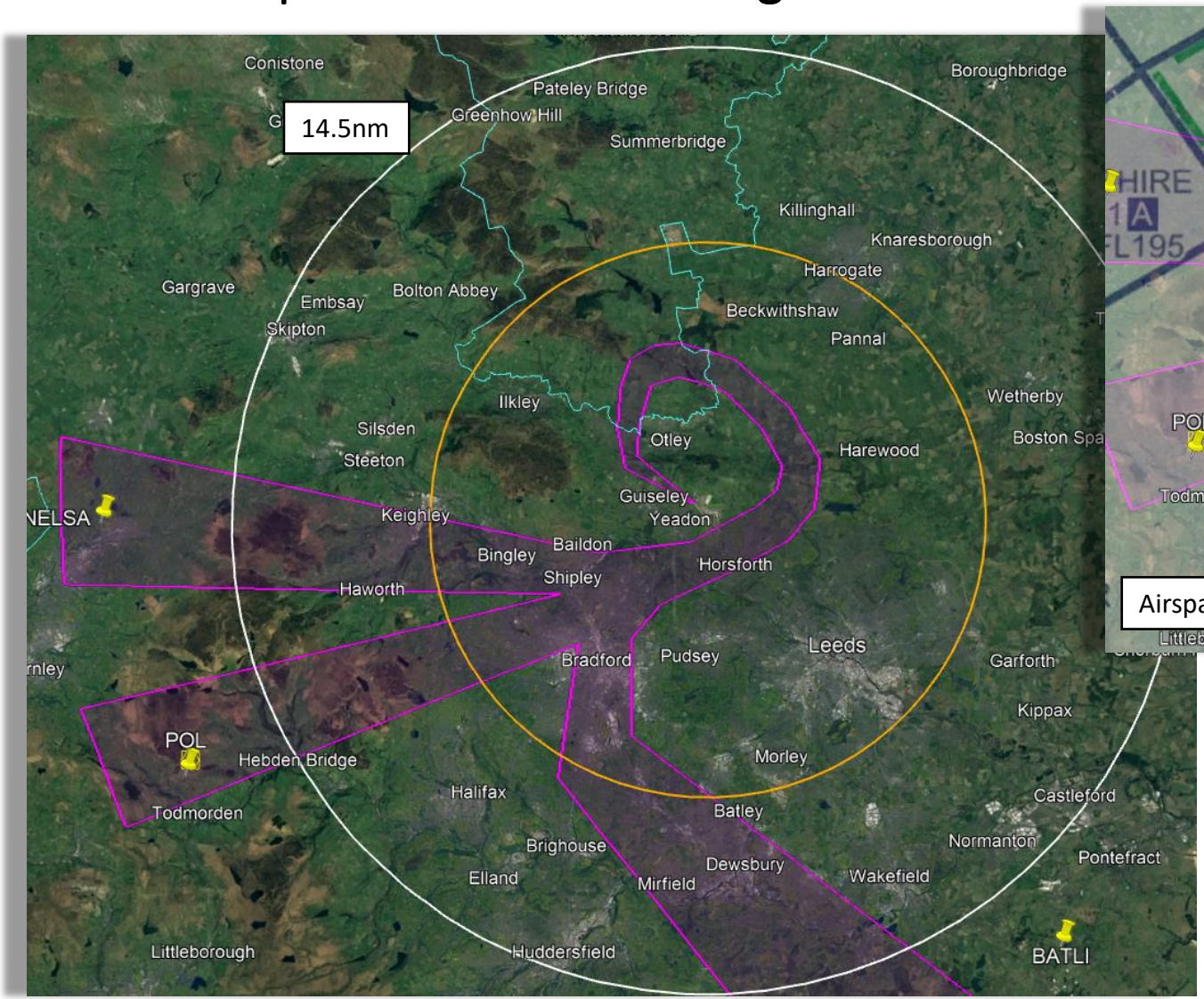
This option uses advanced navigational techniques to fly an early right turn after departure to avoid Otley. It is intended as a respite option to share the noise loading with the traditional route over Menston and Burley In Wharfedale. The aircraft would climb out looping mainly over countryside to then cross Cookridge at realistically 5000 feet or above.

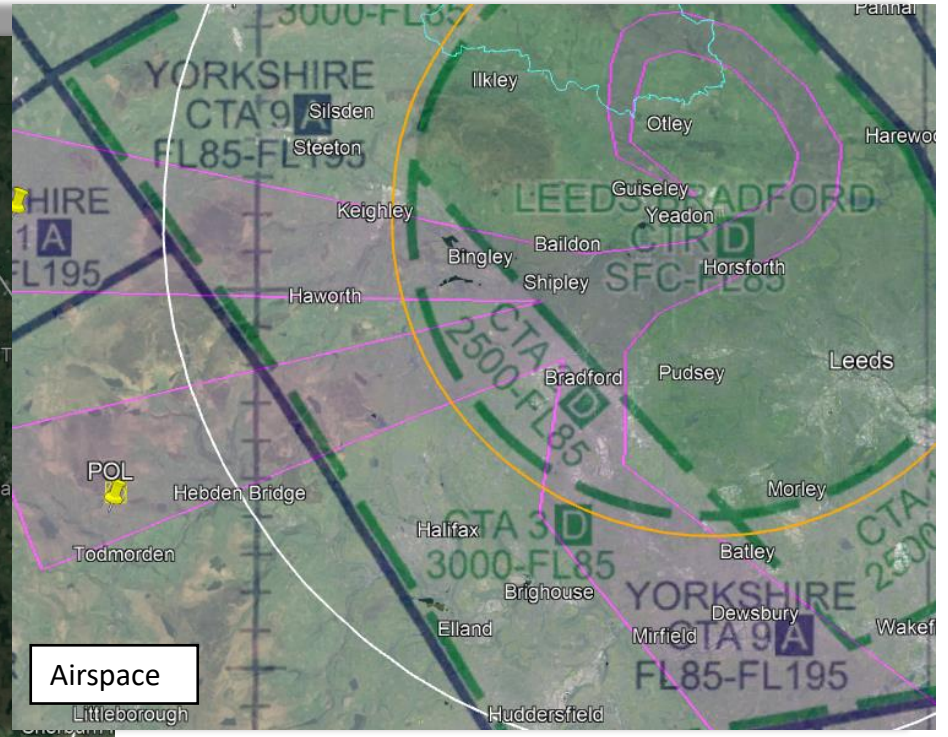
RW32 – New Option C – Zoomed in views





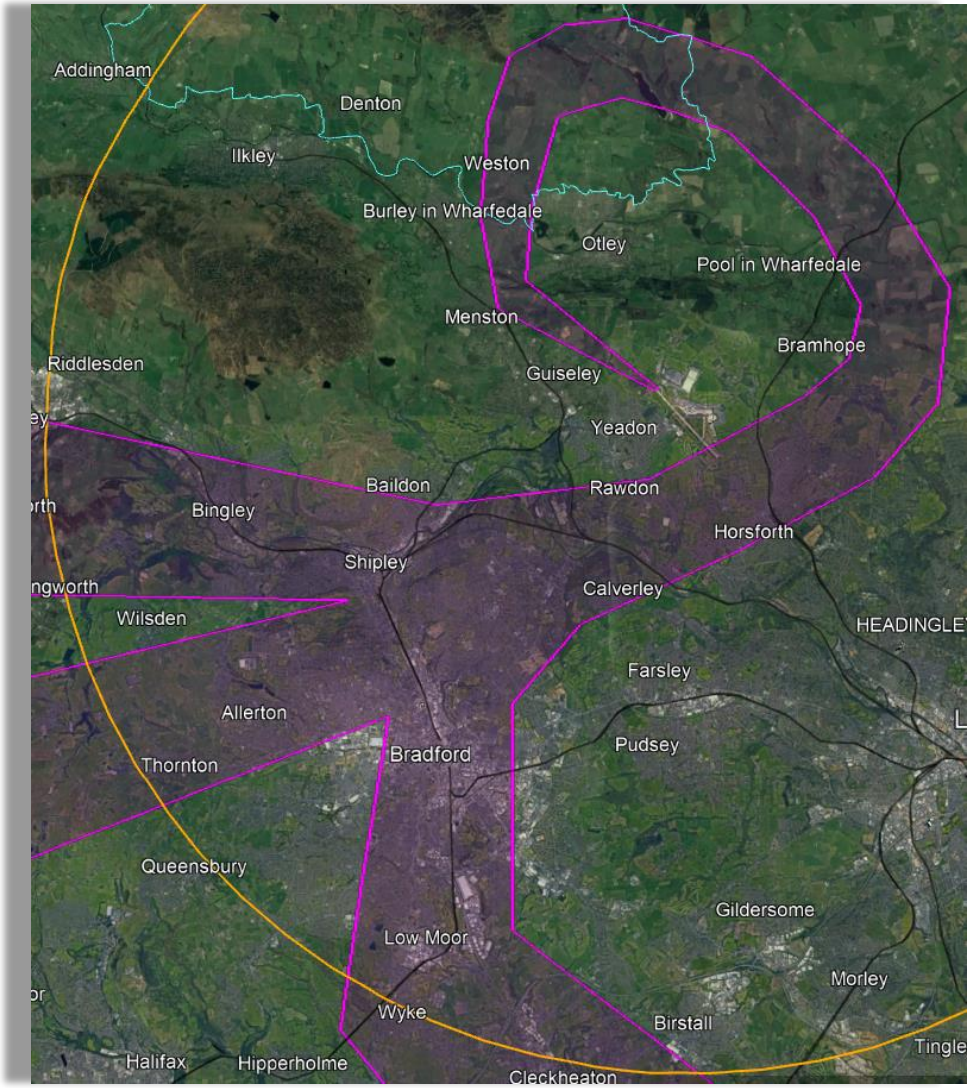
RW32 – New Option D – Potential Night Route

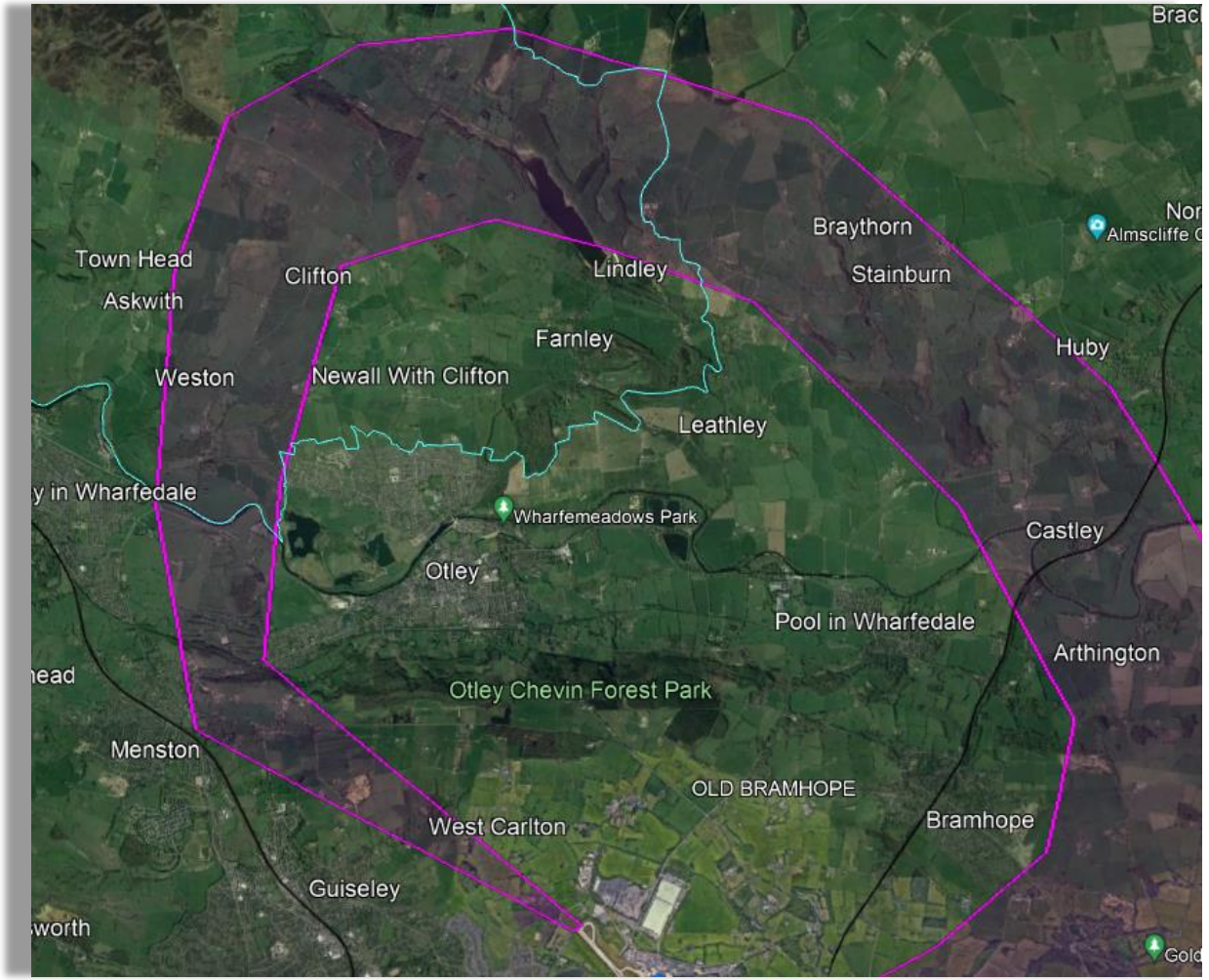




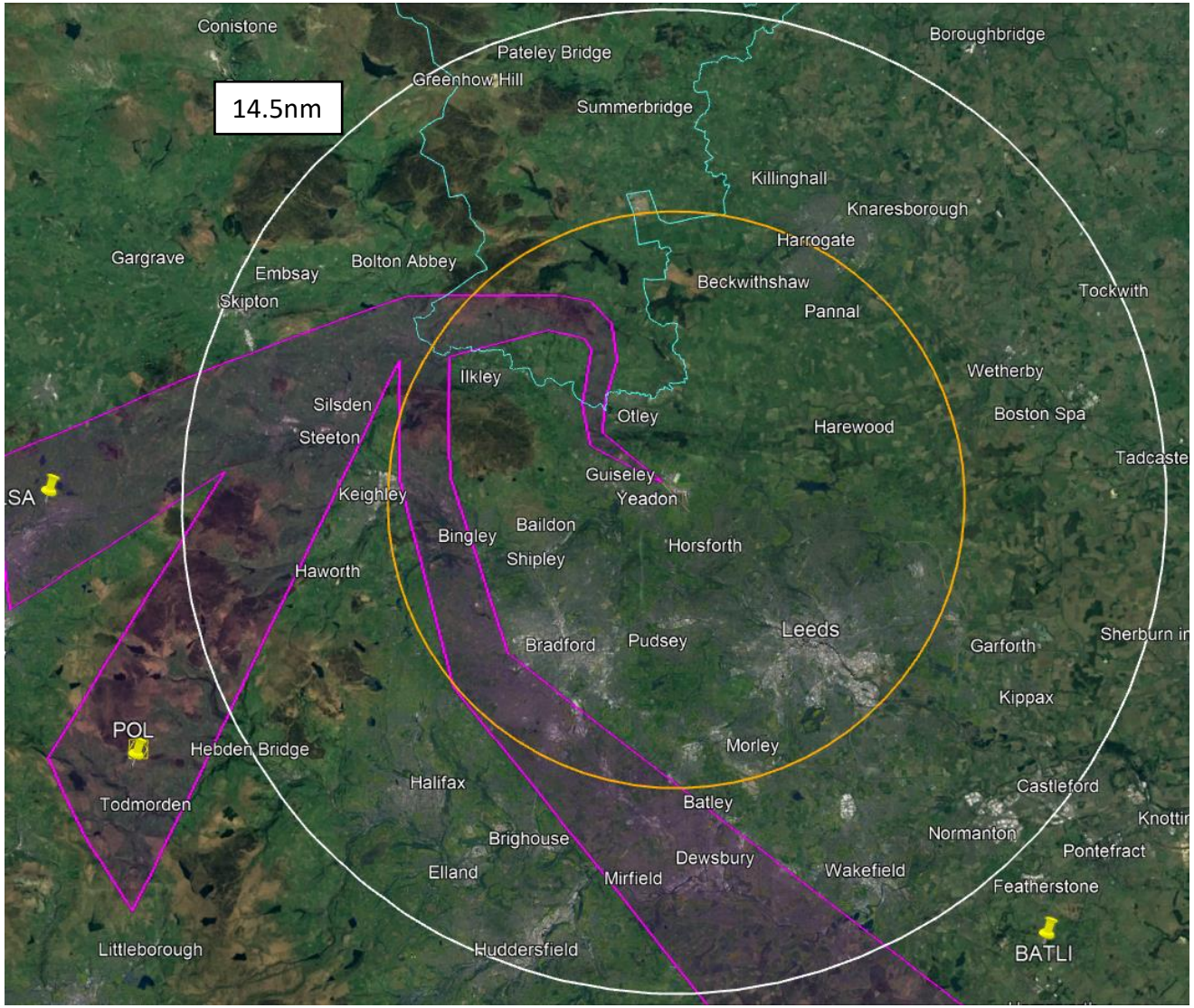
This route generally follows the initial track of the existing flightpath for 2 miles to deviate West of Otley. Rather than turning west over Menston, the flightpath makes a wide right turn to the north of Otley to gain height over open countryside prior to turning back westbound. The route is designed to minimise noise to local communities during the night. Due to the excessive miles flown and excess CO_2 produced, this route is not considered viable for continuous operations and is more suited for use at night for purposes of noise nuisance reduction.

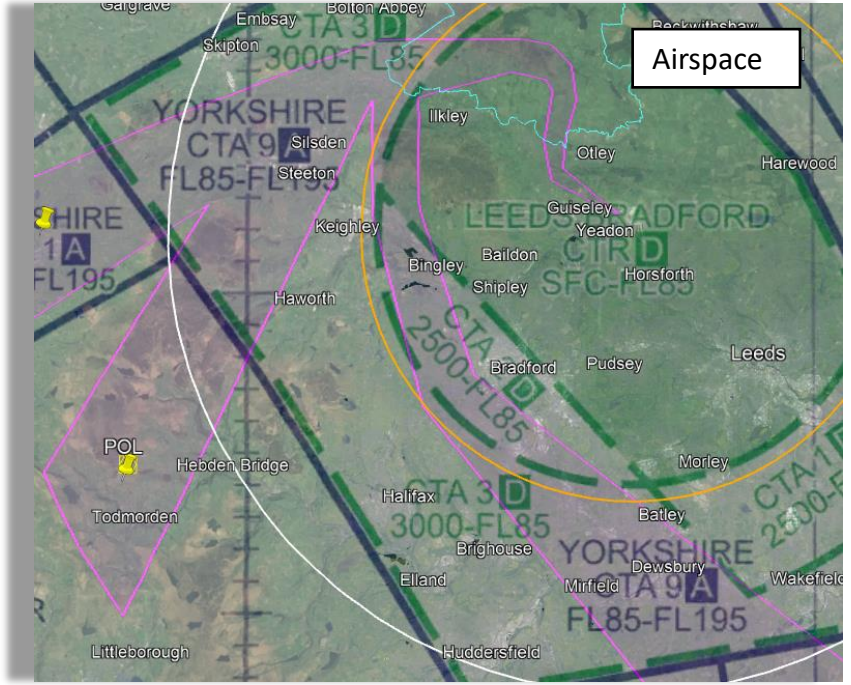
RW32 – New Option D – Zoomed in views





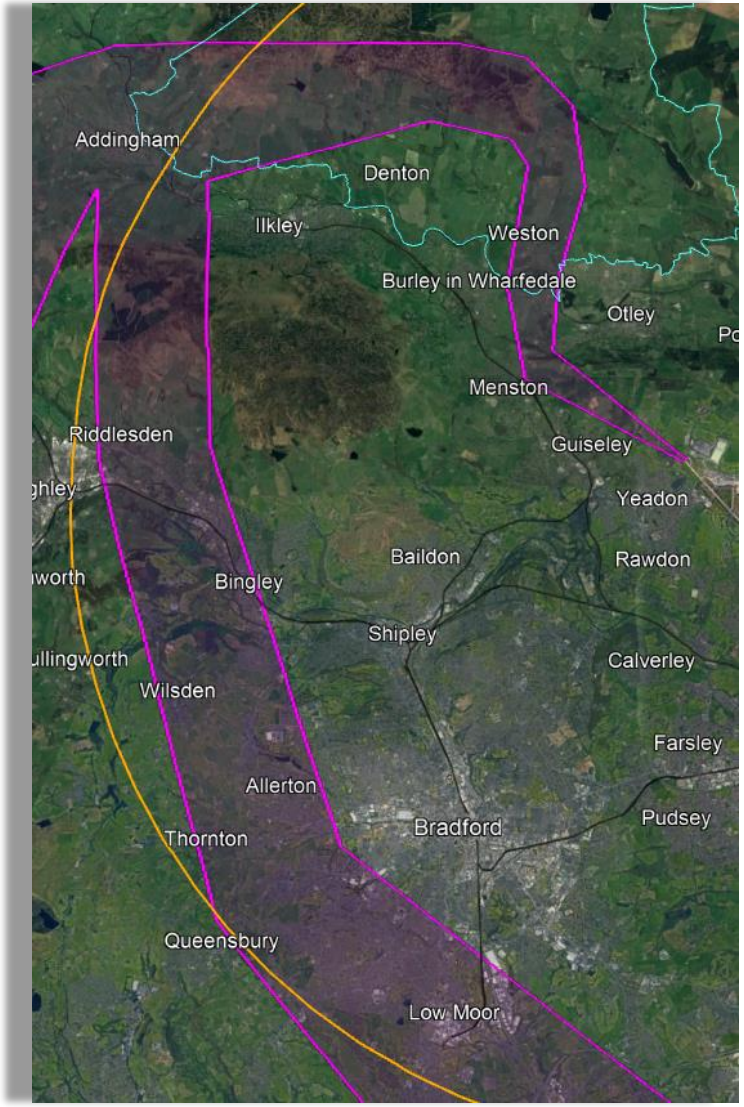
RW32 – New Option E – Potential Night Route

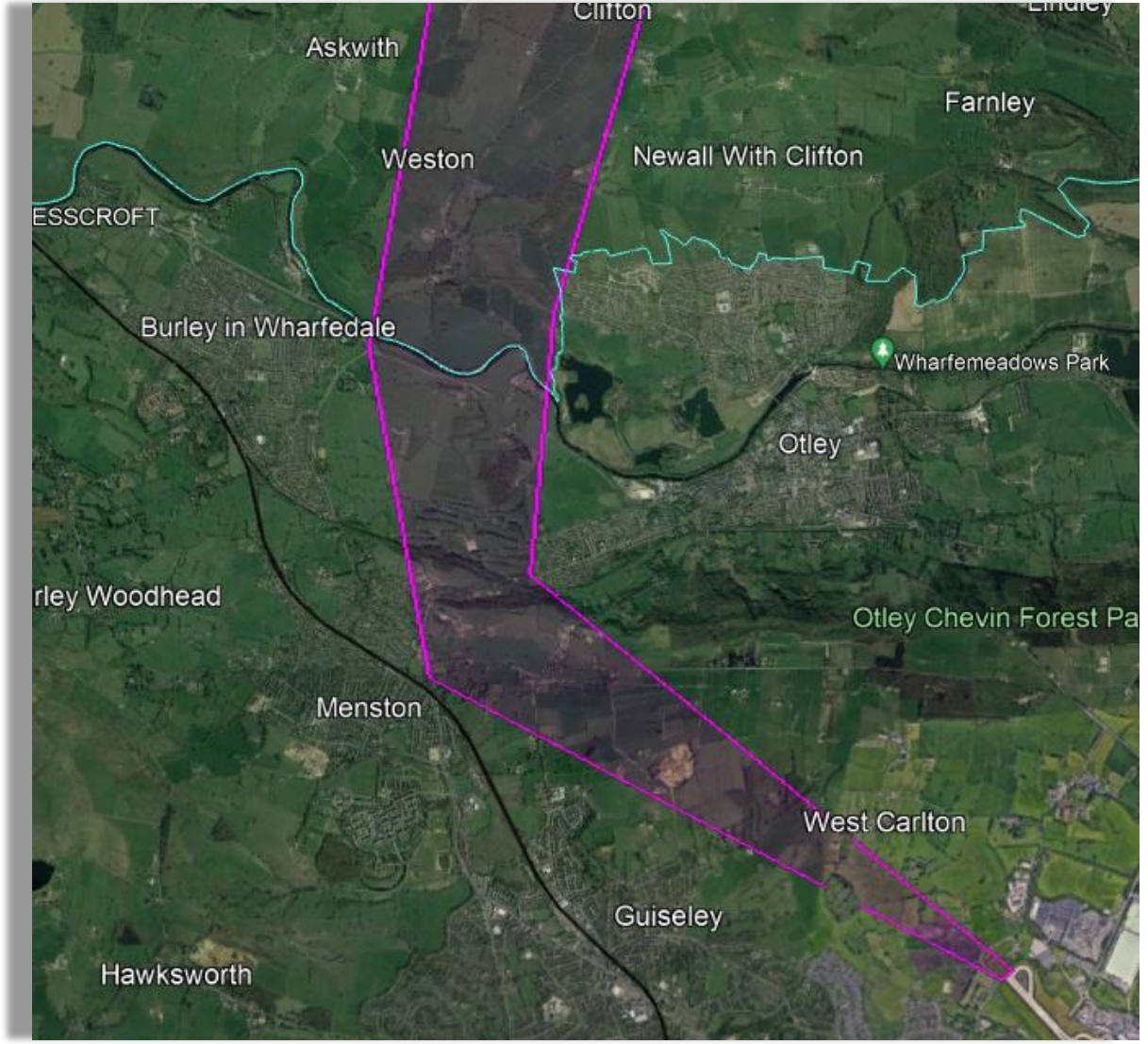




This route generally follows the initial track of the existing flightpath for 2 miles to deviate West of Otley. After this point, the route flies north and then westbound to avoid all major settlements whilst gaining height over open countryside. The route is designed to minimise noise to local communities during the night. Due to the excessive number of additional miles flown and excess CO_2 produced, this route is not considered viable for continuous operations and is more suited for use at night for purposes of noise nuisance reduction.

RW32 – New Option E – Zoomed in views

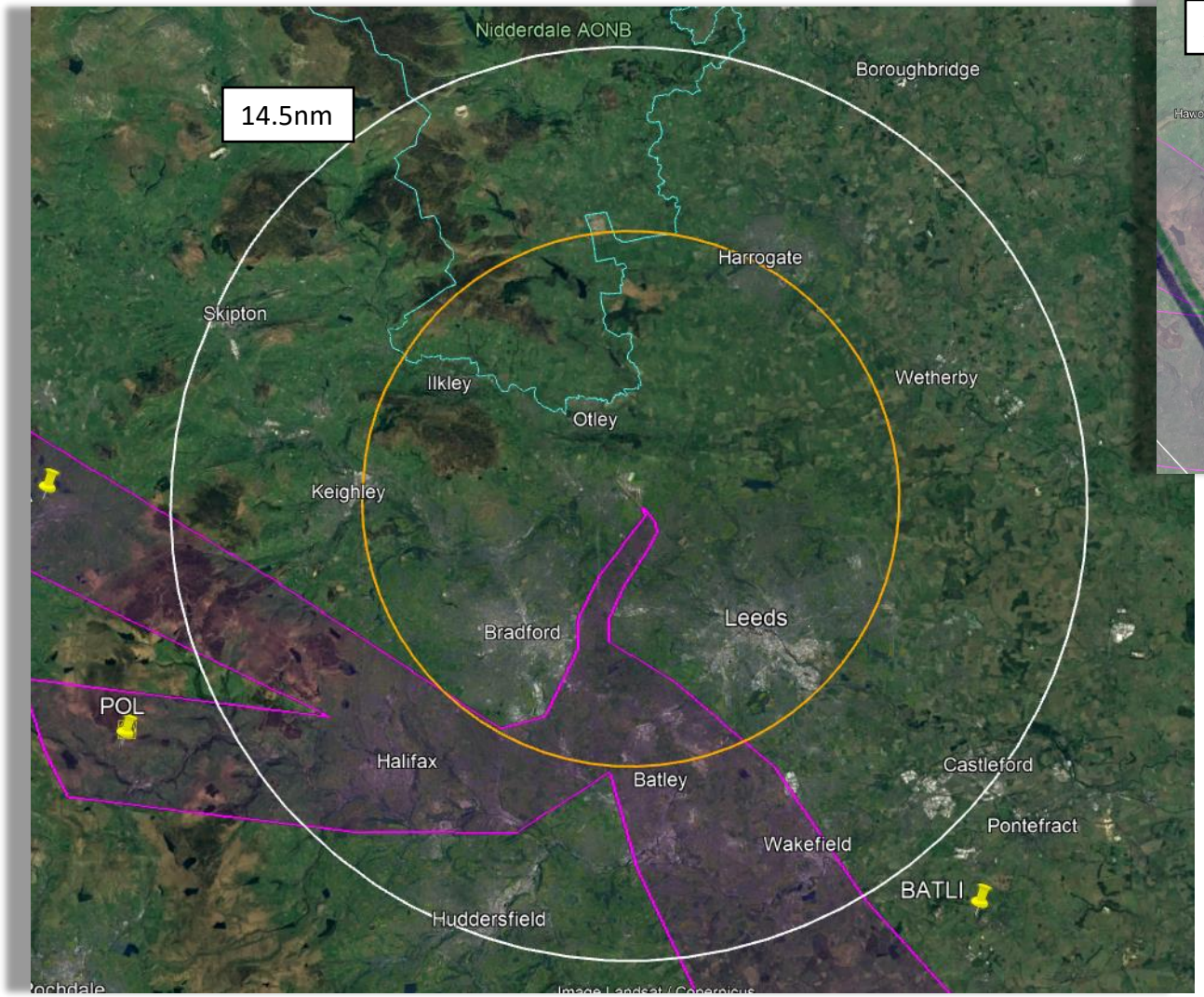


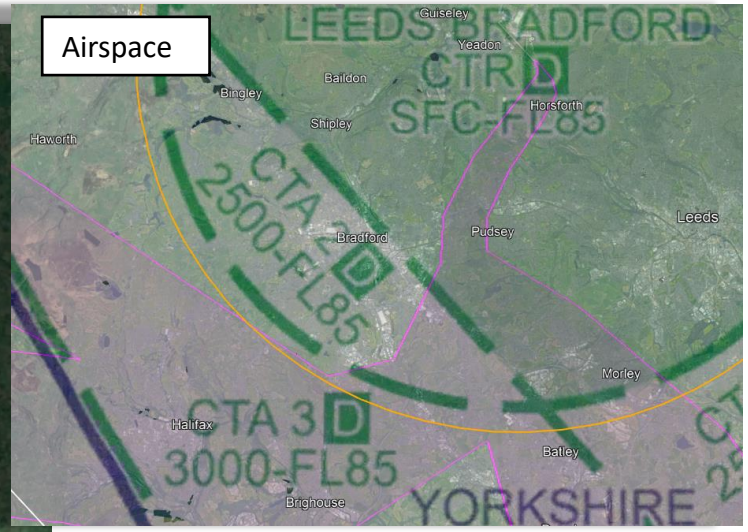


RW32 – New Options A-E - DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
A		Potential to affect less people at lower level but newly affected North Guisley and Baildon	Baildon Moor				Early turn will need some justification				May require fleet upgrades
B			AONB and Chevin	More track miles but facilitates continuous climb			Early turn will need some justification		Done to avoid communities		
C		Affects less people at lower level but newly affected east end Otley	Chevin	Continuous Climb offsets additional miles	Uncertain as to airspace containment in right turn		Early turn will need some justification		Continuous Climb offsets additional miles		May require fleet upgrades
D			AONB	More track miles but facilitates continuous climb	Uncertain as to airspace containment in right turn				Done to avoid communities		
E			AONB	More track miles but facilitates continuous climb					Done to avoid communities		

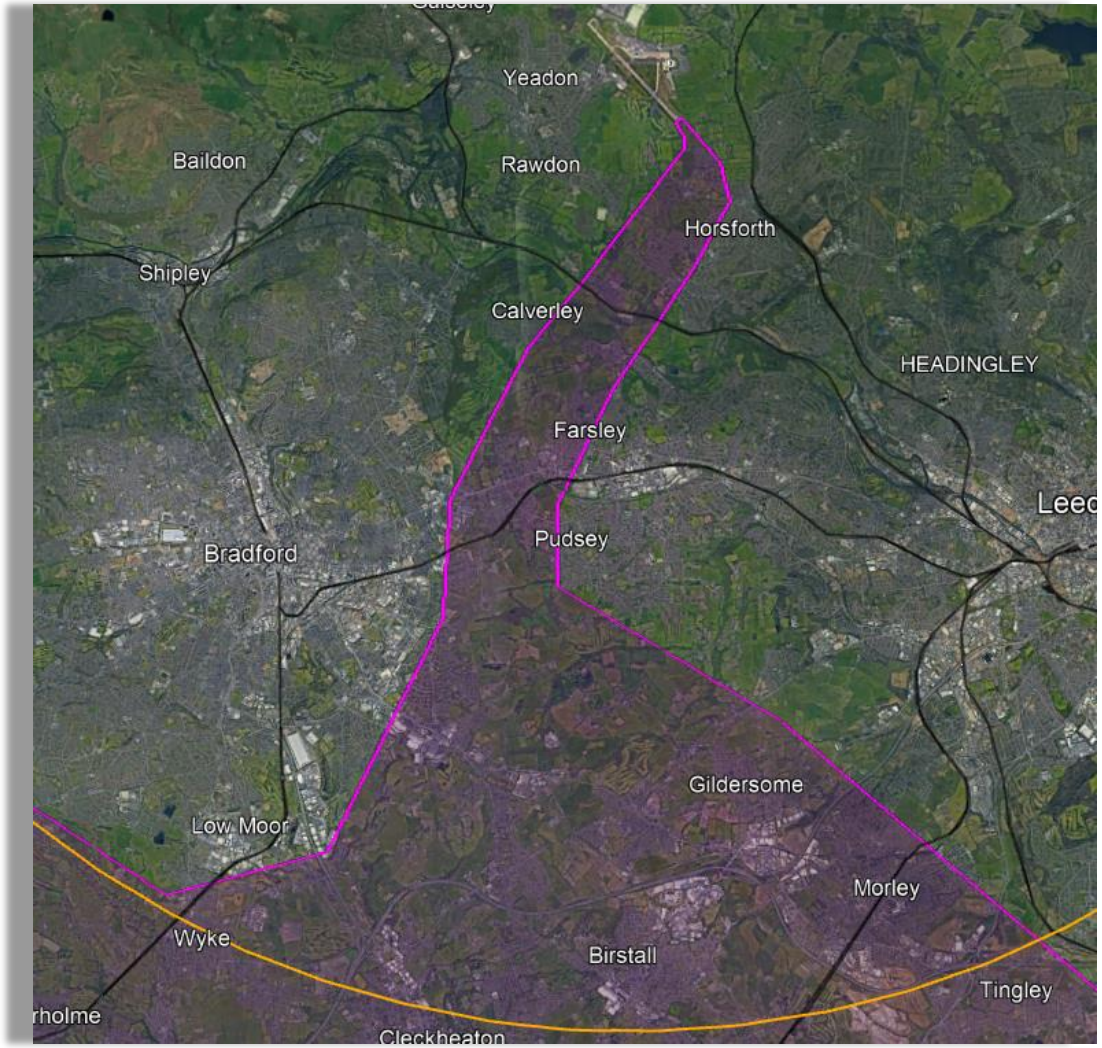
RW14 – New Option A - Potential Respite or Permanent Route

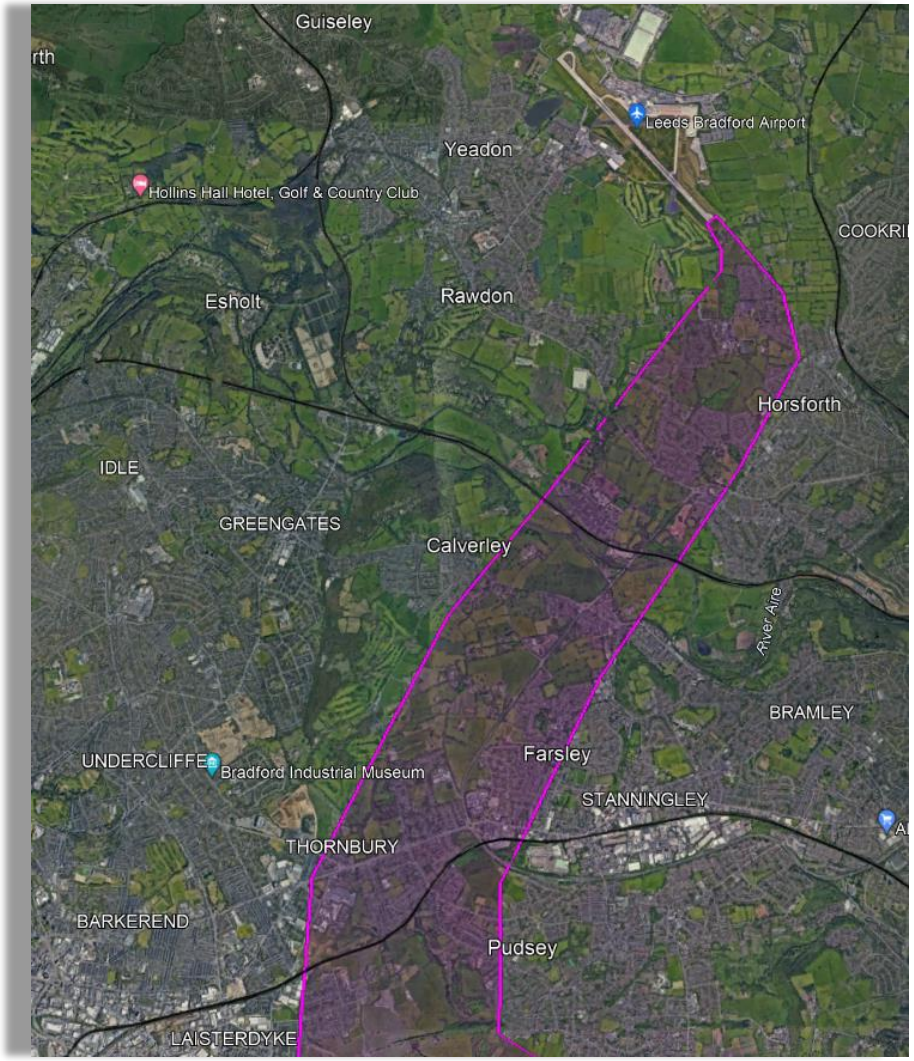




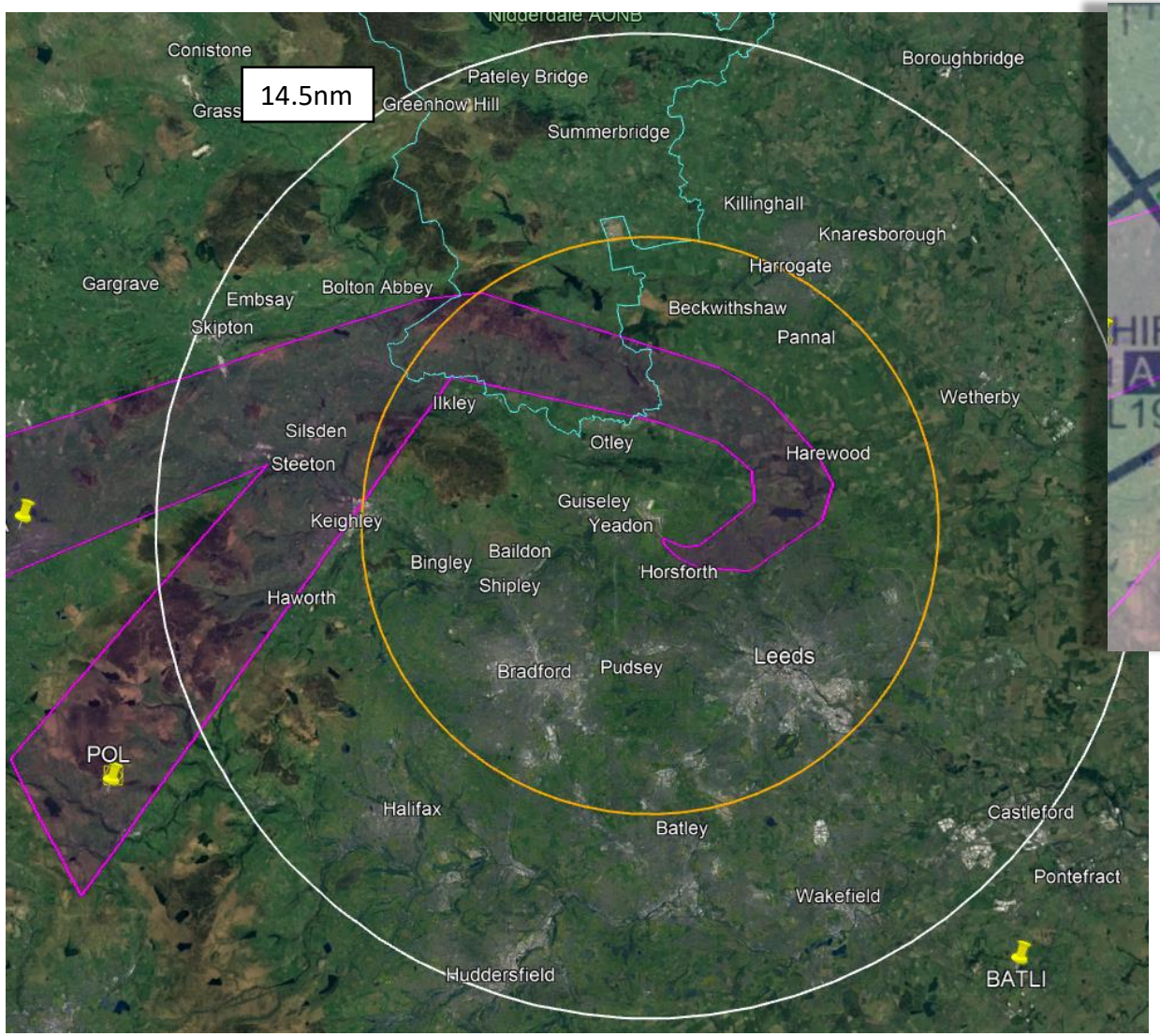
This option turns right on passing 500 feet to avoid overflying the suburbs North-West of Leeds. The route seeks to weave through an area of countryside dividing Leeds and Bradford prior to turning on a direct track. It intends to offer some respite to the North-West Leeds area whilst accepting that new areas such as Eastern Calverley and Farsley may be overflown. This route also offers an element of dispersion; as aircraft climbs rates differ, the point at which the turn is made (500 feet) will vary on each departure, resulting in varied tracks. Currently, due to its proximity to the Airport, the area of North-Western Leeds is regularly directly overflown regardless of the runway in use; departures over this area when on RW14 and arrivals when on RW32. This option may provide an opportunity to remove some noise nuisance from this area when RW14 is in use.

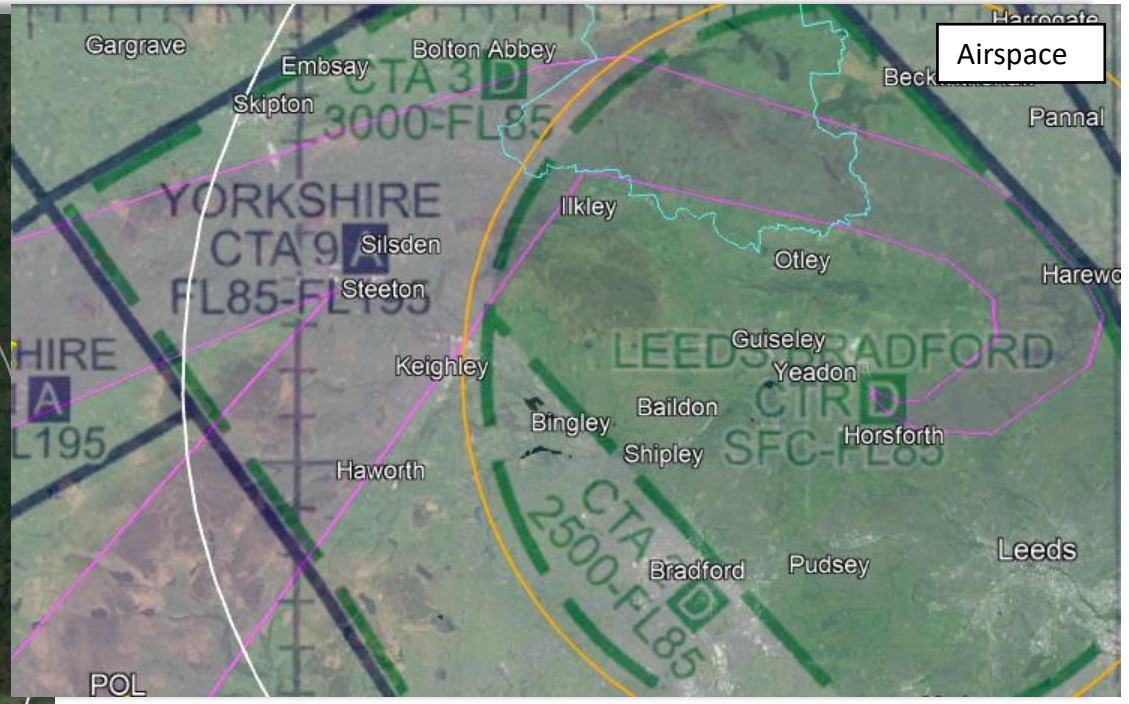
RW14 – New Option A – Zoomed in views





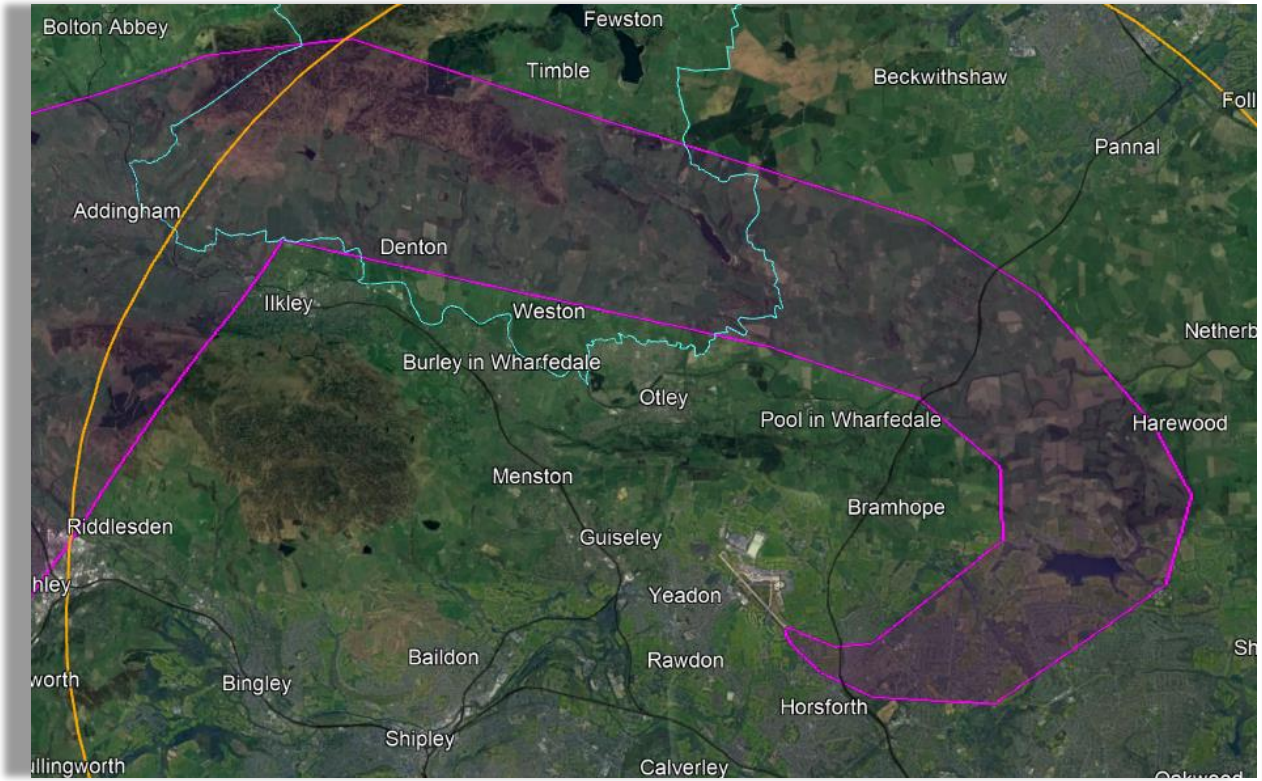
RW14 – New Option B – Potential Night Route

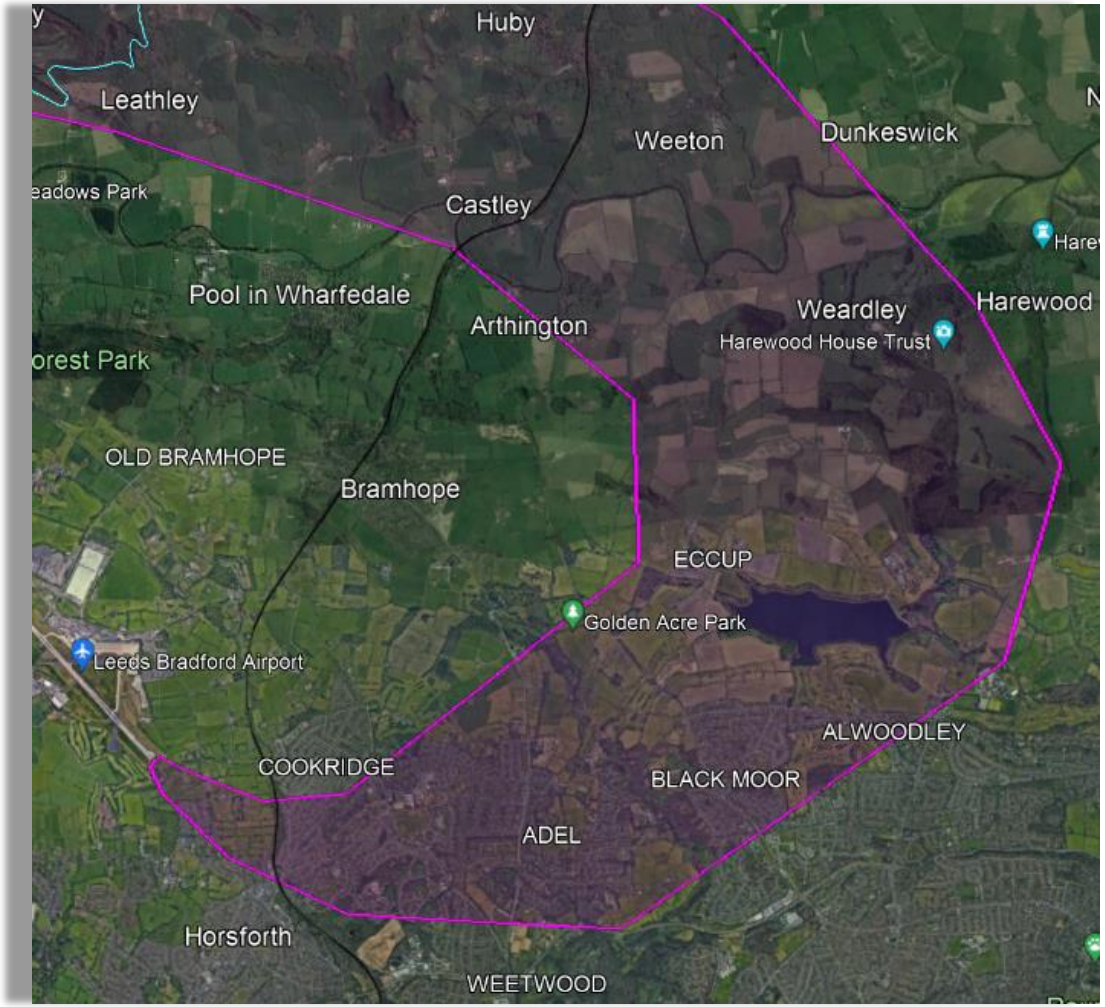




This option utilises an early left turn off RW14 to offer respite to both the suburbs of North-Eastern Leeds and the towns of Pudsey and Bramley. It does however overfly new communities in North-East Leeds such as Weetwood and Adel before continuing to climb out over the countryside. Due to the length of route flown, this route would only be viable as a night noise mitigation route in a combined respite rotation with other noise routes. It would not be viable for departures routing out towards LAMIX (to the South-East).

RW14 – New Option B – Zoomed in views



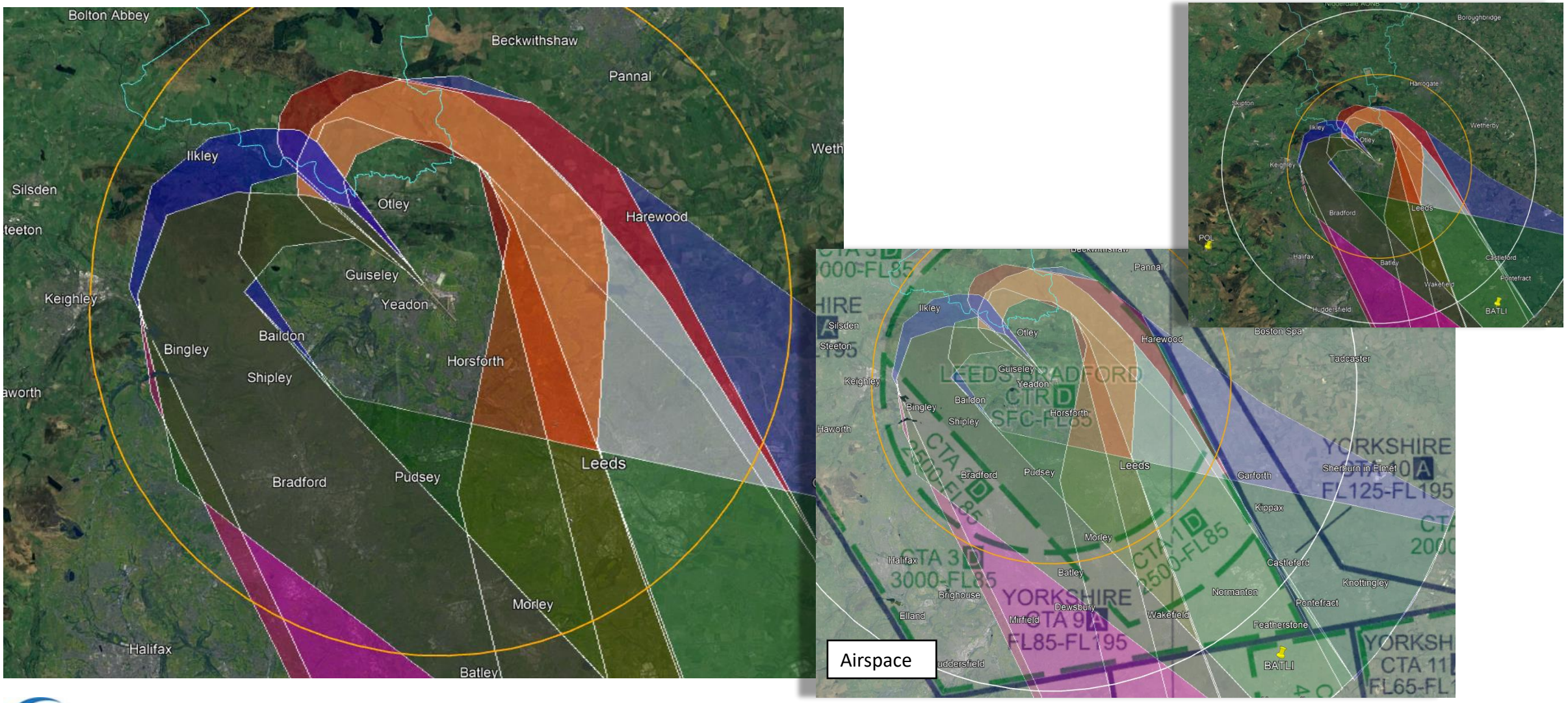


RW14 – New Options A & B - DPE

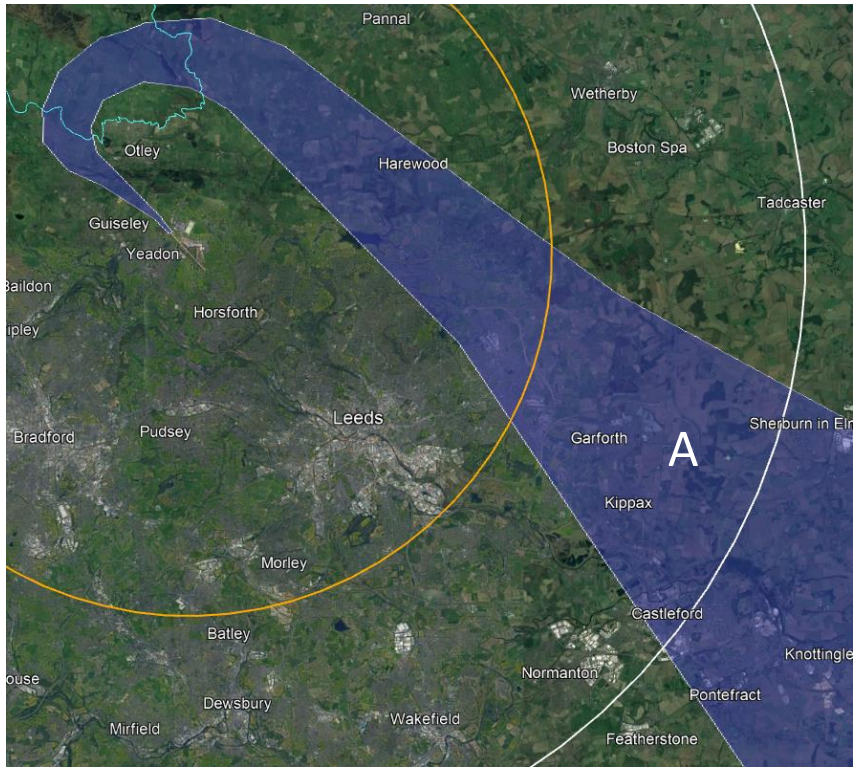
Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
A		New communities impacted including Calverley and Farsley									
B	Potential conflict with inbounds	New communities impacted including Adel and Blackmoor	Eccup Reservoir and AONB	Additional track mileage largely for noise purposes	Uncertain about airspace containment	Potential conflict with inbounds		Potential conflict with inbounds	Additional track mileage largely for noise purposes		

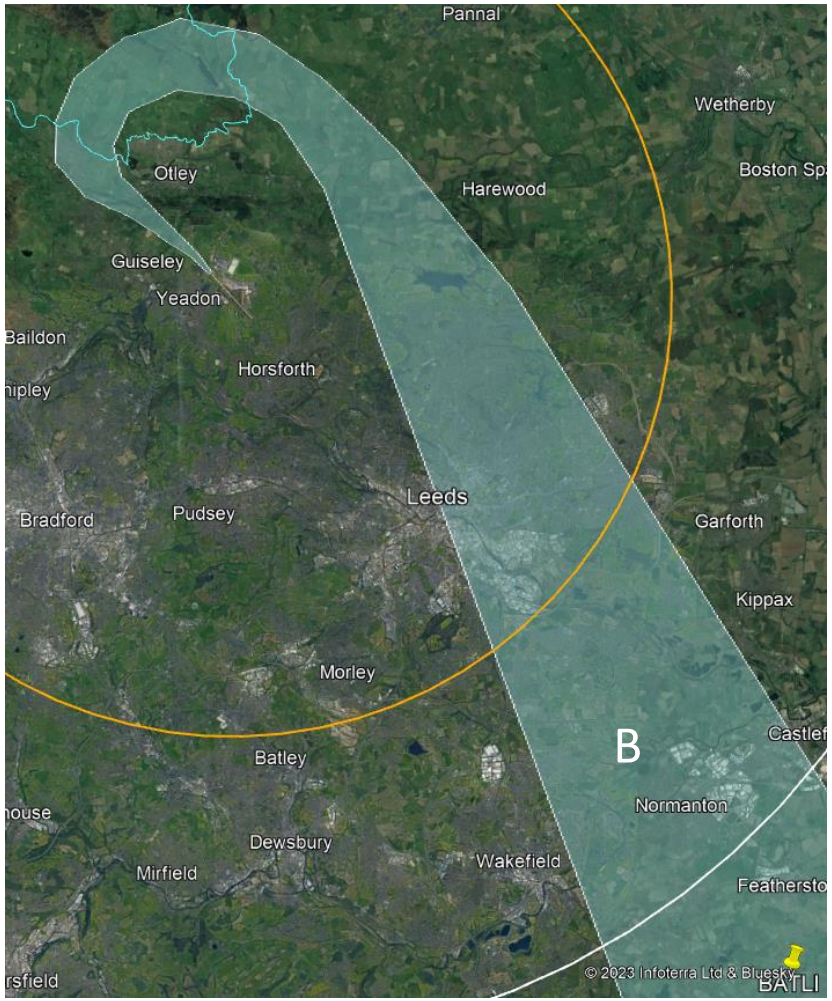
Existing Departure Options

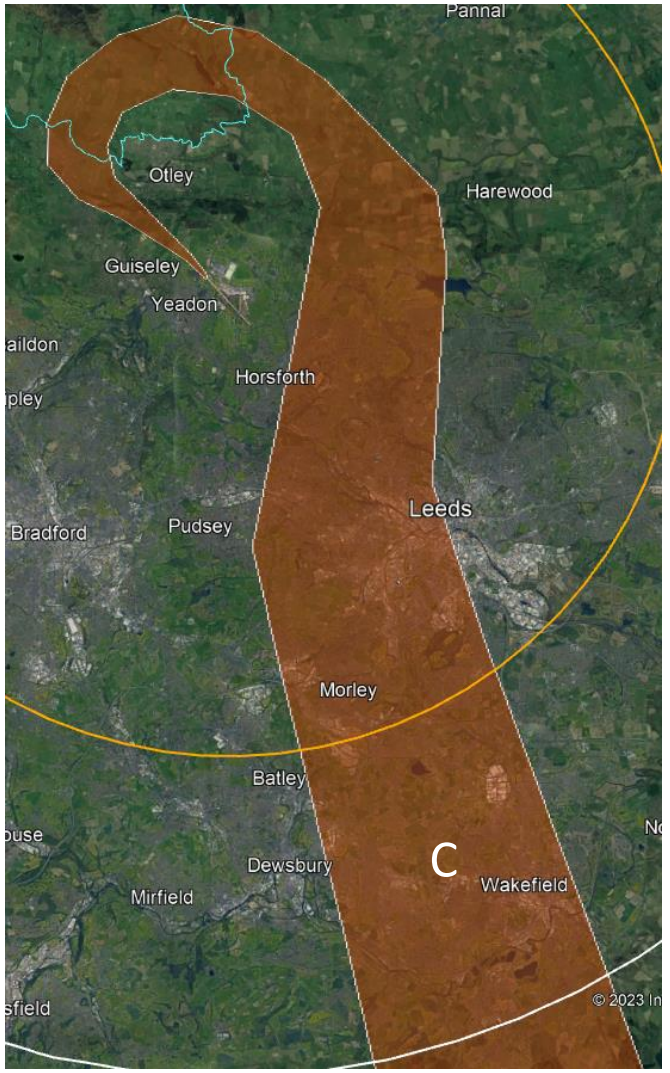
RW32 - South-Easterly Departures - MAMUL



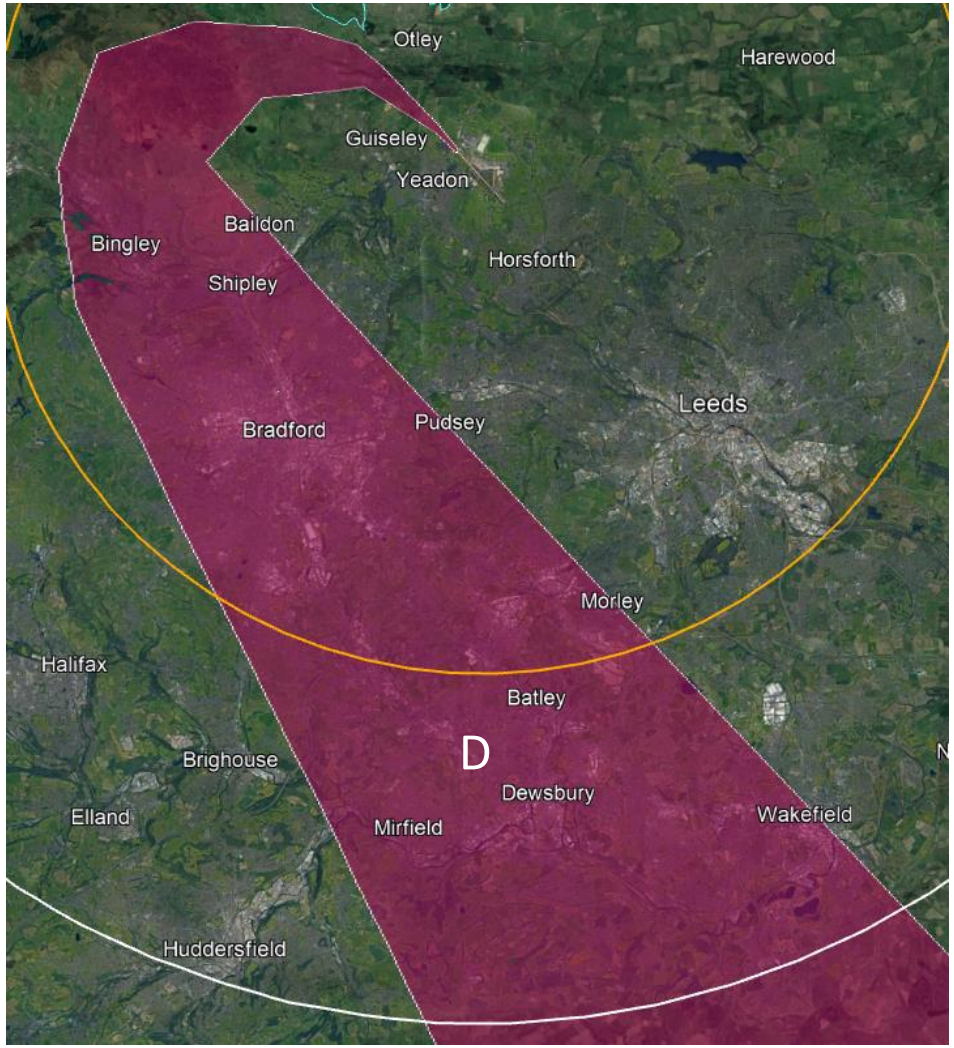
RW32 - South-Easterly Departures - MAMUL

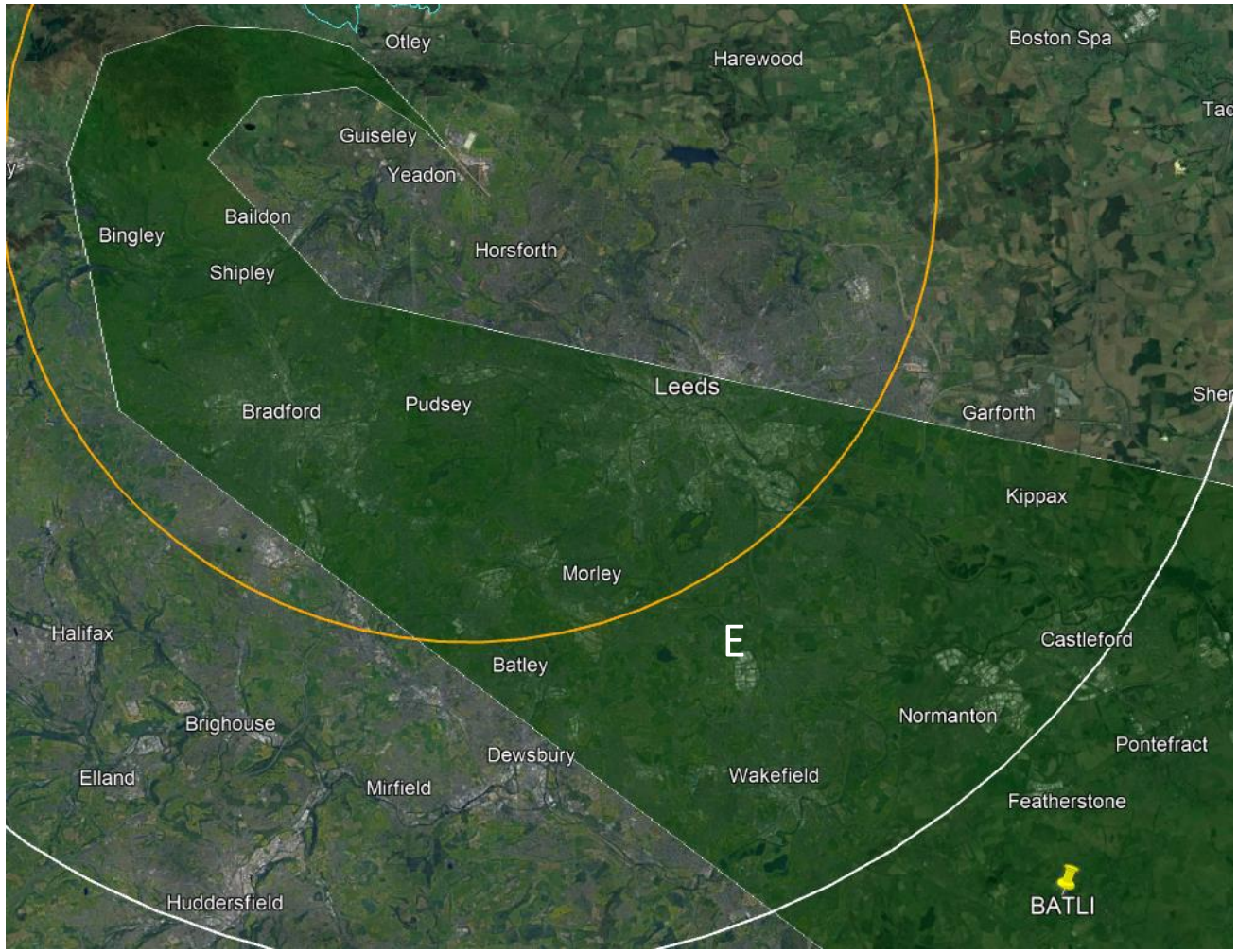




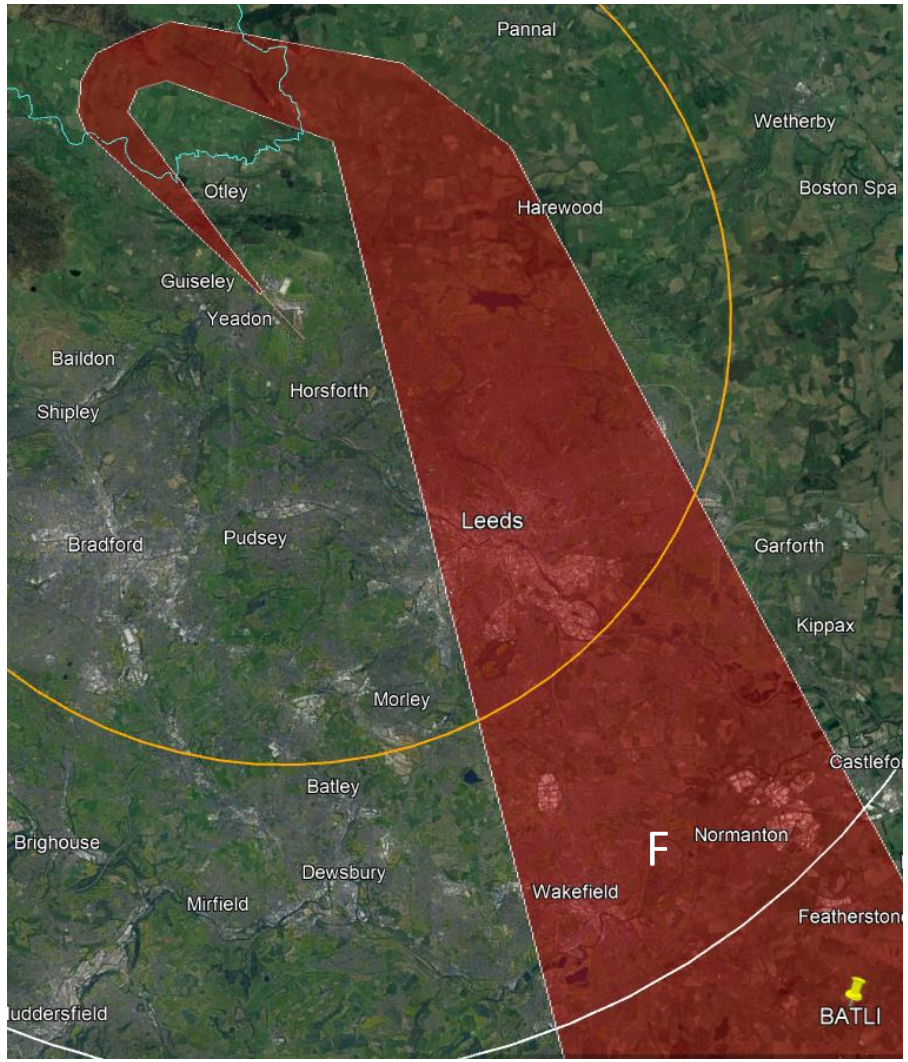


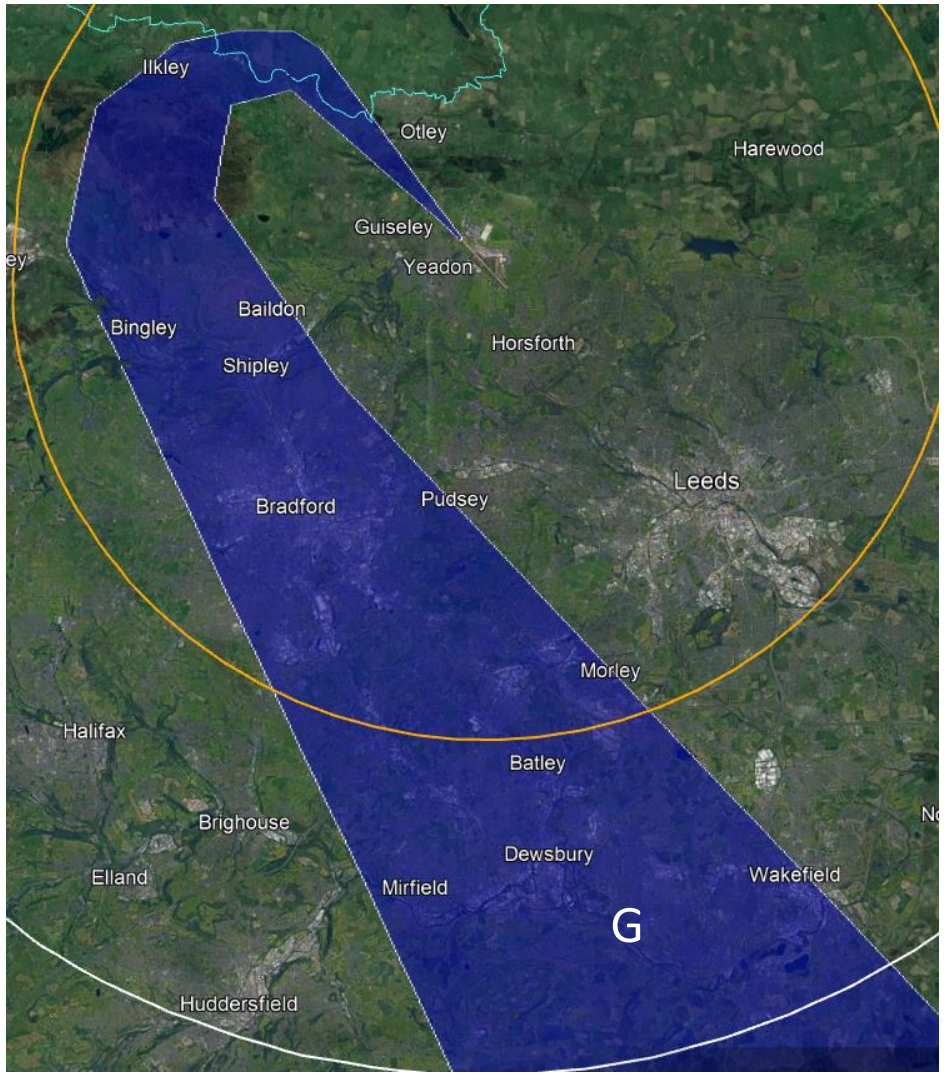
RW32 - South-Easterly Departures - MAMUL





RW32 - South-Easterly Departures - MAMUL





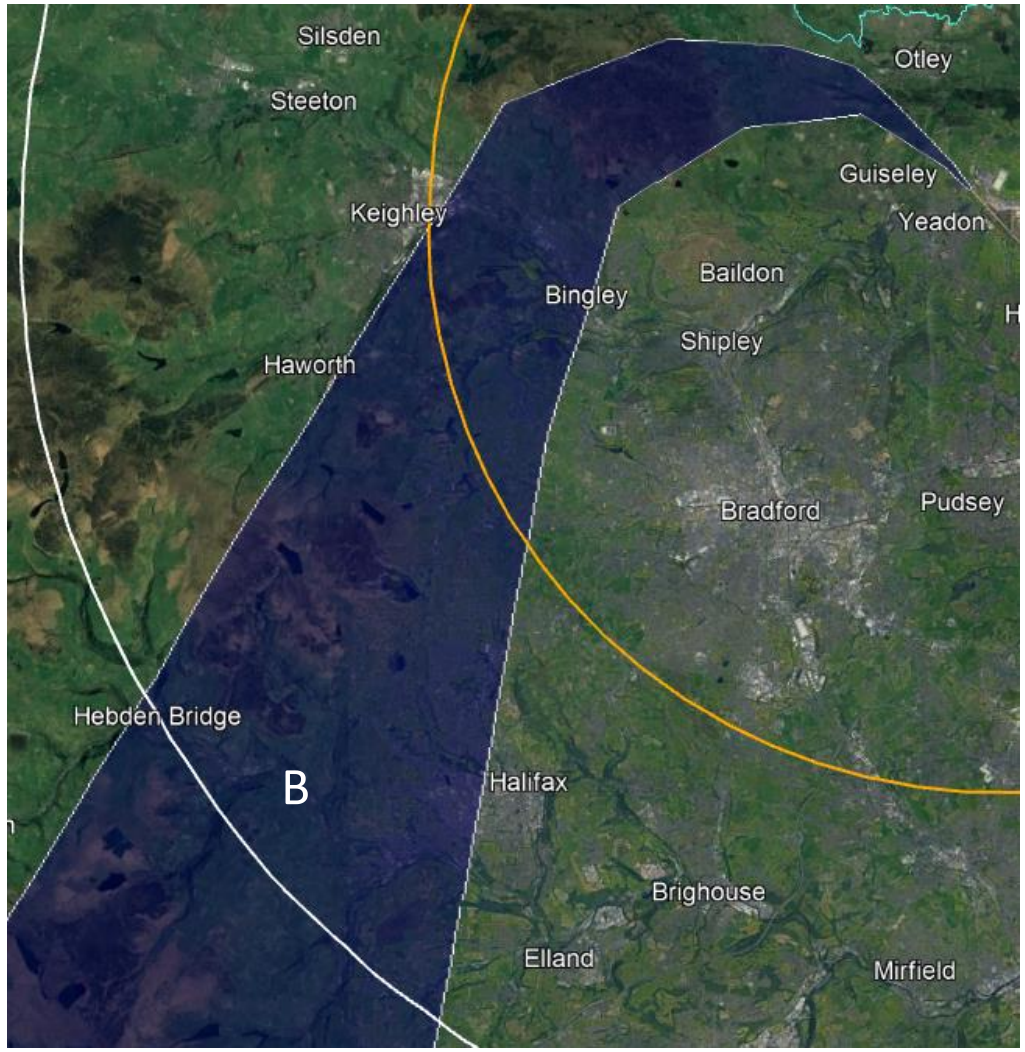
RW32 - South-Easterly Departures – MAMUL - DPE

Leeds Bradford®
Yorkshire's Airport

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32SEA	Considered no longer a viable option and discounted from assessment. Routes outside CAS and does not point in the direction of the Route Network joining points of MAMUL/LAMIX.										
32SEB	Potential conflict with inbounds via GOLES/BATLI	Burley-in-Wharfedale more greatly affected	AONB and Lindley Reservoir		Potential for additional CAS requirement	Potential complexity in GOLES area vs inbounds		Potential complexity in GOLES area vs inbounds			
32SEC		Burley-in-Wharfedale more greatly affected	AONB and Lindley Reservoir		Potential for additional CAS requirement						
32SED		Broadens area of affected communities	Ilkley Moor								
32SEE	Potential conflict with inbounds via GOLES/BATLI	Broadens area of affected communities	Ilkley Moor		Potential for additional CAS requirement	Potential complexity in GOLES area with additional CAS requirement		GOLES area conflictions and L975 flow issues		Unlikely to be systemised	
32SEF	Potential conflict with inbounds via GOLES/BATLI	Otley affected instead of Burley-in-Wharfedale	AONB and Lindley Reservoir		Potential for additional CAS requirement	Potential complexity in GOLES area vs inbounds		Potential complexity in GOLES area vs inbounds			
32SEG		Ilkley	AONB and Ilkley Moor								

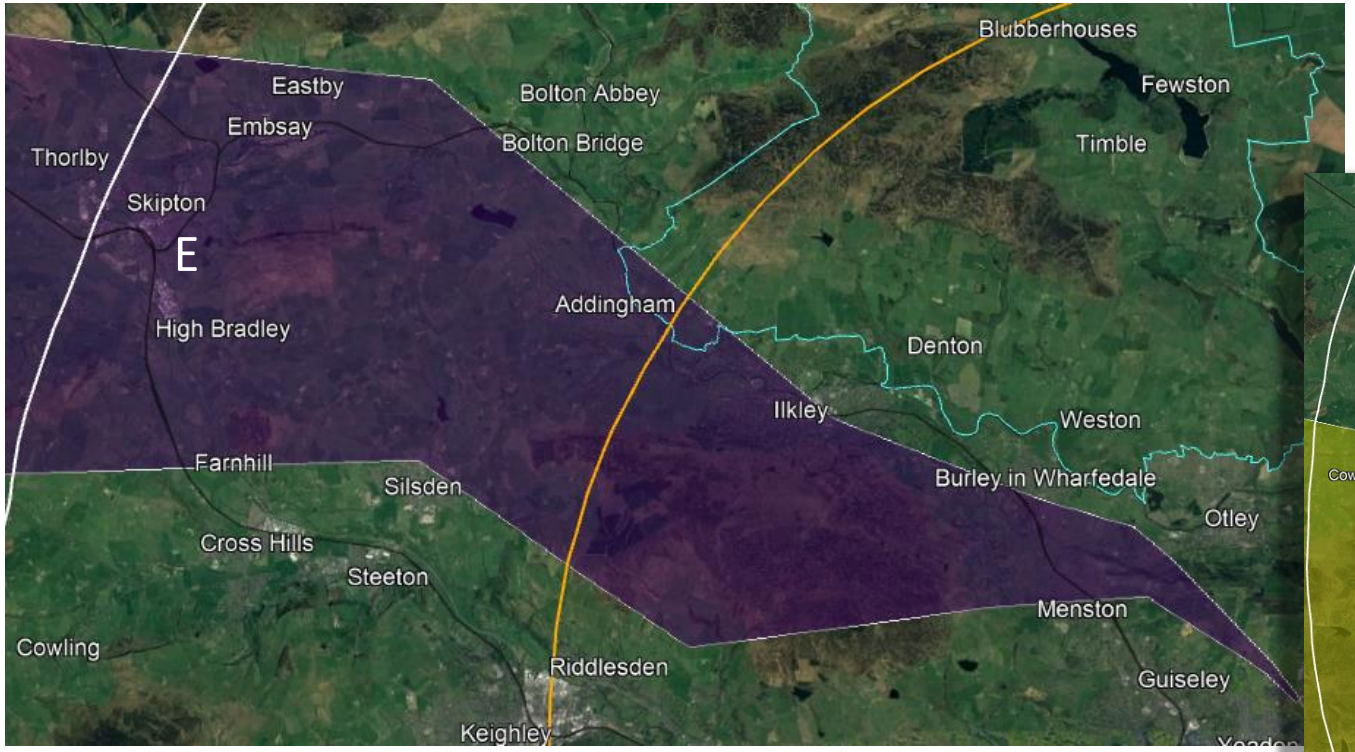
RW32 – South & West Departures – POL/NELSA

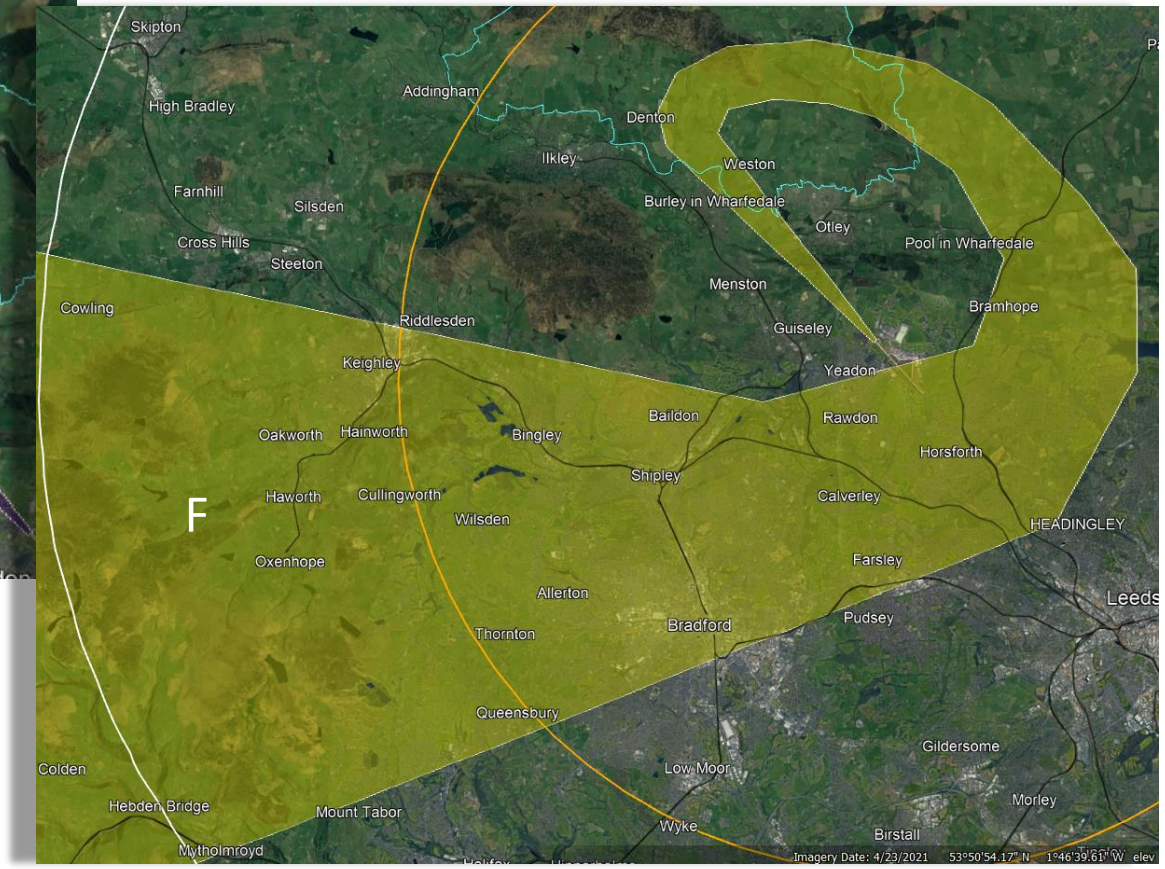
RW32 – South & West Departures – POL/NELSA



RW32 – South & West Departures – POL/NELSA

RW32 – South & West Departures – POL/NELSA





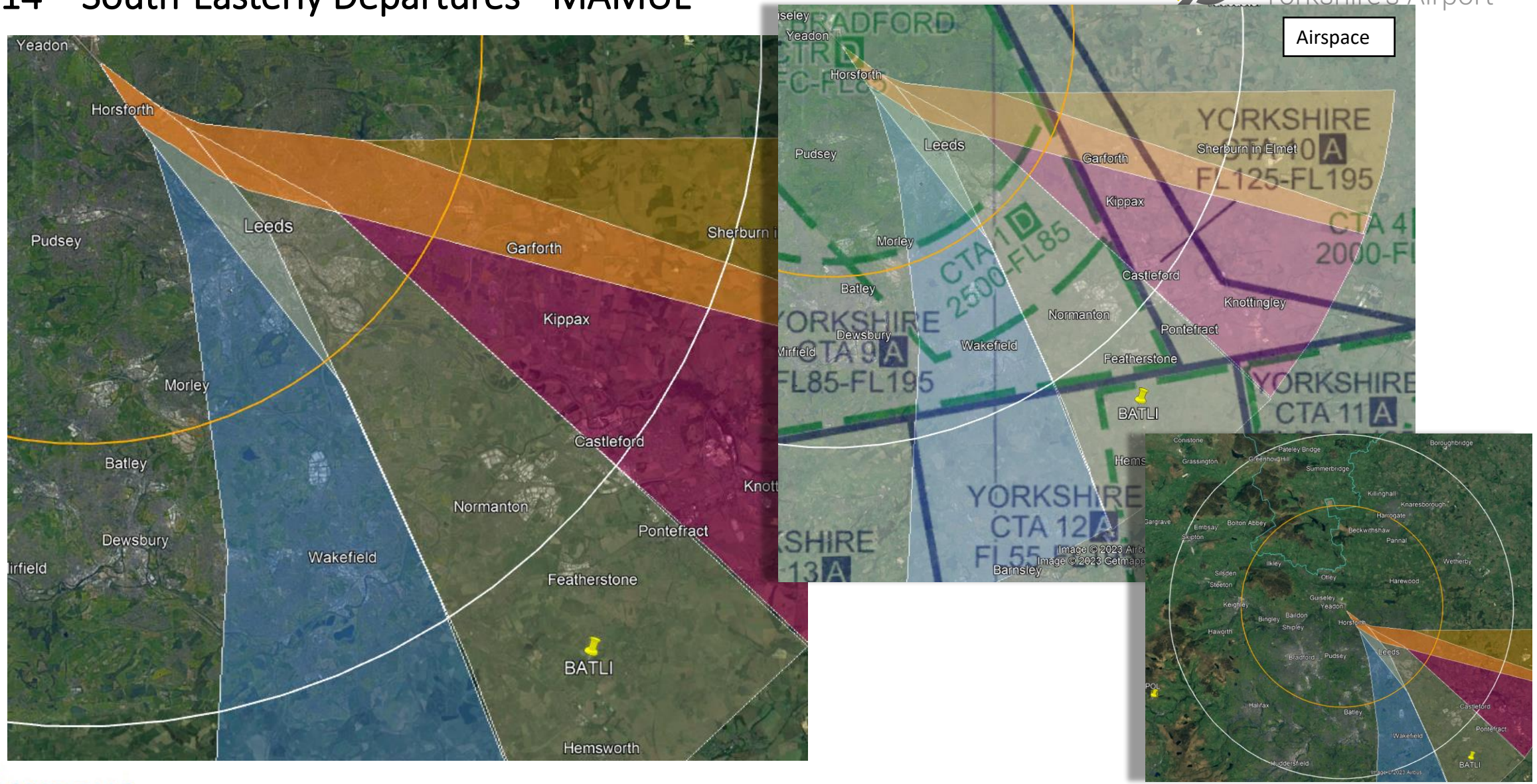
RW32 – South & West Departures – POL/NELSA

RW32 – South & West Departures – POL/NELSA - DPE

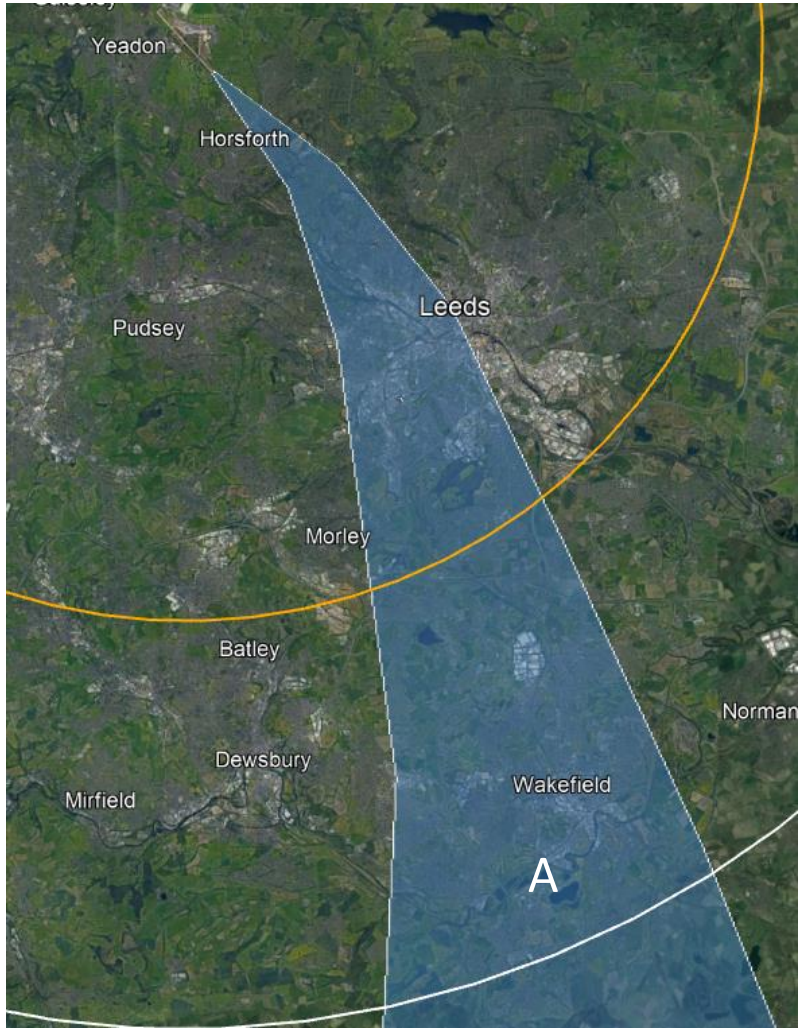
Leeds Bradford®
Yorkshire's Airport

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32S&WA		Burley-in-Wharfedale more greatly affected	AONB	Continuous Climb offsets additional track miles	Uncertainty about requirement for additional CAS				Continuous Climb offsets additional track miles		
32S&WB	Rejected after review as this does not fit with the Route Network as it does not point towards POL or NELSA										
32S&WC		Potentially affects different communities	Ilkley Moor								
32S&WD			Ilkley Moor								
32S&WE	Rejected after review as this does not fit with the Route Network as it does not point towards POL or NELSA										
32S&WF		Affects western Otley but takes some of the impact away from Burley-in-Wharfedale	AONB	Too many track miles in wrong direction	Uncertainty about requirement for additional CAS				Too many track miles in wrong direction		
32S&WG		Also brings Ilkley into the equation	AONB and Ilkley Moor								
32S&WH		Also brings Ilkley into the equation	AONB and Ilkley Moor								

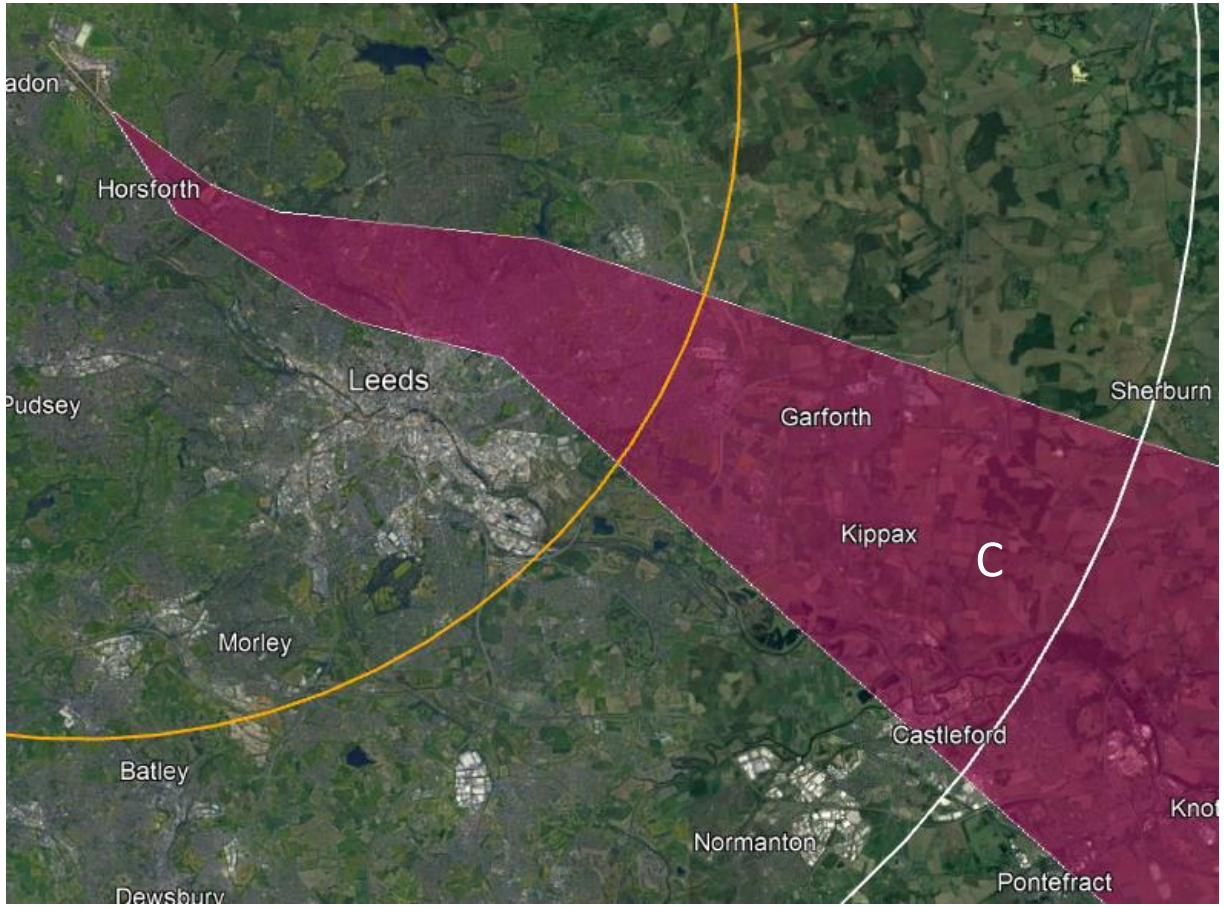
RW14 – South-Easterly Departures - MAMUL

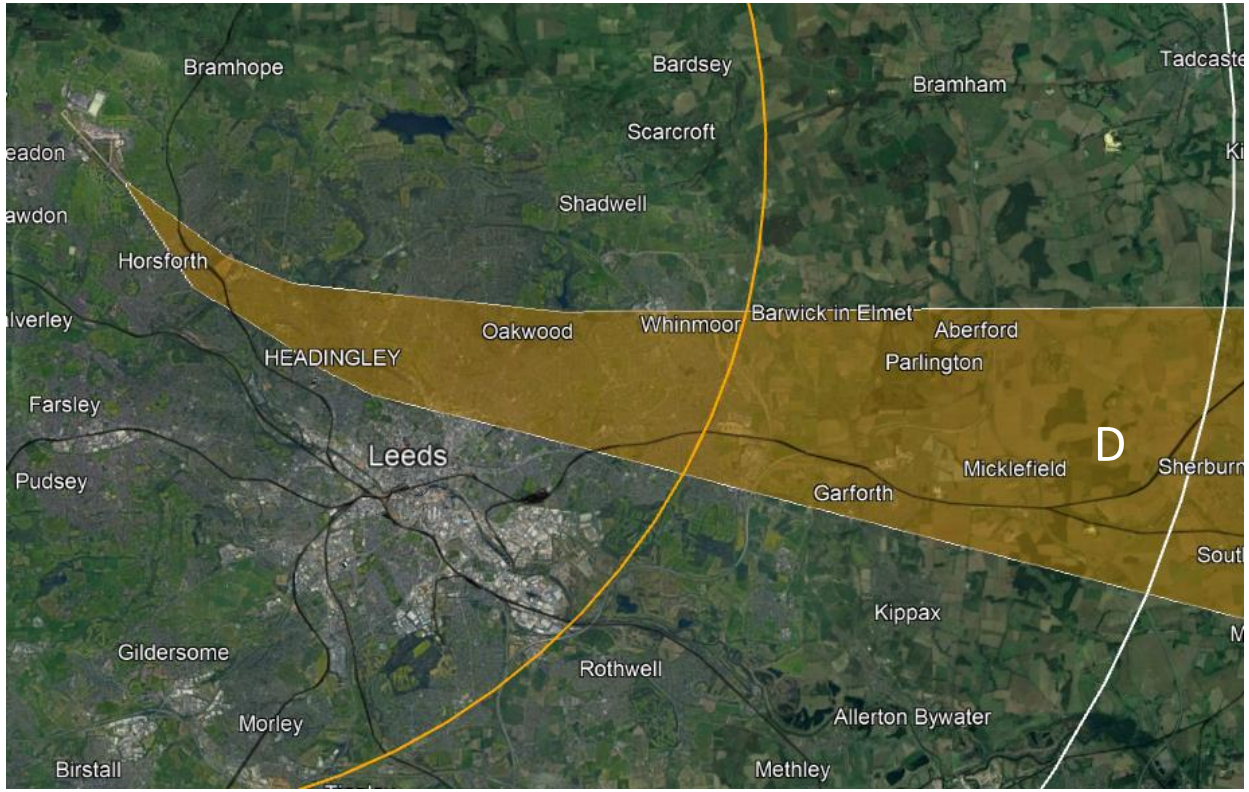


RW14 – South-Easterly Departures - MAMUL



RW14 – South-Easterly Departures - MAMUL



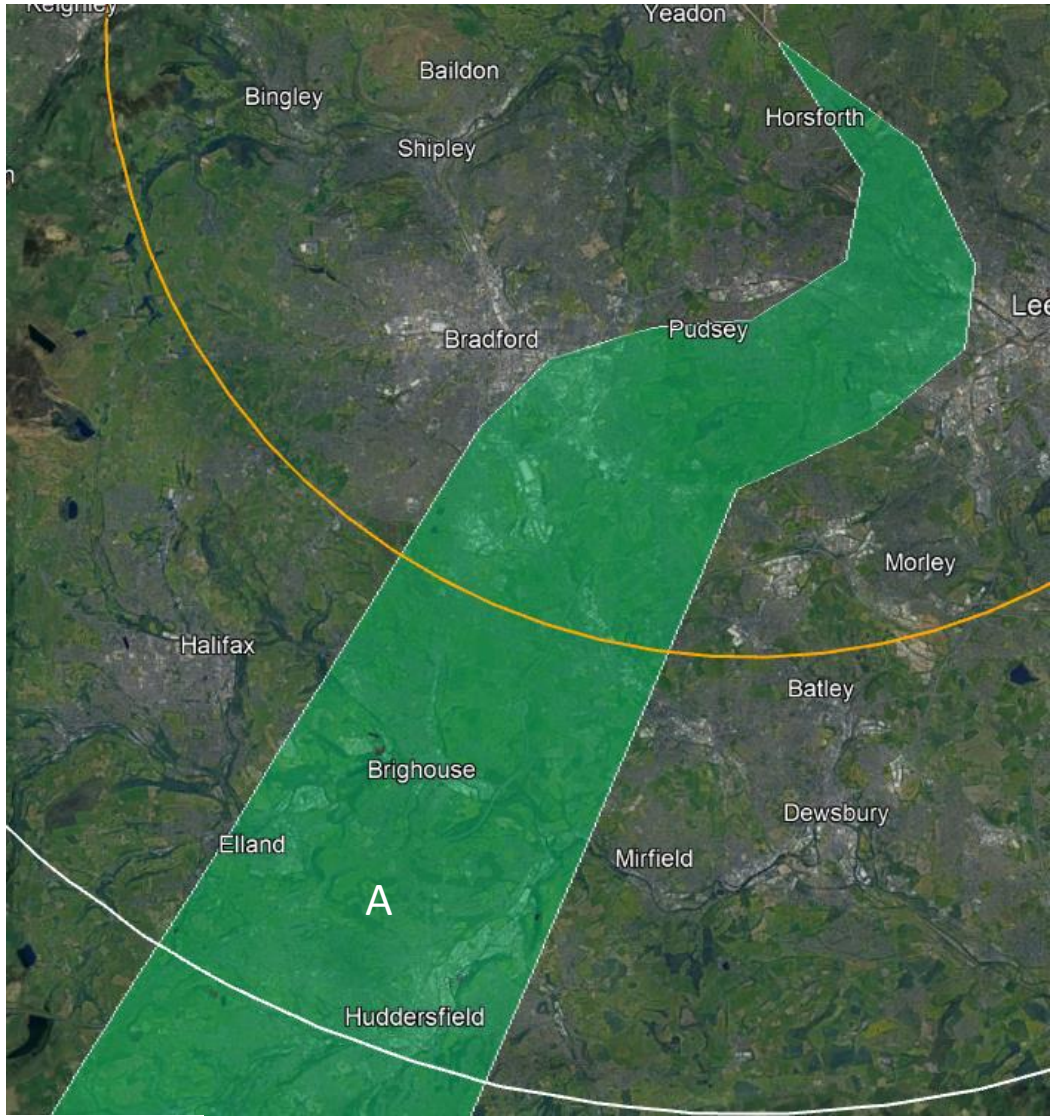


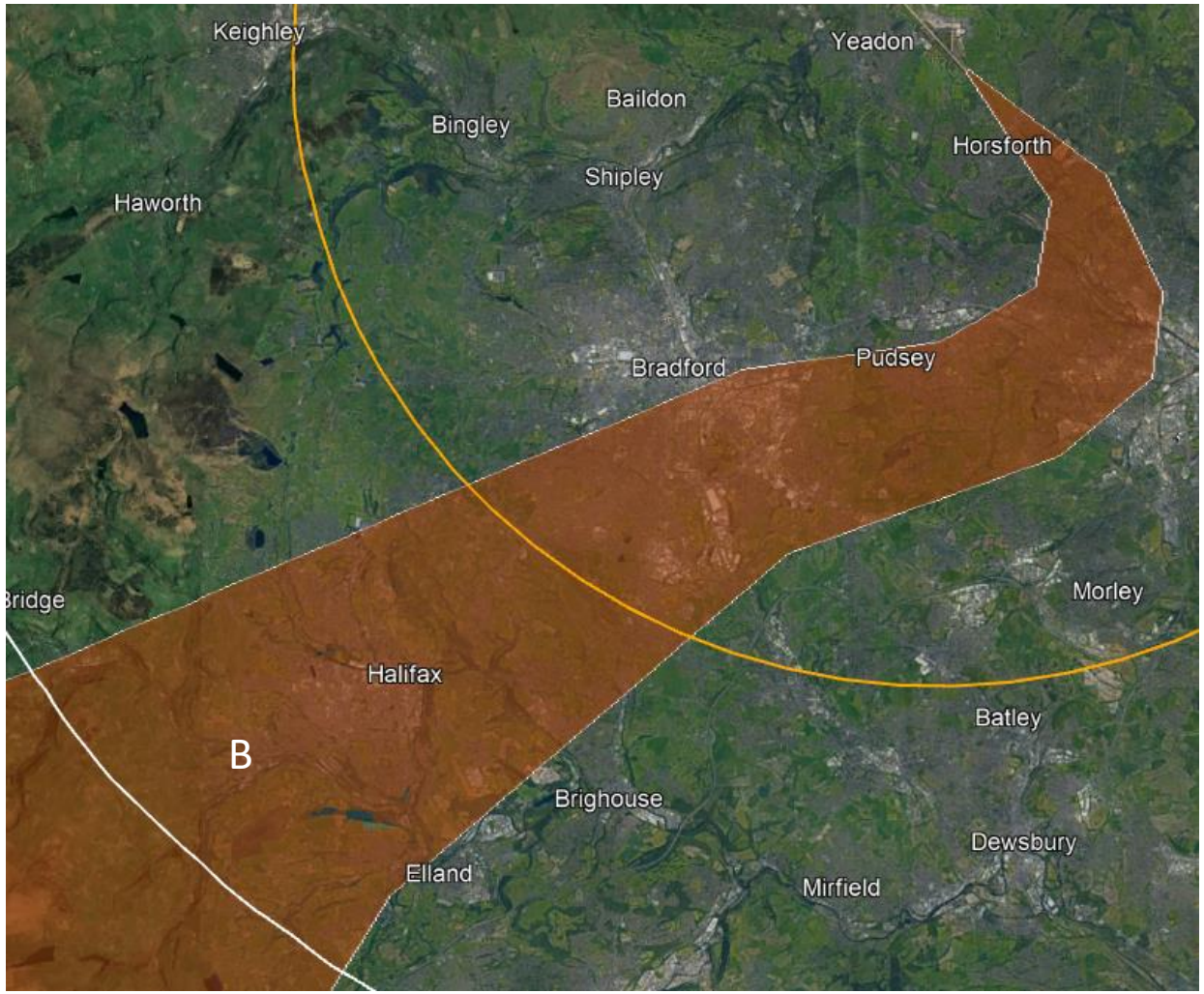
RW14 – South-Easterly Departures - MAMUL

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14SEA		Various different communities affected									
14SEB	Confliction with arrivals via GOLES	Various different communities affected				Confliction with arrivals via GOLES					
14SEC	Rejected at review as does not point to MAMUL or fit with Route Network and L975 flow										
14SED	Rejected at review as does not point to MAMUL or fit with Route Network and L975 flow										

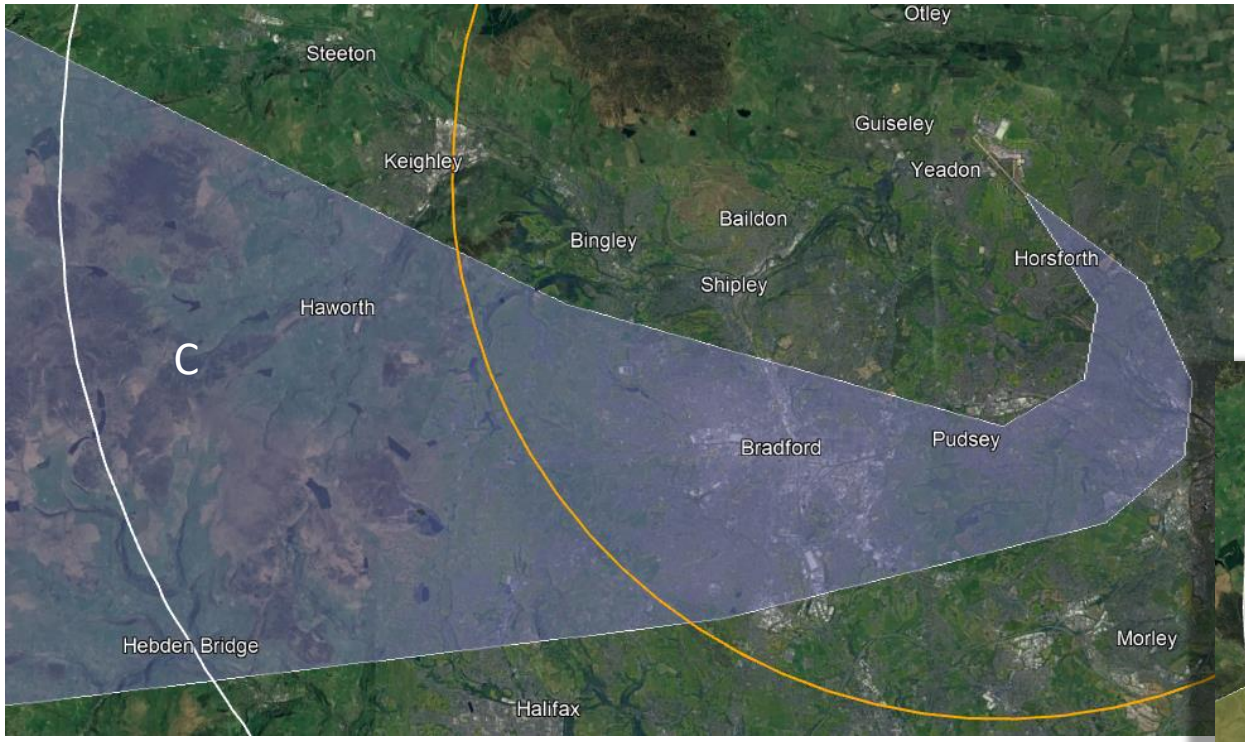
RW14 – South & West Departures – POL/NELSA

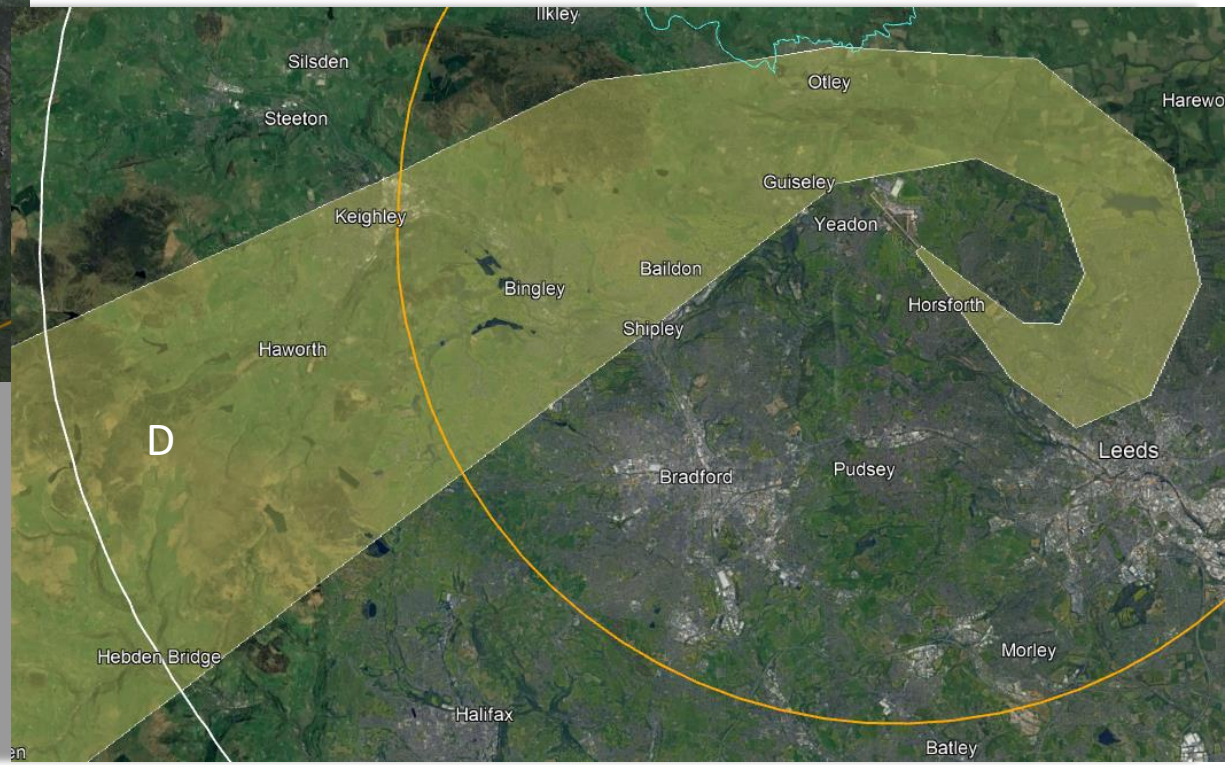
RW14 – South & West Departures – POL/NELSA



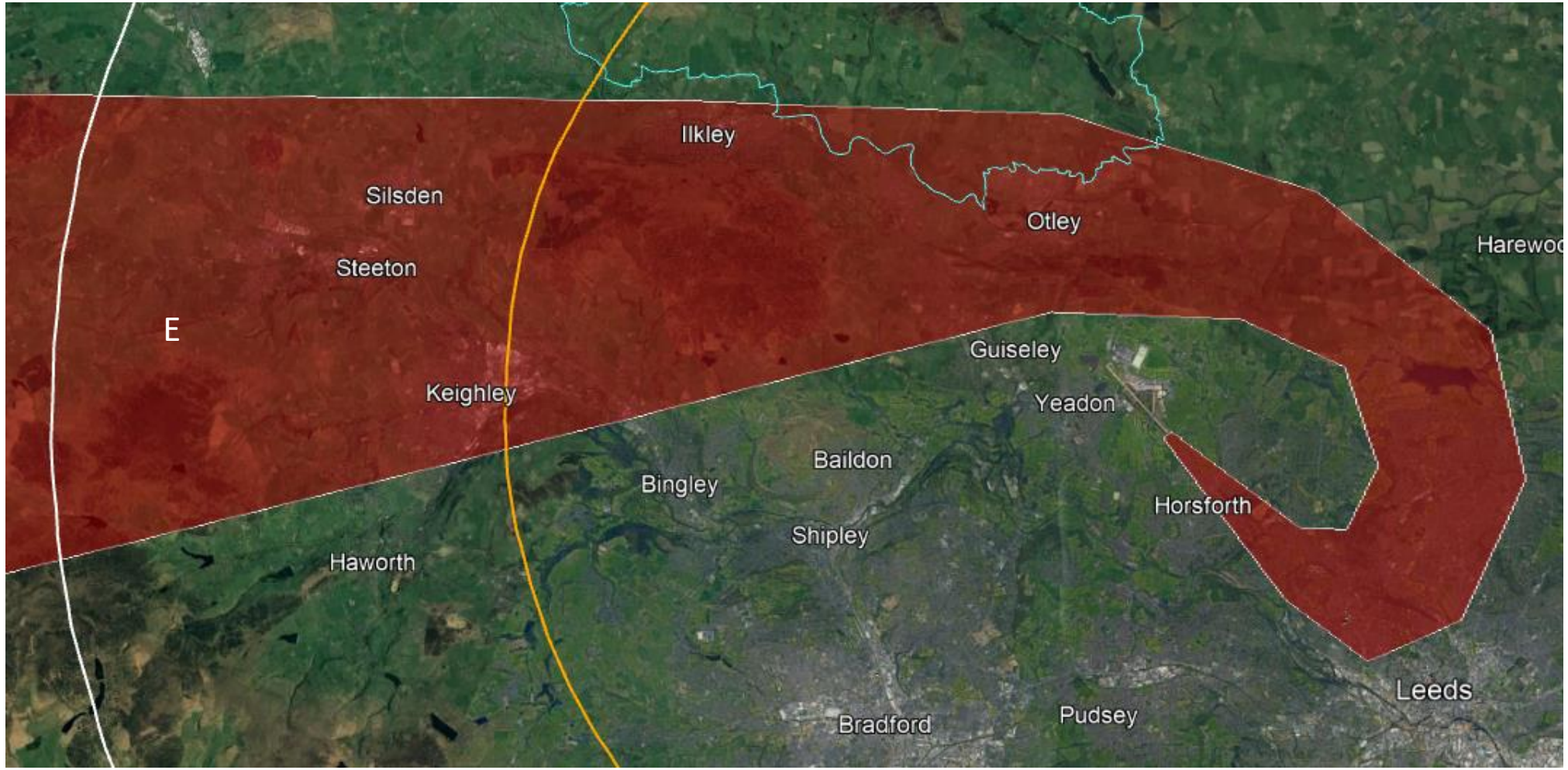


RW14 – South & West Departures – POL/NELSA





RW14 – South & West Departures – POL/NELSA



RW14 – South & West Departures – POL/NELSA

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14S&WA	Rejected on review as does not route towards the joining point at POL										
14S&WB	Rejected on review as does not route towards the joining point at POL										
14S&WC		Similar with potential for other communities affected									
14S&WD		Brings in denser populations ivo Headingley	Meanwood and Eccup	Continuous Climb offsets additional miles	Uncertainty on CAS containment				Continuous Climb offsets additional miles		
14S&WE		Brings in denser populations ivo Headingley	Meanwood, Eccup and AONB	Continuous Climb offsets additional miles	Uncertainty on CAS containment				Continuous Climb offsets additional miles		

Leeds Bradford Airport Future Airspace

Thank you for your time. We hope that you find this information on Leeds Bradford Future Airspace useful.

If you have any further queries, please address them to Airspace Change

We are very grateful for your assistance.

The Leeds Bradford ACP Team

Leeds Bradford Airport (LBA) Future Airspace

Step 2a – Design Option Update Brief – Nov 23

Part 2: Arrivals

IMPORTANT: This presentation is part of the LBA ACP Stage 2 Stakeholder Engagement on Design Options and Design Principle Evaluation, further information, background and context can be found in a document titled ‘CPJ-5692-DOC-034-LBA FASI(N) ACP Stakeholder Engagement Overview’ which has been sent out with this presentation (and another focused on ‘Departures’) and all of these will ultimately be available on the ACP portal.

Agreed Design Principles (DPs)

DP #	Design Principle
1	**Importance of Safety** – The airspace design and its operation must maintain or where possible, enhance current levels of safety.
2	**Noise** - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.
3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONBs.
4	**Emissions and Air Quality** – The proposed design should minimise CO2 emissions per flight.
5	**Airspace Dimensions** – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.
6	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.
7	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.
8	**Systemisation** – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the Instrument Approach Procedures (IAPs), deconflict with the departure procedures, reducing the requirement for tactical coordination.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.
11	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.

Design Principles Evaluation (DPE) Criteria

DP #	Design Principle		
DP1	**Importance of Safety** – The airspace design and its operation must maintain or where possible, enhance current levels of safety.		
Criteria	**Meets:** No safety issues identified that could not be overcome with similar levels of safety assurance to today's operation.	**Partially Meets:** Issues identified that would require a significantly more robust safety argument than today's operation to overcome.	**Does Not Meet:** Issues identified that could not be overcome without prohibitively restrictive safety mitigation.
DP2	**Noise** - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.		
Criteria	**Meets:** Limits or has the potential to reduce overall impacts of aircraft noise.	**Partially Meets:** Impacts of aircraft noise likely to be broadly similar in terms of the number of people affected. Some communities (possibly previously unaffected ones) may be affected more than others.	**Does Not Meet:** Has the potential to increase the overall impacts of aircraft noise on local communities.
DP3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONBs.		
Criteria	**Meets:** Limits effects on Noise Sensitive Areas and does not result in any overflight of an AONB or a NP below 7000ft.	**Partially Meets:** Does not result in overflight of a significant portion of an AONB or a NP but may result in overflight of other sensitive areas.	**Does Not Meet:** Results in direct and significant overflight of AONBs, NPs and/or various tranquil areas important to local communities.
4	**Emissions and Air Quality** – The proposed design should minimise CO_2 emissions per flight.		
Criteria	**Meets:** Has potential to burn less fuel and emit less CO_2 than other DOs.	**Partially Meets:** Is not the most fuel-efficient DO but is not significantly worse than other DOs.	**Does Not Meet:** Clearly an inefficient DO resulting in unnecessary and excessive fuel burn and therefore CO_2 emissions.

Design Principles Evaluation (DPE) Criteria

DP #	Design Principle		
5	**Airspace Dimensions** – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.		
Criteria	**Meets:** Allows for either a reduction in the volume of CAS required or does not require any additional CAS.	**Partially Meets:** May result in a need for small amounts of additional CAS but there may be potential to revert some CAS to Class G.	**Does Not Meet:** Large additional volumes of CAS are required to contain the proposed DO without the potential to revert some to Class G.
6	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.		
Criteria	**Meets:** Does not result in a complex CTA/CTR configuration.	**Partially Meets:** Results in changes to the CAS configuration that may cause other aviators some minor challenges.	**Does Not Meet:** Results in a highly complex CAS configuration.
7	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.		
Criteria	**Meets:** Is fully compliant and meets the technical capabilities of almost all airport operators.	**Partially Meets:** Is largely compliant but with reasonable justification for any non-compliance and meets the technical capabilities of most airport operators.	**Does Not Meet:** Has several non-compliances without reasonable justification and does not meet the technical capabilities of several airport operators.
8	**Systemisation** – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the Instrument Approach Procedures (IAPs), deconflict with the departure procedures, reducing the requirement for tactical coordination.		

Design Principles Evaluation (DPE) Criteria

DP #	Design Principle		
Criteria	**Meets:** Integrates seamlessly with the en-route network and is likely to reduce the need for tactical coordination and vectoring within the CTA/CTR.	**Partially Meets:** Integrates seamlessly with the en-route network but may not reduce the need for tactical coordination and vectoring within the CTA/CTR.	**Does Not Meet:** Does not integrate seamlessly with the en-route network and will increase the need for tactical coordination and vectoring within the CTA/CTR.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.		
Criteria	**Meets:** Fuel efficiency is optimal without an adverse impact on local communities.	**Partially Meets:** Fuel efficiency is marginally sub-optimal due to consideration to the impact on local communities.	**Does Not Meet:** Fuel efficiency is clearly not optimised, or it has been optimised at the expense of local communities.
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.		
Criteria	**Meets:** Generally aligned with the AMS.	**Partially Meets:** Partially aligned with the AMS.	**Does Not Meet:** Not aligned with the AMS.
11	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.		
Criteria	**Meets:** Designed to the latest navigation standards that do not require aircraft fleet upgrades.	**Partially Meets:** Designed to the latest navigation standards that may require aircraft fleet upgrades.	**Does Not Meet:** Fails to utilise the latest navigation standards.

What's New?

Why? As with the departures, the DPE needed to be revised following CAA review and following bilateral meetings between NATS En-Route Ltd (NERL) and LBA, an additional arrival option was deemed necessary.

What has changed? The Arrival DOs that utilised a hold location to the NW of the Airport (named NELSA) may ultimately prove to be not viable. Discussion with NERL has resulted in a conclusion that Arrival DOs 2- 3- 4 and 5 are not viable. Accordingly, an arrival system has been conceived that utilises the LBA (for aircraft from the North, NW and West) and GOLES (for aircraft from the South, SW and East). Additionally, we have developed systems that utilise a hold out to the NW combined with the LBA and GOLES holds.

The DPE for all the Arrival DOs has been revised following CAA review. A revised DPE is presented for comment.

Arrivals

Now ten DOs with pattern shown for each Runway Mode (Runways 32 and 14):

- Option 1 - 1 Hold – LBA
- Option 2 - 2 Holds – NELSA & GOLES
- Option 3 - 2 Holds – ‘AIREY’ & ‘WORTH’
- Option 4 - 3 Holds – LBA, ‘AIREY’ & ‘WORTH’
- Option 5 - 3 Holds – NELSA, GOLES & ’UDDER’
- Option 6 – 2 Holds – LBA & GOLES
- Option 7 – 3 Holds – SETEL, LBA & GOLES
- Option 8 – 3 Holds – NW, LBA & GOLES
- Option 9 – 2 Holds – NW & GOLES
- Option 10 – 1 Arrival Hold (GOLES) & Direct Arrivals

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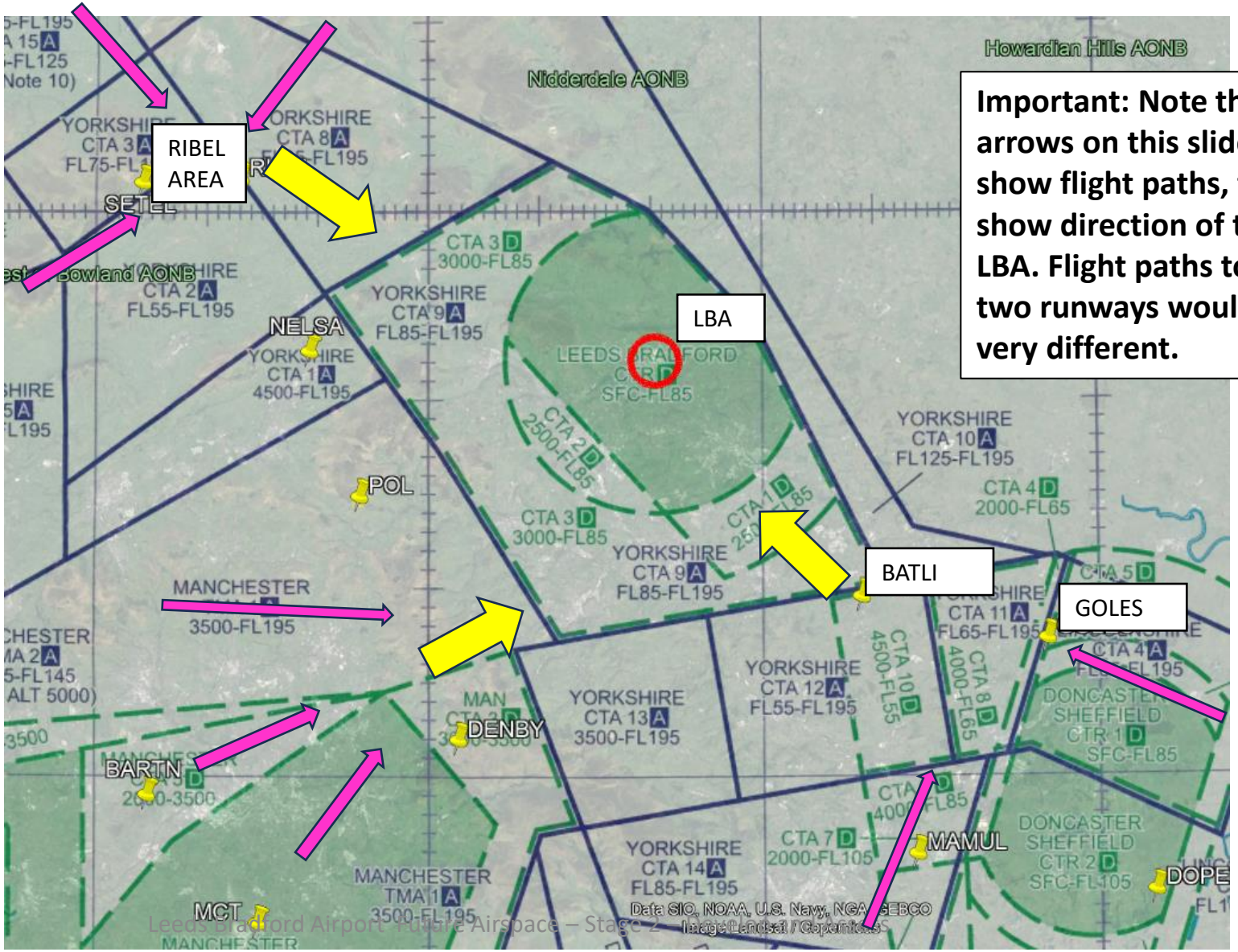
Arrival Directions and the Route Network Flow

NERL have expressed a preference to see Standard Terminal Arrival Routes (STARs) to LBA route via three particular exits from the Route Network:

- Traffic from W, NW and NE via RIBEL area
- Traffic from S and ESE via MAMUL/GOLES
- Traffic from SW and W towards the LBA via existing arrival gates

These points are chosen as they best fit the overall flow of the Manchester Terminal Manoeuvring Area (MTMA) within which aircraft are climbing in and out of various airports.

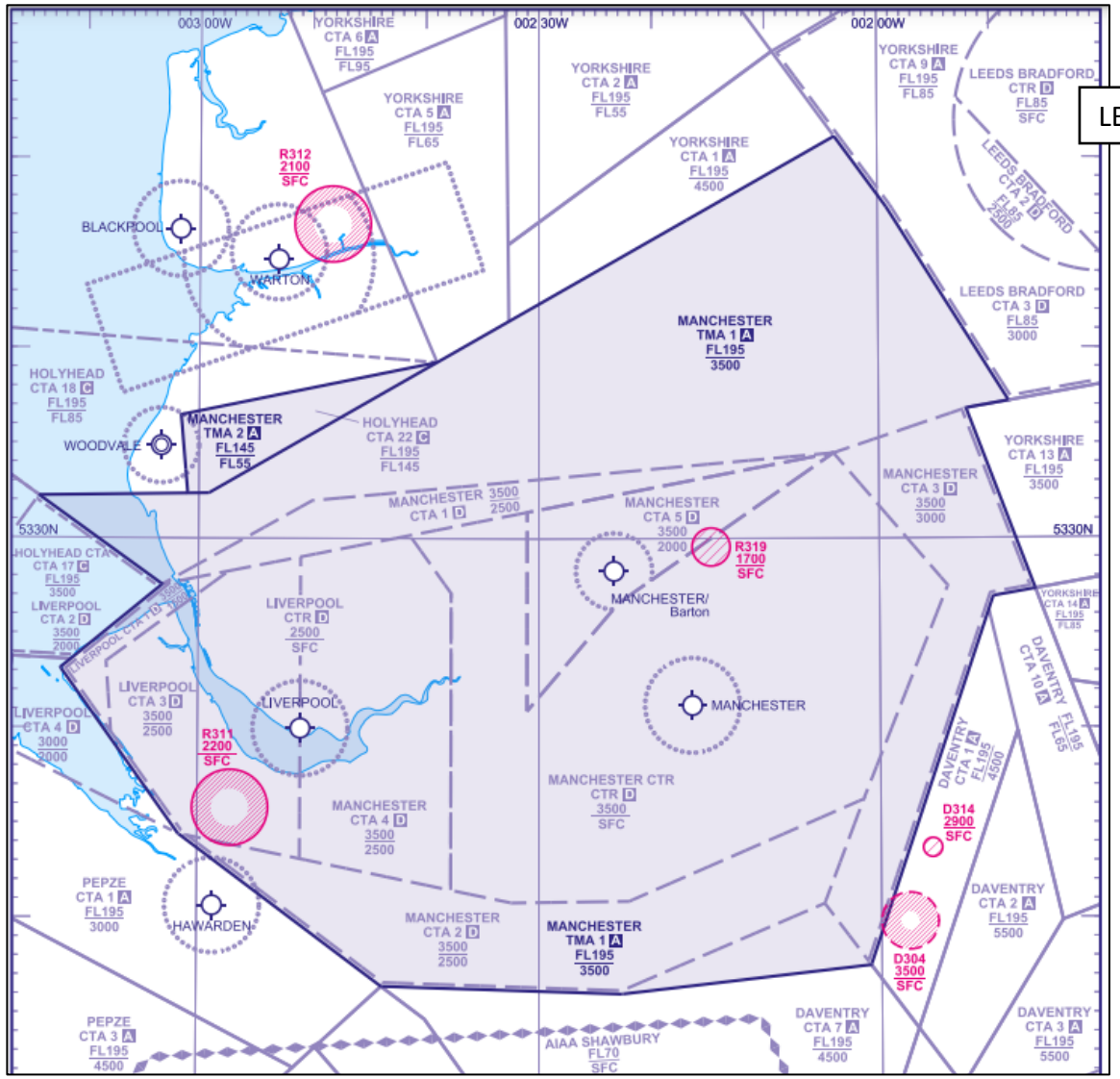


Important: Note that the arrows on this slide do not show flight paths, they show direction of travel to LBA. Flight paths to the two runways would look very different.

MTMA

The points on the previous slides are chosen as they best fit the overall flow of the Manchester Terminal Manoeuvring Area (MTMA) within which aircraft are climbing in and out of various airports, principally:

- Manchester;
- Liverpool;
- East Midlands; and
- Leeds Bradford.



Hold, Missed Approach and Arrival Transition Depictions

Holds

Technically speaking, as the holding patterns form the end of the STARs and are above 7000ft, they are the domain of the en-route Air Traffic Service Provider (ANSP) NATS En-Route Limited (NERL).

The only difference to this is a Hold that is used for the Missed Approach Procedure (MAP). Such a hold may require a lowest holding altitude of 4-5000ft.

The hold depictions are intended to give stakeholders an idea of how the system might work. These are drawn within blue circles/lozenges surrounding them as the final location is not determined.

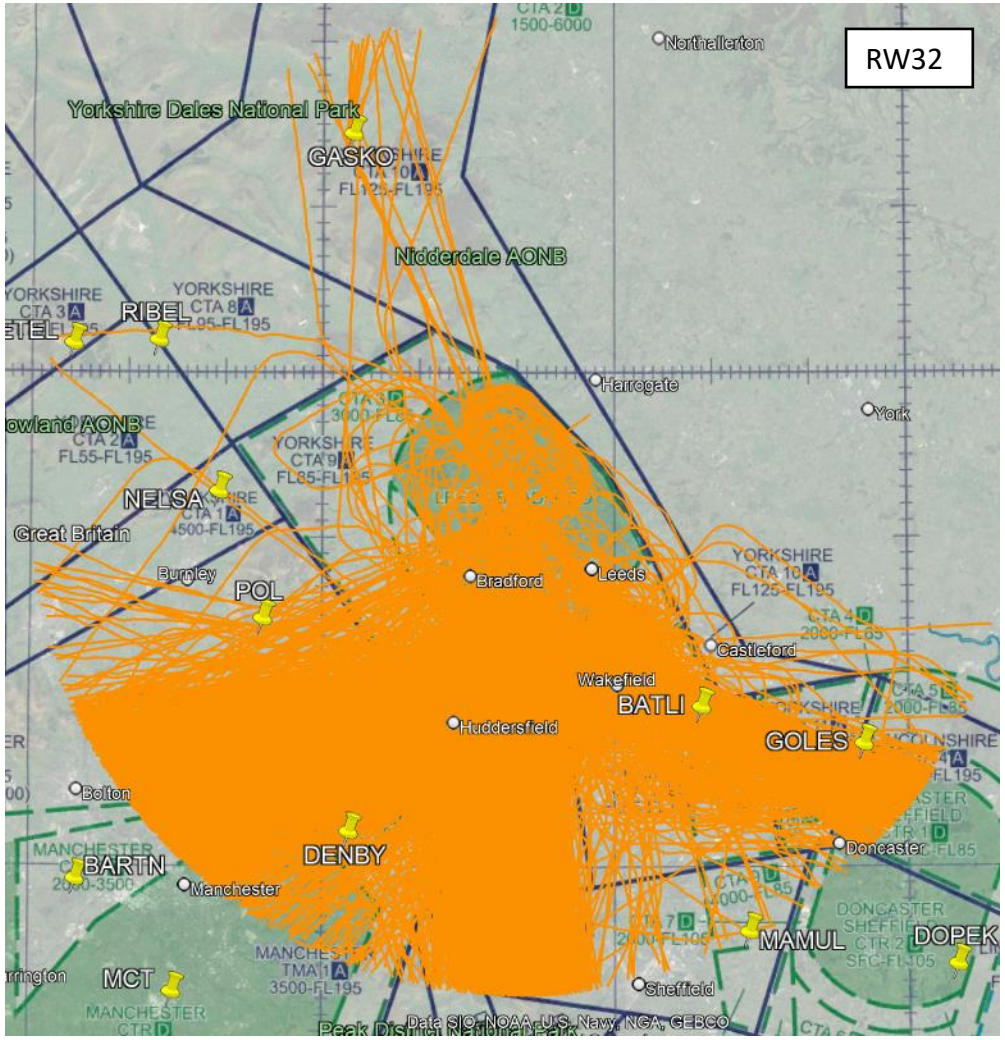
The LBA Hold already exists and this is depicted as it is today.

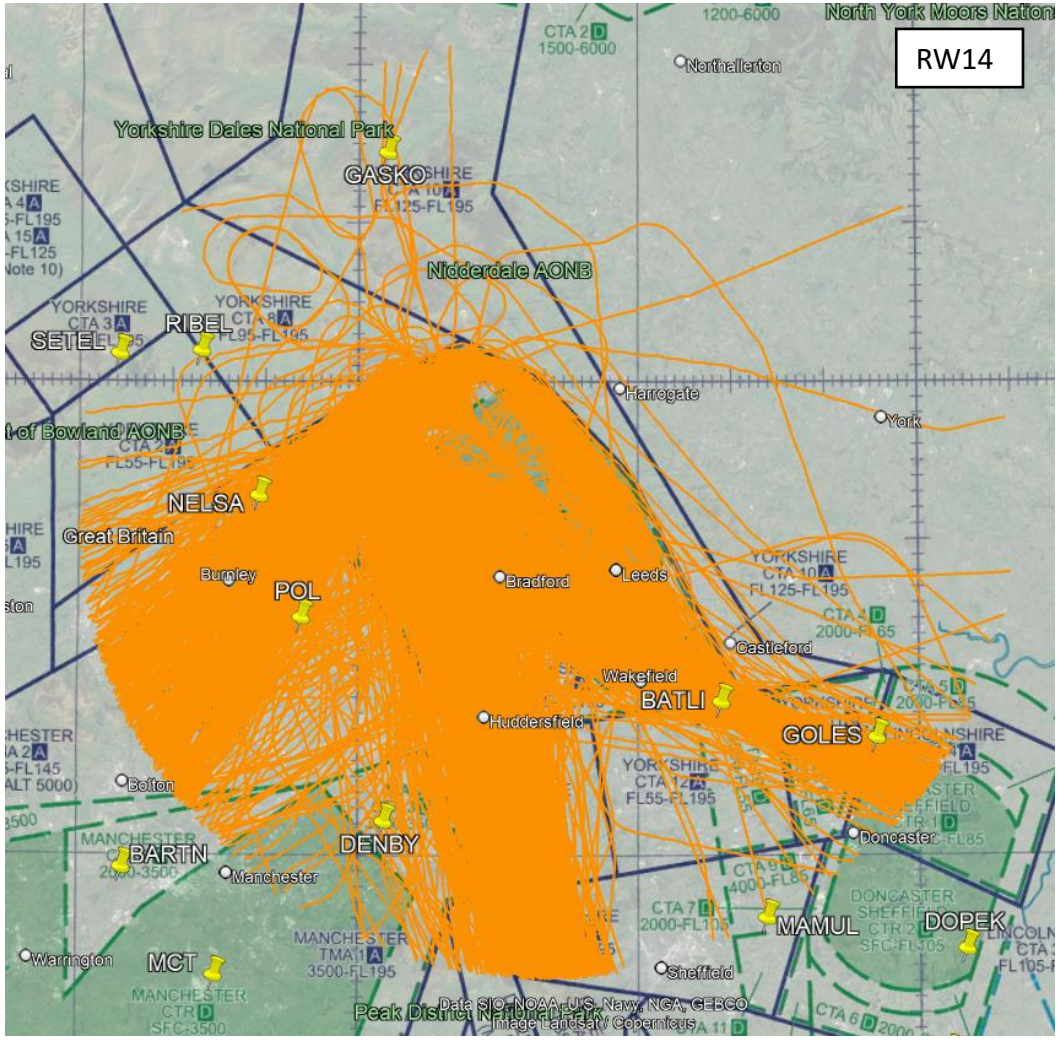
Arrivals Transitions and Missed Approaches

The lines depicting the Arrival Transitions and the Missed Approach Procedures **are not intended to show definitive tracks over the ground**. These are purely intended to provide an indication of how such a system would work. The final procedures would be refined through the consultation process should a given option progress beyond Stage 2 of the process.

Baseline Swathe Development

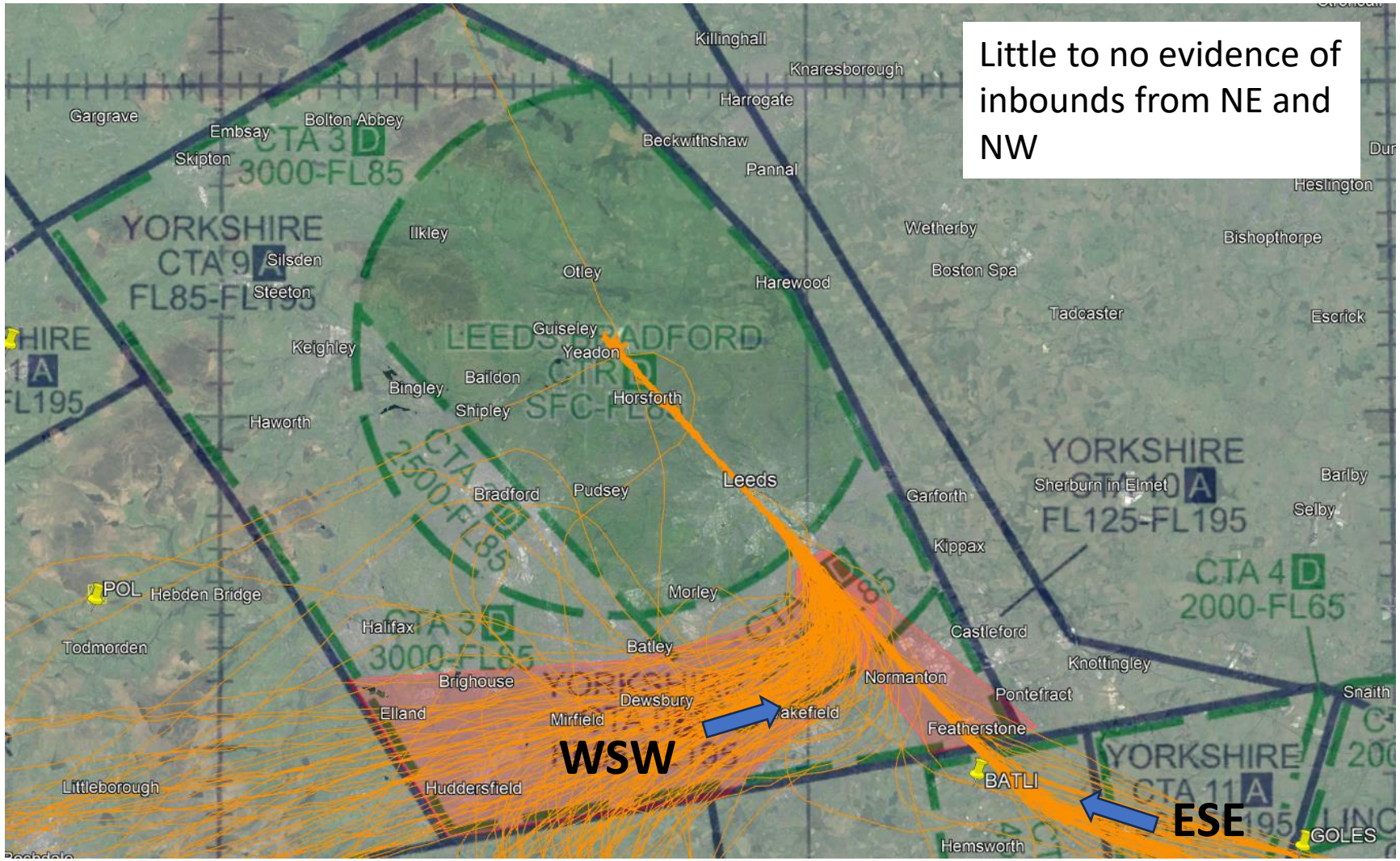
LBA Baseline Arrival Swathe Creation:
Too cluttered to make any sense over 92 days





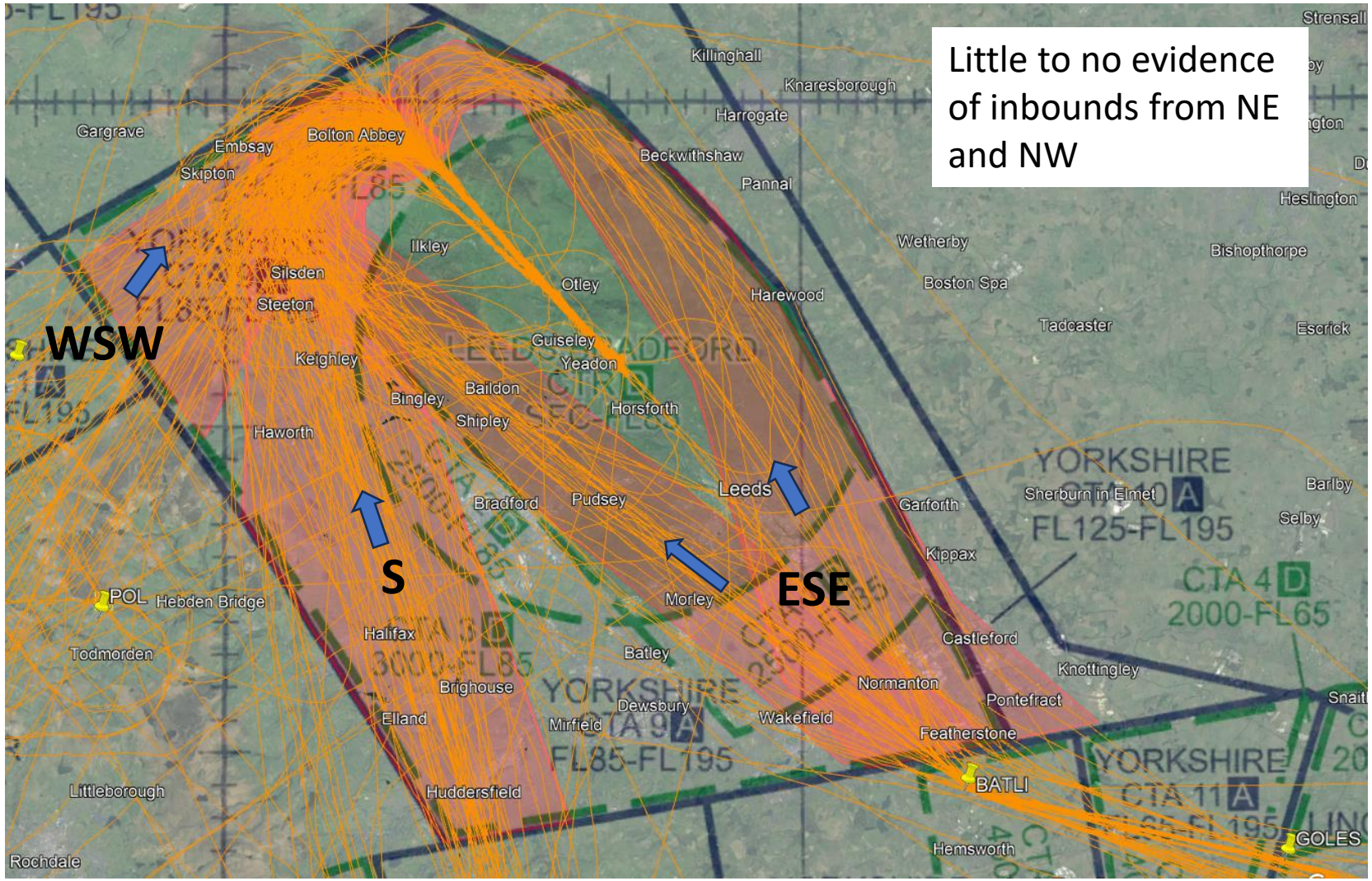
NTMS RW32 & RW14 Arrivals 92-day Summer 2022

LBA RW32 Baseline Arrival Swathe Creation



NTMS RW32 Arrival Data 3rd to 10th July 2022

LBA RW14 Baseline Arrival Swathe Creation



NTMS RW14 Arrival Data 3rd to 10th July 2022

Existing Arrival Options

Arrivals – Option 1 - 1 Hold – LBA – RW32 (Status Quo with PBN)

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LBA hold retained as MAP and weather hold

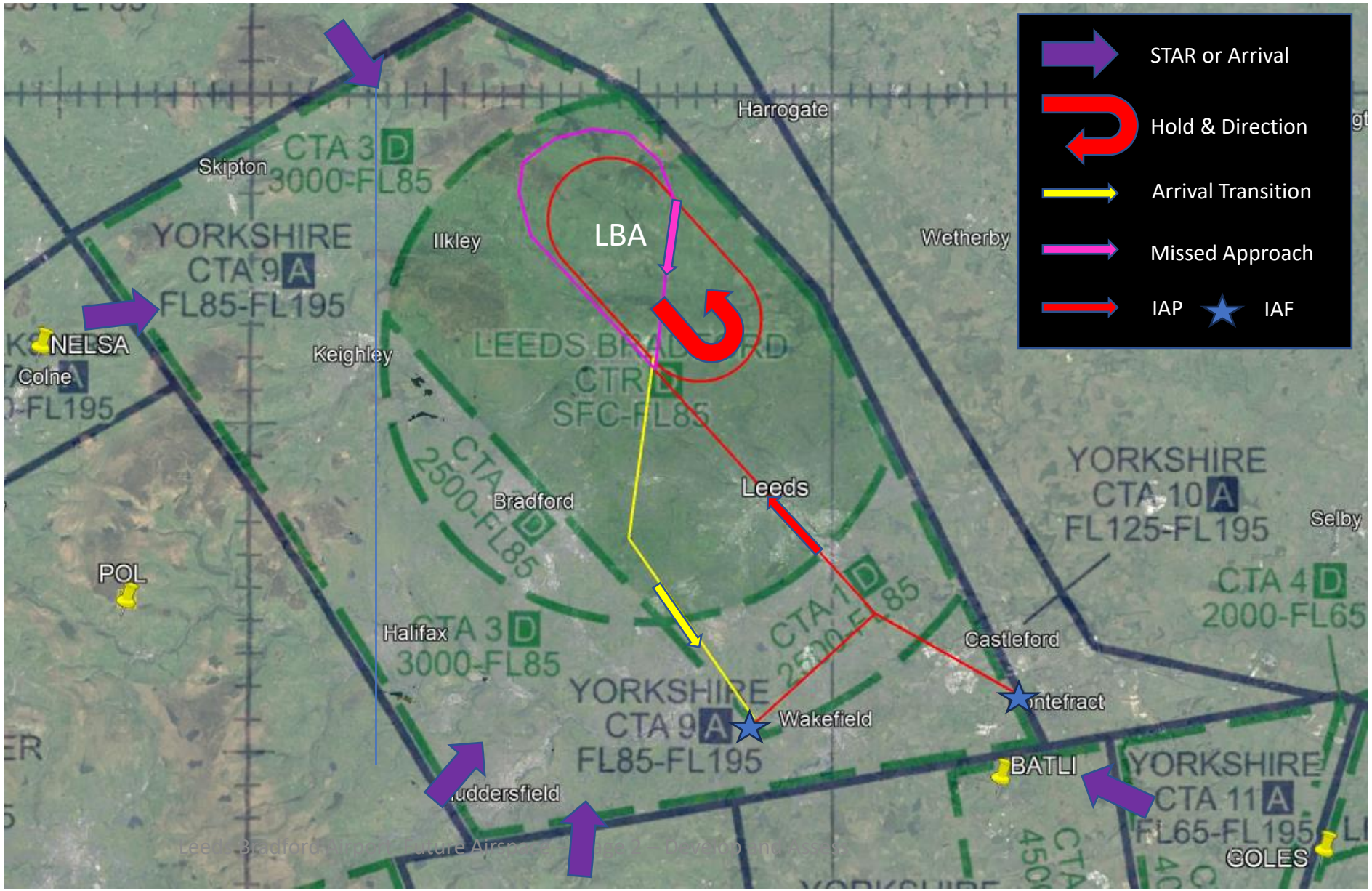
Most traffic would be tactically controlled and would rarely route to the LBA holding fix or follow the arrival transition

One-sided T-Bar or Y-Bar (might be straightened out towards BATLI)

MAP same as existing

Limited flexibility with hold still in overhead

Traffic from the SE likely to be being routed towards MAMUL/GOLES by NERL



Arrivals – Option 1 - 1 Hold – LBA – RW14 (Status Quo with PBN)

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LBA hold retained as MAP and weather hold

Most traffic would be tactically controlled and would rarely route to the LBA holding fix or follow the arrival transitions

Choice of 2 Arrival Transitions from the LBA (yellow lines)

Eastern 'T' extension & Arrival Transition needs additional CAS

MAP same as existing

Limited flexibility with hold still in overhead

Traffic from the SE likely to be being routed towards MAMUL/GOLES by NERL

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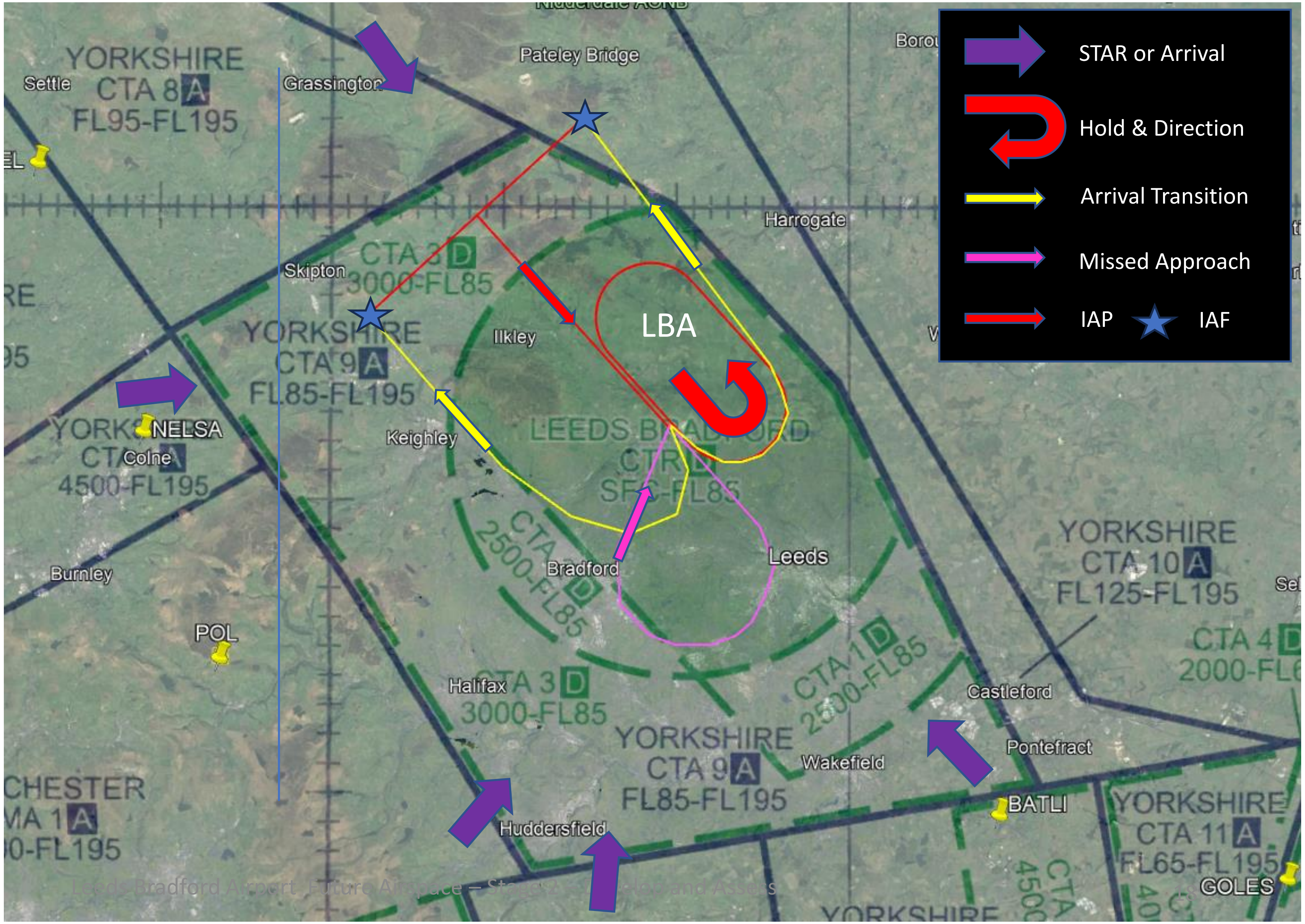


Arrivals – Option 1 - 1 Hold – LBA (Status Quo with PBN)

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 1	Despite MAP requiring controller intervention today	Eastern pattern for RW14 potentially affects new people	Eastern T-Bar for RW14 significant overflight of Nidderdale AONB	Potentially less expeditious than other options	Eastern T-Bar RW14 requires more CAS			Hold in the overhead can limit Continuous Climb Operations	Every arrival must file and plan to route via the LBA	Not really a modernisation of the LBA operation	

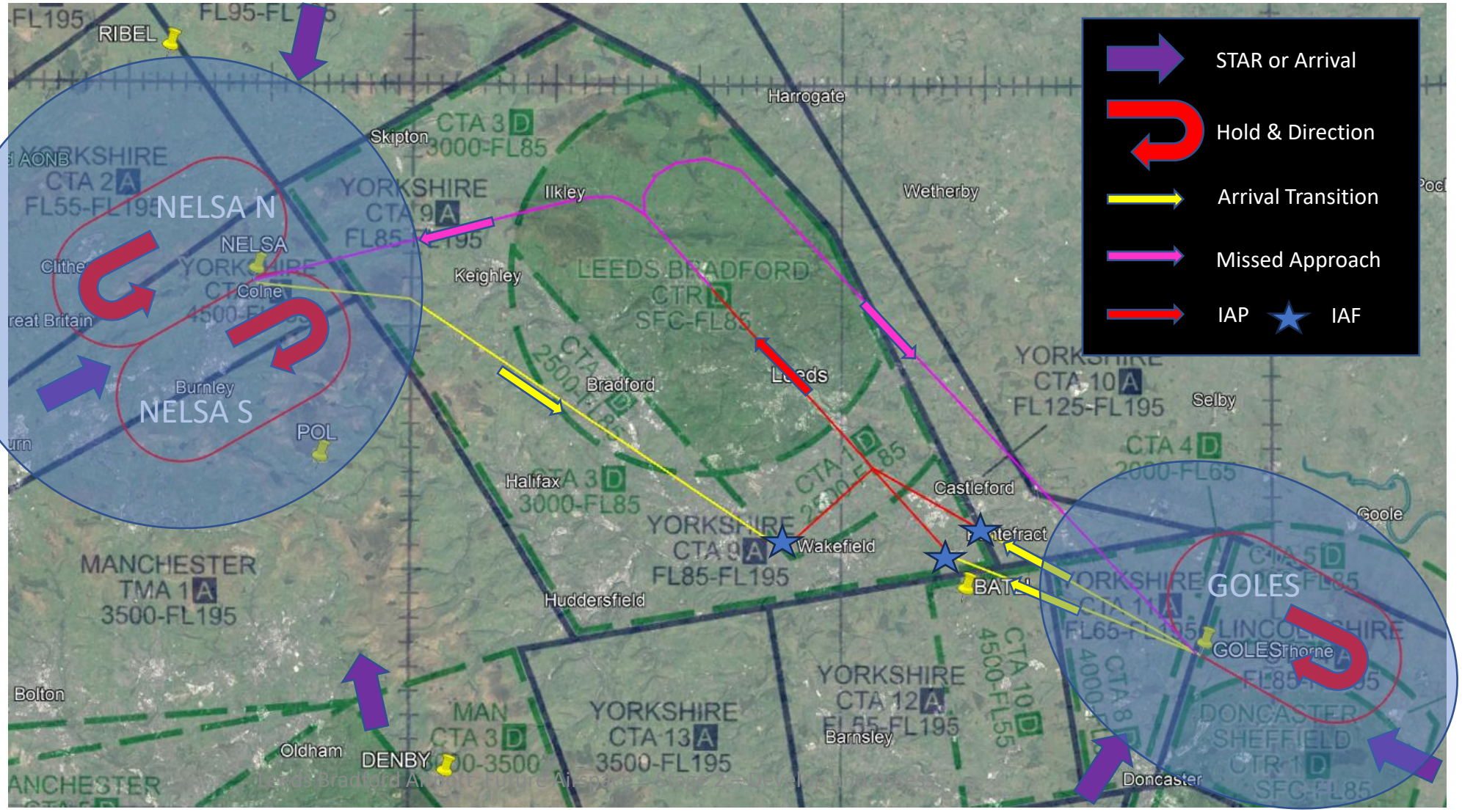
Arrivals – Option 2 - 2 Holds - NELSA/GOLES – RW32

Either NELSA North (left hand) or NELSA South (right hand) - potential Arrival/MAP Hold from 5000ft vice the LBA

Traffic from the SE likely to be routed towards MAMUL/GOLES by NERL

T-Bar or Y-Bar to suit based on airspace and noise considerations

GOLES more likely just an Arrival Hold with a lowest base of FL80 and likely to require additional CAS



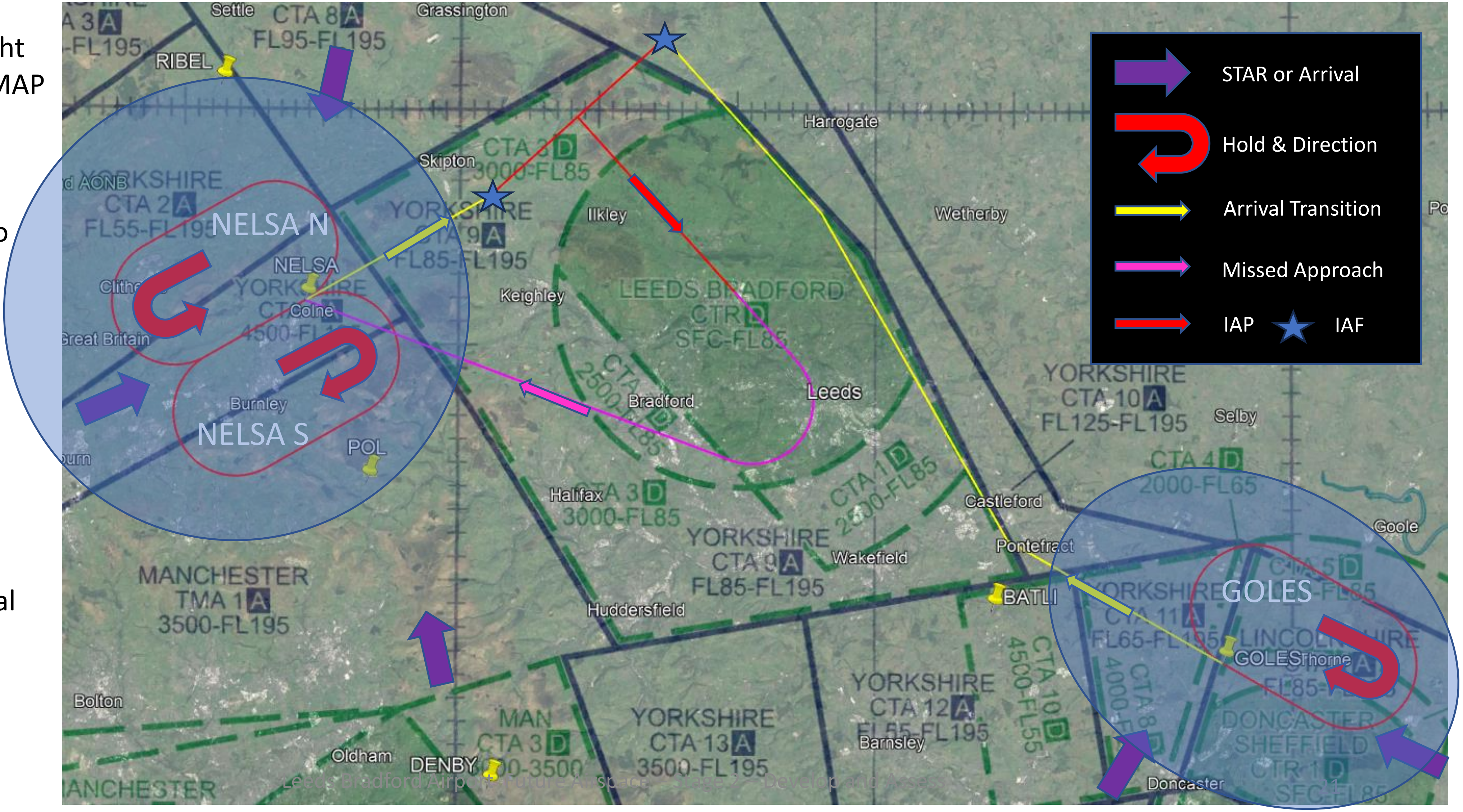
Arrivals – Option 2 - 2 Holds - NELSA/GOLES – RW14

Either NELSA North (left hand) or NELSA South (right hand) - potential Arrival/MAP Hold from 5000ft vice the LBA

Traffic from the SE likely to be routed towards MAMUL/GOLES by NERL

GOLES more likely just an Arrival Hold with a lowest base of FL80 and likely to require additional CAS

Additional CAS will be required for eastern Arrival Transition and T-Bar



Arrivals – Option 2 - 2 Holds - NELSA/GOLES

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 2		Eastern pattern for RW14 potentially reduces noise impact	Eastern T-Bar for RW14 affects Nidderdale AONB		Potential requirement for additional CAS for GOLES/NELSA holds	Likely changes to CAS		Arrival route BARTN-POL-NELSA may not work well for NERL			

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Arrivals – Option 3 - 2 Holds – 'AIREY' & 'WORTH' – RW32

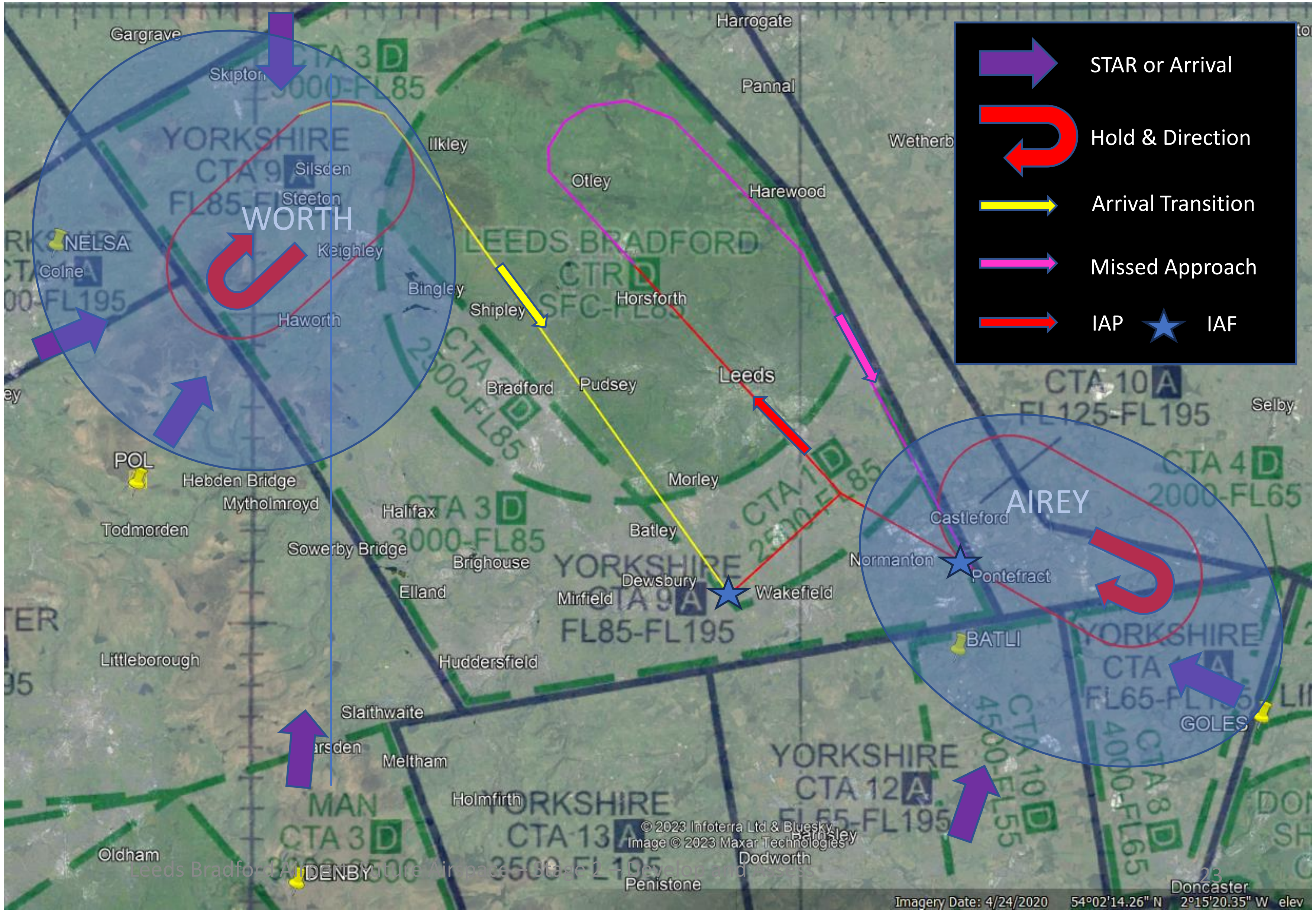
WORTH too close and limiting deps?

AIREY needing additional CAS

T/Y-Bar angle – closer to BATLI? SIE/Leeds East/Burn GC to consider

MAP to AIREY as WORTH in conflict with deps? (Hold base circa 5000ft)

Traffic from the SE likely to be routed towards MAMUL/GOLES by NERL



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Arrivals – Option 3 - 2 Holds – 'AIREY' & 'WORTH' – RW14

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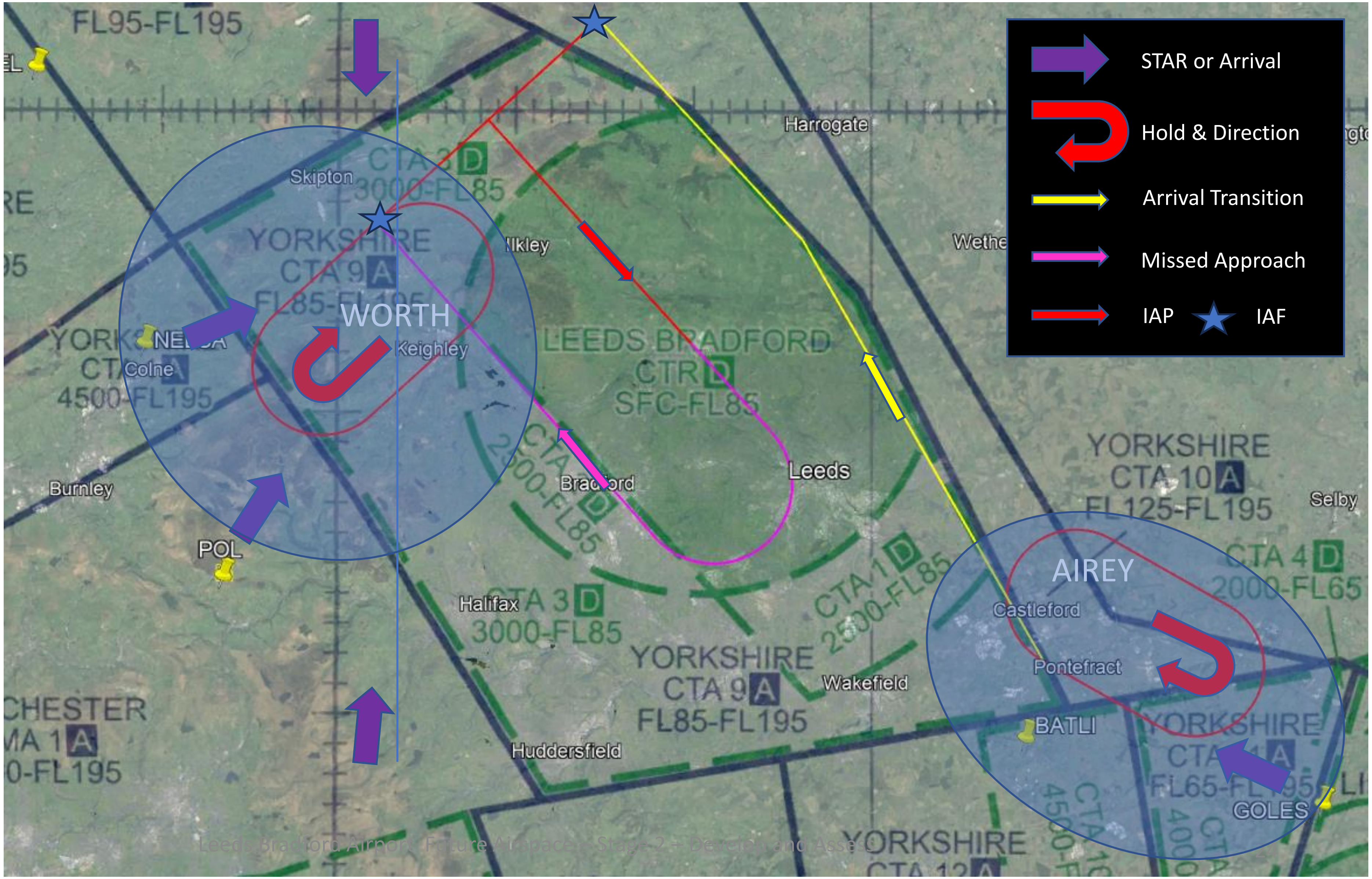
WORTH too close and limiting deps?

AIREY needing additional CAS and unlikely due to SIE/Leeds East/Burn GC

MAP to WORTH (Hold base circa 5000ft)

Traffic from the SE likely to be routed towards MAMUL/GOLES by NERL



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Arrivals – Option 3 - 2 Holds – 'AIREY' & 'WORTH'

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 3	Tactical coordination required to deconflict WORTH and RW32 departures. Proximity of AIREY hold to Sherburn and Leeds East and Burn Gliders is problematic.	Eastern transition to RW14 likely to reduce noise impact	Eastern T-Bar for RW14 affects Nidderdale AONB	Stepped climbs off RW reduces efficiency	Requirement for significantly more CAS to contain AIREY hold	Likely changes to CAS		WORTH may result in stepped climbs off RW32			

Arrivals – Option 4 - 3 Holds – LBA with 'AIREY' & 'WORTH' – RW32

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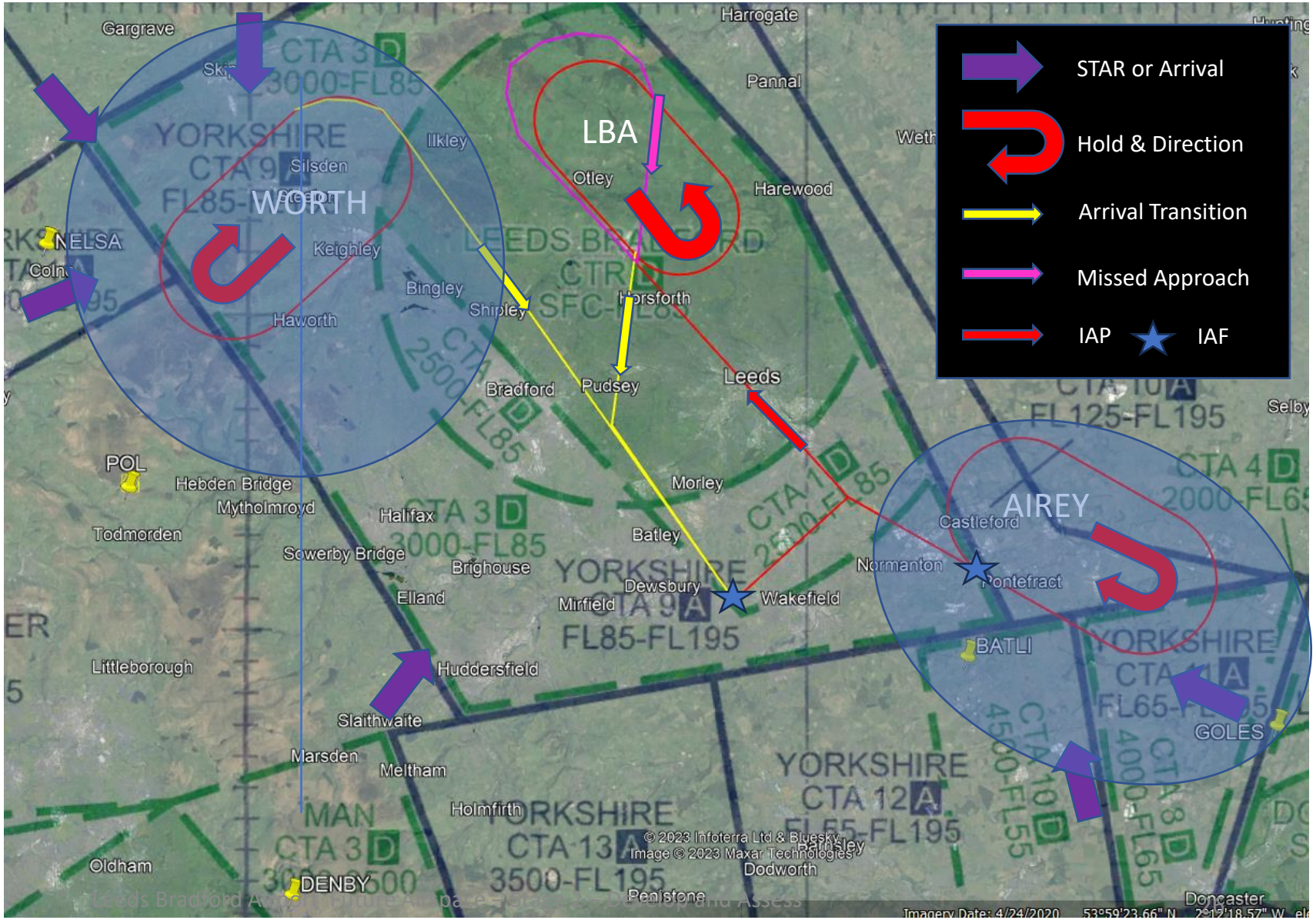
Traffic from SW still inbound via arrival gates towards the LBA and likely to be tactically controlled direct to the IAF

WORTH too close and limiting deps?

AIREY needing additional CAS and unlikely due to Sherburn-in-Elmet, Leeds East and Burn GC.

T/Y-Bar angle – should the IAF be closer to BATLI?

MAP for LBA or AIREY?



Arrivals – Option 4 - 3 Holds – LBA with 'AIREY' & 'WORTH' – RW14

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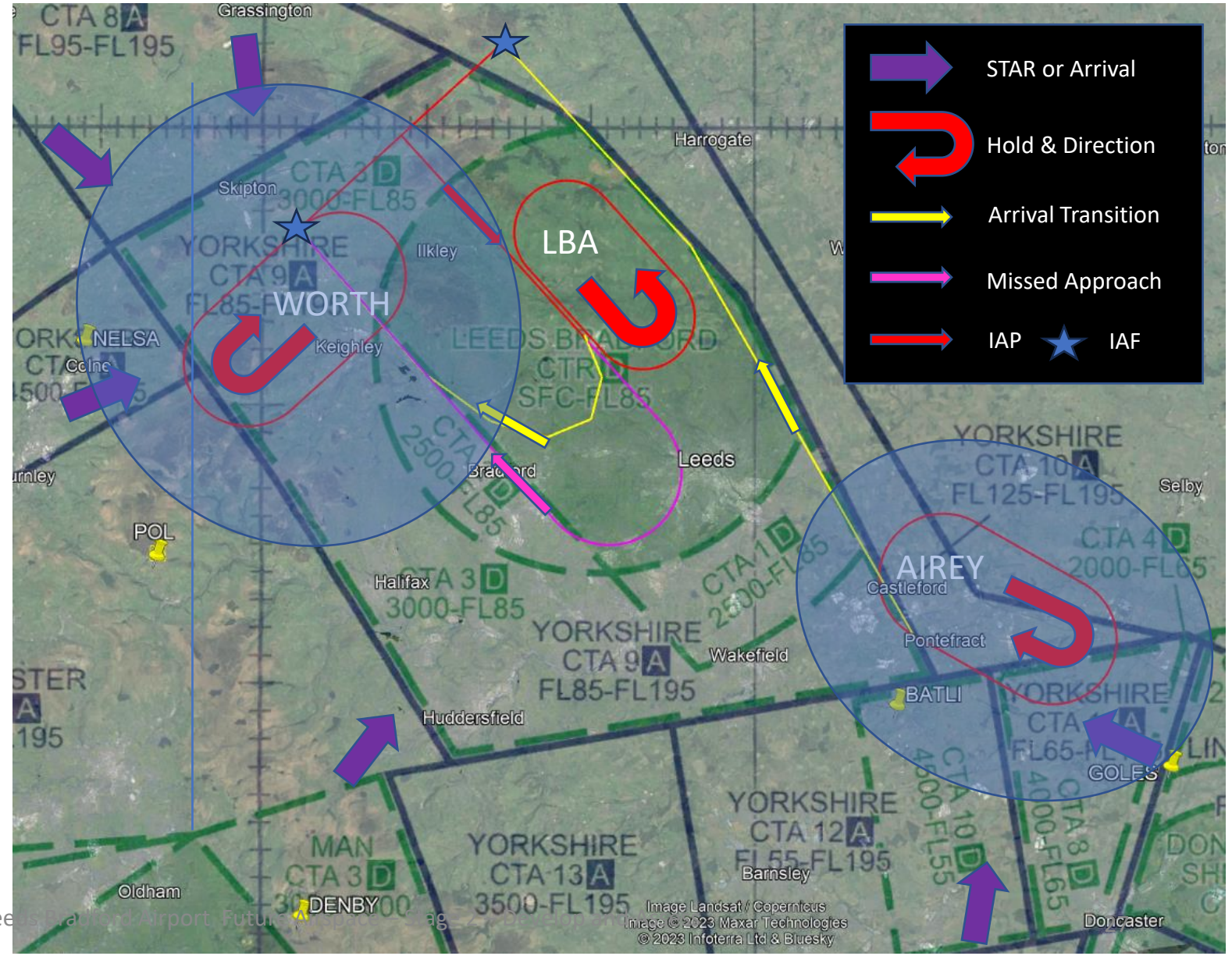
Traffic from SW still inbound via arrival gates towards the LBA and likely to be given own navigation or vectored towards the IAF

AIREY needing additional airspace and unlikely due to Leeds East, Burn Gliders etc.

MAP for LBA or AIREY?



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Arrivals – Option 4 - 3 Holds – LBA with 'AIREY' & 'WORTH'

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 4	Tactical coordination required to deconflict WORTH and RW32 departures. Proximity of AIREY hold to Sherburn and Leeds East and Burn Gliders is problematic.	Eastern transition to RW14 likely to reduce noise impact	Eastern T-Bar for RW14 affects Nidderdale AONB	WORTH and LBA hold likely to result In impact to Continuous Climbs off RW32	Requirement for significantly more CAS to contain AIREY hold	Likely changes to CAS		WORTH and LBA hold likely to result In impact to Continuous Climbs			

Arrivals – Option 5 - 3 Holds – NELSA/'UDDER'/GOLES – RW32

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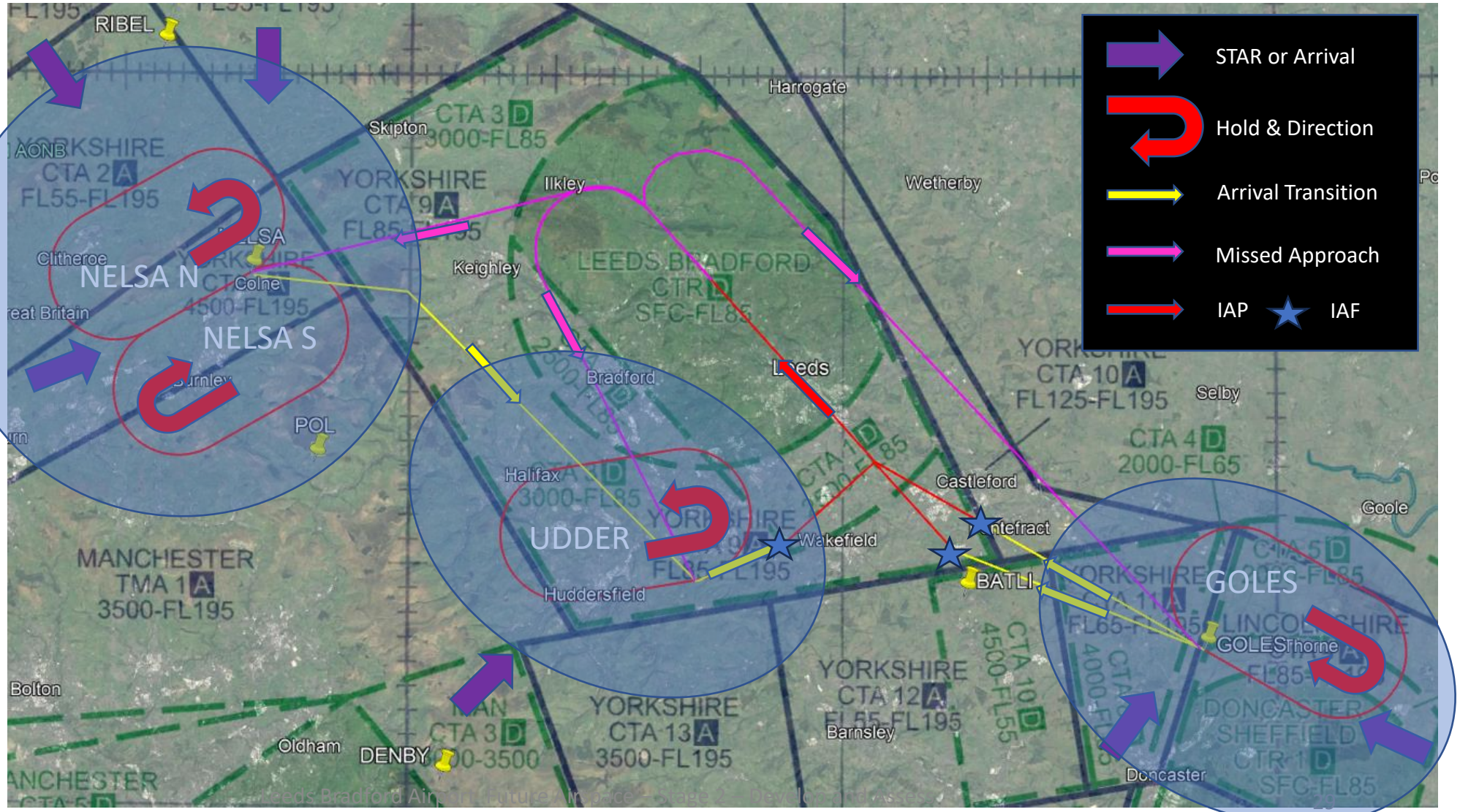
Either NELSA North (LH) or NELSA South (RH) – potential Arrival/MAP Hold from 5000ft

Arrivals from the SW now have 'UDDER' option (Note: Traffic from SE likely to be being routed towards MAMUL/GOLES by NERL)

GOLES additional CAS required

GOLES & UDDER Arrival Holds FL80 upwards



Arrivals – Option 5 - 3 Holds – NELSA/'UDDER'/GOLES – RW14

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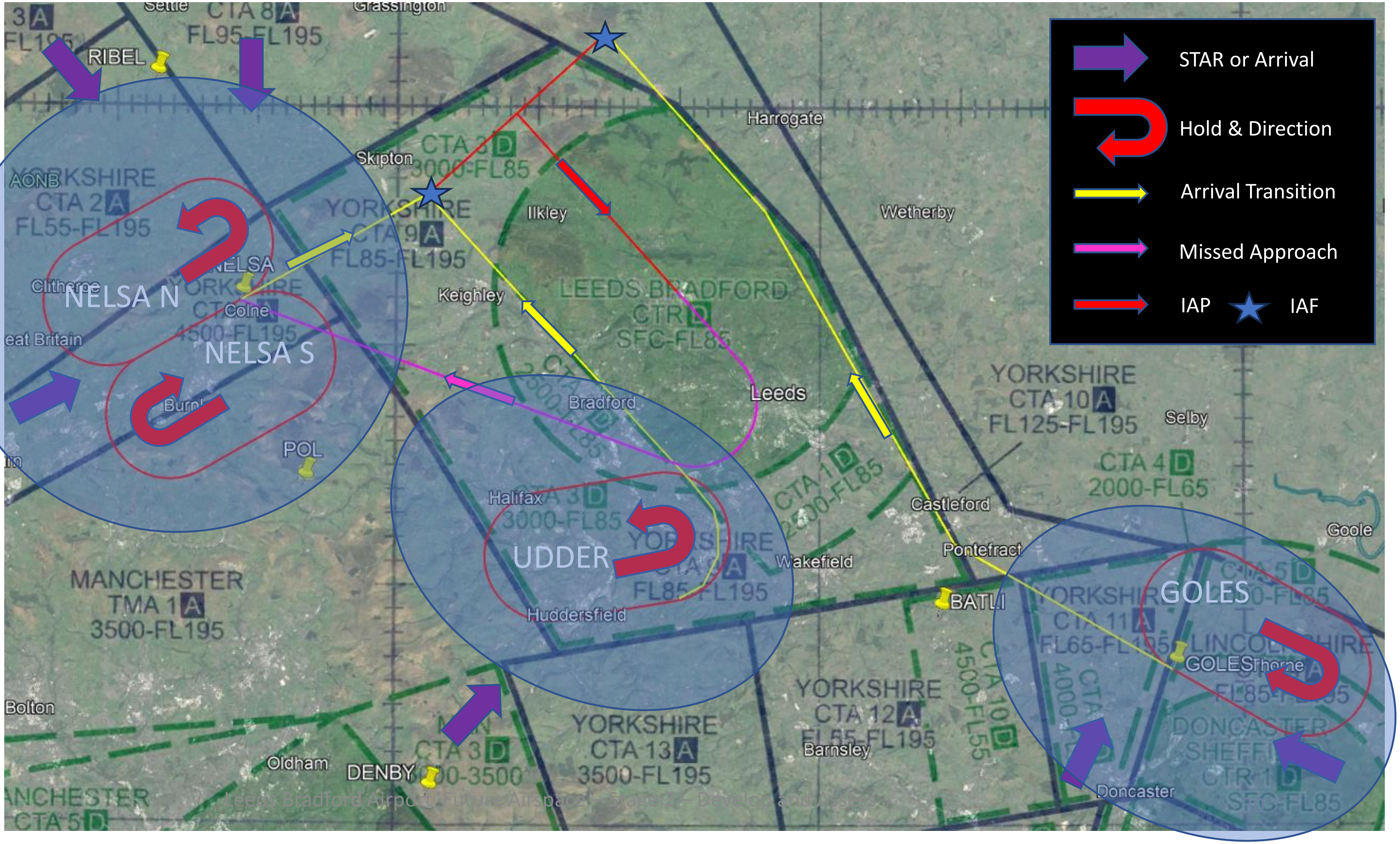
Either NELSA North (LH) or NELSA South (RH) - potential Arrival/MAP Hold from 5000ft

Arrivals from the SW now have 'UDDER' option (Note: Traffic from SE likely to be being routed towards MAMUL/GOLES by NERL)

'UDDER' – Potential conflict with deps to South and West off RW14

GOLES additional CAS required

GOLES & UDDER Arrival Holds FL80 upwards



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Arrivals – Option 5 - 3 Holds – NELSA/'UDDER'/GOLES

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 5			Eastern T-Bar for RW14 affects Nidderdale AONB	UDDER hold may impact RW14 departures	Potential requirement for additional CAS for GOLES/NELSA holds	Likely changes to CAS		UDDER hold may impact RW14 departures			

New Arrival Options

Arrivals – Option 6 - 2 Holds - LBA/GOLES – RW32

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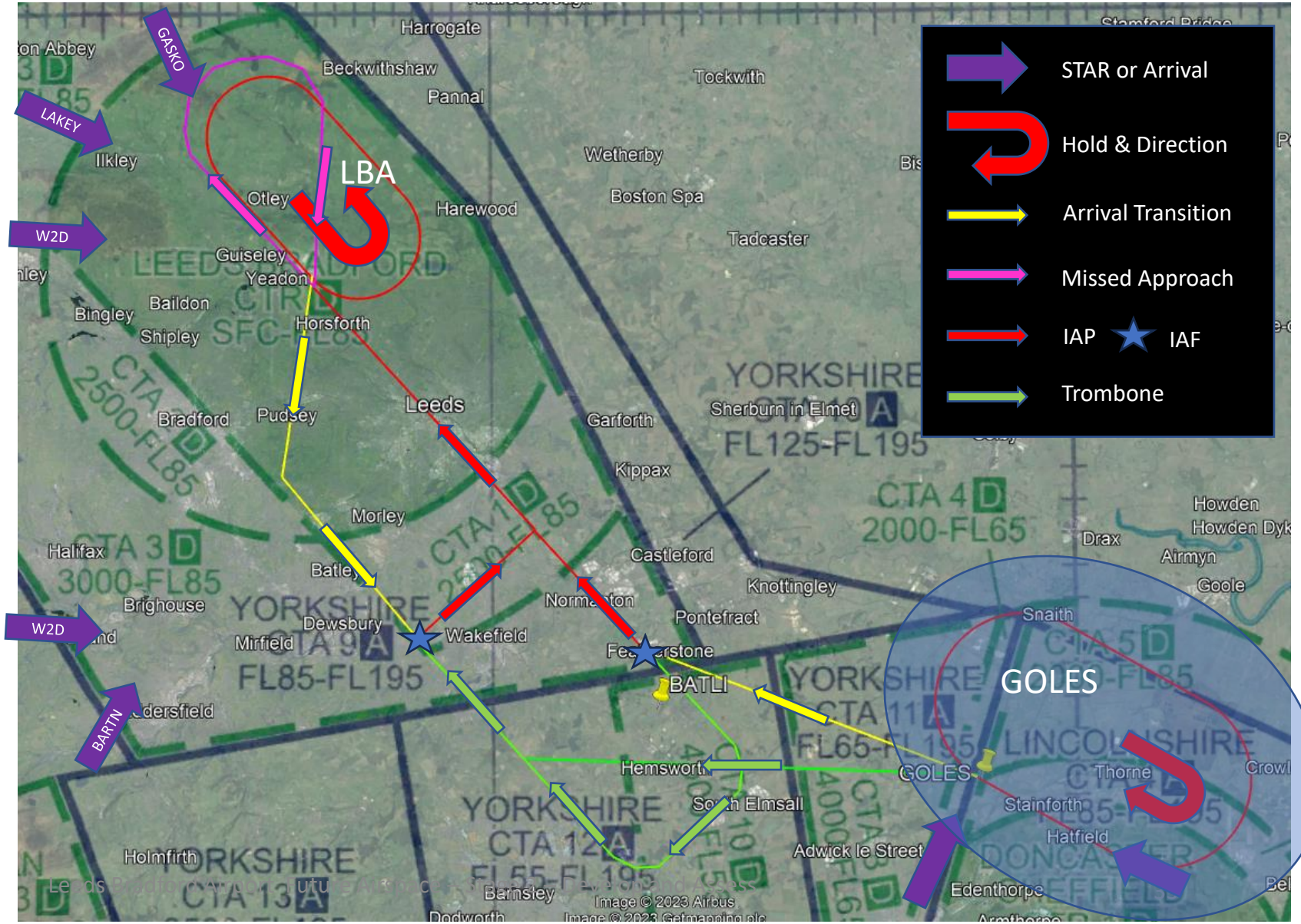
MAP to 5000ft turning right back towards the LBA at circa 4.5nm

Traffic from the South likely to be being routed towards MAMUL/GOLES by NERL

GOLES just an Arrival Hold with a base of FL90 and likely to require additional CAS

Two overflow extensions (Trombones) for sequencing; one from the LBA and one from GOLES



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Arrivals – Option 6 - 2 Holds - LBA/GOLES – RW14

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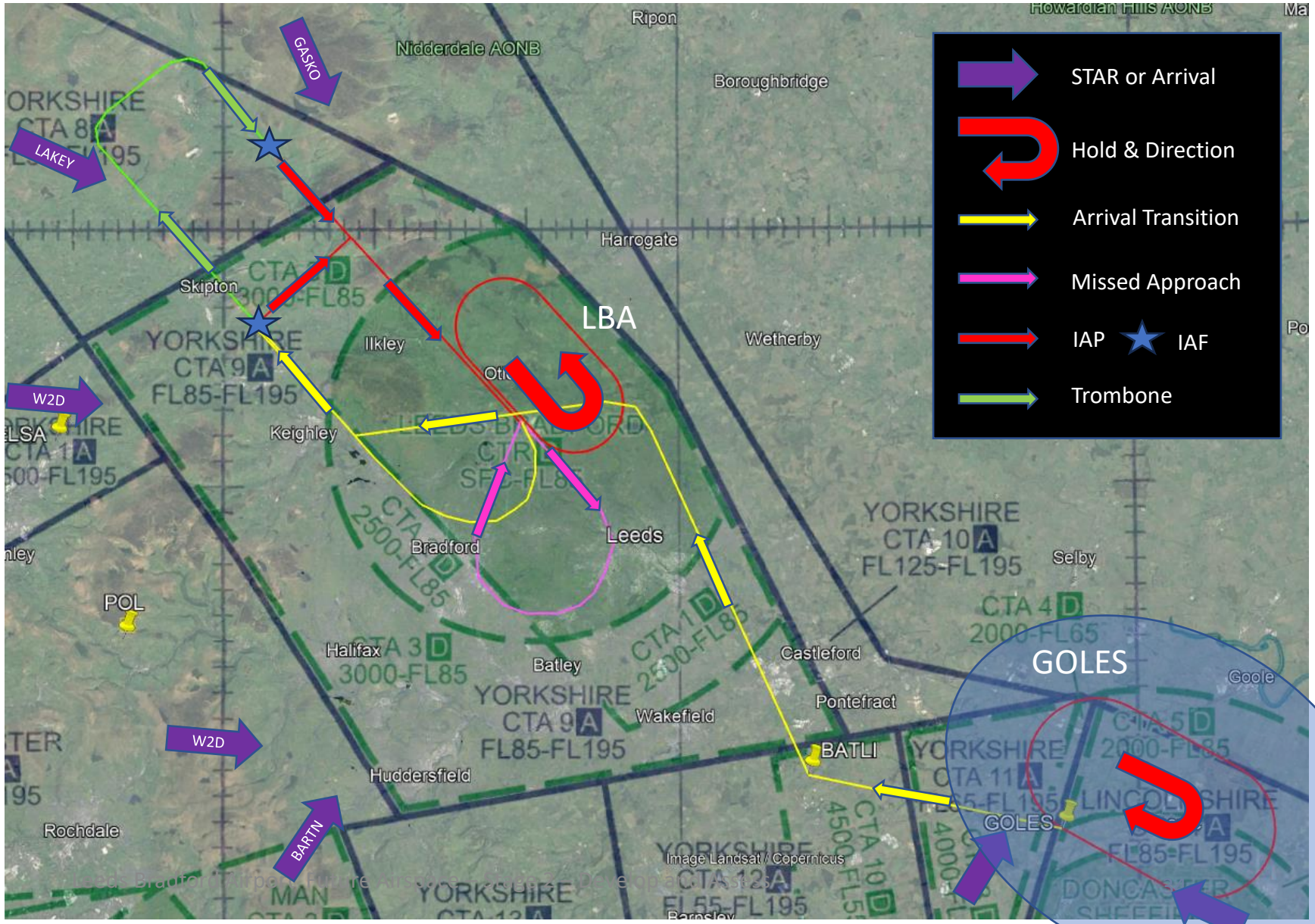
MAP mirror image of RW32

RH Arrival Transitions from both Arrival Holds

Traffic from the South likely to be being routed towards GOLES by NERL

GOLES Hold just an Arrival Hold from FL90 up and likely to require additional CAS

Additional CAS will be required for overflow extension (Trombone) to a 15nm final required for sequencing



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Arrivals – Option 6 - 2 Holds – LBA/GOLES

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 6		Similar to what is done today.	AONB and NP overflown	Unnecessary fuel carriage for always planning via LBA	Needed for 15nm final and trombone	GOLES element simplifies but the LBA and trombone airspace has the opposite affect		Heavy requirement for tactical vectoring and level restrictions particularly on RW32	Unnecessary fuel carriage for always planning via LBA	Not entirely systemised but modernising airspace with PBN	

Arrivals – Option 7 - 3 Holds – NW Hold/LBA/GOLES – RW32

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MAP to 5000ft turning right back towards the LBA at circa 4.5nm

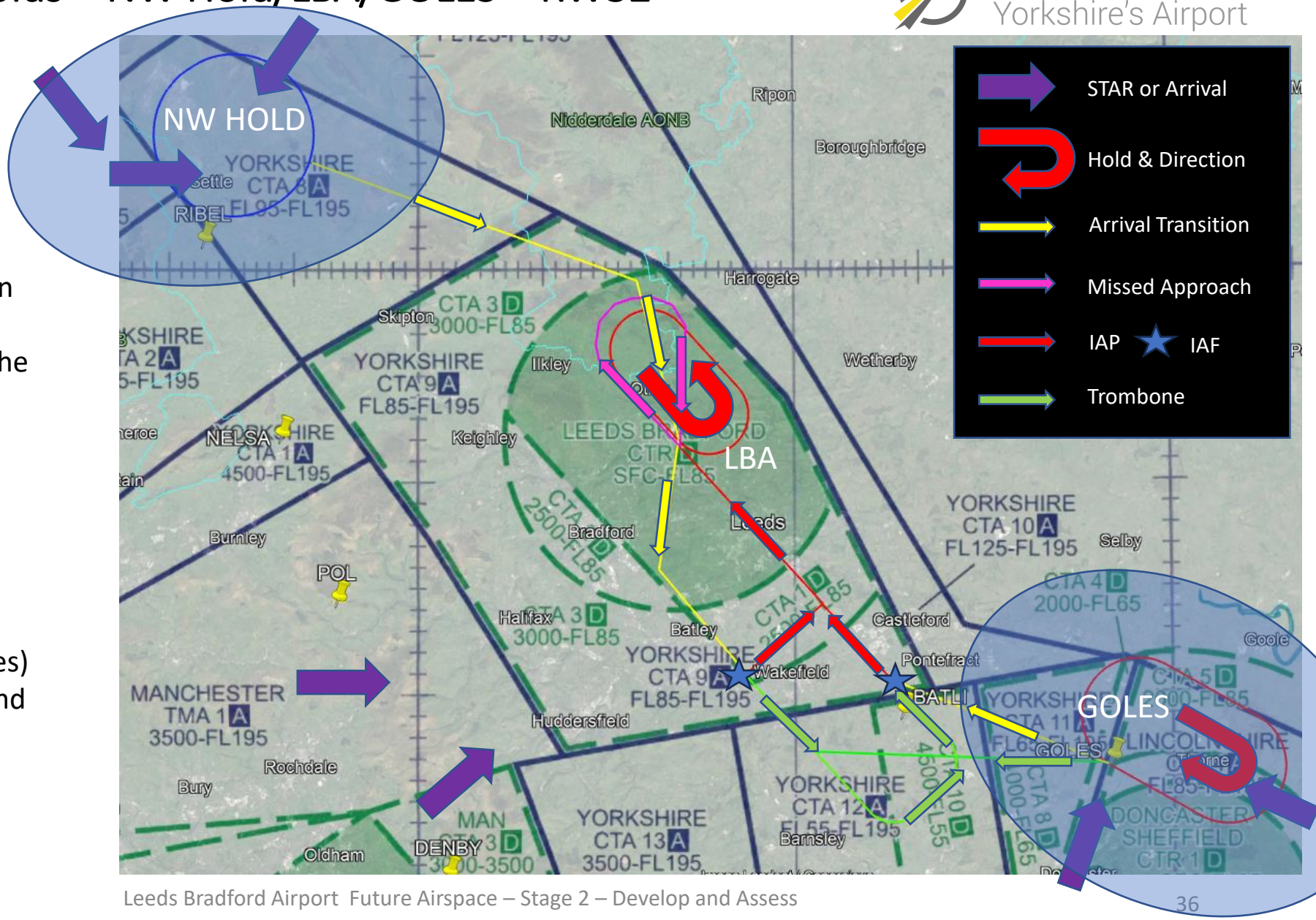
From the SE: MAMUL/GOLES

Arrival Gates for SW/W, direct to western IAF or via LBA and transition

From the NW and NE: NW Hold to the LBA then transition or direct to western IAF

Arrival Holds with a base of at least FL90 and likely to require additional CAS

Two overflow extensions (Trombones) for sequencing; one from the LBA and one from GOLES



Arrivals – Option 7 - 3 Holds – NW HOLD/LBA/GOLES – RW14

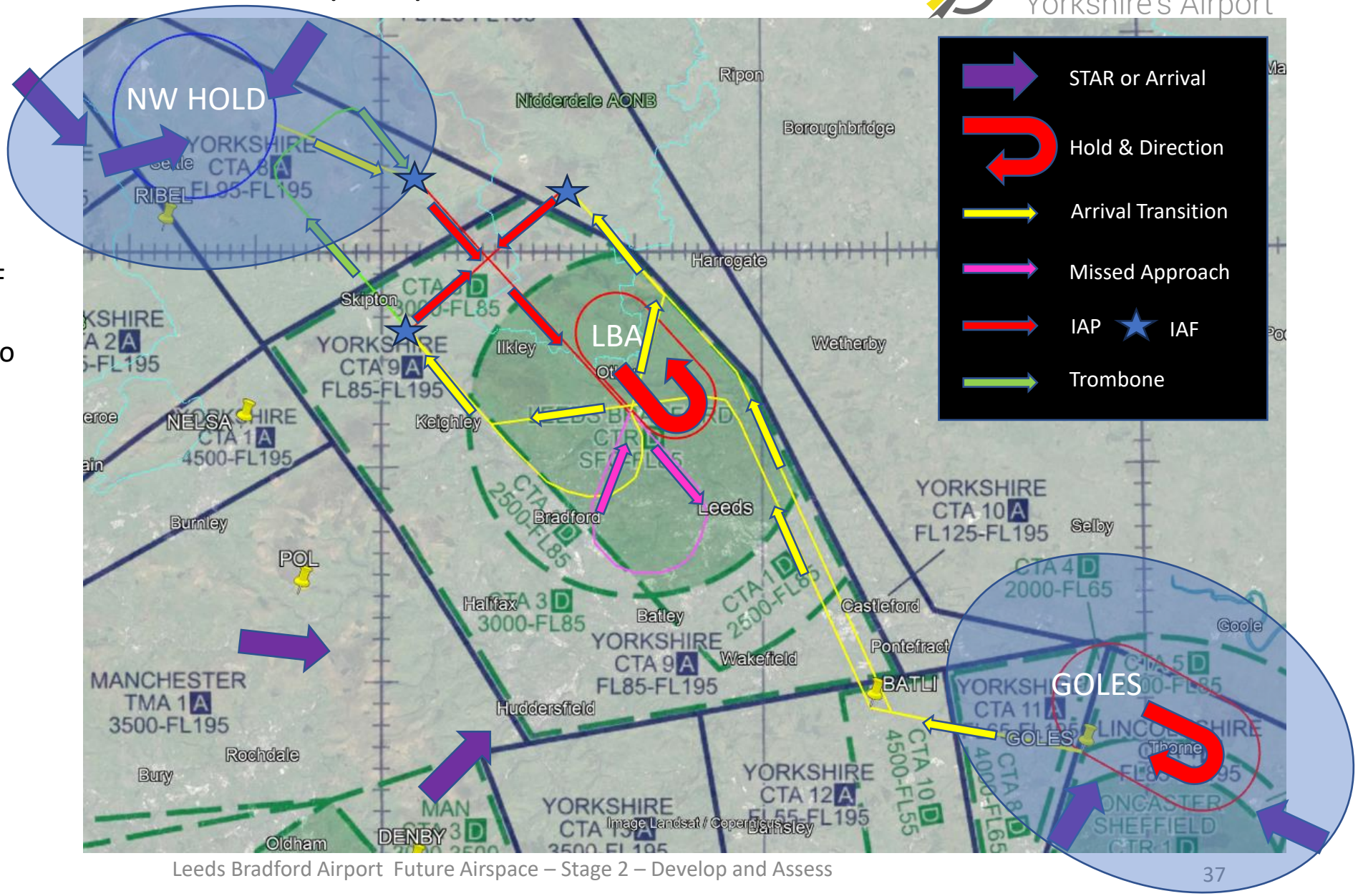
From the SE: MAMUL/GOLES - arrival transition through the overhead or downwind left

Arrival Gates for SW/W and Arrival Transition downwind left from LBA or direct to western IAF

From the NW and NE: NW Hold to 15nm straight-in final

Arrival Holds with a base of at least FL90 and likely to require additional CAS

One overflow extension (Trombone) from the LBA for sequencing



Arrivals – Option 7 - 3 Holds – NW Hold/LBA/GOLES

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 7	LBA STAR via SW Arrival Gate system is the problem as conflicts with outbounds off RW14	No improvement	AONB and NP overflown	Regardless of Hold, if coming from the SW, aircraft planning for unexpeditious recovery	Needed for 15nm final, eastern T on RW14 and trombone to the north	GOLES element simplifies but the LBA and trombone airspace has the opposite affect		Heavy requirement for tactical vectoring and level restrictions particularly on RW32	Regardless of Hold, if coming from the SW, aircraft planning for unexpeditious recovery	Not entirely systemised but modernising airspace with PBN	

Arrivals – Option 8 - 2 Arrival Holds – NW Hold/GOLES – RW32

MAP to 5000ft turning right back towards the LBA (purely MAP Hold) at circa 4.5nm

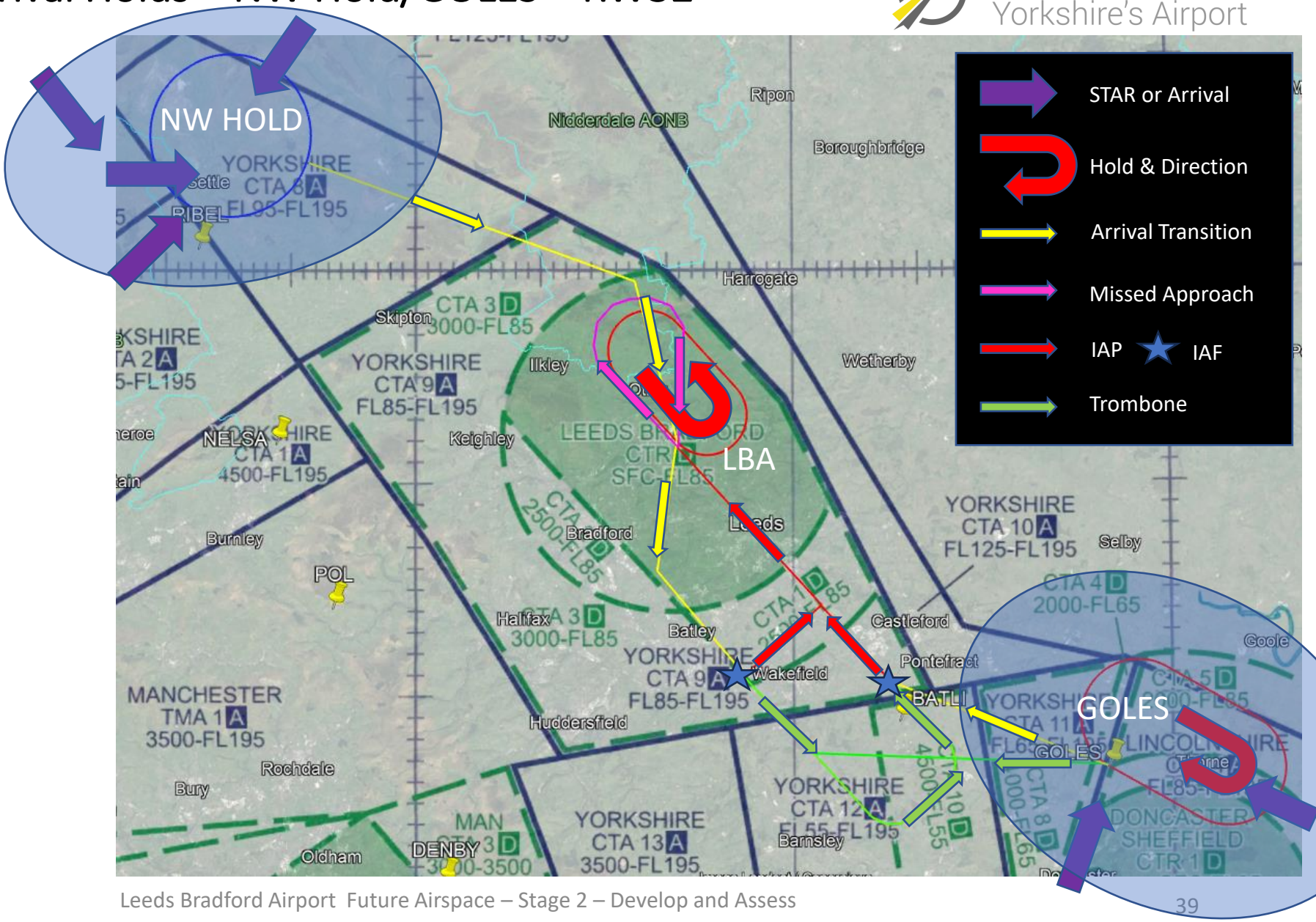
No Arrival Gates

From the SW and SE: MAMUL/GOLES

From the W, NW and NE: NW Hold to the LBA then transition or direct to western IAF

Arrival Holds with a base of at least FL90 and likely to require additional CAS

Two overflow extensions (Trombones) for sequencing; one from the LBA and one from GOLES



Arrivals – Option 8 – 2 Arrival Holds – NW HOLD/GOLES – RW14

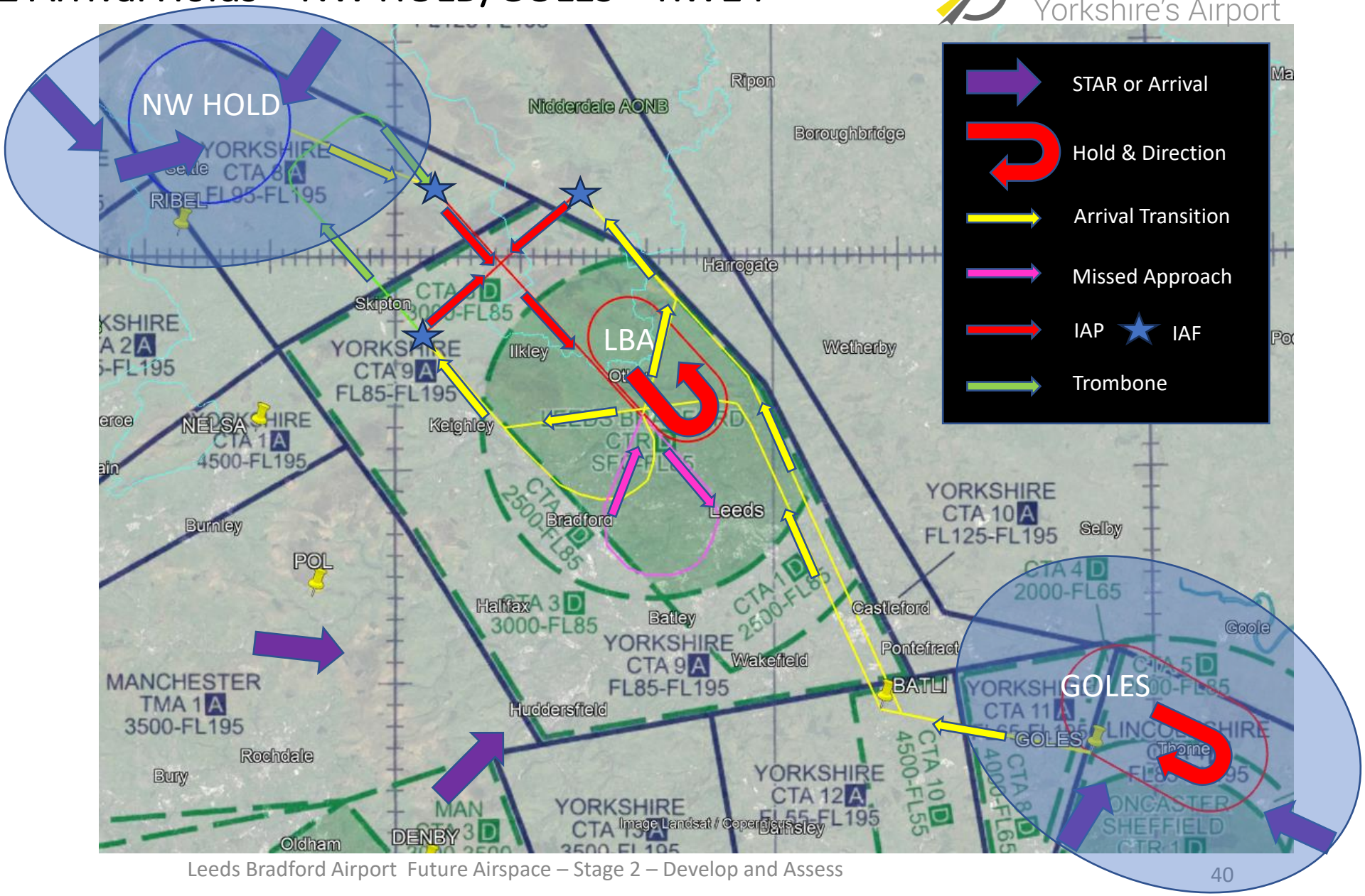
From the SW and SE: MAMUL/GOLES - arrival transition through the overhead or downwind left

No Arrival Gates

From the W, NW and NE: NW Hold to 15nm straight-in final

Arrival Holds with a base of at least FL90 and likely to require additional CAS

One overflow extension (Trombone) from the LBA for sequencing



Arrivals – Option 8 - 2 Holds – SETEL/LBA/GOLES

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 8		No improvement	AONB and NP overflown		Needed for 15nm final, eastern T on RW14 and trombone to the north						

Arrivals – Option 9 - 2 Holds – ’UDDER’/GOLES – RW32

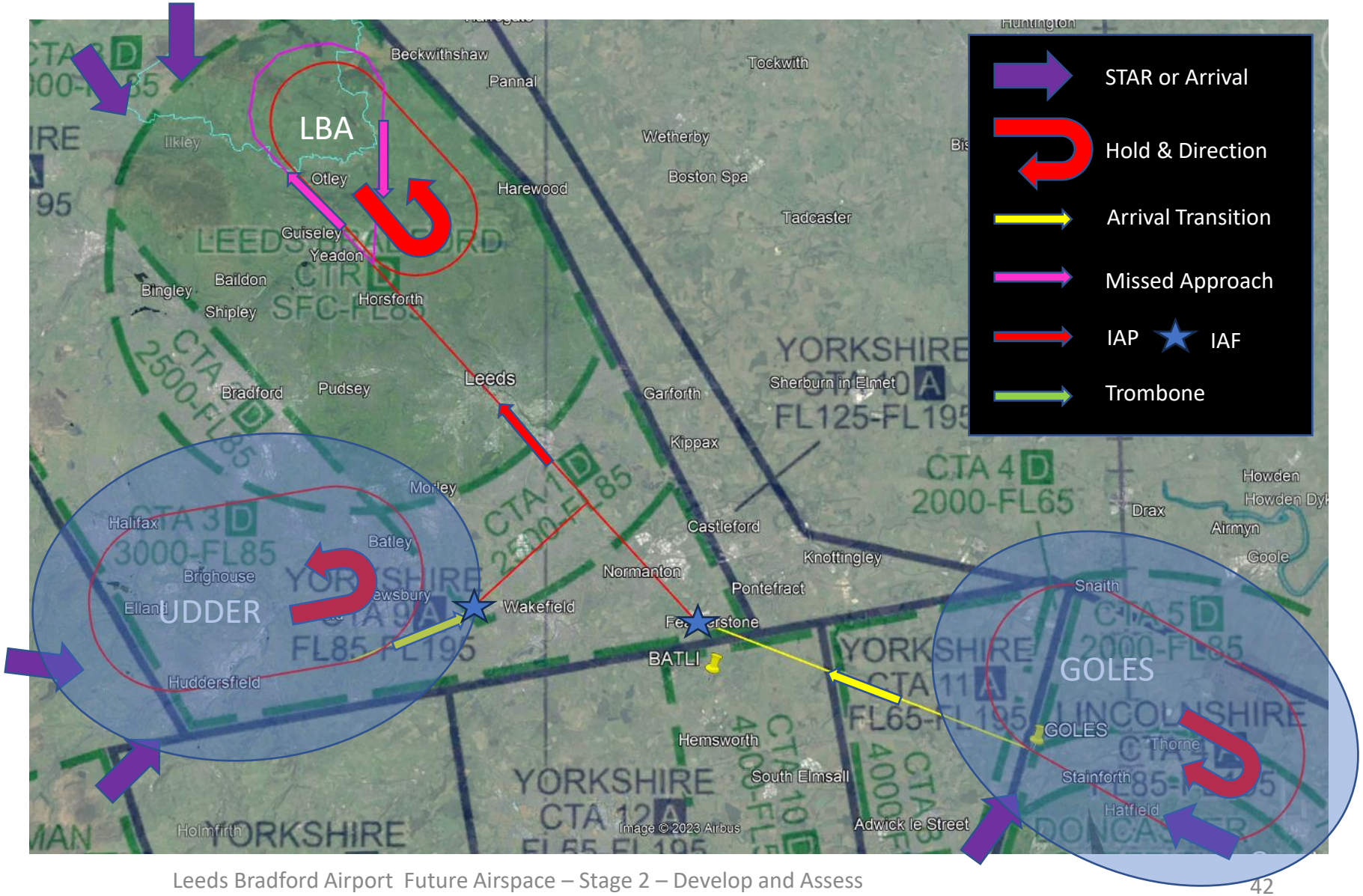
LBA purely MAP Hold

Arrivals from the W and SW now have ‘UDDER’ option (Note: Traffic from SE likely to be being routed towards MAMUL/GOLES by NERL)

GOLES additional CAS required

GOLES & UDDER Arrival Holds FL80 upwards

Arrivals from NW and NE tactically managed



Arrivals – Option 9 - 2 Holds – 'UDDER'/GOLES – RW14

LBA purely MAP Hold

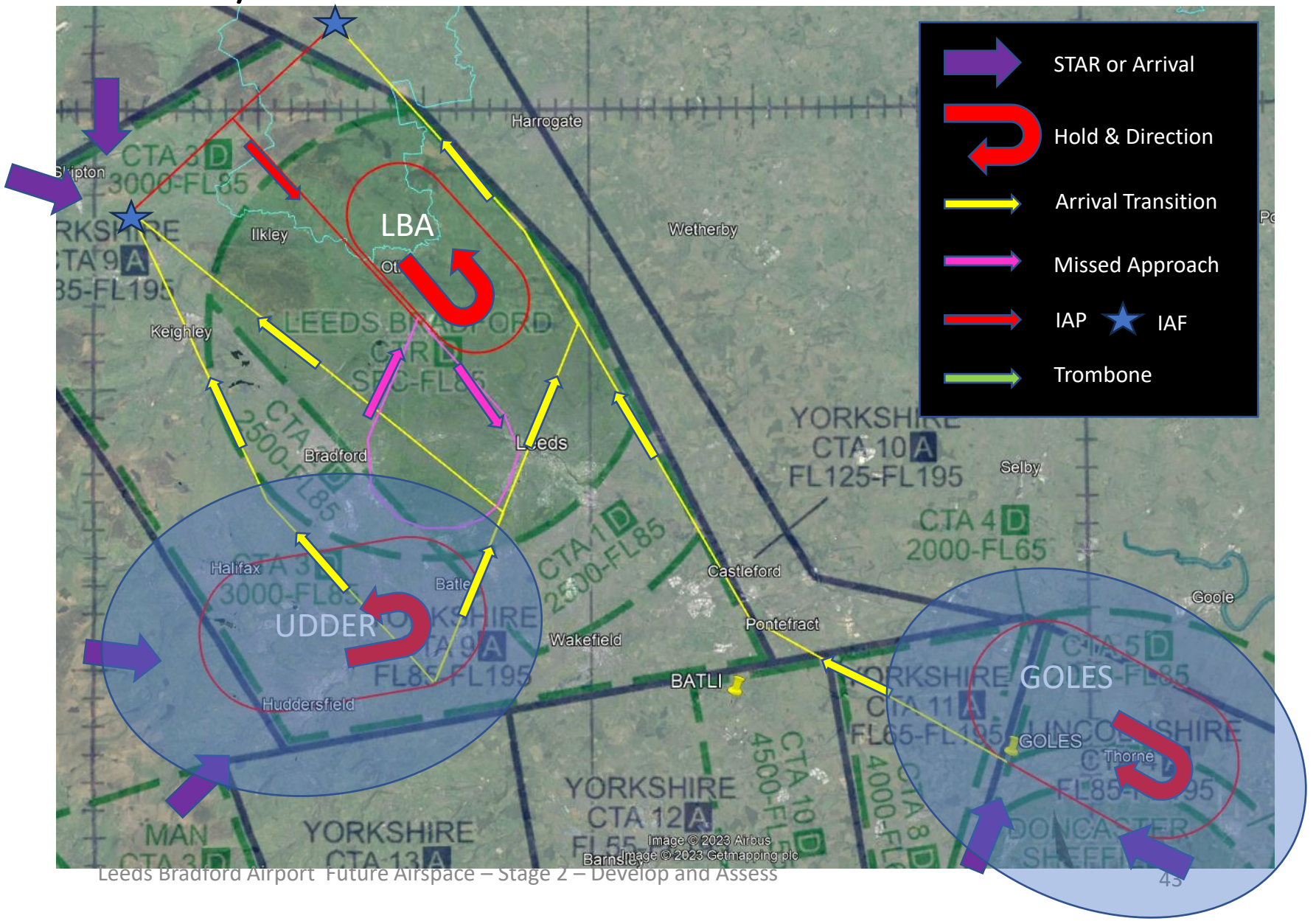
Arrivals from the W and SW now have 'UDDER' option (Note: Traffic from SE likely to be being routed towards MAMUL/GOLES by NERL)

GOLES additional CAS required

GOLES & UDDER Arrival Holds FL80 upwards

Arrivals from NW and NE tactically managed

Arrival transition options: wide downwind right for when no POL/NELSA departures, closer downwind right and downwind left for when there are departures to LAMIX or POL/NELSA



Arrivals – Option 9 - 2 Holds - ’UDDER’/GOLES

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 9		No improvement	AONB overflown by eastern T-Bar to RW14	UDDER hold may impact RW14 departures	Potential requirement for additional CAS for GOLES/UDDER holds	Likely changes to CAS		UDDER hold may impact RW14 departures			

Rationale behind Option 10

UK Policy on STARs versus the AMS

UK policy requires that STARs conclude at a holding fix with an associated arrival hold. From this holding fix, arrival transitions can be designed to take aircraft directly to the various IAFs from which to commence their final approach.

Holds take up significant volumes of airspace and the protection required around them exacerbates this still further. Therefore, finding suitable volumes of airspace within which to contain the holds required for the required STARs into LBA has become a challenge.

One of the objectives of the AMS is to systemise airspace to an optimal extent, providing repeatable, predictable and efficient procedures that are all linked. Adherence to UK policy on STARs whilst seeking to meet the demands of the AMS is proving challenging at LBA due to the limitations on where holds can go.

CAP785B

The above-named Civil Aviation Publication written by the CAA gives sponsors the option to develop STARs that do not have holding fixes or holds but instead route directly to the IAFs. These 'Direct Arrivals' require the Sponsor to provide the CAA's IFP Regulator sufficient justification for why they do not wish to adhere to normal policy.

Option 10 is an attempt to systemise the LBA operation without having STARs (that have holding fixes and holds) for every arrival direction. Instead, only traffic from the South and East would have a STAR ending at a holding fix (GOLES). Traffic from all other arrival directions would have direct arrivals to the respective IAFs contained within the swathes depicted on the following slides.

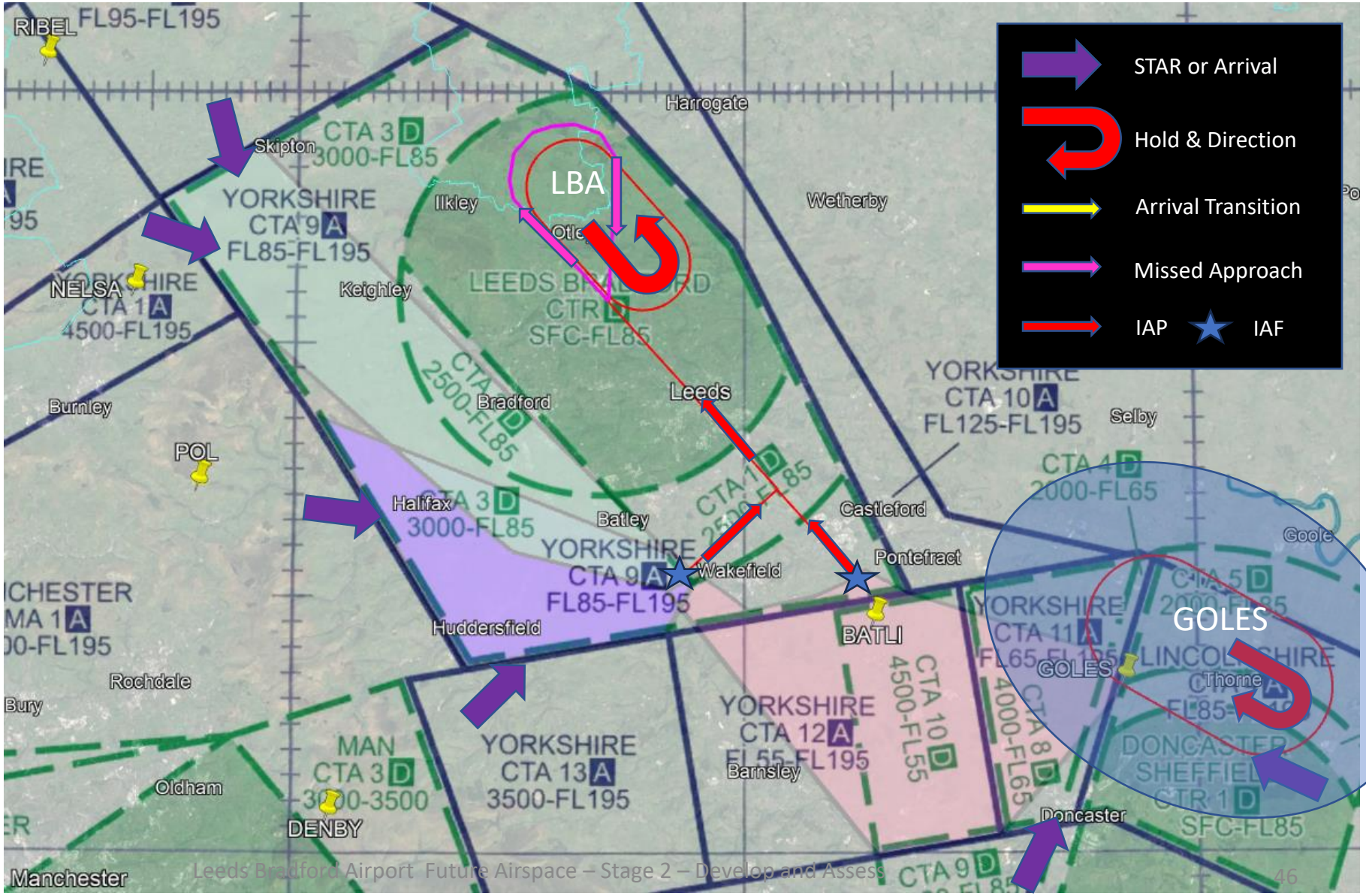
Arrivals – Option 10 – 1 Arrival Hold – GOLES & Direct Arrivals – RW32

LBA MAP and weather hold. GOLES arrival and weather hold with transitions to the approach

Coloured swathes depict containment for other arrival transitions with purple arrows depicting the likely origin of that traffic into the LBA CTA

Airspace to the west of GOLES intended to contain potential 'trombone' procedure to facilitate the sequencing of arrivals

GOLES additional CAS required and likely base FL80



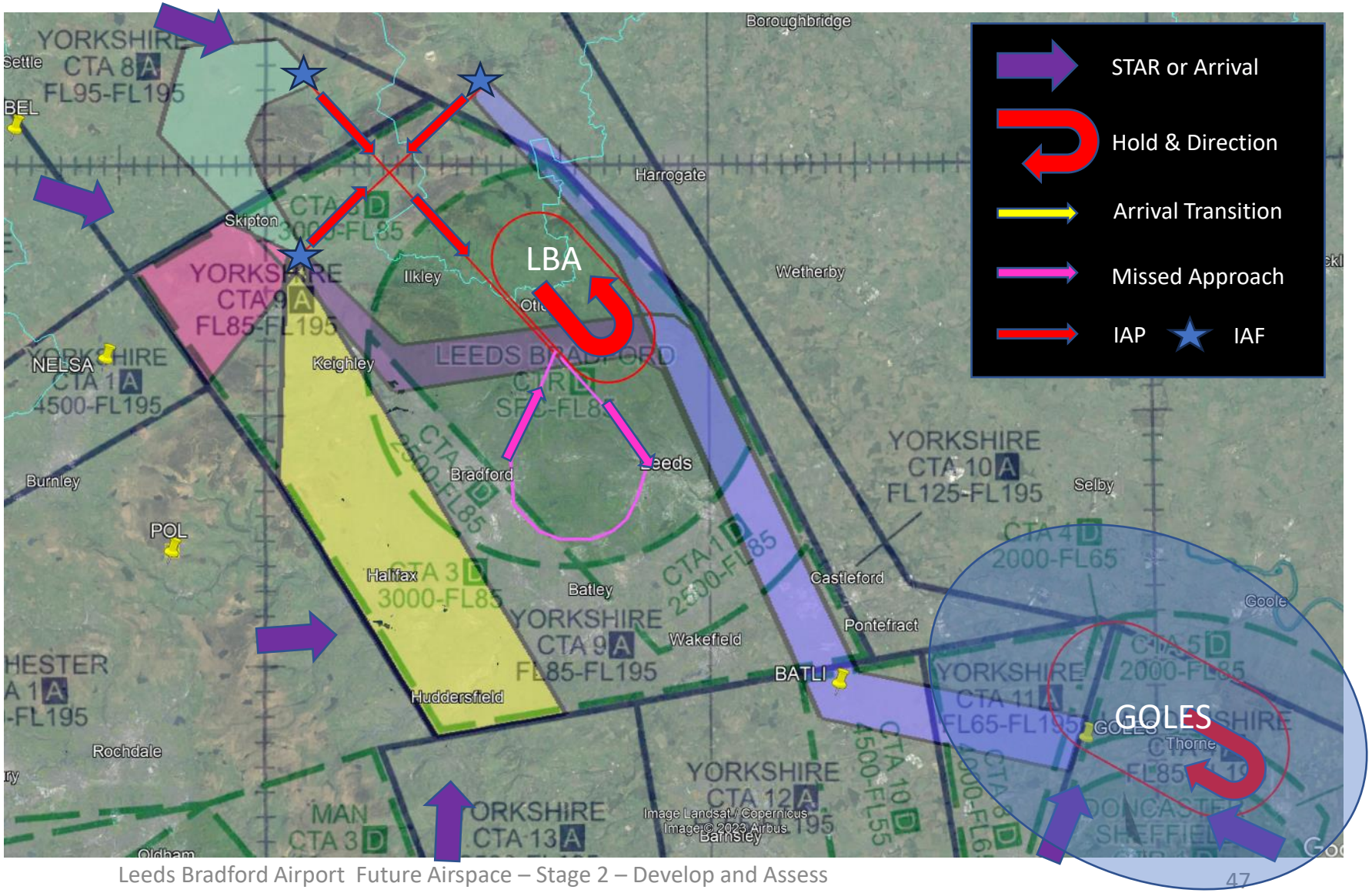
Arrivals – Option 10 – 1 Arrival Hold – GOLES & Direct Arrivals – RW14

LBA MAP and weather hold. GOLES arrival and weather hold with transitions to the approach

Coloured swathes depict containment for other arrival transitions with purple arrows depicting the likely origin of that traffic into the LBA CTA

Airspace to the NW intended to contain potential 'trombone' procedure to facilitate the sequencing of arrivals

GOLES additional CAS required and likely base FL80



Arrivals – Option 10 – 1 Arrival Hold – GOLES & Direct Arrivals

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 10		Potential for improvements to be made within the swathes	Yorkshire Dales NP and AONB impacted	Cannot justify 'green' at this stage. Too early to tell.	Potential requirement for additional CAS for GOLES hold	Likely changes to CAS	Lack of holding fixes and holds for some arrivals needs justification	Potential for inbounds from W and SW to still conflict with departures			

Arrival Options Overview

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Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 1											
Option 2											
Option 3											
Option 4											
Option 5											
Option 6											
Option 7											
Option 8											
Option 9											
Option 10											

Required Navigation Performance Authorisation Required (RNP AR)

Cutting-edge satellite-based technology utilised by the most up to date aircraft fleets.

Highly accurate track monitoring enables shorter final approaches and manoeuvres around built-up areas.

LBA would be the first UK airport to propose such ambitious eco-friendly approaches, but these have been safely proven around the world for over a decade.

Limited aircraft certified to fly such approaches in Instrument Meteorological Conditions in the UK at this time, however forecast to increase rapidly in the next 2-5 years.

Could potentially be flown under Visual Meteorological Conditions by non-certified operators.

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Yorkshire's Airport

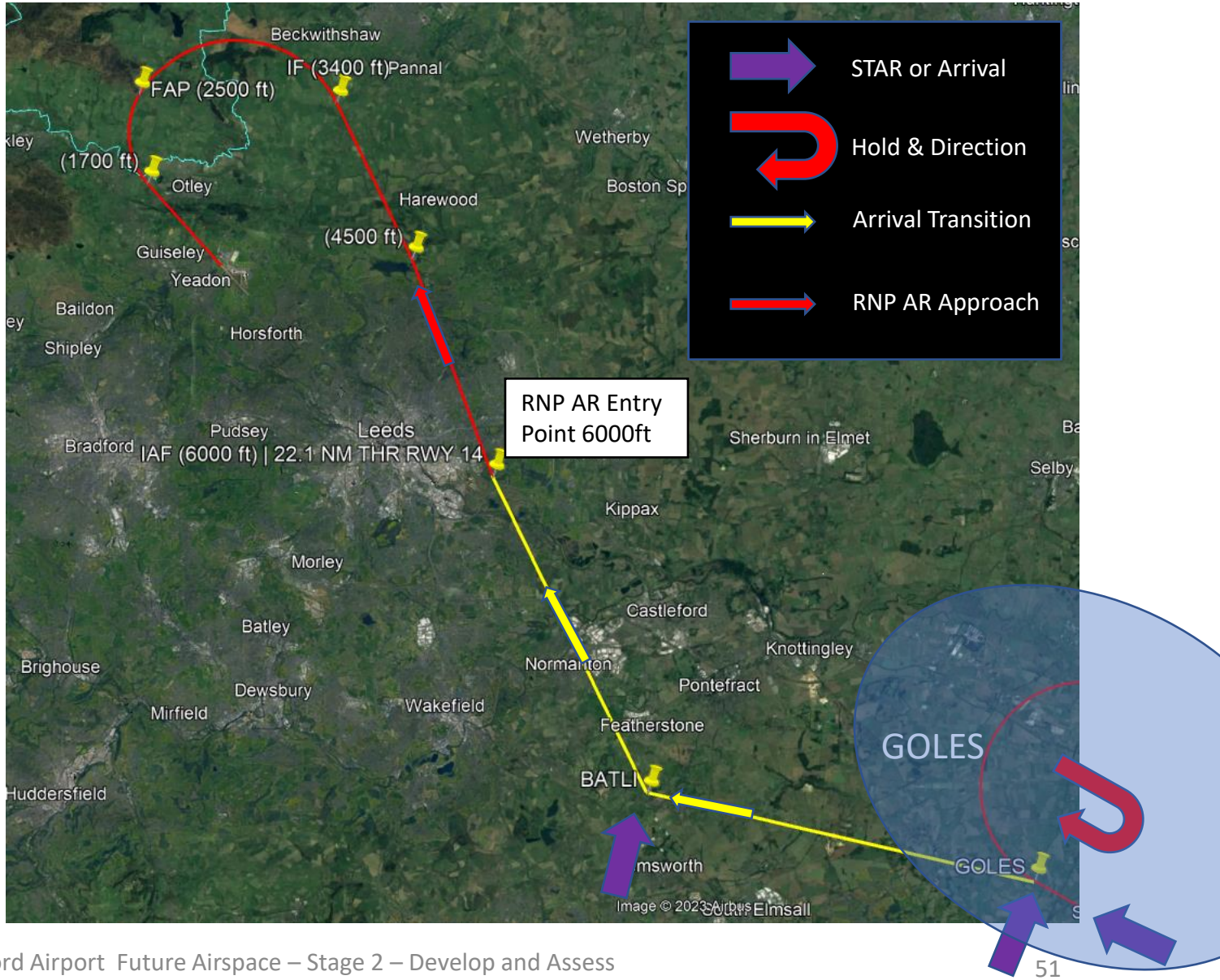
CYRRUS

Additional Option – RNP AR - RW14

More environmentally friendly approach providing a shorter route to RW14 from the SE

Significantly shorter than the standard arrival and, as a result, significant fuel and CO_2 saved on each arrival

Eastern suburbs of Leeds overflown not below 5000 feet at continuous descent on idle power, further descent over open countryside until final approach



Additional Option – RNP AR - RW14

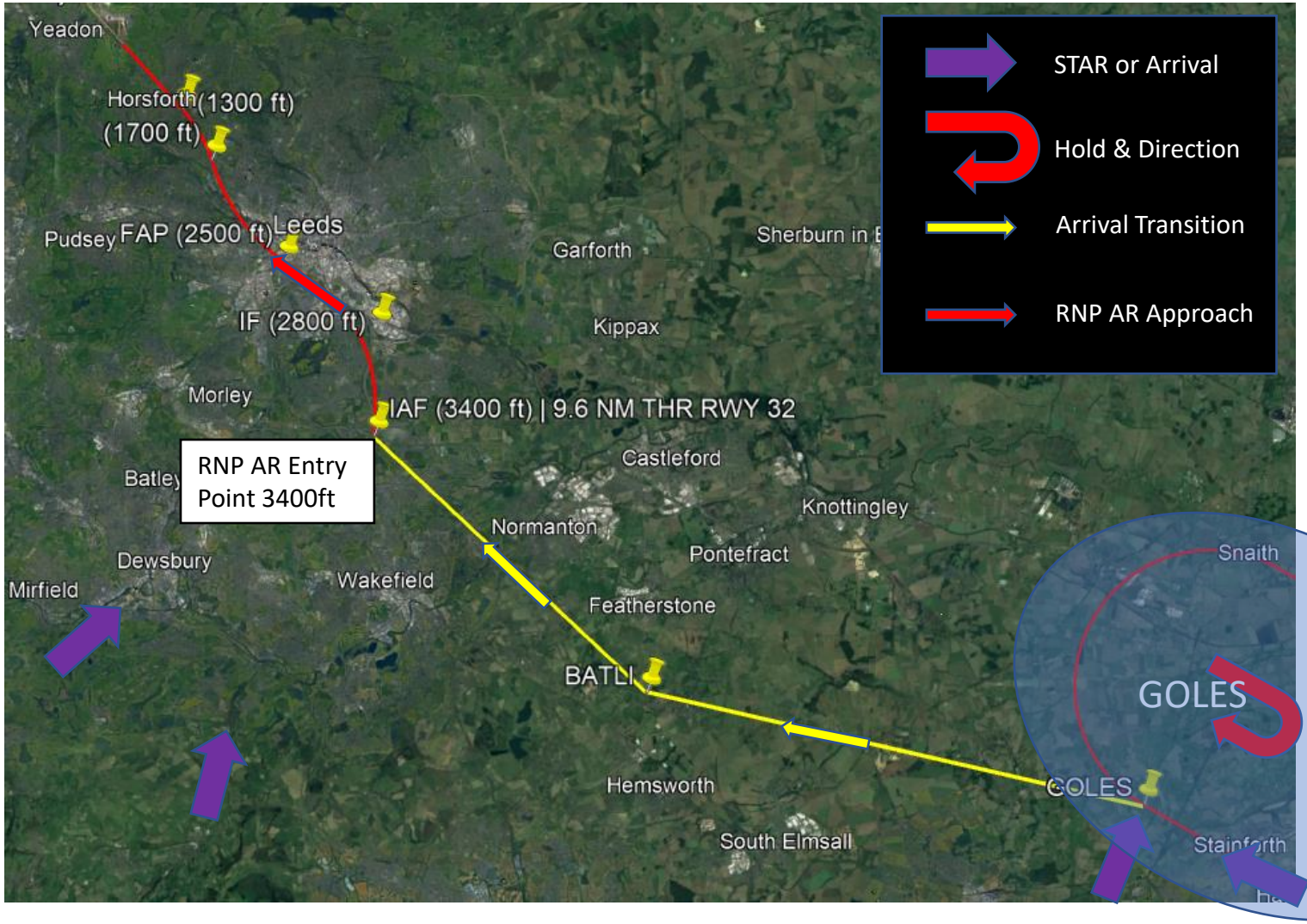
Important Note: Concept Only - Track only an indication of what might be possible. It would be optimised for noise, fuel and emissions reduction before final proposals are developed for consultation

Additional Option – RNP AR – RW32

Approach offset intended to avoid overflying central Leeds Residential district, Headingley, Hyde Park Districts

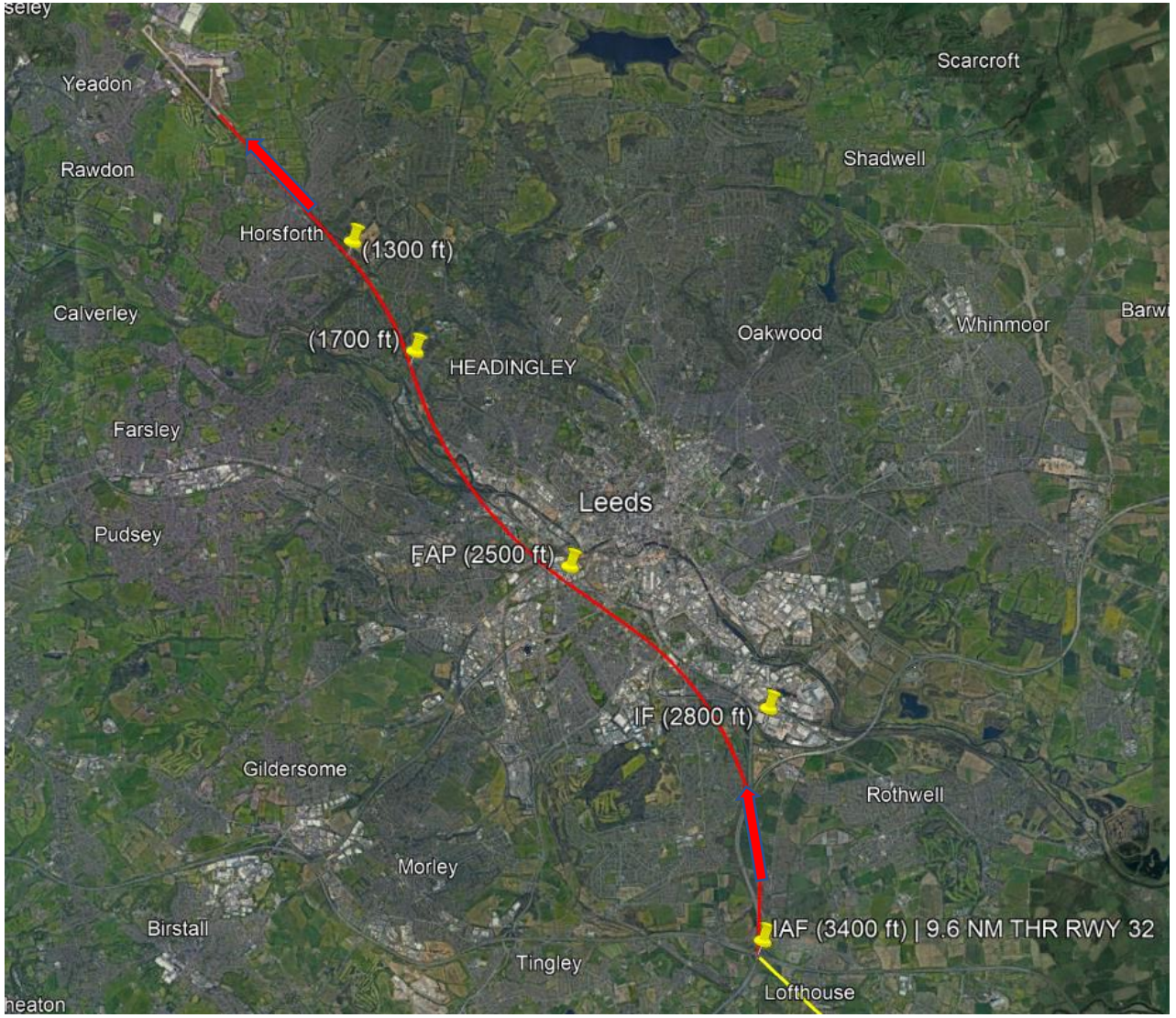
Potential respite option that could be alternated with standard approach on rotation

Potential for arrival transitions to the IAF from other arrival directions, not just GOLES



Additional Option – RNP AR – RW32

Important Note: Concept Only - Track only an indication of what might be possible. It would be optimised for noise, fuel and emissions reduction before final proposals are developed for consultation



Additional Option – RNP AR – RW14 and RW32

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
RW14		NE Leeds suburbs overflown in the descent to 5000ft					Crews not currently certified to fly such approaches				Some operators would require a fleet upgrade
RW32							Crews not currently certified to fly such approaches				Some operators would require a fleet upgrade

Leeds Bradford Airport Future Airspace

Thank you for your time. We hope that you find this information on Leeds Bradford Future Airspace useful.

If you have any further queries, please address them to Airspace Change

We are very grateful for your assistance.

The Leeds Bradford ACP Team

Round 4 Update – May 2025

Our Ref: CPJ-5692-DOC-044-V1.0

LEEDS BRADFORD AIRPORT (LBA) FUTURE AIRSPACE – CAP1616 ACP – STAGE 2 – Clarification Update and New Arrival Option Engagement.

Introduction

Following on from our previous engagement activities, the LBA Airspace Change Proposal (ACP) did not pass through the CAA CAP1616 Stage 2 gateway in May 2024. The CAA feedback has highlighted where LBA need to provide updates to stakeholders and areas that require additional clarification. In addition, following design feedback from the En-Route Air Traffic Service (ATS) provider NERL, LBA would like to introduce an additional eastern arrival transition for Runway 32.

We sincerely appreciate the time you have already invested in the LBA (ACP) and now seek your further feedback on the new option and welcome your comments on the updates provided.

Clarification & Updates

We would like to share the following updates with you:

1. **Clarification on the Presentation of new Departure Options:** The presentation of the new departure options differed from previous rounds of engagement based on stakeholder feedback. We aim to provide further explanation and clarification on the nature of the feedback and our decision to amend how the options were presented.
2. **Our Rationale for Retaining Certain Arrival Options:** An explanation of why arrival options previously considered unviable were not discounted in our last presentation.
3. **Changes to Design Principle Evaluation (DPE):** Revisions to the wording of the design principle evaluation criteria for three of the Design Principles (DPs) and an explanation of any impacts on the DPE results. Also, the methodology used for applying the criterion has been updated so we will explain the rationale and impacts of that on the DPE process.

As well as providing the specific clarifications and updates outlined above, we have also updated some of the materials used in the last round of engagement with the new information and outcomes. This will provide an updated picture of the DPE with all of the key updates highlighted.

- 'LBA FASI(N) ACP Further Design Option Update Brief – Part 1: Departures'
- 'LBA FASI(N) ACP Further Design Option Update Brief – Part 2: Arrivals'

New Eastern Arrival Transition Option for Runway 32

As a result of stakeholder feedback and discussions with NERL, an opportunity arose to include an additional Eastern Transition for Runway 32, connecting to the proposed northwest hold. This aims to deconflict with all proposed western departure options from Leeds.

This new option is presented below (New Eastern Arrival Transition Option for Runway 32) and in the *'LBA FASI(N) ACP Further Design Option Update Brief – Part 2: Arrivals'* presentation. It includes:

1. The baseline
2. The rationale for the new option
3. Our initial DPE assessment

As with previous rounds of engagement, we ask for your feedback on whether the DPs have been correctly applied to this option. We are not providing a survey response form for this round. However, if you have comments, please email us at **acp@lba.co.uk**, clearly referencing the relevant DP in your response.

Clarification & Updates

1. **Clarification on Departure Options**

Based on feedback from previous consultation rounds, the illustrative format of these options was revised to present a clearer and less cluttered depiction of departure swathes.

The new departure options focus on new ground tracks during the initial climb-out phase, aiming to maximise benefits for local communities. Recognising that all three departure directions align with these new ground tracks, it was decided to consolidate them into a single "combination departure option." This approach addresses concerns raised in earlier consultations about the extensive documentation, streamlining the process by focusing on initial track changes considered for new flight paths.

2. **Rationale for Retaining Certain Arrival Options**

It was acknowledged in the previous presentation (LBA FASI(N) ACP Further Design Option Update Brief-Part 2 Arrivals) that NERL's preference for an arrival system from the northwest could render options 2–5 potentially unviable, this routing remains dependent on NERL securing agreements with other ANSPs for revised airspace routings. Consequently, options 2–5 were included in the Design Principle Evaluation and Initial Options Appraisal as alternative options, in case NERL's request for the northwest route is unsuccessful.

3. **Changes to Design Principle Evaluation (DPE)**

Following guidance from the CAA and a review of our documentation, we have revised the wording of three DPE assessment criteria: **DP2 (Noise), DP4 (Emissions and Air Quality)** and **DP9 (Operational Cost).** The tables below outline the updated wording alongside the previous versions for comparison.

DP#	Design Principle	Qualitative Assessment	
DP2	**Noise -** The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.	Initial high level qualitative assessment based on examining the number of people flown over using Population-Weighted Centroids (PWC) data. While communities may vary, the primary focus remains on population metrics. Note: we have not captured different communities in DP2 as this is captured in DP9.	
Old Criteria	**Meets:** Limits or has the potential to reduce overall impacts of aircraft noise.	**Partially Meets:** Impacts of aircraft noise likely to be broadly similar in terms of the number of people affected albeit some communities (possibly previously unaffected ones) may be affected more than others.	**Does Not Meet:** Has the potential to increase the overall impacts of aircraft noise on local communities.
New Criteria	**Meets:** Limits or has the potential to reduce the number of people flown over.	**Partially Meets:** Impacts of aircraft noise likely to be broadly similar in terms of the number of people flown over although it may be different communities	**Does Not Meet** Has the potential to increase the number of people flown over

Table 1: DPE Criteria Change DP2 Noise

The revised criteria for DP2 have been simplified to clarify that the emphasis is on the impact on the number of people flown over, rather than changes to the specific communities affected. Any changes to the communities themselves are addressed under DP9. This adjustment enhances consistency and clarity when evaluating options against the DP.

DP#	Design Principle		Qualitative Assessment
DP4	**Emissions and Air Quality** – The proposed design should minimise CO2 emissions per flight.		Initial high level qualitative assessment based on track miles. A more detailed assessment will be conducted in Stage 2B in the IOA sections 'Greenhouse gas impact' and 'Fuel burn'.
Old Criteria	As compared to other DOs, has potential to burn less fuel and, as a result, minimise CO_2 emissions.	Is not the most fuel-efficient DO but is not significantly worse than other DOs.	Clearly an inefficient DO resulting in an unnecessary and excessive fuel burn and the resulting CO2 emissions.
New Criteria	**Meets:** Has potential to reduce CO2 emissions.	**Partially Meets:** CO2 emissions likely to be the same or similar to today's operation.	**Does not Meet:** Has the potential to increase CO2 emissions.

Table 2: DPE Criteria Change DP4 Emissions and Air Quality

The revised criteria for DP4 have been updated to compare each option directly with today's operations, rather than with other options. This approach offers a clearer indication of whether an option is likely to be better, the same, or worse outcomes in terms of emissions and air quality, using track miles as a key indicator.

DP#	Design Principle		Qualitative Assessment
DP9	**Operational Cost** – Provided it does not have an adverse impact on community disturbance, procedures should be designed to optimise fuel efficiency.		Assessed similarly to DP4 - Emissions and Air Quality, more track miles will incur more fuel cost. Initial high level qualitative assessment. Further assessment relating to this DP will be conducted in Stage 2B in the IOA section 'Fuel burn'.
Old Criteria	Fuel efficiency is optimal without an adverse impact on local communities.	Fuel efficiency is marginally sub-optimal due to consideration to the	Fuel efficiency is clearly not optimised, or it has been optimised at the expense of local communities.

		impact on local communities.	
New Criteria	**Meets:** Fuel efficiency is optimal without an adverse impact on local communities.	**Partially Meets:** Fuel efficiency is optimal however there is some impact on local communities.	**Does not Meet**: Fuel efficiency not optimized and/or the community impact is greater compared with today.

Table 3: DPE Criteria Change DP9 Operational Cost

Given that DP9 consists of two distinct elements, the revised criteria aim to improve clarity in both application and interpretation, particularly when determining the RAG score. The first element, fuel burn, is assessed using track miles as an indicator, while the second, impact on local communities, considers whether different communities would be flown over. Therefore, this DP can be considered in two parts, as outlined below:

Meets	**Partially Meets**	**Does not Meet**
Fuel burn reduced compared to today	Fuel burn comparable to today	Fuel burn increased compared to today
Community impact reduced compared to today	Community impact comparable to today	Community impact increased compared to today

Table 4: Breakdown of DP9

Using this guide, an example would be if an option represents the potential to reduce fuel usage but the impact on communities is similar to today, then the DP would be rated Amber.

The table below offers a reminder of all our Design Principles (DPs) along with their corresponding assessment criteria, including the updated wording for the revised criteria. Following the table, we provide a more detailed explanation of how these criteria have been applied in practice.

DP #	Design Principle		
DP1	**Importance of Safety** – The airspace design and its operation must maintain or where possible, enhance current levels of safety.		
Criteria	**Meets:** No safety issues identified.	**Partially Meets:** Issues identified to overcome that would require a significantly more robust safety argument than today's operation.	**Does Not Meet:** Issues identified that would be unlikely to be overcome without prohibitively restrictive safety mitigations.
DP2	**Noise** - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.		

DP #	Design Principle		
Criteria	**Meets:** : Limits or has the potential to reduce the number of people flown over.	**Partially Meets:** Impacts of aircraft noise likely to be broadly similar in terms of the number of people flown over although it may be different communities	**Does Not Meet:** Has the potential to increase the number of people flown over.
DP3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONB's.		
Criteria	**Meets:** Limits effects on Noise Sensitive Areas and does not result in any overflight of a AONB or a NP below 7000ft.	**Partially Meets:** May result in overflight of a portion of an AONB or a NP, also may result in overflight of tranquil areas important to local communities such as reservoirs or parks.	**Does Not Meet:** Results in direct and significant overflight of AONBs or NPs and/or various tranquil areas important to local communities.
4	**Emissions and Air Quality** – The proposed design should minimise CO_2 emissions per flight.		
Criteria	**Meets** Has potential to reduce CO2 emissions.	**Partially Meets:** CO_2 emissions likely to be the same or similar to today's operation.	**Does Not Meet:** Has the potential to increase CO_2 emissions.
5	**Airspace Dimensions** – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.		
Criteria	**Meets:** Allows for either a reduction in the volume of CAS required or does not require any additional CAS.	**Partially Meets:** May result in a need for small amounts of additional CAS but there may be potential to revert some CAS to Class G.	**Does Not Meet:** Large additional volumes of CAS are required to contain the proposed option without the potential to revert to Class G.
6	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.		

DP #	Design Principle		
Criteria	**Meets:** Does not result in a complex CTA/CTR configuration with numerous different base levels likely to lead to inadvertent CAS penetrations.	**Partially Meets:** Results in changes to the CAS configuration that may cause other aviators some minor challenges.	**Does Not Meet:** Results in a highly complex CAS configuration.
7	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.		
Criteria	**Meets:** Is fully compliant and meets the technical capabilities of almost all airport operators.	**Partially Meets:** Is largely compliant but with reasonable justification for any non-compliance and meets the technical capabilities of most airport operators.	**Does Not Meet:** Has several non-compliances without reasonable justification and does not meet the technical capabilities of several airport operators.
8	**Systemisation** – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the IAPs, deconflict with the departure procedures, reducing the requirement for tactical coordination.		
Criteria	**Meets:** Integrates seamlessly with the en-route network and is likely to reduce the need for tactical coordination and vectoring within the CTA/CTR.	**Partially Meets:** Integrates seamlessly with the en-route network but may not reduce the need for tactical coordination and vectoring within the CTA/CTR.	**Does Not Meet:** Does not integrate seamlessly with the en-route network and will not decrease the need for tactical coordination and vectoring within the CTA/CTR.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.		
Criteria	**Meets:** Fuel efficiency is optimal without an adverse impact on local communities.	**Partially Meets:** Fuel efficiency is optimal however there is some impact on local communities.	**Does Not Meet:** : Fuel efficiency not optimized and/or the community impact is greater compared with today.
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.		
Criteria	**Meets:** Aligned with the AMS.	**Partially Meets:** Partially aligned with the AMS.	**Does Not Meet:** Not aligned with the AMS.
11	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.		

DP #	Design Principle		
Criteria	**Meets:** Designed to the latest navigation standards that do not require aircraft fleet upgrades.	**Partially Meets:** Designed to the latest navigation standards that may require aircraft fleet upgrades.	**Does Not Meet:** Fails to utilise the latest navigation standards.

Table 5: LBA Design Principle Criteria

DPE Assessment Methodology

The following section provides details on how the criteria in the table above (table 3) were applied. The DPE is a high-level qualitative assessment, using a simple **Red-Amber-Green (RAG)** scoring for each DP. Further detail for some DPs will be included during the Initial Options Appraisal (IOA), and more in-depth quantitative analysis is planned for Stage 3 of this ACP.

DP1 - Safety

The safety assessment was conducted by Subject Matter Experts (SMEs) at LBA. The focus was on how each option affected the safety of the Air Traffic Management (ATM) system. Safety issues caused by additional controlled airspace (CAS) were scored under the Airspace Complexity Design Principle (DP6). All baseline options were assessed as **Green**, as they reflected the current safe operation. Considerations for safety included conflicts between arrivals and departures. A more detailed safety assessment is planned for Stage 3, once options were rationalised. Safety remained a priority throughout the process.

DP2 - Noise

Noise was assessed by examining the number of people flown over using Population-Weighted Centroids (PWC) data from the Office of National Statistics. PWC is a method for calculating human population density within a given area, which allowed the identification of densely populated regions. Baseline operations were scored as Amber, as they provided no improvement over current operations. Options that resulted in fewer people being flown over were scored as Green, while options that affected more people were marked Red. Different communities impacted (compared with today's operation) were not considered under this DP, as community impacts were assessed in DP9 (Operational Cost).

DP3 - Tranquillity

Tranquillity and noise-sensitive areas were assessed by identifying all options, including baselines, that overflew Areas of Outstanding Natural Beauty (AONB) and National Parks (NP). Additionally we considered the North and South Pennine Moors due to the feedback from previous stakeholder engagement. Further consideration is given to other noise sensitive sites in the IOA, such as Ramsar sites, Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) and Special Areas of Conservation (SAC). DEFRA's MAGIC maps were used to identify areas of tranquillity.

DP4 - Emissions and Air Quality

As mentioned above, the wording for this criterion was revised. The assessment compared options to current operations, focusing on track miles (distance flown by aircraft) as a proxy for fuel burn and emissions. Options resulting in longer track miles, compared to todays operation, were assessed as **Red**,

while options with fewer track miles, than todays operation, were marked **Green**. Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) were noted as potential mitigating factors, but they were not factored into the initial assessment due to uncertainties regarding interactions between options. For example, some departure routes may achieve continuous climb when used with one arrival option, however another arrival option may offer overall greater benefits but involve a period of level flight.

DP5 - Airspace Dimensions

SMEs assessed the airspace required for each option, aiming to minimise the volume of new controlled airspace. Options requiring the same or less airspace were scored as **Green**, those needing a small additional amount of controlled airspace were scored **Amber**, and those requiring a significant increase were scored **Red**. There may be potential to reduce the amount of CAS, particularly to the west of Leeds Bradford Airport. The extent of any changes will depend on the final preferred departure and arrival options, as well as their interactions. A more detailed assessment of the proposed CAS configuration will be conducted during the Stage 3 evaluation.

DP6 - Airspace Complexity

Each option's airspace configuration was assessed to determine its impact on airspace complexity. This included both controlled and uncontrolled airspace, with attention given to potential challenges for other airspace users, such as the General Aviation (GA) community. Baseline operations were scored **Green**, as they represented current operations. Do-minimum options were also scored **Green**, as they remain within the existing airspace structure.

DP7 - Technical Requirements

SMEs evaluated whether operators at LBA had the technical capability to fly each option and whether the procedures complied with PANS-OPS and UK CAA criteria. Options that met the technical capabilities of most operators were scored **Green**, while those with partial compliance or requiring minor adjustments were marked **Amber**. No option was designed with multiple non-compliance issues or where several operators could not fly the procedure (**Red**).

DP8 - Systemisation

Systemisation was assessed by evaluating connectivity to and from the en-route network, considering the Future Airspace Strategy Implementation (North) (FASI(N)) programme. Tactical coordination[1] and vectoring[2] requirements between arrival transitions and departure procedures were also considered.

Options that offered seamless integration with the en-route network and reduced the need for tactical coordination or vectors were scored **Green**. Options that required some coordination were marked **Amber**, while those needing significant coordination were scored **Red**.

DP9 - Operational Cost

The revised wording for this criterion focused on fuel efficiency and community impact compared with today's operation. Similar to DP4, track miles were used as a measure of fuel efficiency. Options that

[1] Tactical coordination in refers to real-time communication and decision-making between ATC units or sectors to manage immediate or short-term situations. It involves resolving conflicts, adjusting flight paths, or updating transfer conditions on the fly, typically to address dynamic traffic conditions or unforeseen circumstances.

[2] Tactical vectoring involves giving immediate, short-term heading instructions to pilots to manage traffic separation, sequence aircraft, or respond to dynamic operational needs.

increased track miles were scored **Red**, while those that reduced or matched current levels were scored **Green**. Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) were again noted but not included in the scoring due to their dependency on other options. Community impact was assessed: **Green** if no new communities were affected, **Amber** if the same communities were impacted, and **Red** if different communities were affected.

DP10 AMS Realisation

Several DPs evaluated aligned with the objectives of the Airspace Modernisation Strategy (AMS). The key objectives of the AMS are Safety, Integration of Diverse Users, Simplification and Environmental Sustainability.

The DPs we used to assess AMS realisations are as follows:

- DP1 - Safety
- DP2 - Noise
- DP4 - Emissions and Air Quality
- DP5 - Airspace Dimensions
- DP6 - Airspace Complexity
- DP8 - Systemisation
- DP 9 - Operational Cost
- DP11 – PBN

If either DP1 or DP11 was scored Red, DP10 was also scored Red. Safety is of the highest priority— any option rated Red for safety will automatically receive a red score for the AMS. Without PBN, the vast majority of proposed upgrades to UK airspace are not viable. A Red score on PBN will therefore automatically result in a red score for the AMS design principle . All baseline options were scored Red for DP10 because none of them met the PBN requirement at LBA.

DP10 was also rated Red if three or more of DP2, DP4, DP5, DP6, DP8, or DP9 were Red. The score was Green if all of DP1, DP2, DP4, DP5, DP6, DP8, DP9, and DP11 are Green. All other combinations resulted in an Amber rating.

DP11 PBN (Performance-Based Navigation)

SMEs at LBA assessed whether the options would capitalise on the benefits of PBN[3] implementation. The introduction of PBN allows tightly spaced routes, and the opportunity to reduce workload. Any positive impact that PBN has on Safety is included in the Safety Design Principle. Any impact on the Environment will be assessed as part of the Noise, Emissions and Operational Costs Design Principles.

New Eastern Arrival Transition Option for Runway 32

Following our last round of engagement and as a result of stakeholder feedback and discussions with NERL, an opportunity arose to include an additional Eastern Transition for Runway 32, connecting to the proposed northwest hold. This aims to deconflict with all proposed western departure options from Leeds.

[3] PBN is a navigation framework that relies on satellite-based systems and onboard aircraft capabilities, rather than traditional ground-based navigation aids. It enhances accuracy, efficiency, and flexibility in airspace management by specifying required performance standards for aircraft operations.

Current Baseline

Arrivals from Northern Ireland and the North are vectored through this arrival gate in the vicinity of Huddersfield towards Runway 32. Figure 1 illustrates the current baseline swathe from the WSW. As the aircraft are under radar vectors, no exact track over the ground is followed. This leads to a large dispersion of flight paths to the South West of the Airport. Between 7-10% of the daily arrivals into Leeds would potentially use the MARIA transition. A peak summers day would see around 8 arrivals per day, the vast majority of inbounds arriving between 0800-2200 local time. Around 3/4 of these arrivals are propeller driven commuter aircraft used on the service to Belfast.

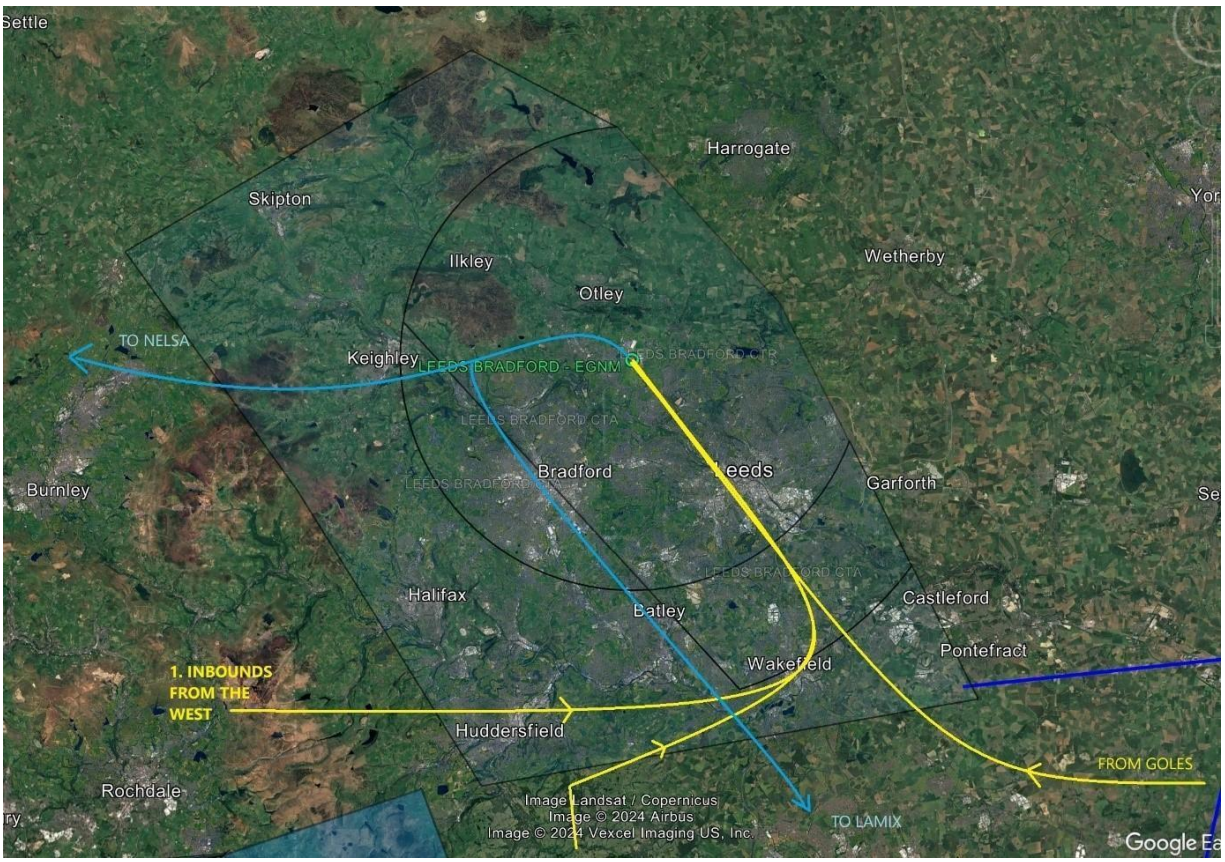


Figure 1: Typical routing of all Irish flights under the baseline present day operations as shown on the yellow line – 1. inbounds from the west"

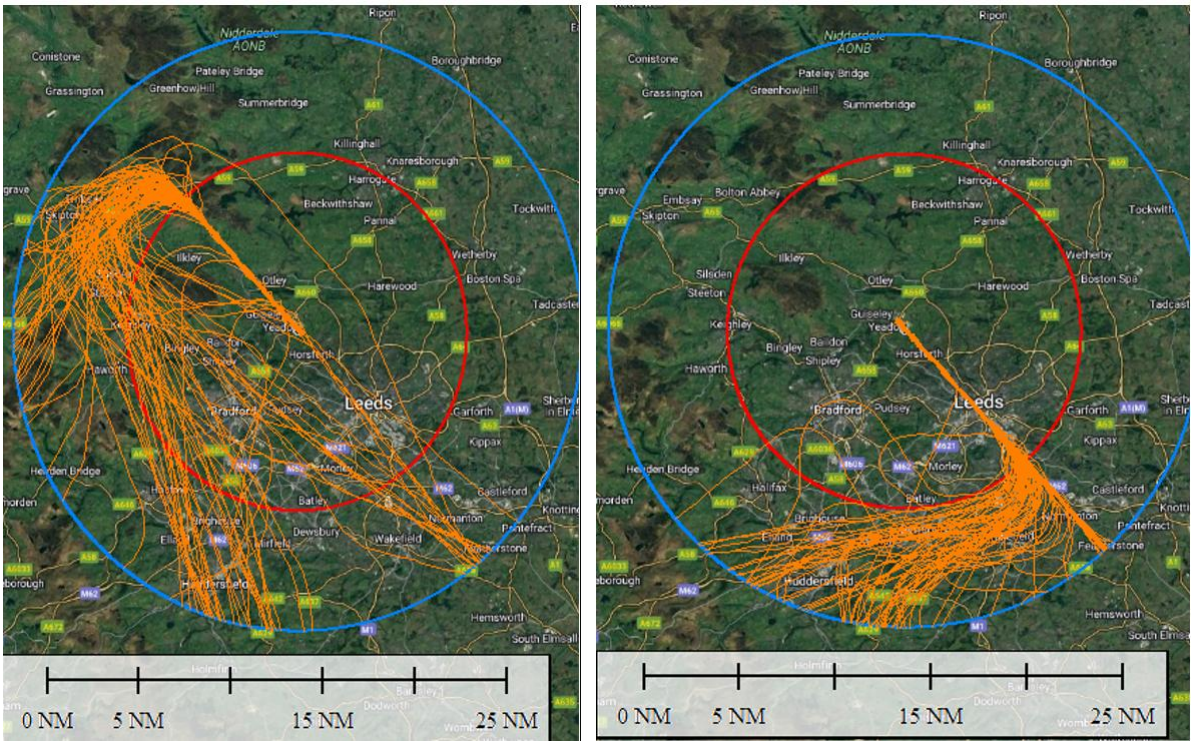


Figure 2: Baselines from Noise and Track Monitoring System (NTMS) Data (Summer 2022)

The Problem

The current arrival system into Leeds is not systemised. As part of their changes to the lower airways system, NERL are proposing that inbound traffic from Northern Ireland, Scotland and the Baltic region are routed to a new northwest hold, provisionally named MARIA to the northwest of Leeds. Leeds Bradford Airport are then responsible for designing arrival rotes which link the hold to the arrival runway. The proposed arrival routes must endeavour to meet the objectives of the Airspace Modernisation Strategy. Wherever possible, arrival routes should provide separation from departure routes to enable fuel efficient continuous climbs and descents.

Runway 32 North West Hold Easterly Arrival Option

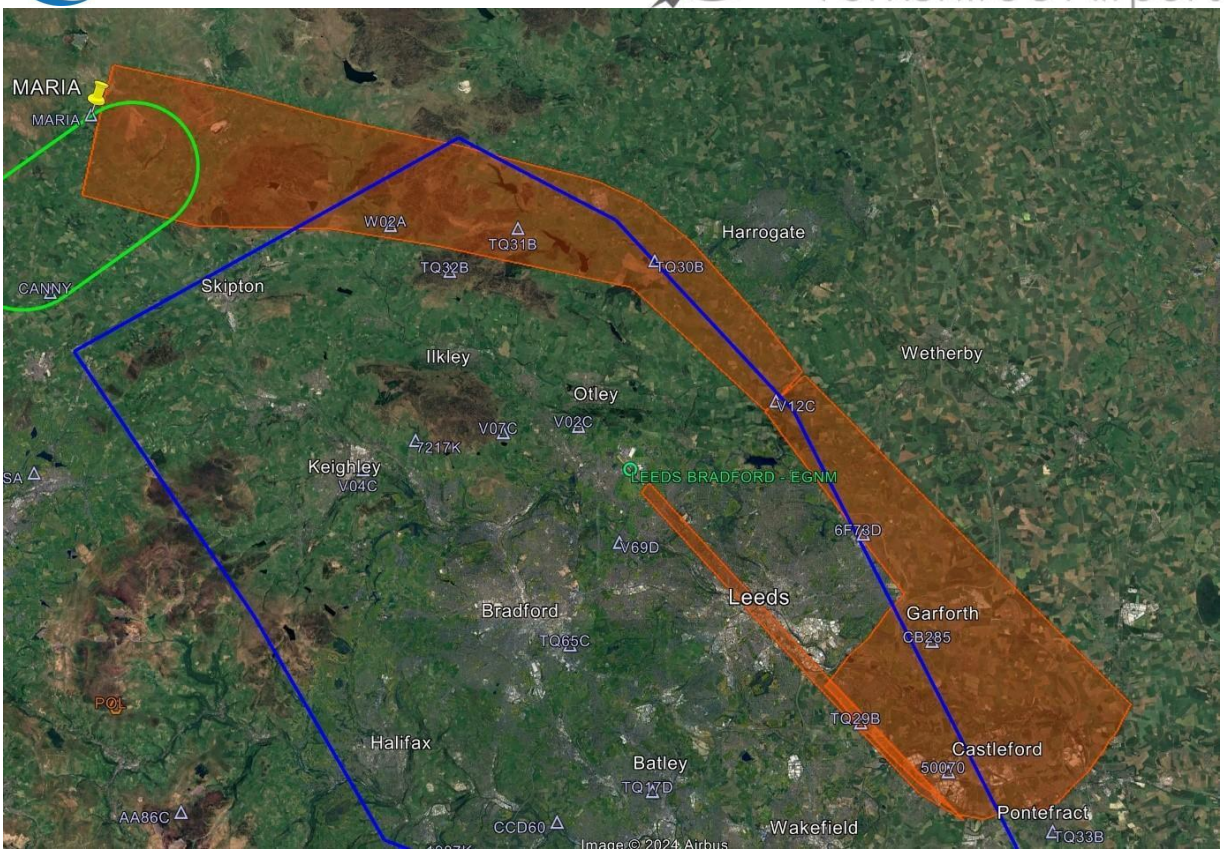


Figure 3: The proposed Easterly MARIA transition. The orange swath indicates the proposed area that the transition may encompass. The blue line indicates the current boundary of controlled airspace.

This transition leaves the proposed northwestern hold (MARIA) on an ESE track to pass well to the north of the Runway 32 extended climb out. This track will deconflict from all departure routes from Runway 32, allowing continuous climbs for outbounds. The transition would track, as far as practical, open countryside to the east of the airport onto the downwind.

The proposed transition would require additional controlled airspace to the east and southeast of the airport in order to comply with regulatory standards. The current eastern boundary of controlled airspace is shown in blue in the above diagram.

The transition will be designed to turn inbound towards the airport in the vicinity of Northern Kippax, with the track designed to avoid as much of the population as possible. An overrun buffer area extending to the south of Castleford may be considered to give the controllers additional room to sequence arrivals in the event of conflictions with other inbound aircraft.

Height Profile

The transition will be designed to facilitate the most economical, continuous descent procedures to the runway. Figures 5 and 6 below indicate the estimated height profiles on the transition. It must be noted that the exact tracks and height bands would be determined in stage 3 after simulation trials had been completed.

On leaving the MARIA hold, traffic would be at or above 8000 feet until passing to the west of Harrogate as illustrated by the red line. The inbound would then commence a descent to be at 5000 feet or above when commencing the turn in the vicinity of Kippax back towards the airport.
The coloured lines below give a general indication of the phases of the approach and associated heights:

- Red Line: At or above 7000 feet (Note that at these levels this segment is out of the scope of the Leeds ACP and will be covered by the NERL ACP)
- Yellow Line : Between 6999 and 4000 feet
- White Line : Below 4000 feet.

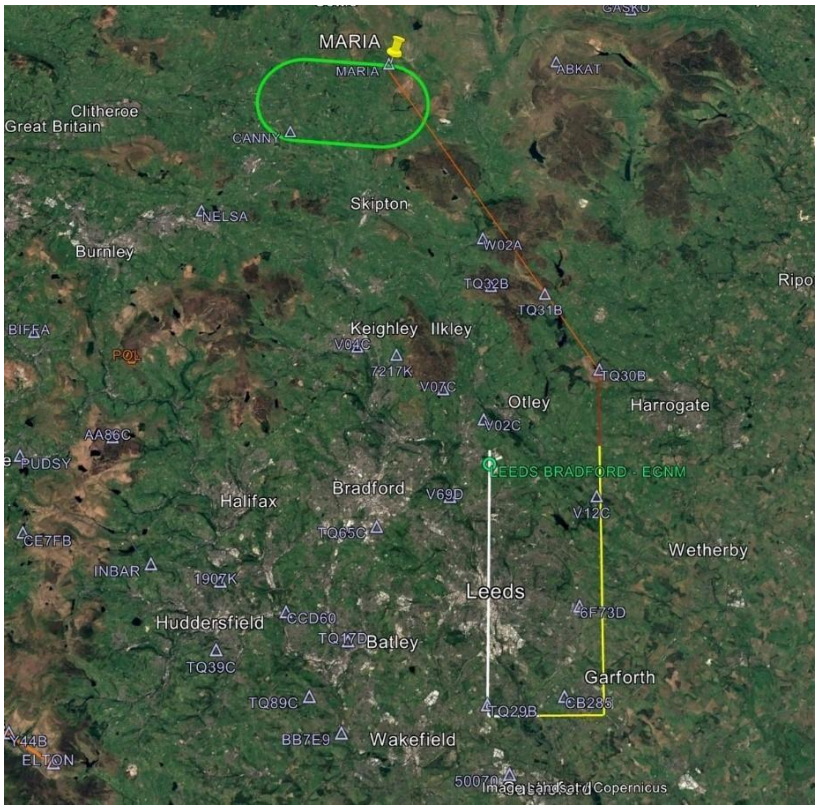


Figure 4: Approximate Height profile of the proposed MARIA Easterly transition. Tracks and altitudes are shown for demonstrative purposes only.

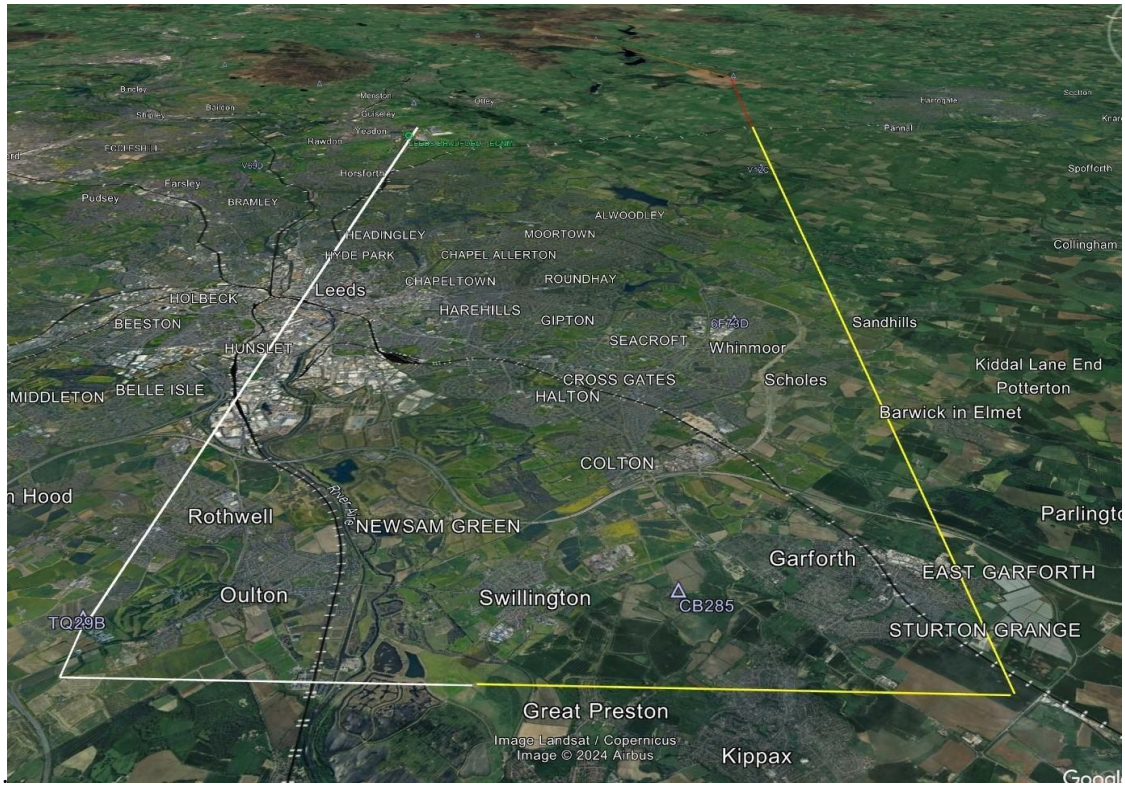


Figure 5: Another view of the approximate height profile of the MARIA transition. Tracks and altitudes are shown for demonstrative

New Option DPE

Option 11	Design Principle	Qualitative Assessment	June 2023	Nov 2023	Final
1	**Safety**	Assessed as fully met as no safety issues identified.			
2	**Noise**	Assessed as fully met as the impact of aircraft noise has the potential to be reduced.			
3	**Tranquillity**	Assessed as fully met as there is no overflight of any AONBs, NPs or noise sensitive areas.			
4	**Emissions and Air Quality**	Assessed as not met due to the significant increase in track miles meaning this option has the potential to increase CO2 emissions.			
5	**Airspace Dimensions**	Assessed as partially met as will require an additional small area of CAS to contain the downwind.			
6	**Airspace Complexity**	Additional airspace may be required with the potential for stepped bases. This may cause other aviators some minor challenges.			
7	**Technical Requirements**	Assessed as being fully met due to the design being fully compliant with PANS-OPS and UK CAA criteria meeting the technical capability requirements of all aircraft using the airport.			
8	**Systemisation**	Assessed as fully met as integrates with the en-route network and is likely to reduce the need for tactical coordination and vectoring.			
9	**Operational Cost**	Assessed as not met as fuel efficiency is not optimised due to the indirect route.			
10	**AMS Realisation**	Assessed as partially met as does not meet the simplification objective. Additionally, no improvement is expected for the environmental sustainability objectives.			
11	**PBN**	Designed to the latest navigation standards that do not require aircraft fleet upgrades for the majority of IFR users of Leeds Bradford Airport.			

Table 6: DPE new Arrival Option

Rationale for DPE

DP1 Safety-Green

No Safety issues identified. The systemised routing will reduce ATC workload which will increase safety levels compared to traditional radar vectoring.

DP 2 Noise-Green

Has potential to reduce the overall impact of noise. The transition will route to the east of the airport over mainly open countryside, rather than route over Bradford and its suburbs which a westerly arrival would entail.

DP3 Tranquillity-Green

Any overflight of AONB to the north of the airport would be at 8000 feet or above. The inbound would commence a descent as it passed east abeam the airport to the northeast of Eccup Reservoir. No tranquil areas would be overflown below 7000 feet.

DP4 Emissions & Air Quality - Red

Routes from the North and Northwest will fly similar miles to touchdown as today. Routes from Northern Ireland would however fly more miles than the baseline within Leeds airspace.

DP5 Airspace and Dimensions-Amber

The downwind leg to the East of the airport would require additional controlled airspace to protect both the downwind and base leg of the transition.

The overall DP is therefore rated amber, due to the requirement of a small amount of controlled airspace to the East of Leeds.

DP6 Complexity-Amber

To keep the requirement for additional controlled airspace to a minimum, stepped bases of controlled airspace may be considered as viable. This may cause other aviators some minor challenges.

DP7 Technical Requirements- Green

The proposed transition should satisfy all PANS OPS and regulatory requirements.

DP8 Systemisation-Green

The proposed transition will link with the proposed en-route entry fix to the northwest. The transition would link with an eastern T-Bar Initial Approach Fix feeding onto the instrument approach procedure. The track of the transitions would be separated from all departure routes offering a fully systemised option.

DP9 Operational Cost-Red

The transition does not offer direct route from the northwest hold therefore fuel efficiency will not be optimised.

DP10 AMS Realisation-Amber

Rated Amber due to a combination of Amber and Red ratings for DPs related to AMS objectives; see page 10 above for further details.

DP11 PBN

The transition would be designed to PANS OPS specifications using existing PBN technology which would not require fleet upgrades to the majority of aircraft likely to use the route at Leeds Bradford Airport.

Thank you for taking the time to review this new option. If you have any feedback on whether the Design Principles (DPs) have been correctly applied, please email us at **acp@lba.co.uk,** clearly referencing the relevant DP in your response.

Please note that we are not providing a survey response form for this round.

Leeds Bradford Airport (LBA) Future Airspace

Step 2a – Design Principle Evaluation Update Brief – May 2025

Part 1: Departures

- **IMPORTANT:** This presentation should be read in conjunction with the **'ACP Stakeholder Engagement Update and New Arrival Option'** document.

- This document highlights the changes made to the DPE for all departure options between the last DPE (November 2023) and the final DPE. (Arrivals are presented separately in Part 2.)

- Key updates:

  - The wording of three DPE assessment criteria—**DP2** (Noise), **DP4** (Emissions and Air Quality) and **DP9** (Operational Cost)—has been revised and reassessed.
  - The methodology for applying other DPs has changed.

- This document illustrates **what** has changed and a brief explanation of **why**; please refer to the **Update document** for a further explanation of **why** these changes have been made and **how** the criteria were applied.

Presentation Roadmap

Leeds Bradford®
Yorkshire's Airport

- **Slides 4 to 8** provide a reminder of the **Design Principles (DP)** and **Design Principle Evaluation Criteria (DPE)**.
- **Slides 9 to 11** recap the **Departure Directions and Network Flow**.
- **Slide 12** gives a rough indication of aircraft altitudes based on an **8% climb gradient** from the airport.
- **Slides 13 to 18** review the **baseline scenario** (current operations) and introduce a new **DPE assessment** for each runway's baseline.
- For each subsequent section:
  - A summary of the **options** is presented.
  - Each **design envelope** includes:
    - The **previous DPE**,
    - The **new DPE**, and
    - A **list of changes**, highlighting differences between the last and current DPE assessments.

Agreed Design Principles (DPs)

DP #	Design Principle
1	**Importance of Safety** – The airspace design and its operation must maintain or where possible, enhance current levels of safety.
2	**Noise** - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.
3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONBs.
4	**Emissions and Air Quality** – The proposed design should minimise CO2 emissions per flight.
5	**Airspace Dimensions** – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.
6	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.
7	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.
8	**Systemisation** – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the Instrument Approach Procedures (IAPs), deconflict with the departure procedures, reducing the requirement for tactical coordination.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.
11	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.

Design Principles Evaluation (DPE) Criteria (DP1-3)

DP #	Design Principle		
DP1	**Importance of Safety** – The airspace design and its operation must maintain or where possible, enhance current levels of safety.		
Criteria	**Meets:** No safety issues identified.	**Partially Meets:** Issues identified to overcome that would require a significantly more robust safety argument than today's operation.	**Does Not Meet:** Issues identified that would be unlikely to be overcome without prohibitively restrictive safety mitigations.
DP2	**Noise** - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.		
Criteria	**Meets:** : Limits or has the potential to reduce the number of people flown over.	**Partially Meets:** Impacts of aircraft noise likely to be broadly similar in terms of the number of people flown over although it may be different communities	**Does Not Meet:** Has the potential to increase the number of people flown over.
DP3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONB's.		
Criteria	**Meets:** Limits effects on Noise Sensitive Areas and does not result in any overflight of a AONB or a NP below 7000ft.	**Partially Meets:** May result in overflight of a portion of an AONB or a NP, also may result in overflight of tranquil areas important to local communities such as reservoirs or parks.	**Does Not Meet:** Results in direct and significant overflight of AONBs or NPs and/or various tranquil areas important to local communities.

Design Principles Evaluation (DPE) Criteria (DPs 4-6)

DP #	Design Principle		
4	**Emissions and Air Quality** – The proposed design should minimise CO_2 emissions per flight.		
Criteria	**Meets** Has potential to reduce CO2 emissions.	**Partially Meets:** CO_2 emissions likely to be the same or similar to today's operation.	**Does Not Meet:** Has the potential to increase CO_2 emissions.
5	**Airspace Dimensions** – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.		
Criteria	**Meets:** Allows for either a reduction in the volume of CAS required or does not require any additional CAS.	**Partially Meets:** May result in a need for small amounts of additional CAS but there may be potential to revert some CAS to Class G.	**Does Not Meet:** Large additional volumes of CAS are required to contain the proposed option without the potential to revert to Class G.
6	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.		
Criteria	**Meets:** Does not result in a complex CTA/CTR configuration with numerous different base levels likely to lead to inadvertent CAS penetrations.	**Partially Meets:** Results in changes to the CAS configuration that may cause other aviators some minor challenges.	**Does Not Meet:** Results in a highly complex CAS configuration.

Design Principles Evaluation (DPE) Criteria (DPs 7-9)

DP #	Design Principle		
7	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.		
Criteria	**Meets:** Is fully compliant and meets the technical capabilities of almost all airport operators.	**Partially Meets:** Is largely compliant but with reasonable justification for any non-compliance and meets the technical capabilities of most airport operators.	**Does Not Meet:** Has several non-compliances without reasonable justification and does not meet the technical capabilities of several airport operators.
8	**Systemisation** – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the IAPs, deconflict with the departure procedures, reducing the requirement for tactical coordination.		
Criteria	**Meets:** Integrates seamlessly with the en-route network and is likely to reduce the need for tactical coordination and vectoring within the CTA/CTR.	**Partially Meets:** Integrates seamlessly with the en-route network but may not reduce the need for tactical coordination and vectoring within the CTA/CTR.	**Does Not Meet:** Does not integrate seamlessly with the en-route network and will not decrease the need for tactical coordination and vectoring within the CTA/CTR.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.		
Criteria	**Meets:** Fuel efficiency is optimal without an adverse impact on local communities.	**Partially Meets:** Fuel efficiency is optimal however there is some impact on local communities.	**Does Not Meet:** : Fuel efficiency not optimized and/or the community impact is greater compared with today.

Design Principles Evaluation (DPE) Criteria (DPs 10 and 11)

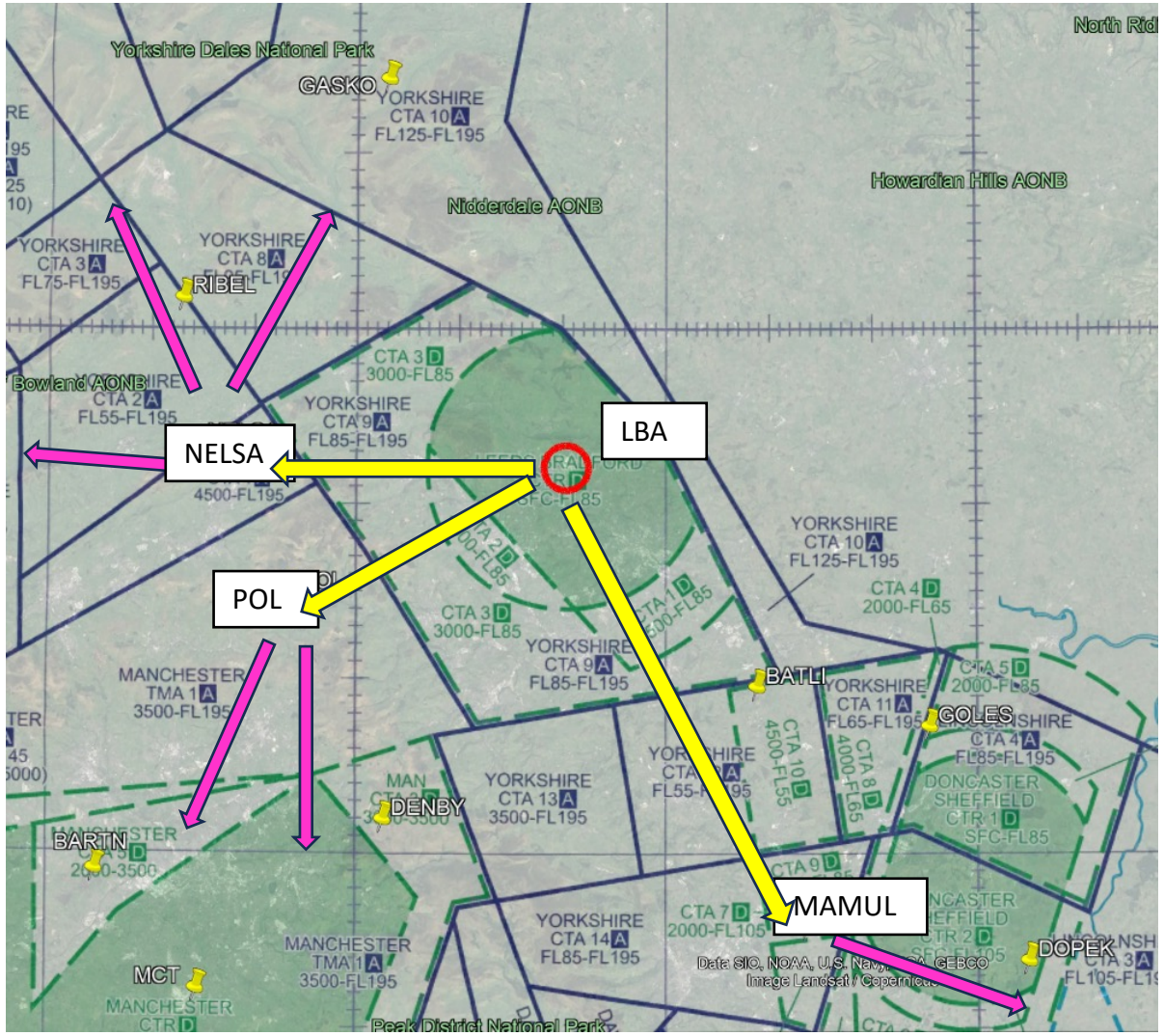
DP #	Design Principle		
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.		
Criteria	**Meets:** Aligned with the AMS.	**Partially Meets:** Partially aligned with the AMS.	**Does Not Meet:** Not aligned with the AMS.
11	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.		
Criteria	**Meets:** Designed to the latest navigation standards that do not require aircraft fleet upgrades.	**Partially Meets:** Designed to the latest navigation standards that may require aircraft fleet upgrades.	**Does Not Meet:** Fails to utilise the latest navigation standards.

Departures

Departure Directions and the Route Network Flow

Stakeholders have expressed a preference to see departures from LBA to route via three gateways into the Route Network:

- W, NW and NE via NELSA
- S and SW via POL
- ESE via MAMUL

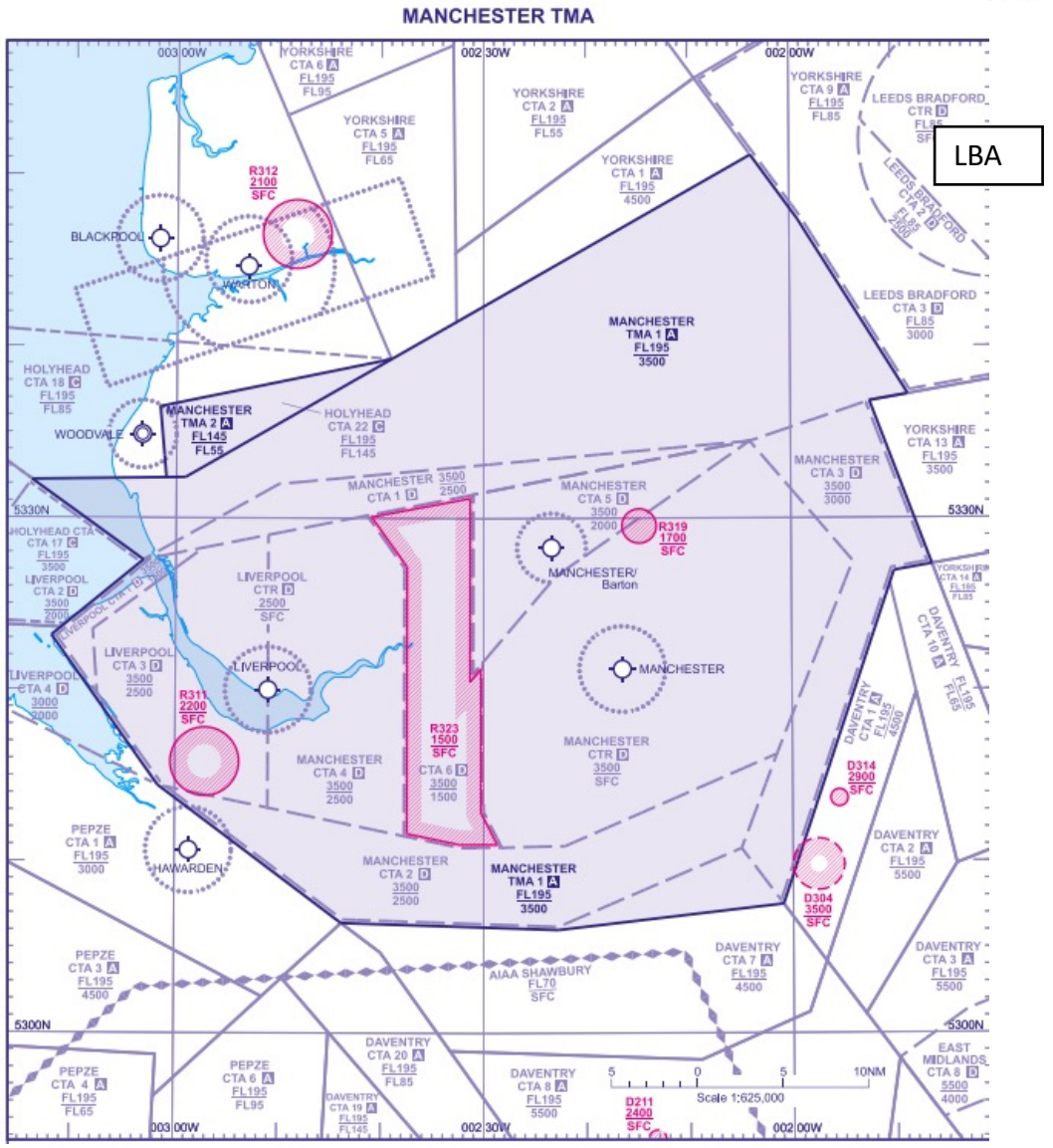


Important: Note that the arrows on this slide do not show flight paths, they show direction of travel from LBA. Flight paths off the two runways would look very different.

MTMA

The points on the previous slides are chosen as they best fit the overall flow of the Manchester Terminal Manoeuvring Area (MTMA) within which aircraft are climbing in and out of various airports, principally:

- Manchester;
- Liverpool;
- East Midlands; and
- Leeds Bradford.

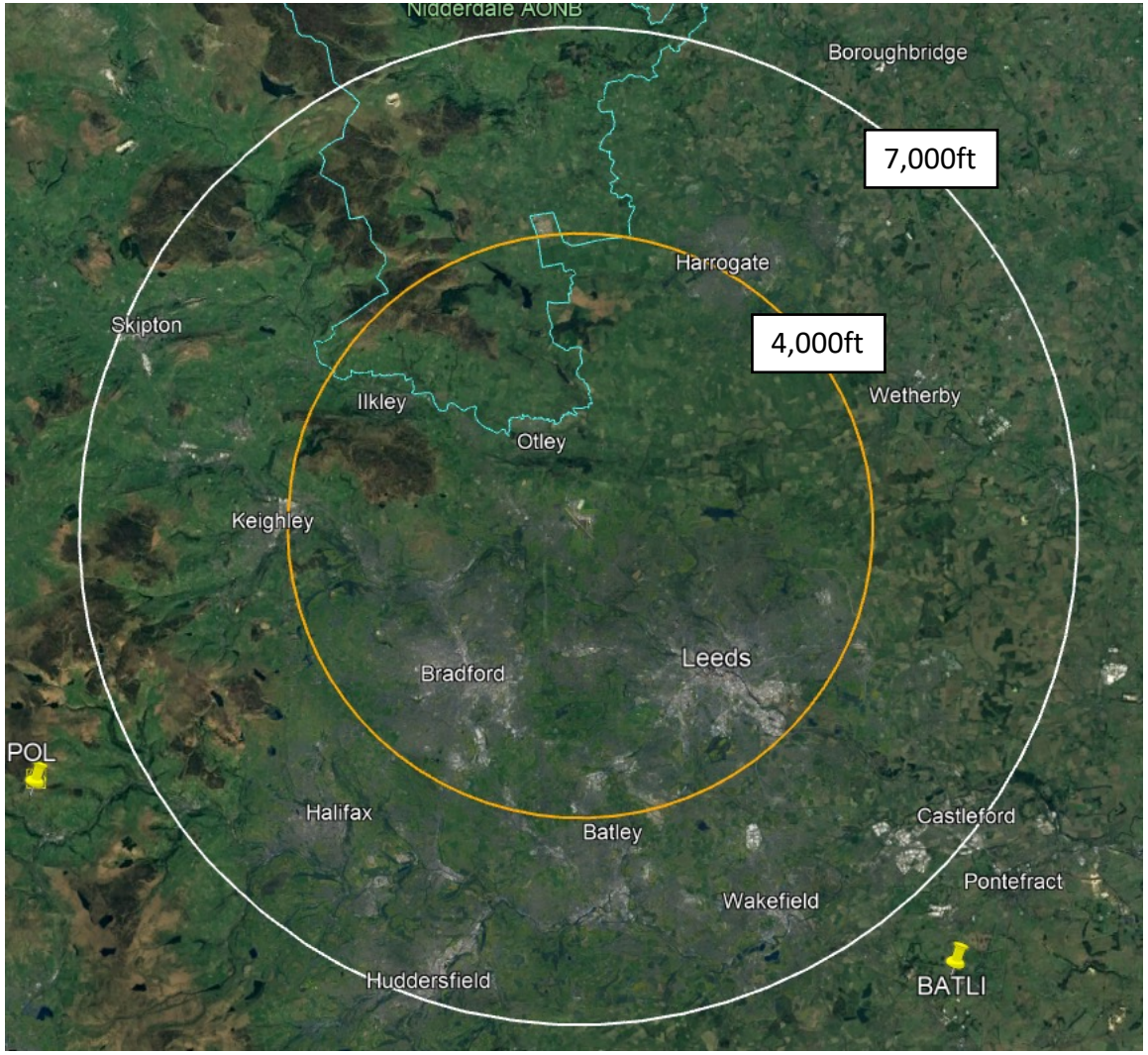


Climb Gradient Range Rings

This graphic shows two ranges from LBA where aircraft can realistically expect to achieve 4,000ft and 7,000ft on an 8% climb gradient.

This gradient has been routinely achieved and exceeded, even on the hottest days of the summer months.

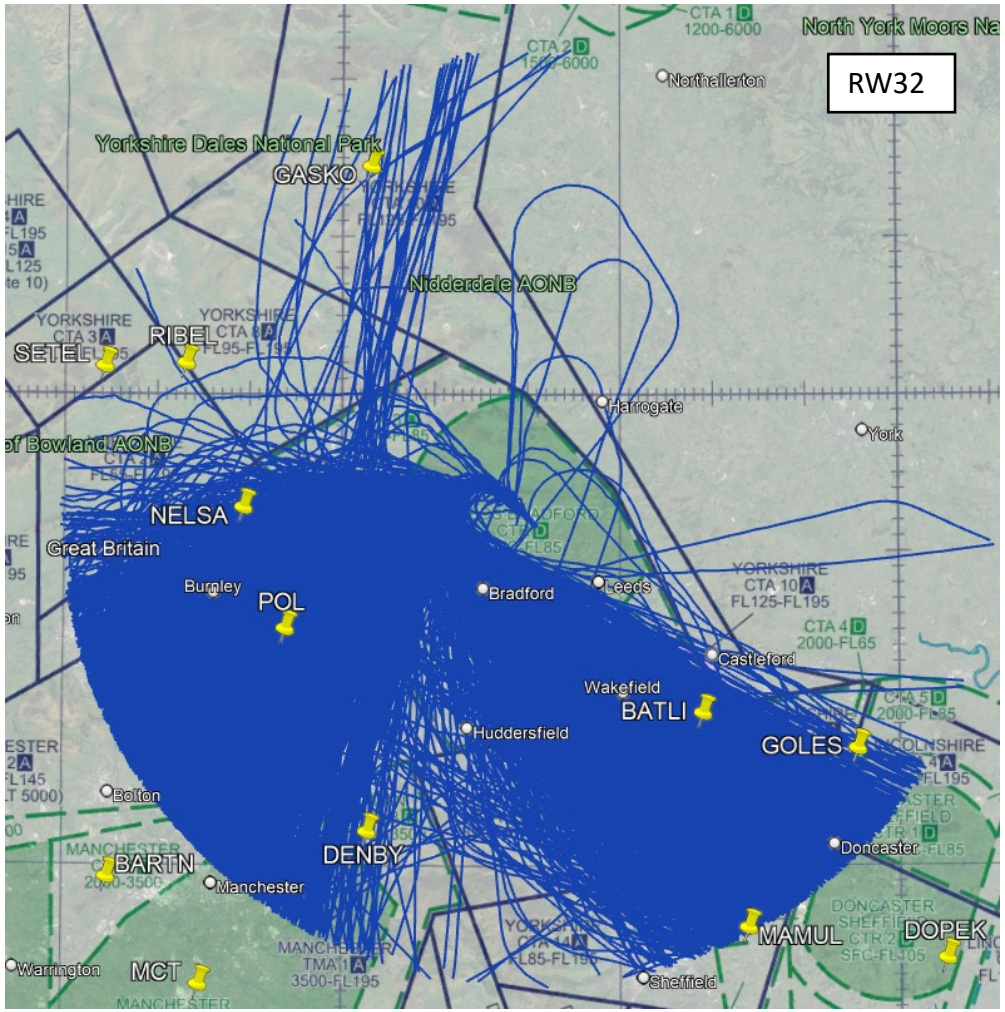
These range rings are presented on the departure option slides for perspective.

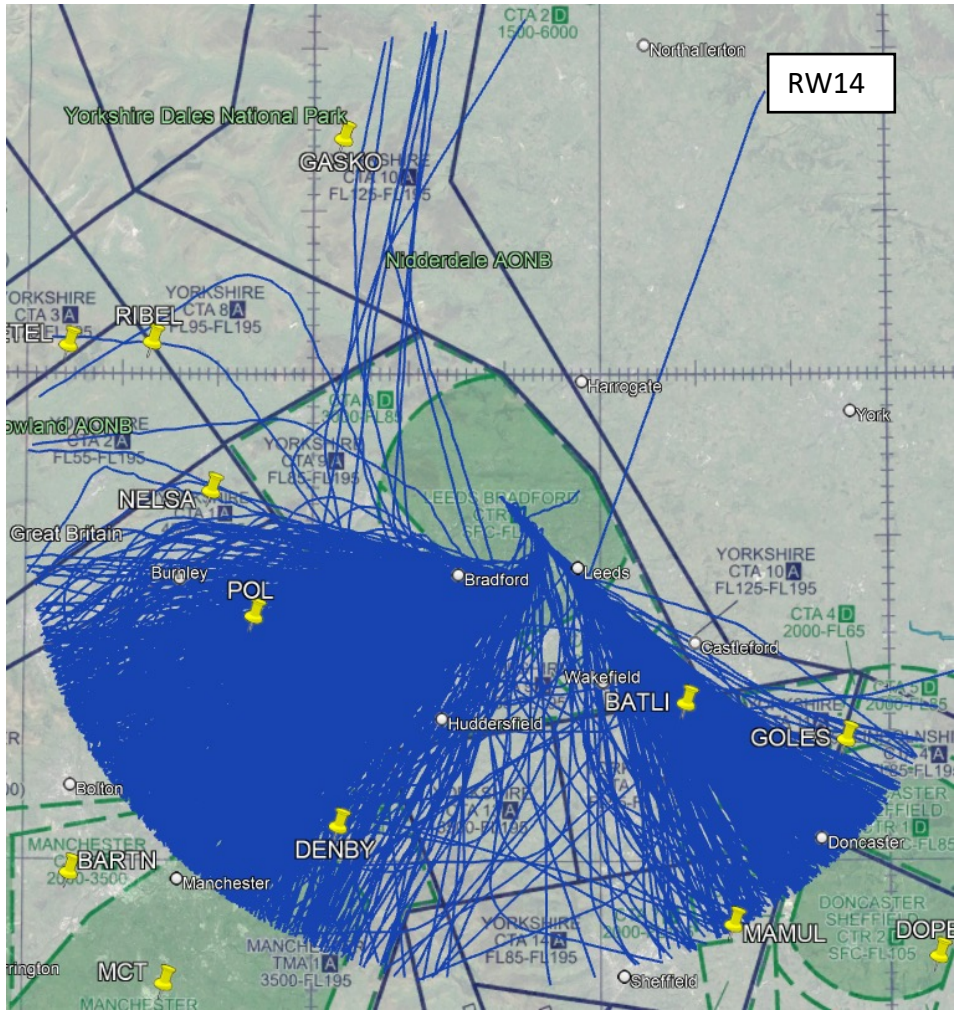


Baseline Swathe Development

LBA RW32 Baseline Departure Swathe Creation:

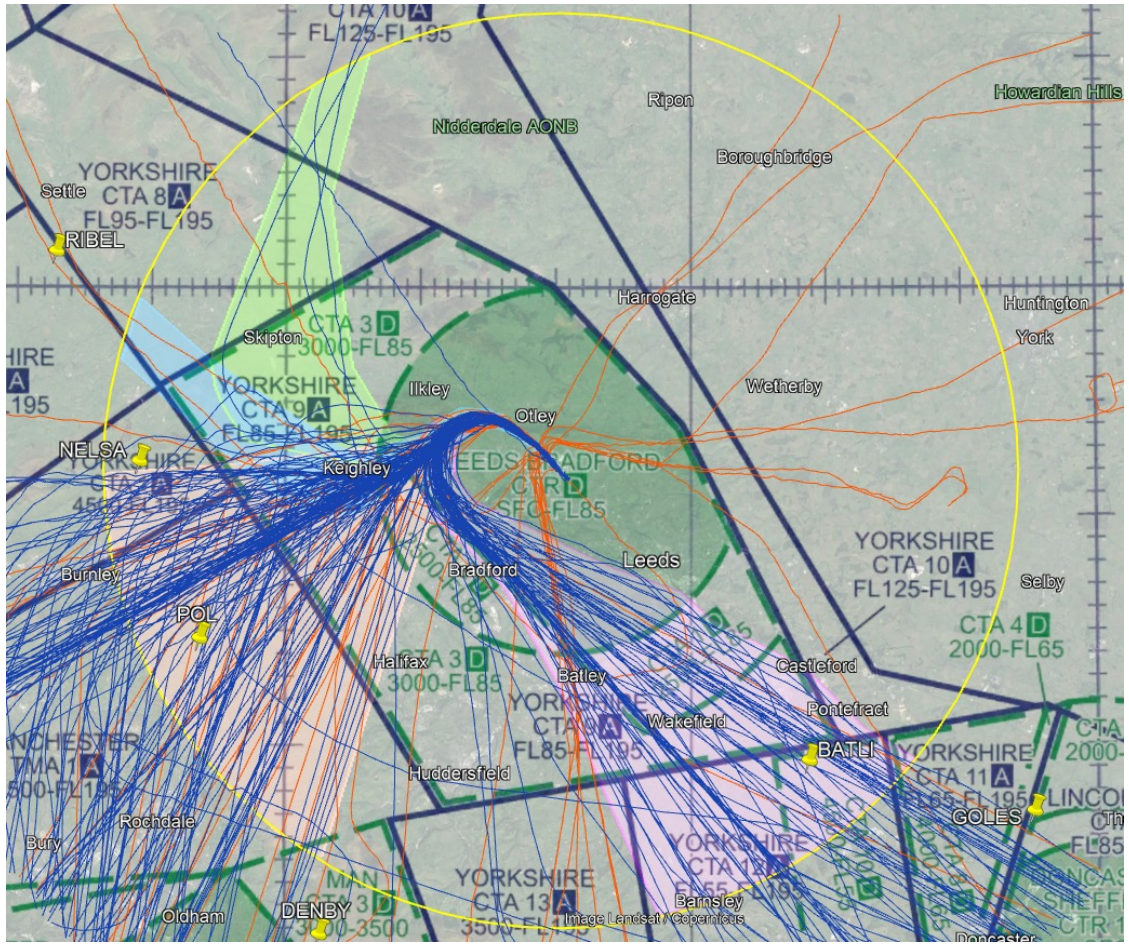
Too cluttered to make any sense over 92 days





NTMS RW32 & RW14 Departures 92-day Summer 2022

LBA RW32 Baseline Departure Swathe Creation



Blue = Commercial Traffic

Orange = Non-Commercial Traffic

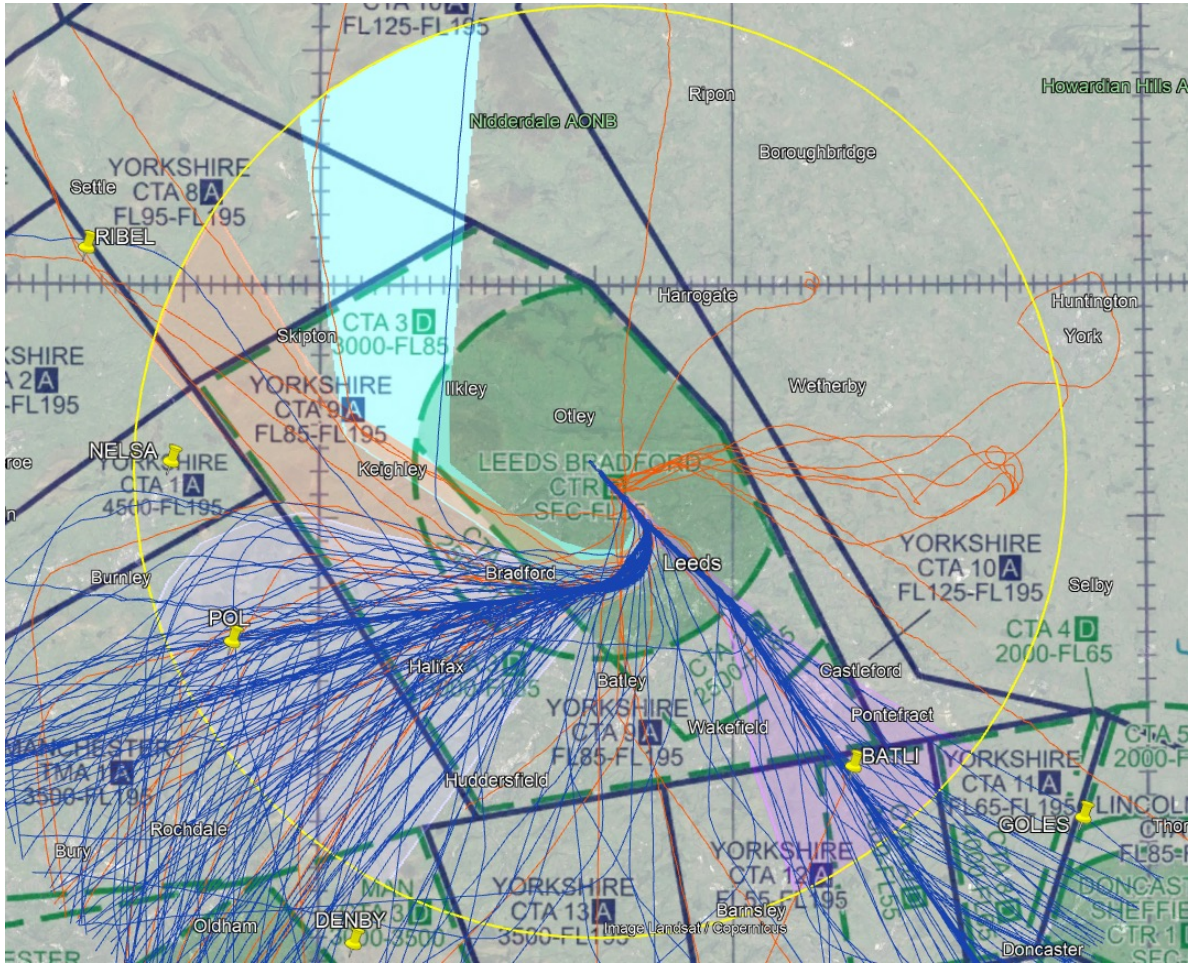
NTMS RW32 Departure Data 3rd to 10th July 2022

LBA RW32 Baseline Departure DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32SE Baseline											
32SE Do-Minimum											
32S&W Baseline											
32S&W Do-Minimum											

There are no changes to the DPE for the Baseline or Do-Minimum options, as a DPE was not previously conducted.

LBA RW14 Baseline Departure Swathe Creation



Blue = Commercial Traffic

Orange = Non-Commercial Traffic

NTMS RW14 Departure Data 3rd to 10th July 2022

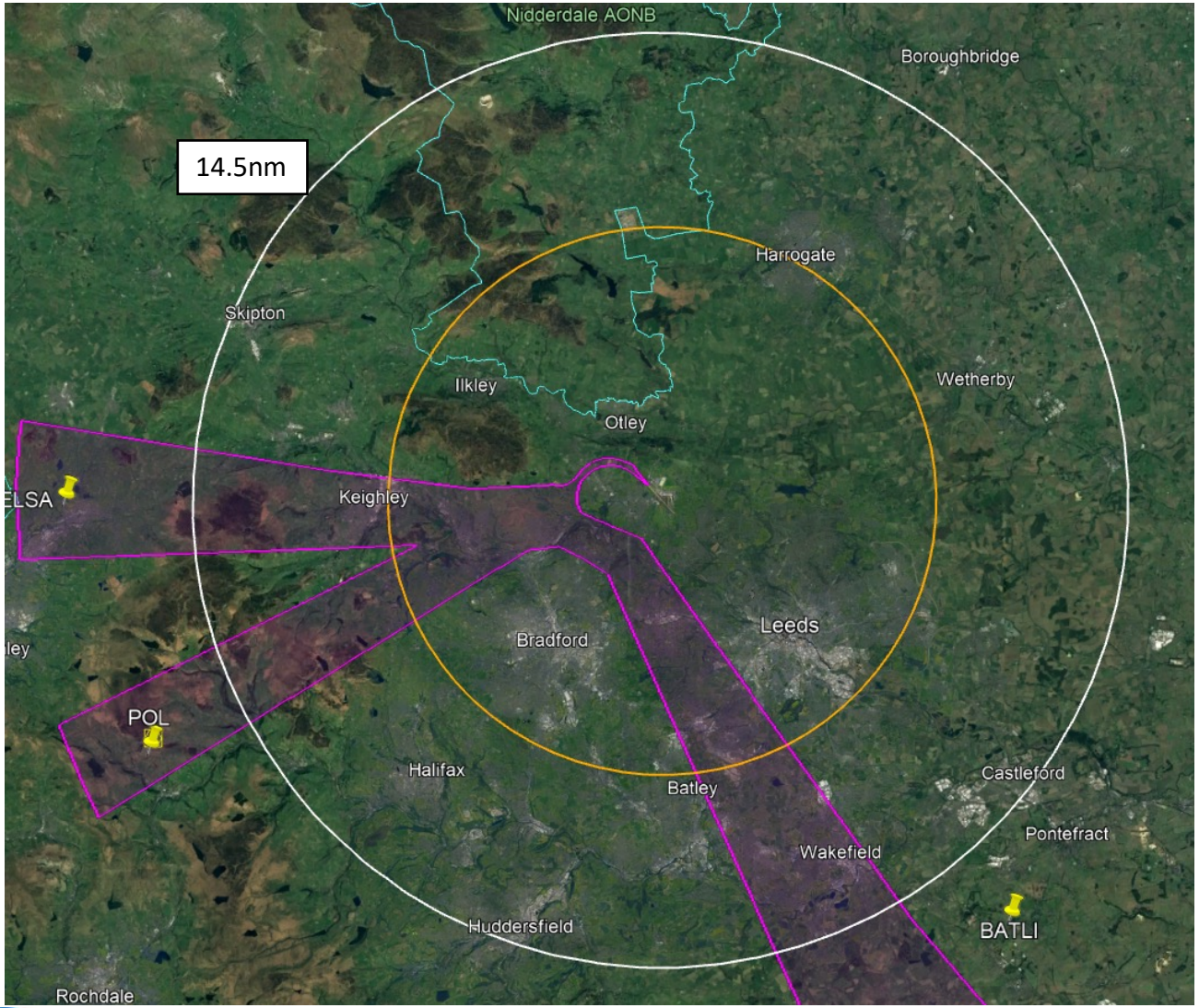
LBA RW14 Baseline Departure DPE

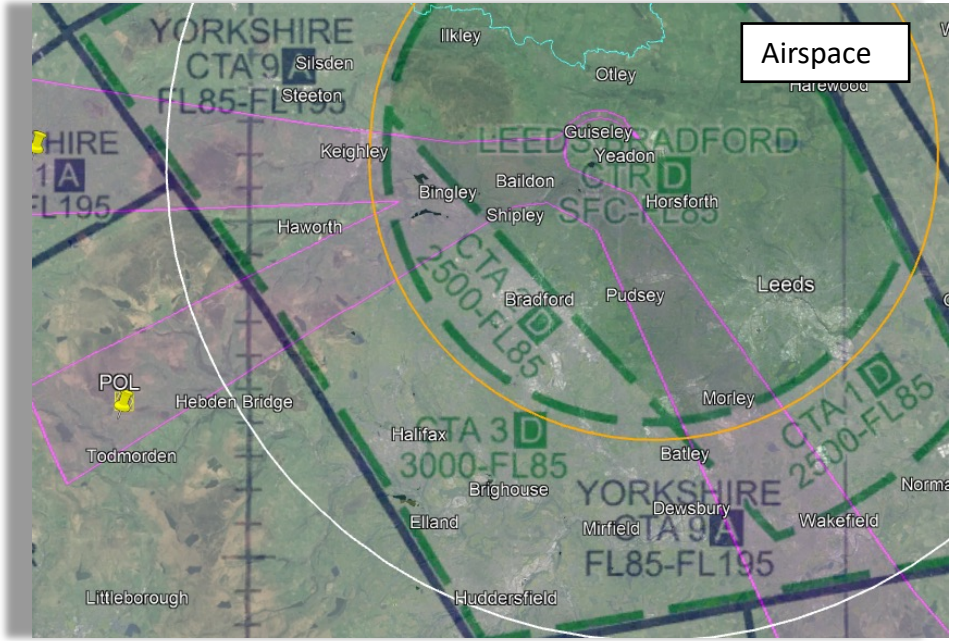
Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14SE Baseline											
14SE Do-Minimum											
14S&W Baseline											
14S&W Do-Minimum											

There are no changes to the DPE for the Baseline or Do-Minimum options, as a DPE was not previously conducted.

Departure Options

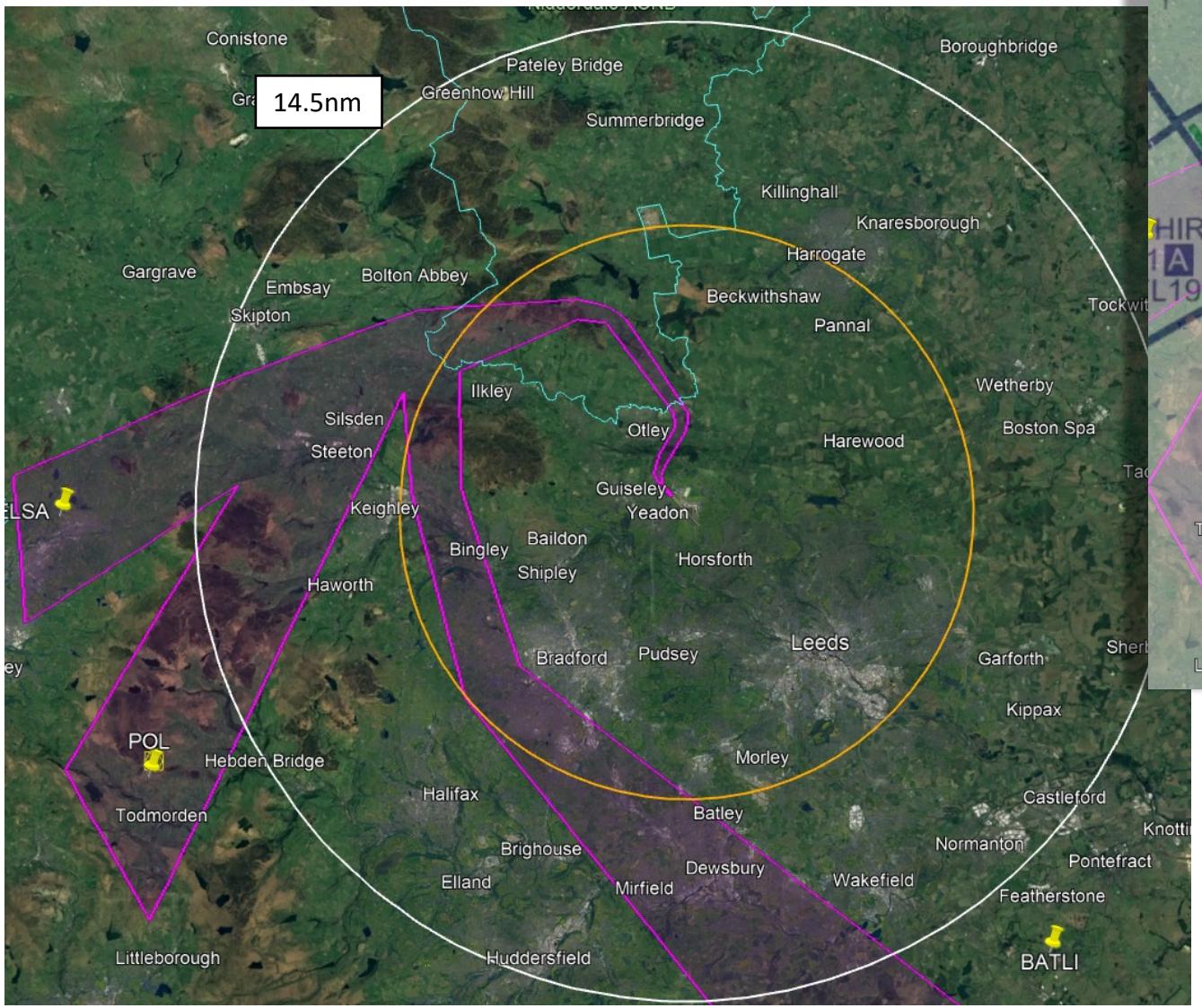
RW32 – New Option A – Potential Respite Route

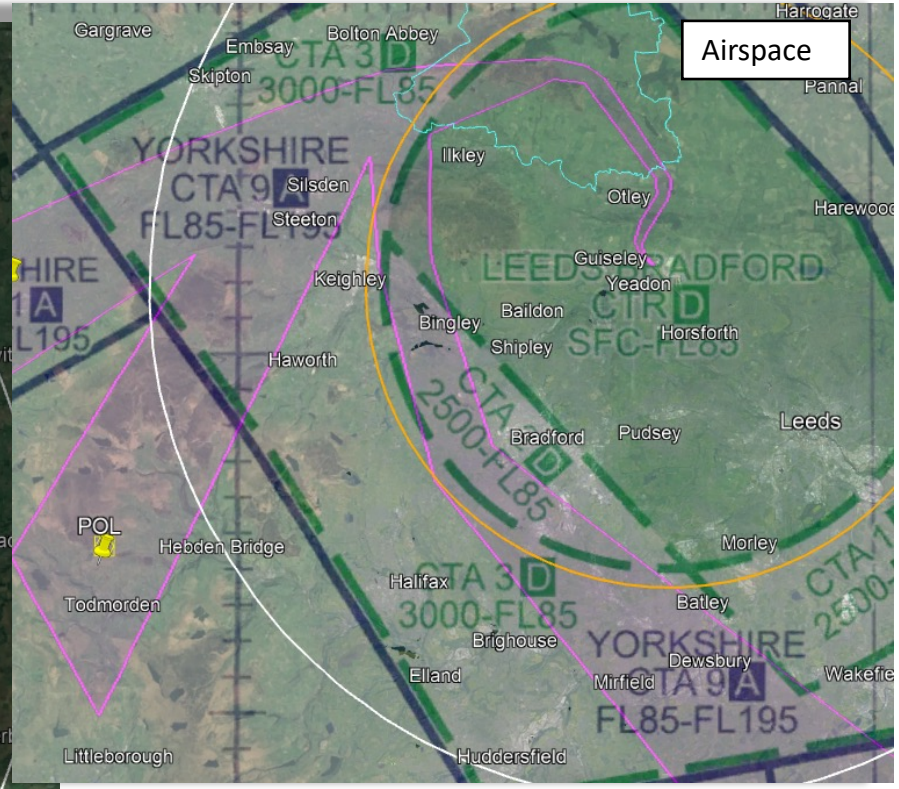




This option uses modern navigational techniques (Radius-to-Fix turns) to navigate over the fields between North Guiseley and South Menston. The objective is to reduce the noise nuisance from the existing route over North Menston/South Burley by sharing the load between the two routes. Flight paths could be altered on a daily basis to share the noise between the two areas. As satellite navigational techniques are used, the flight tracks over the area will be accurate.

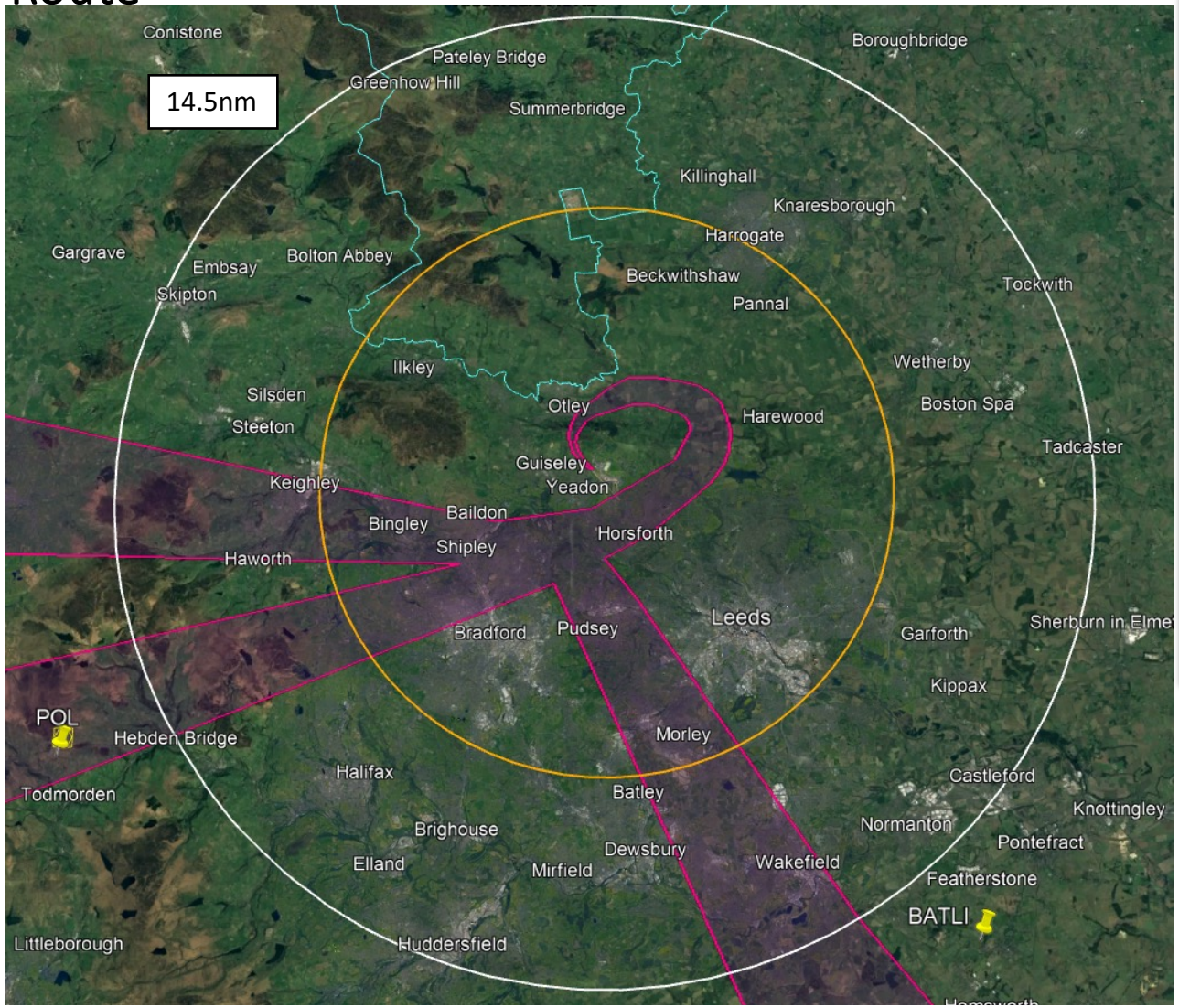
RW32 – New Option B – Potential Night Route

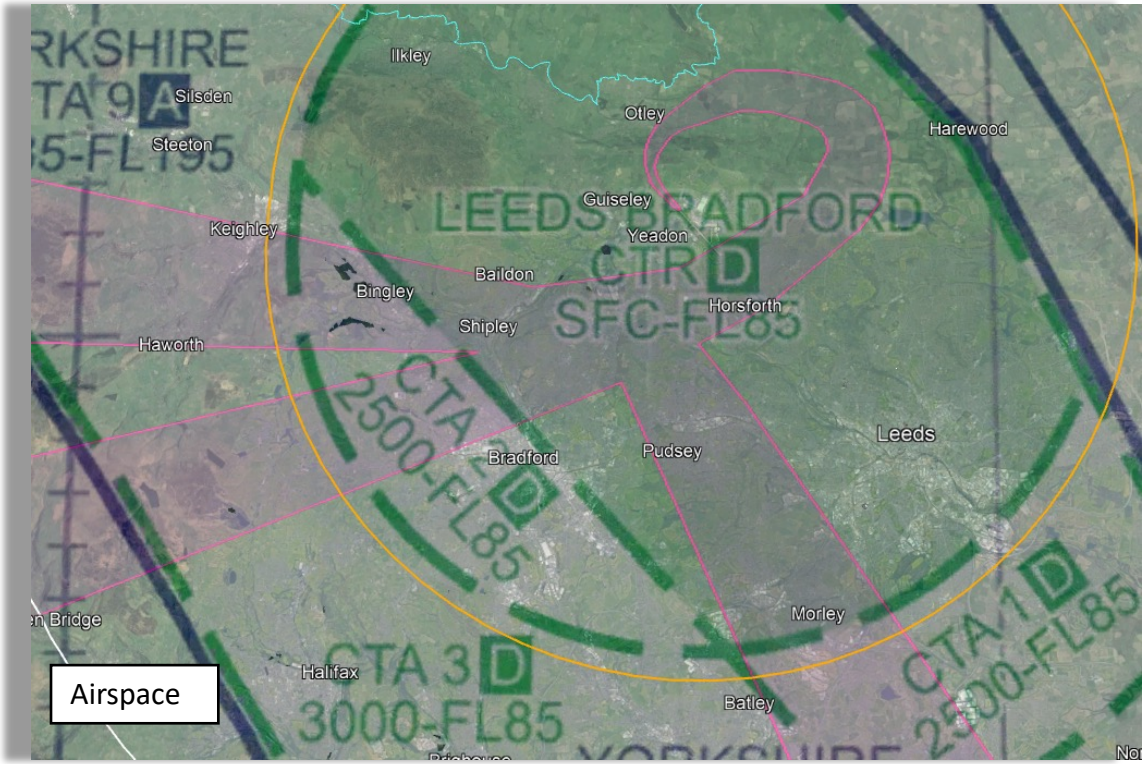




This option involves an early right turn over the Chevin followed by a left turn intended to route around the back of Otley and in so doing, reduce the populated areas overflown. The initial climb-out is then split in the three most in demand departure directions. The extra track distance makes less likely for regular use but instead as a night-time noise abatement route.

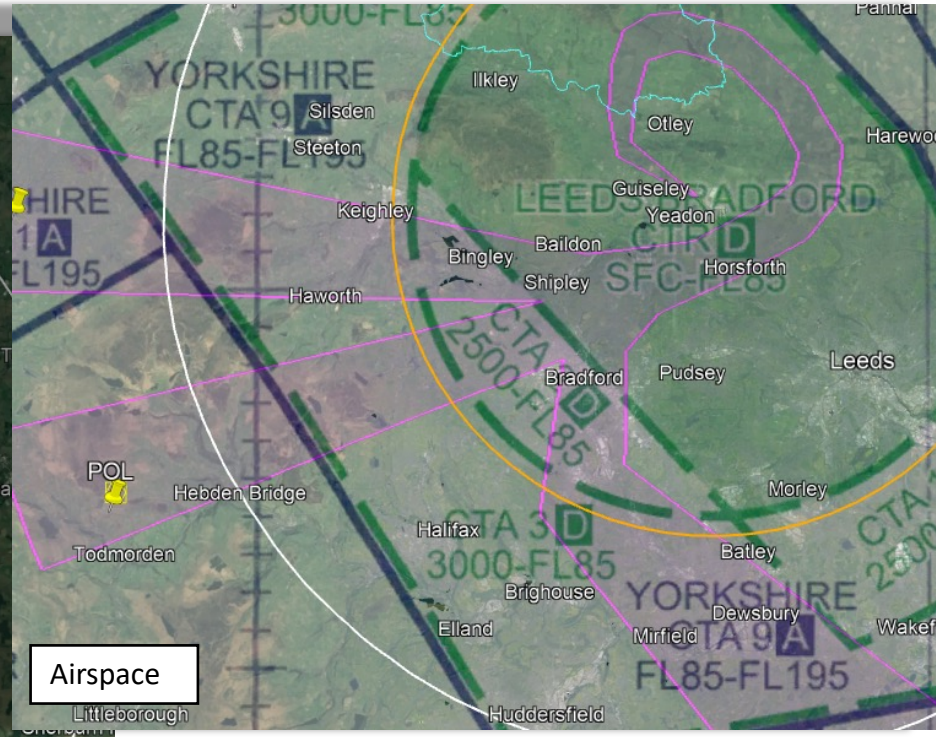
RW32 – New Option C - Potential Respite or Night Route





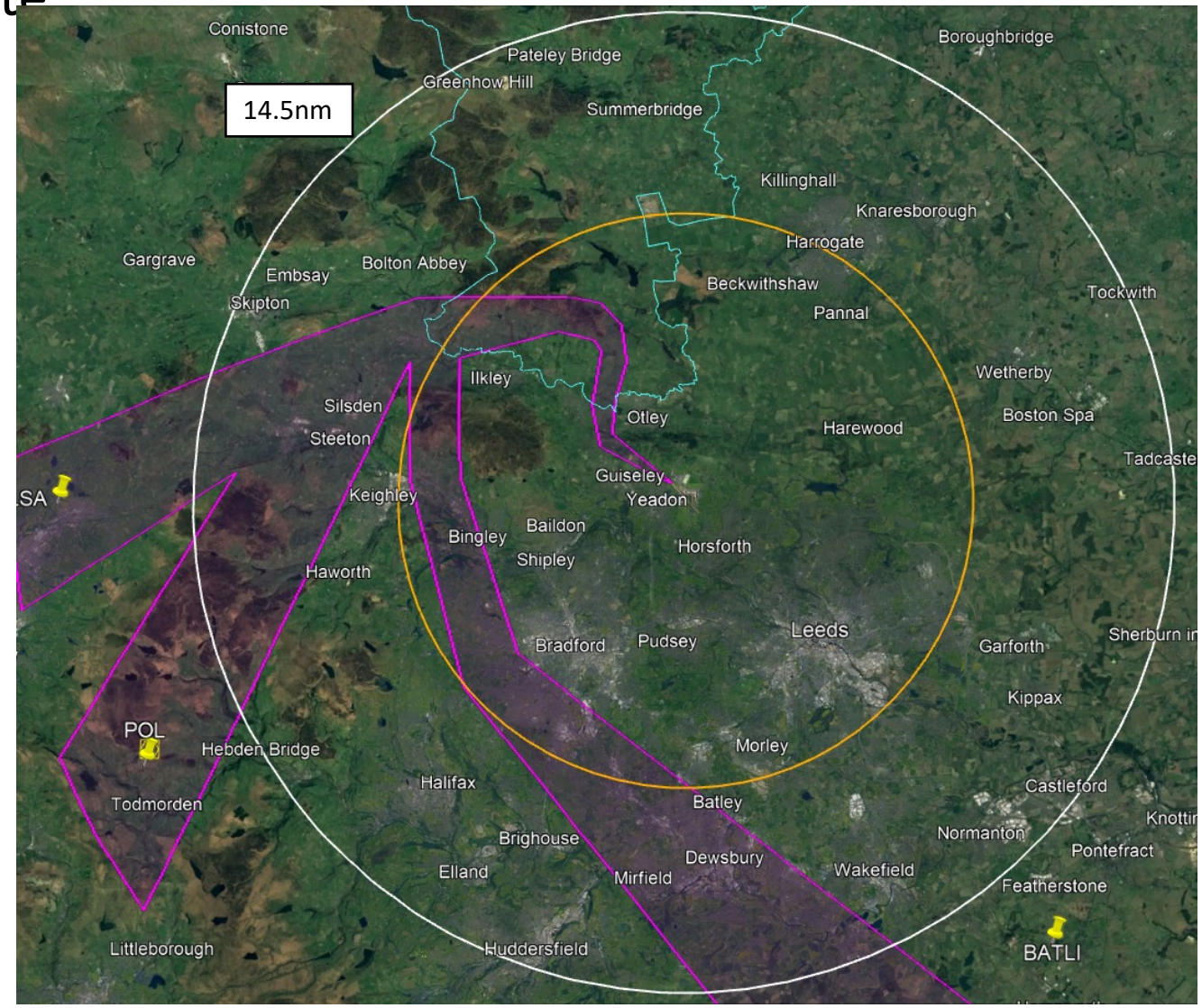
This option uses advanced navigational techniques to fly an early right turn after departure to avoid Otley. It is intended as a respite option to share the noise loading with the traditional route over Menston and Burley In Wharfedale. The aircraft would climb out looping mainly over countryside to then cross Cookridge at realistically 5000 feet or above.

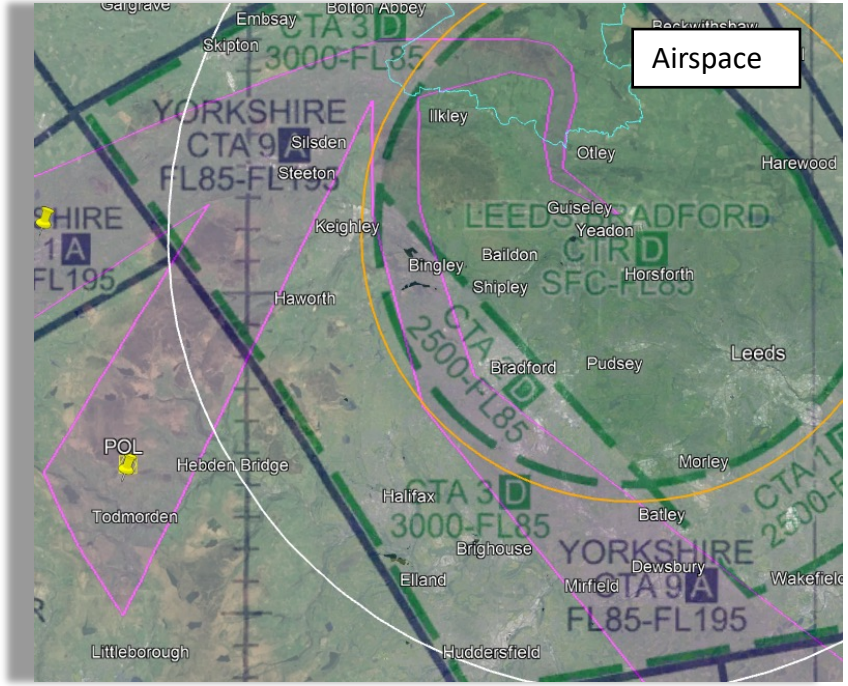
RW32 – New Option D – Potential Night Route



This route generally follows the initial track of the existing flightpath for 2 miles to deviate West of Otley. Rather than turning west over Menston, the flightpath makes a wide right turn to the north of Otley to gain height over open countryside prior to turning back westbound. The route is designed to minimise noise to local communities during the night. Due to the excessive miles flown and excess CO_2 produced, this route is not considered viable for continuous operations and is more suited for use at night for purposes of noise nuisance reduction.

RW32 – New Option E – Potential Night Route





This route generally follows the initial track of the existing flightpath for 2 miles to deviate West of Otley. After this point, the route flies north and then westbound to avoid all major settlements whilst gaining height over open countryside. The route is designed to minimise noise to local communities during the night. Due to the excessive number of additional miles flown and excess CO_2 produced, this route is not considered viable for continuous operations and is more suited for use at night for purposes of noise nuisance reduction.

RW32 – New Options A-E – DPE (Old)

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
A											
B											
C											
D											
E											

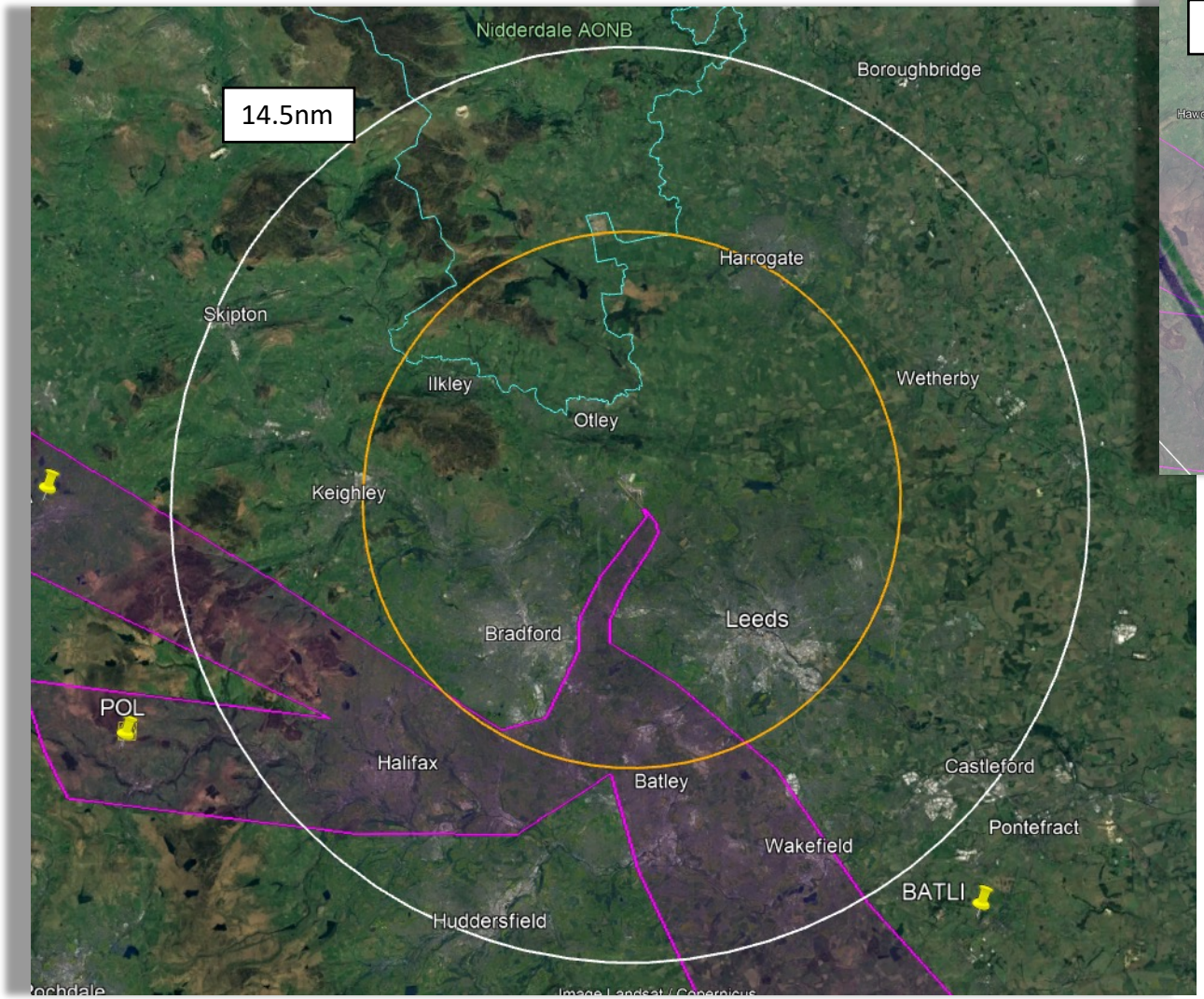
RW32 – New Options A-E – DPE (New)

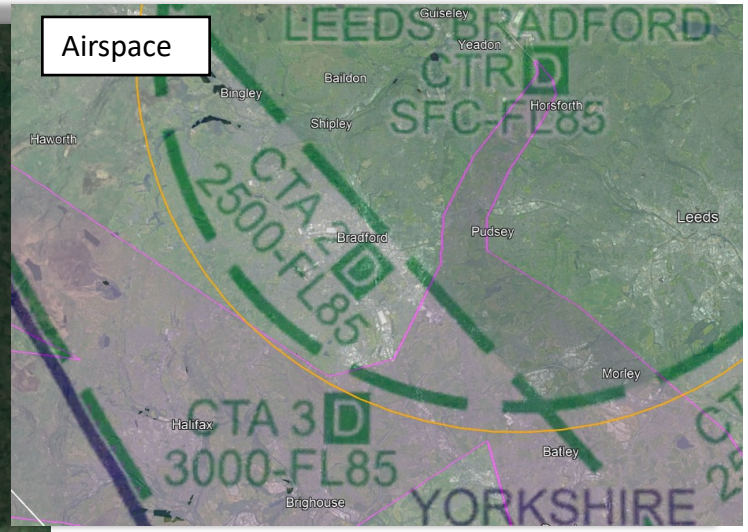
Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32NEWA											
32NEWB											
32NEWC											
32NEWD											
32NEWE											

DPE Changes RW32 – New Options A-E - DPE

- DP1 – Safety – No change.
- DP2 - Noise – Options C and D changed from Green to Red - *Due to number of people flown over, different communities now accounted for in DP9.*
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – Option C changed from Amber to Red - *Due to reassessment of track miles – CCO not considered as an offset..*
- DP5 – Airspace Dimensions – No change
- DP6 – Airspace Complexity – Options C and D changed from Green to Amber - *Due to reassessment by SME at LBA.*
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Option C changed from Amber to Red - *Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – Options B and E changed from Green to Amber, Options C and D changed to Red - *Due to changes in other DPs and criteria.*
- DP11 – PBN – No change – Option C changed from Amber to Green and Option D from Amber to Green.

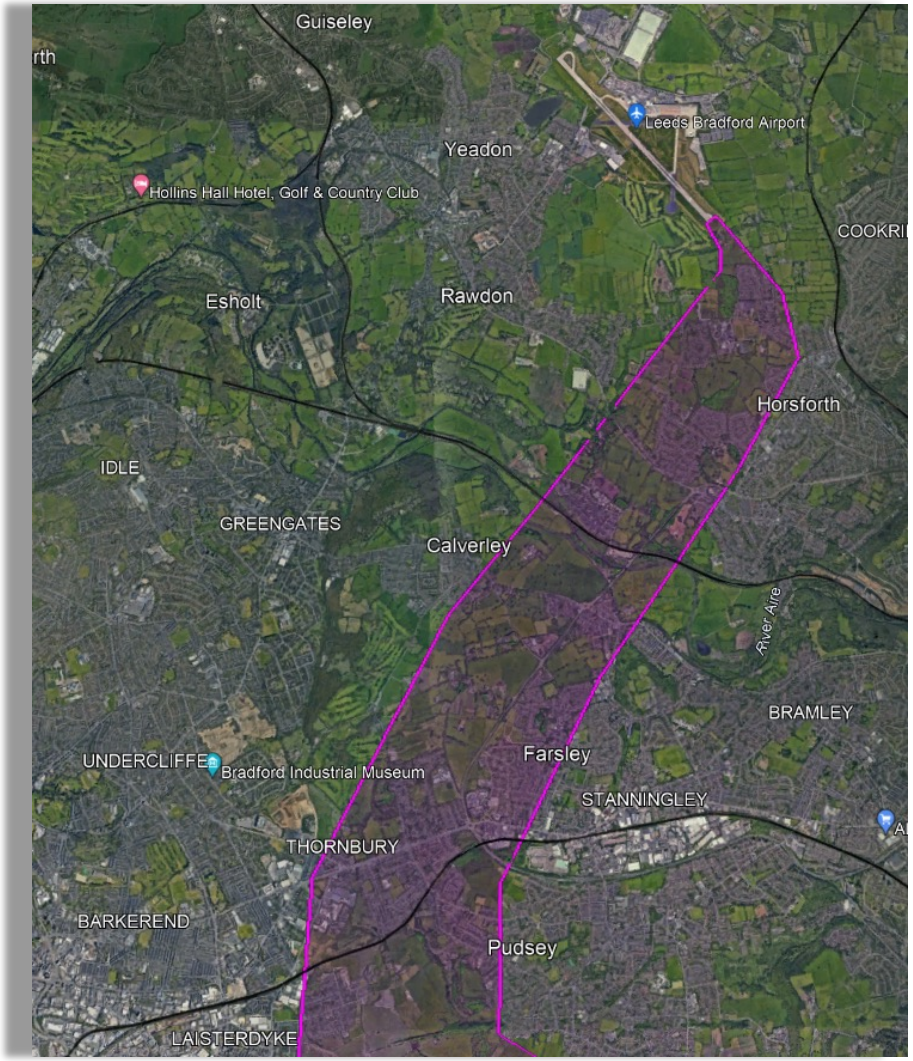
RW14 – New Option A - Potential Respite or Permanent Route



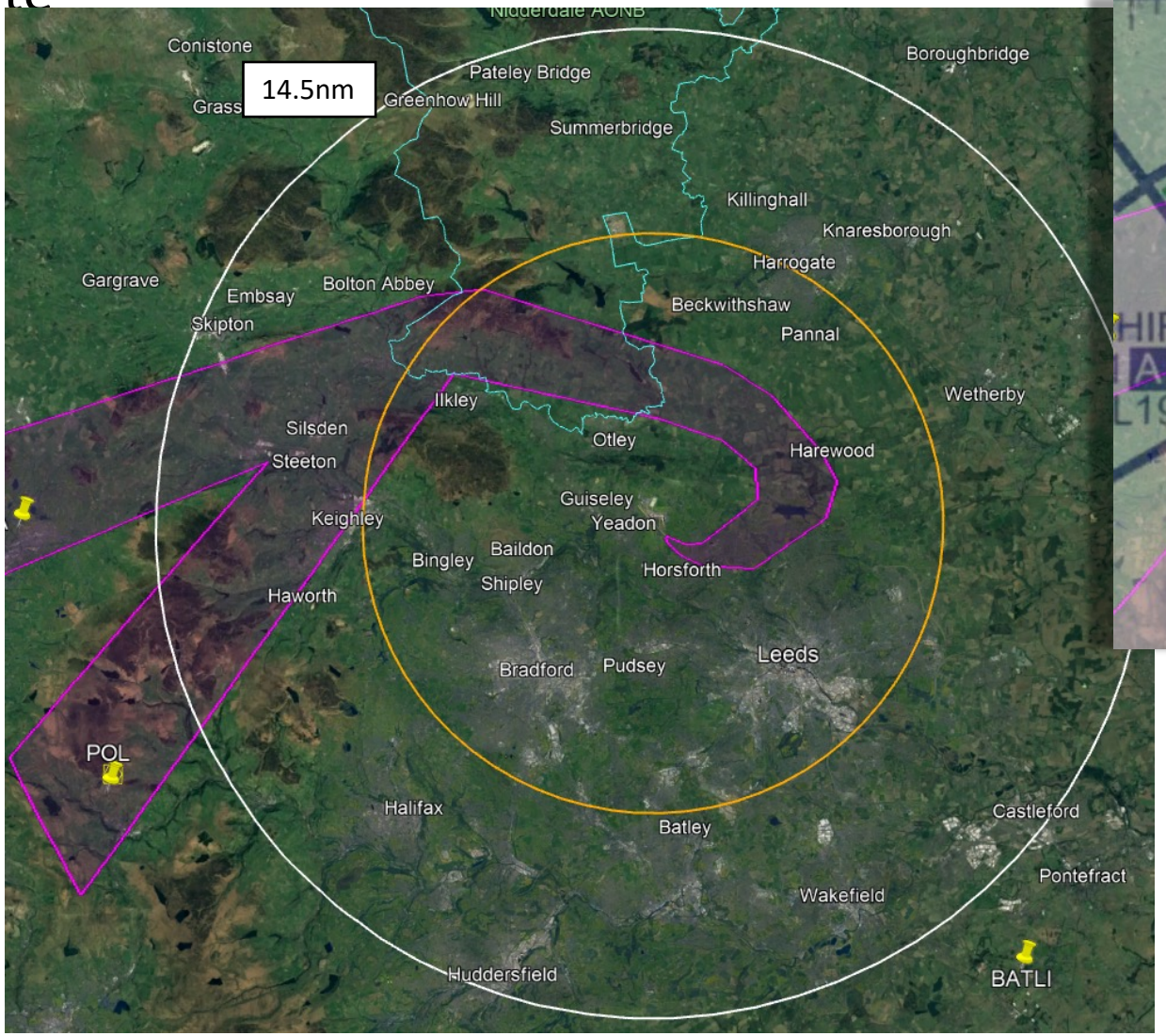


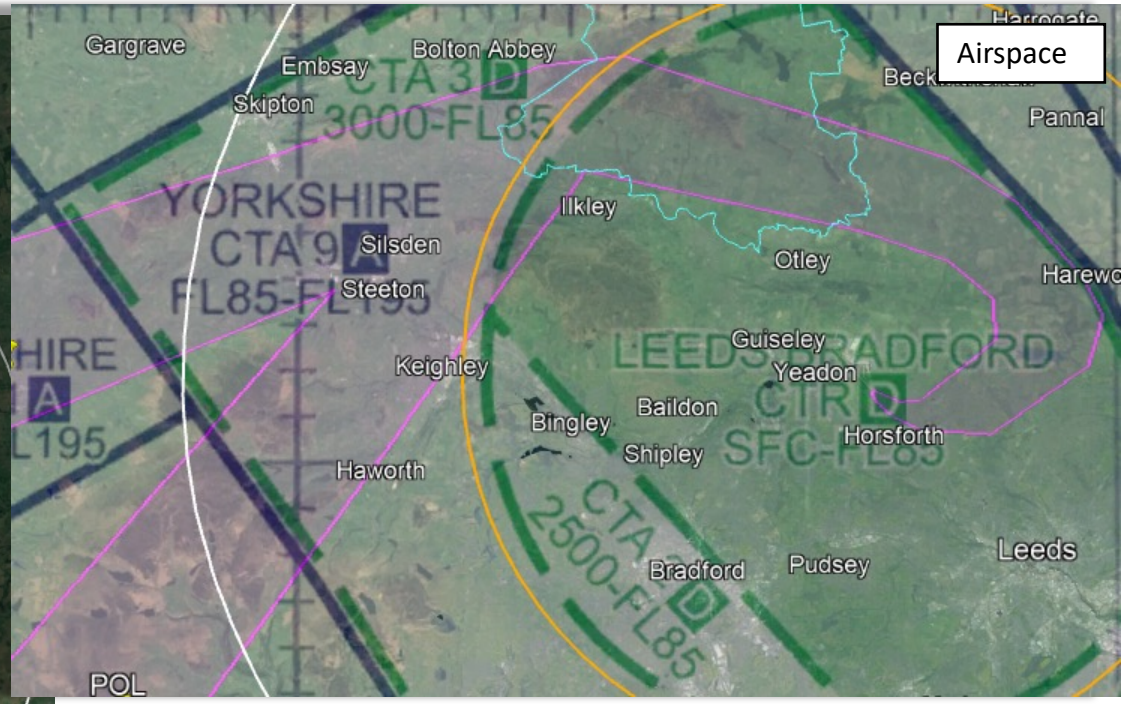
This option turns right on passing 500 feet to avoid overflying the suburbs North-West of Leeds. The route seeks to weave through an area of countryside dividing Leeds and Bradford prior to turning on a direct track. It intends to offer some respite to the North-West Leeds area whilst accepting that new areas such as Eastern Calverley and Farsley may be overflown. This route also offers an element of dispersion; as aircraft climbs rates differ, the point at which the turn is made (500 feet) will vary on each departure, resulting in varied tracks. Currently, due to its proximity to the Airport, the area of North-Western Leeds is regularly directly overflown regardless of the runway in use; departures over this area when on RW14 and arrivals when on RW32. This option may provide an opportunity to remove some noise nuisance from this area when RW14 is in use.

RW14 – New Option A – Zoomed in views



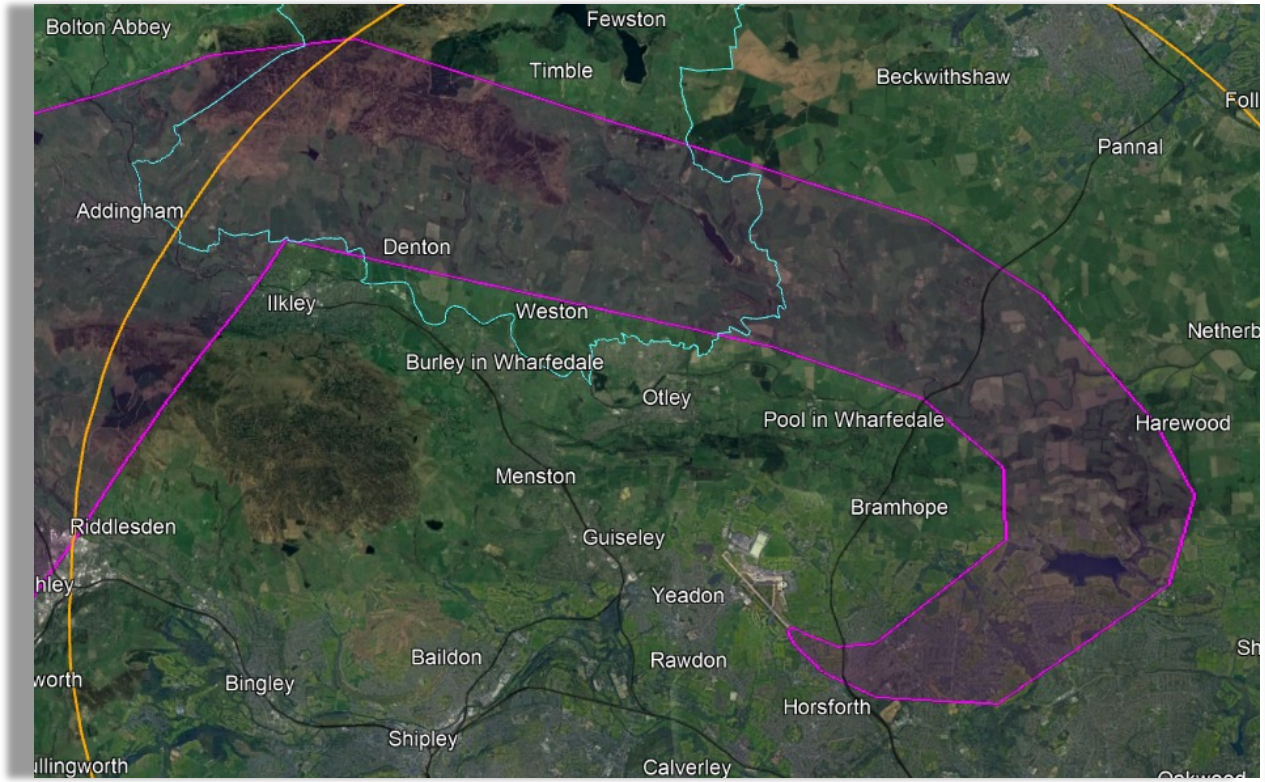
RW14 – New Option B – Potential Night Route





This option utilises an early left turn off RW14 to offer respite to both the suburbs of North-Eastern Leeds and the towns of Pudsey and Bramley. It does however overfly new communities in North-East Leeds such as Weetwood and Adel before continuing to climb out over the countryside. Due to the length of route flown, this route would only be viable as a night noise mitigation route in a combined respite rotation with other noise routes. It would not be viable for departures routing out towards LAMIX (to the South-East).

RW14 – New Option B – Zoomed in views



RW14 – New Options A & B – DPE (Old)

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
A											
B											

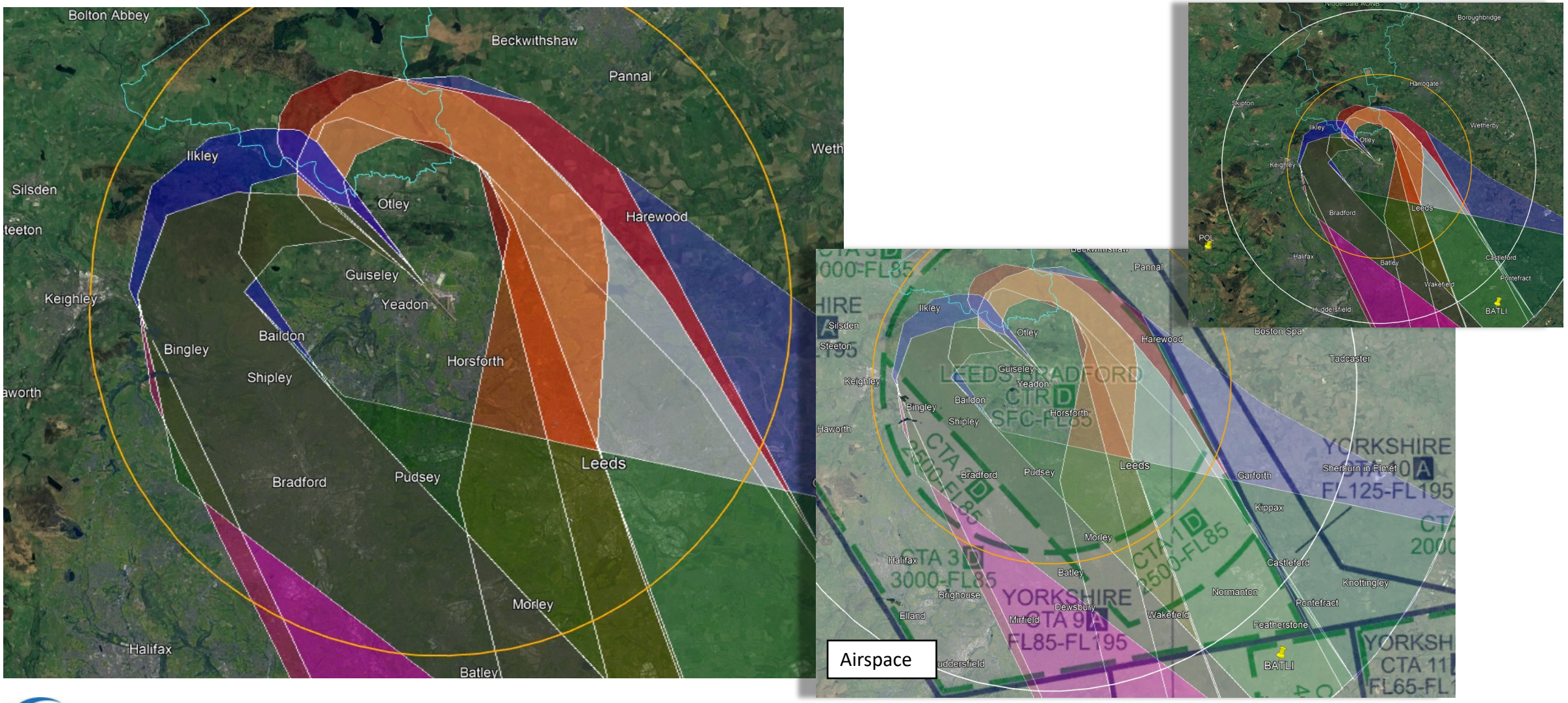
RW14 – New Options A & B – DPE (New)

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14NEWA											
14NEWB											

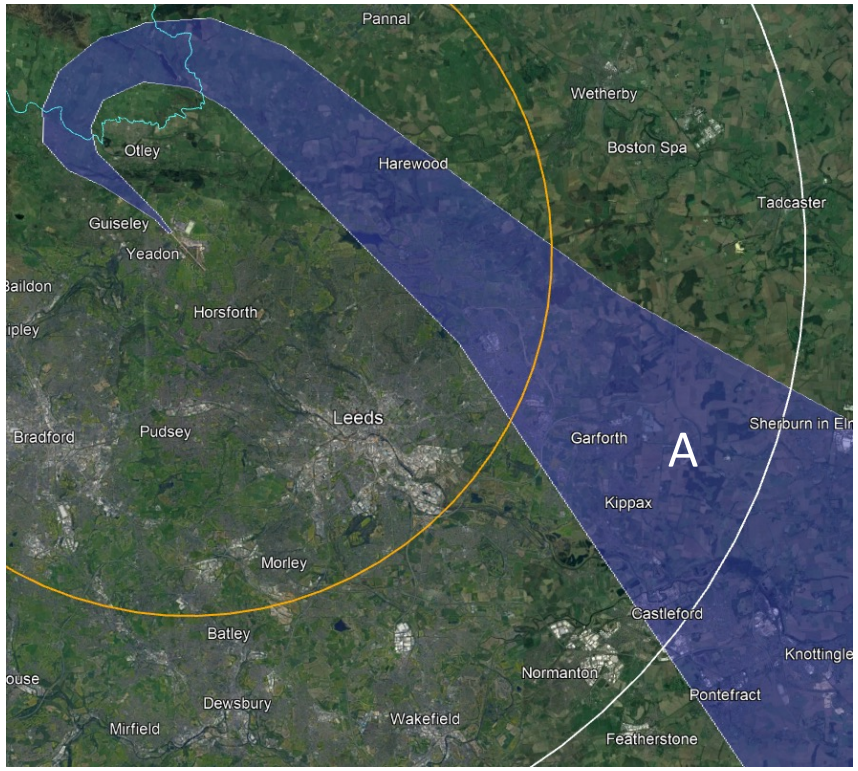
DPE Changes RW14 –New Options A & B - DPE

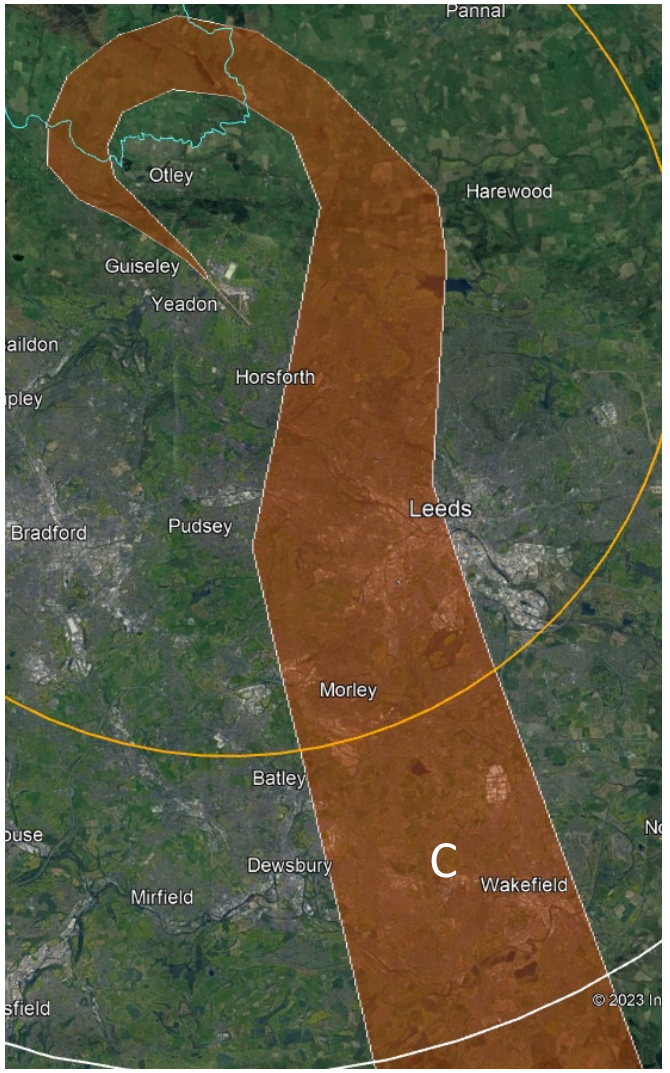
- DP1 – Safety – Option B changed from Amber to Green - *Due to reassessment by SME at LBA.*
- DP2 - Noise – Options A and B changed from Amber to Green - *Due to number of people flown over, different communities now accounted for in DP9.*
- DP3 – Tranquillity – Option A changed from Amber to Green - *Due to reassessment of tranquil areas – AONB, NPs and South Pennine Moors only.*
- DP4 – Emissions and Air Quality – No change.
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – No change.
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Option A changed from Green to Amber-*Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – Option A and B changed from Green to Amber - *Due to changes in other DPs.*
- DP11 – PBN – No change.

RW32 - South-Easterly Departures - MAMUL

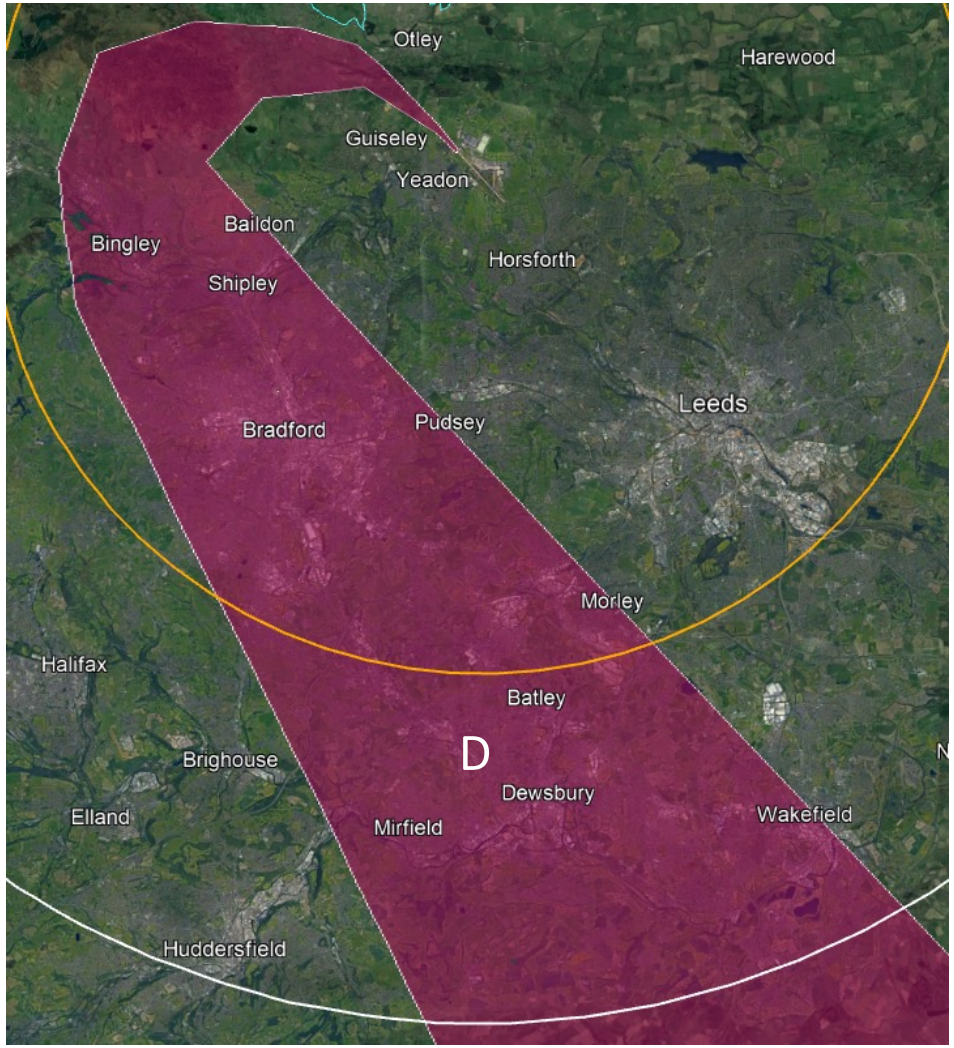


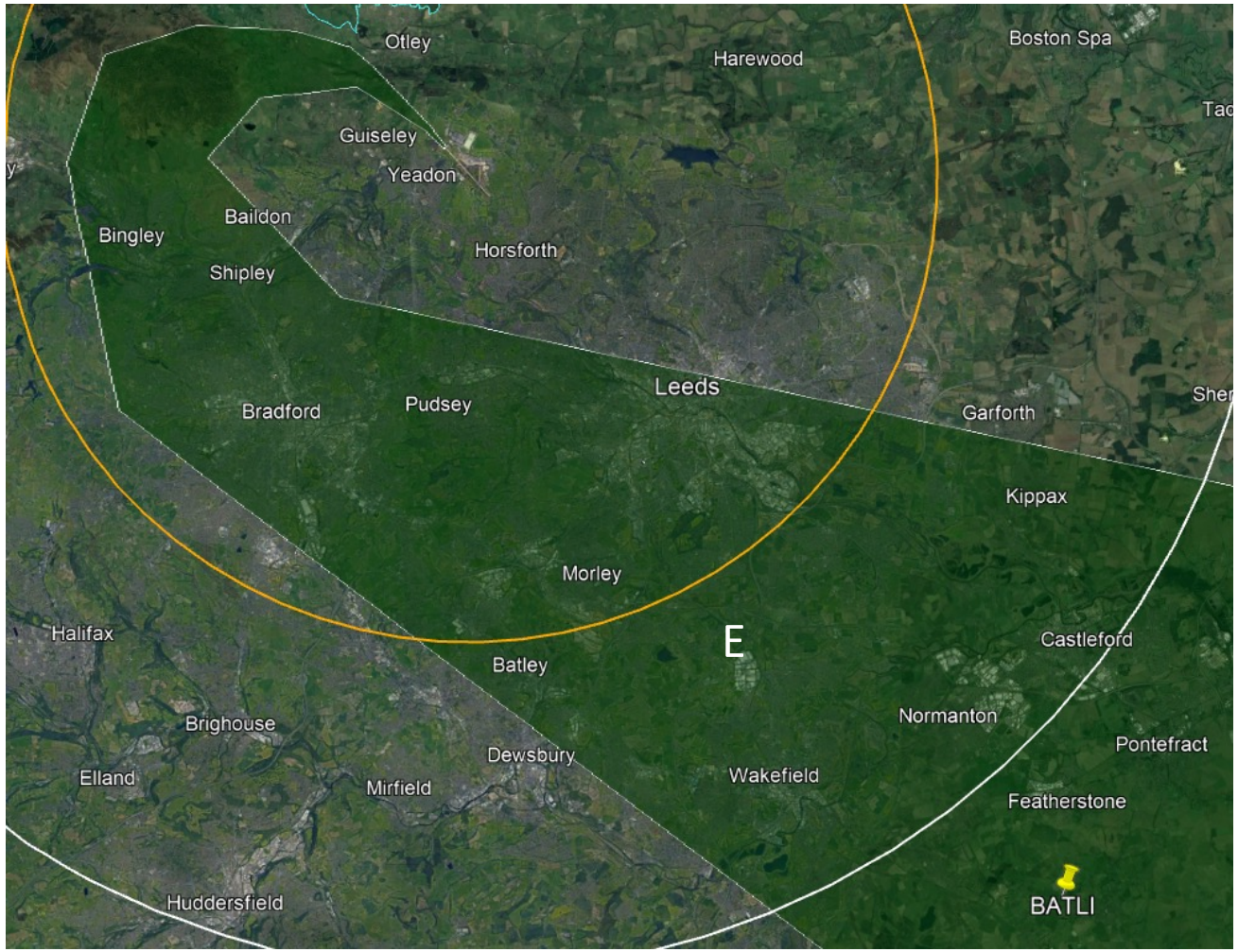
RW32 - South-Easterly Departures - MAMUL



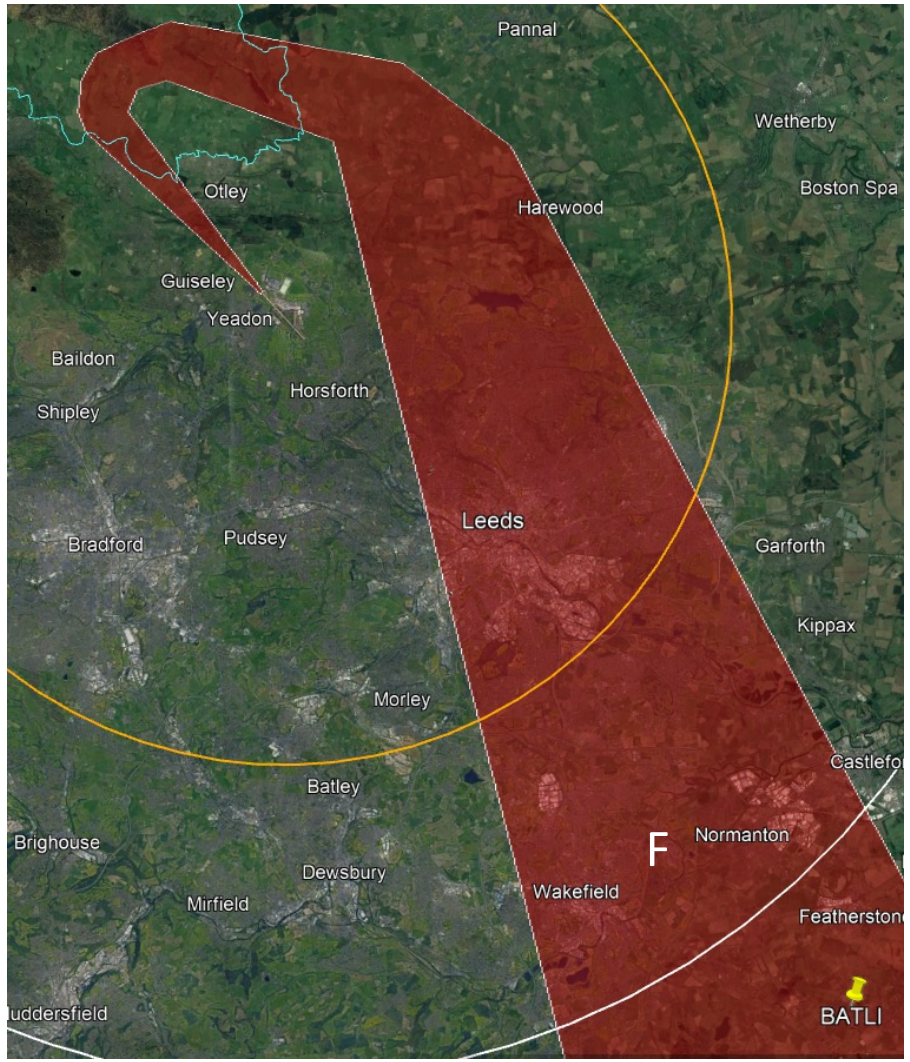


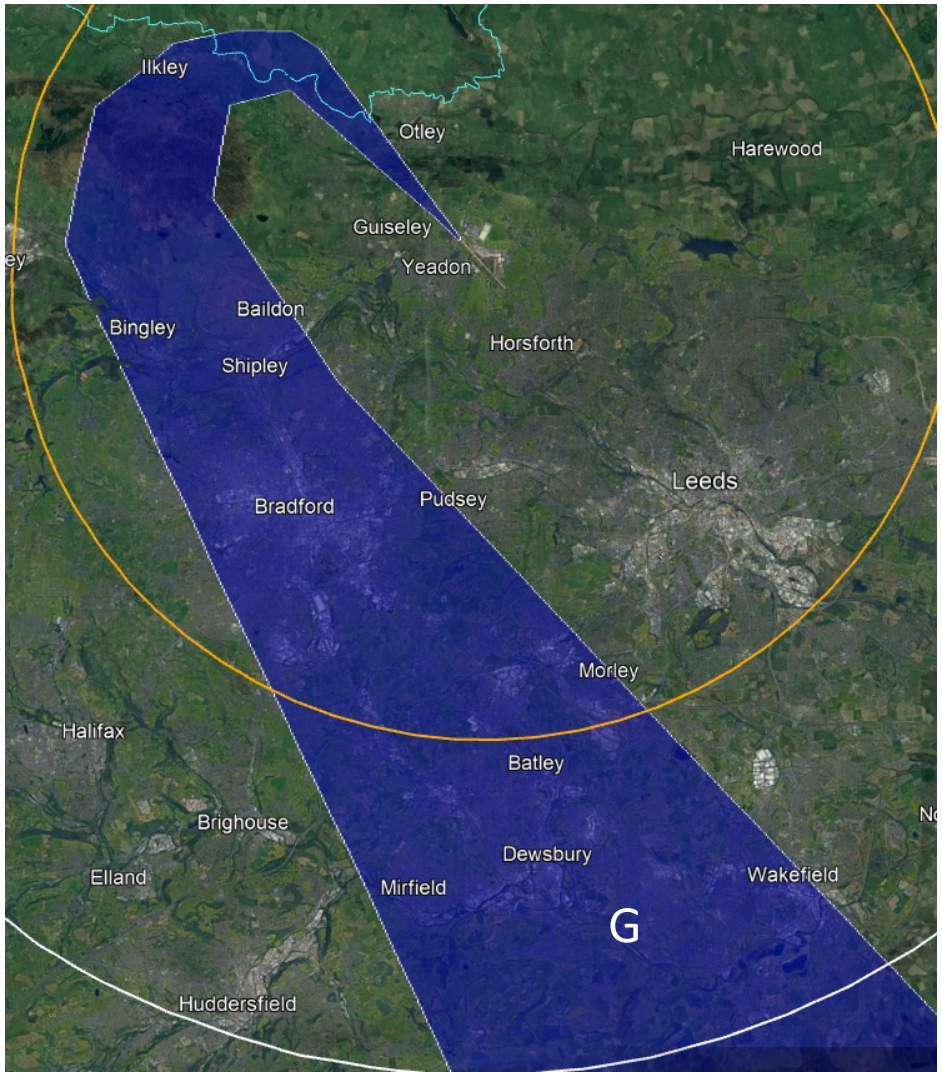
RW32 - South-Easterly Departures - MAMUL





RW32 - South-Easterly Departures - MAMUL





RW32 - South-Easterly Departures – MAMUL – DPE (OLD)

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32SEA	Considered no longer a viable option and discounted from assessment. Routes outside CAS and does not point in the direction of the Route Network joining points of MAMUL/LAMIX.										
32SEB											
32SEC											
32SED											
32SEE											
32SEF											
32SEG											

RW32 - South-Easterly Departures – MAMUL – DPE (NEW)

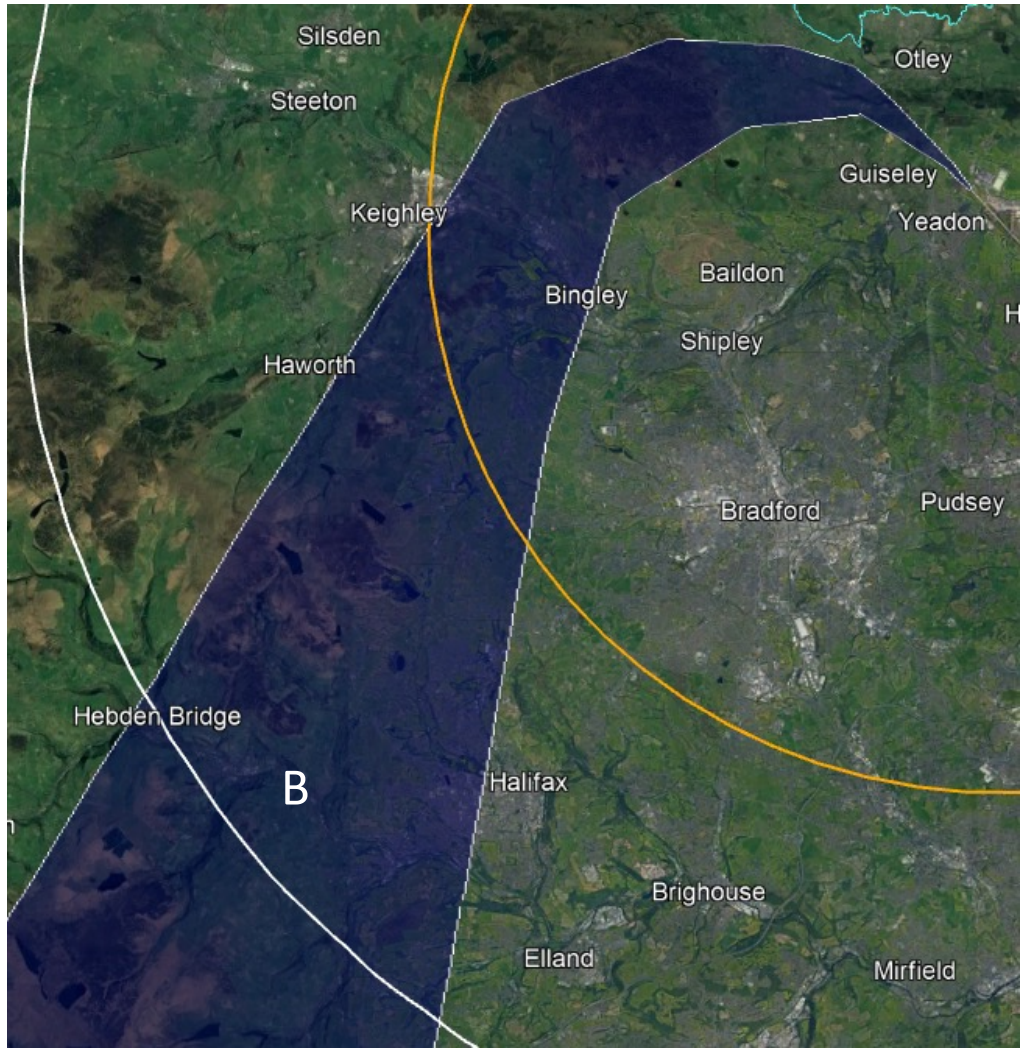
Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32SEA	Considered no longer a viable option and discounted from assessment.										
32SEB											
32SEC											
32SED											
32SEE											
32SEF											
32SEG											

DPE Changes RW32 - South-Easterly Departures – MAMUL – DPE

- DP1 – Safety – No change.
- DP2 - Noise – Options B and C changed from Red to Amber - *Due to number of people flown over, different communities now accounted for in DP9.*
- DP3 – Tranquillity – Options D and E changed to Red from Amber - *Due to reassessment of tranquil areas – AONB, NPs and South Pennine Moors only.*
- DP4 – Emissions and Air Quality – Options A, B C and D changed from Green to Amber. Options F and G changed from Green to Red - *Due to reassessment of track miles – CCO not considered as an offset.*
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – Options B, E and F changed from Amber to Red, option C changed from Green to Amber - *Due to reassessment by SME at LBA.*
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Options B, C and D changed from Green to Amber, options F and G changed from Green to Red - *Due to reassessment of track miles as indicator for fuel, and new communities flown over.*
- DP10 – AMS Realisation – Options B, C and D changed from Green to Amber, Option E changed from Red to Amber F changed from Green to Red - *Due to changes in other DPs and the new criteria.*
- DP11 – PBN – No change.

RW32 – South & West Departures – POL/NELSA

RW32 – South & West Departures – POL/NELSA



RW32 – South & West Departures – POL/NELSA

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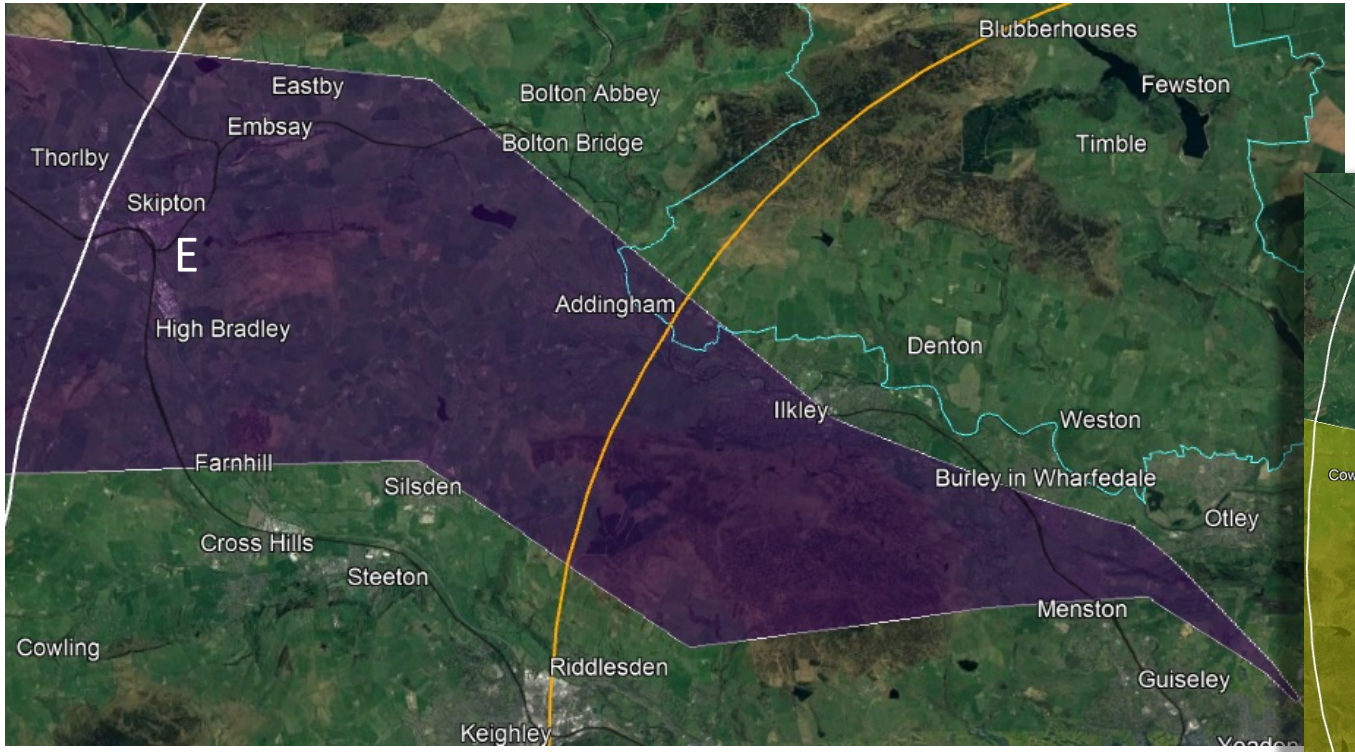
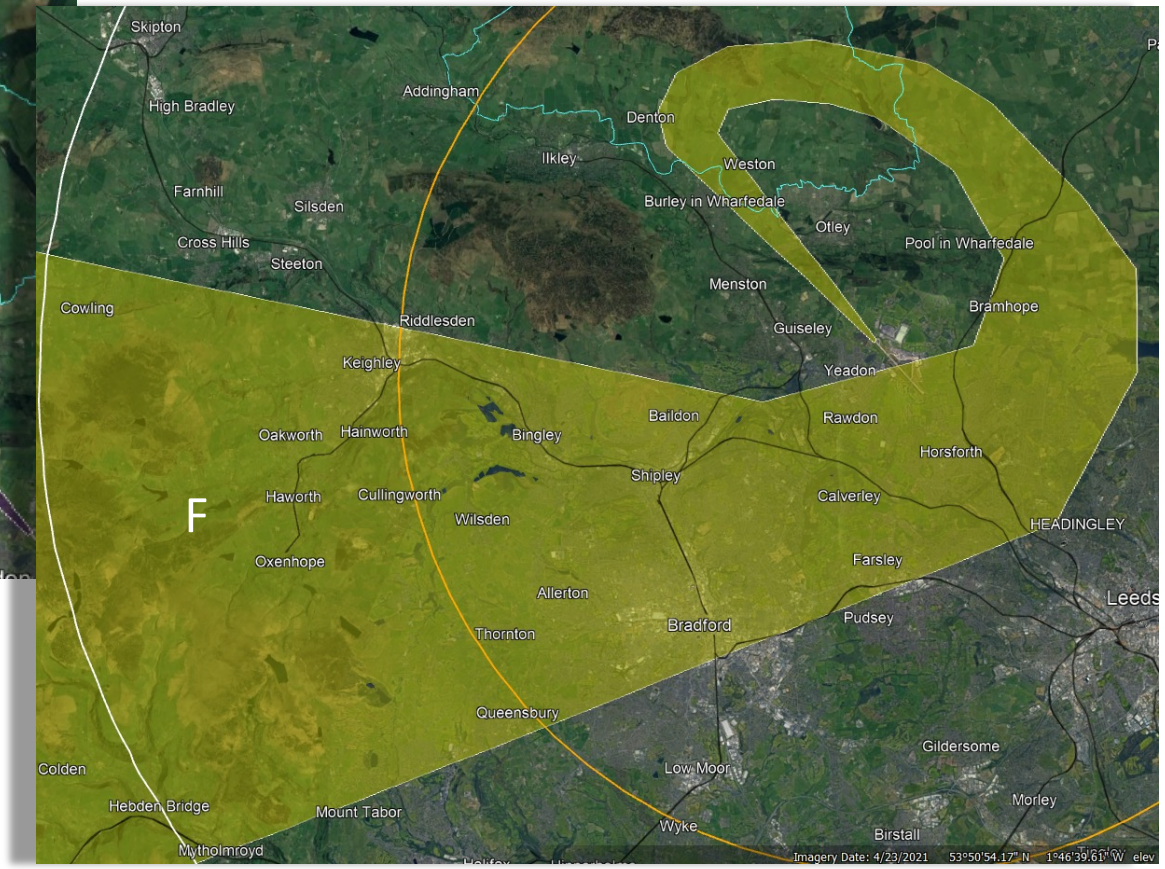




RW32 – South & West Departures – POL/NELSA

RW32 – South & West Departures – POL/NELSA – DPE (OLD)

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity DP4	Emissions & Air Quality DP5	Airspace Dimensions DP6	Airspace Complexity DP7	Technical DP8	Systemisation DP9	Operational Cost DP10	AMS Realisation DP11	PBN
32S&WA											
32S&WB	Rejected after review as this does not fit with the Route Network as it does not point towards POL or NELSA										
32S&WC											
32S&WD											
32S&WE	Rejected after review as this does not fit with the Route Network as it does not point towards POL or NELSA										
32S&WF											
32S&WG											
32S&WH											

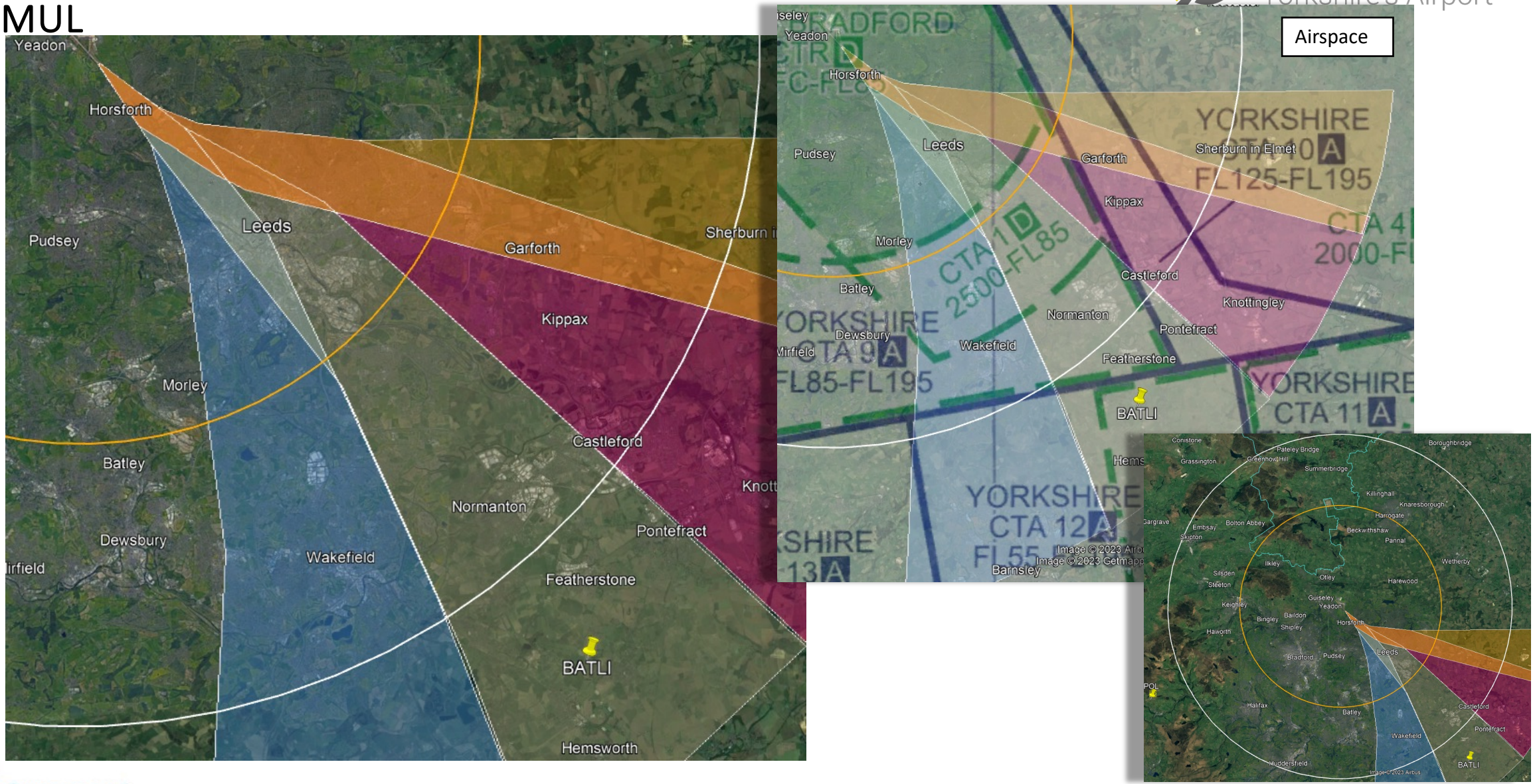
RW32 – South & West Departures – POL/NELSA - DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
32S&WA											
32S&WB	Considered no longer a viable option and discounted from assessment.										
32S&WC											
32S&WD											
32S&WE	Considered no longer a viable option and discounted from assessment.										
32S&WF											
32S&WG											
32S&WH											

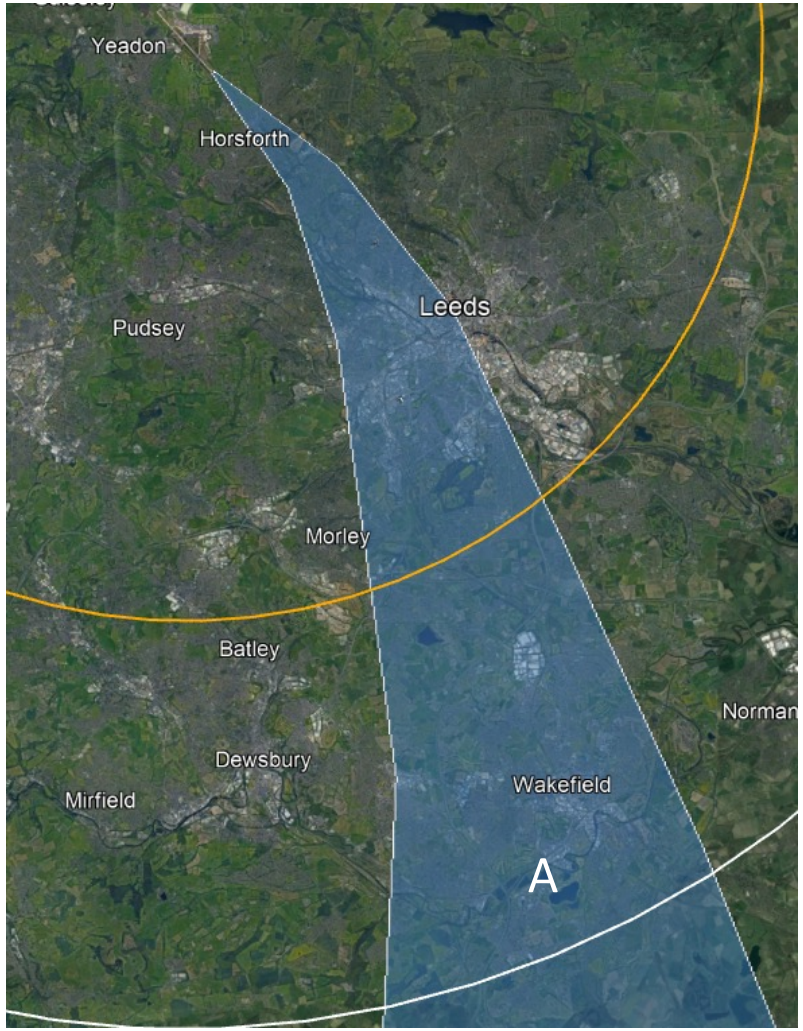
DPE Changes RW32 – South & West Departures – POL/NELSA - DPE

- DP1 – Safety – No change.
- DP2 - Noise – Option D changed from Green to Amber, Option F changed from Amber to Red and Option H from Red to Green - *Due to number of people flown over, different communities now accounted for in DP9.*
- DP3 – Tranquillity – Options C and D changed from Amber to Red - *Due to reassessment of tranquil areas – AONB, NPs and South Pennine Moors only.*
- DP4 – Emissions and Air Quality – Option A changed from Amber to Red, Options G and H from Green to Amber - *Due to reassessment of track miles.*
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – Options A and F changed from Green to Amber - *Due to reassessment by SME at LBA.*
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Option A changed from Amber to Red, Option D, G and H from Green to Amber - *Due to reassessment of track miles as indicator for fuel, and new communities flown over.*
- DP10 – AMS Realisation – Options C, D G and H changed from Green to Amber , Options A and F changed from Green to Red - *Due to changes in other DPs and the new criteria..*
- DP11 – PBN – No change.

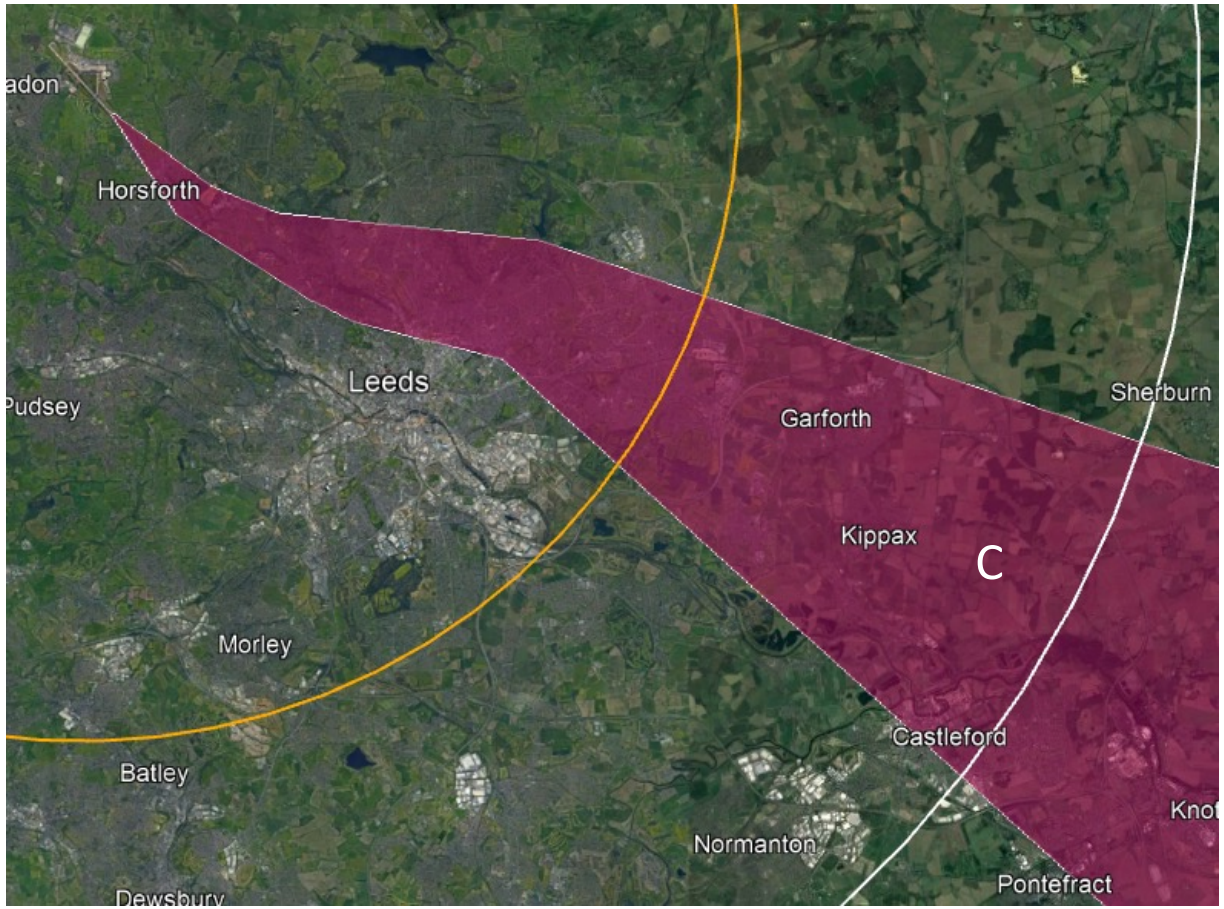
RW14 – South-Easterly Departures - MAMUL

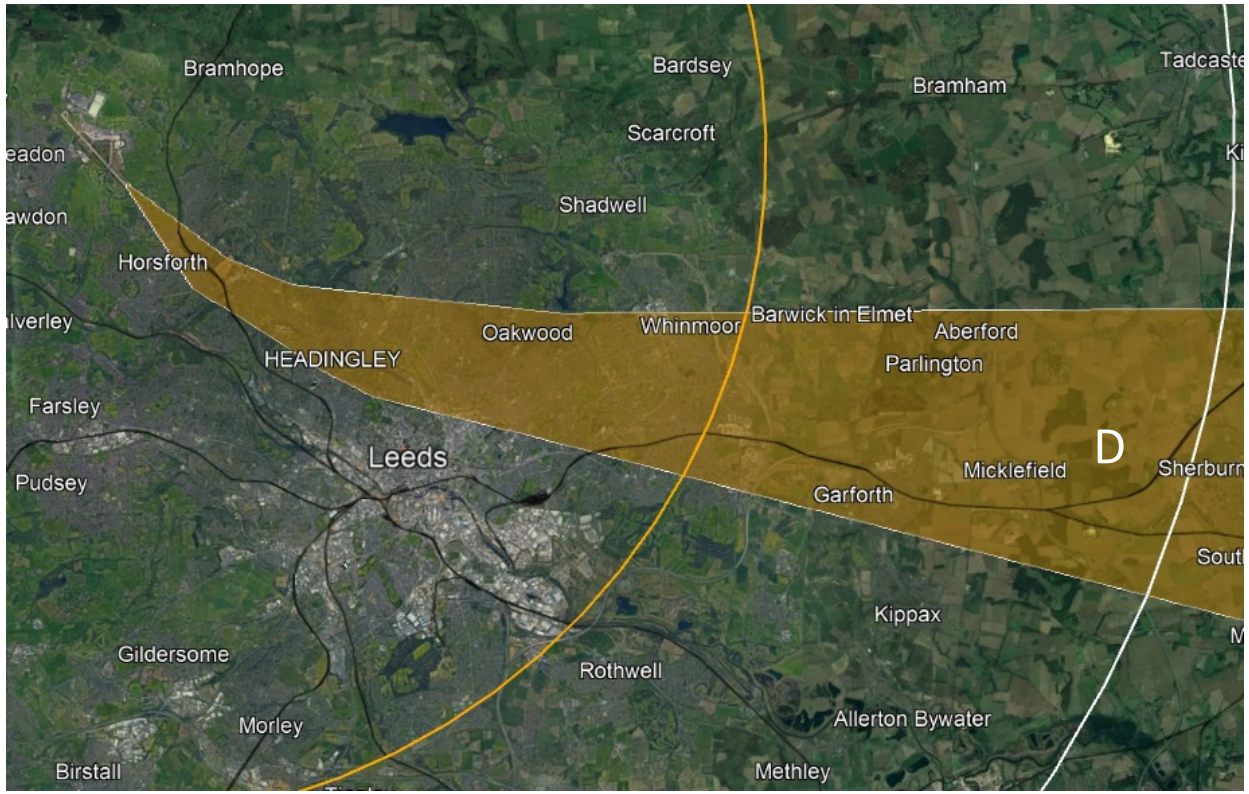


RW14 – South-Easterly Departures - MAMUL



RW14 – South-Easterly Departures - MAMUL





RW14 – South-Easterly Departures - MAMUL

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14SEA											
14SEB											
14SEC	Rejected at review as does not point to MAMUL or fit with Route Network and L975 flow										
14SED	Rejected at review as does not point to MAMUL or fit with Route Network and L975 flow										

RW14 – South-Easterly Departures - MAMUL

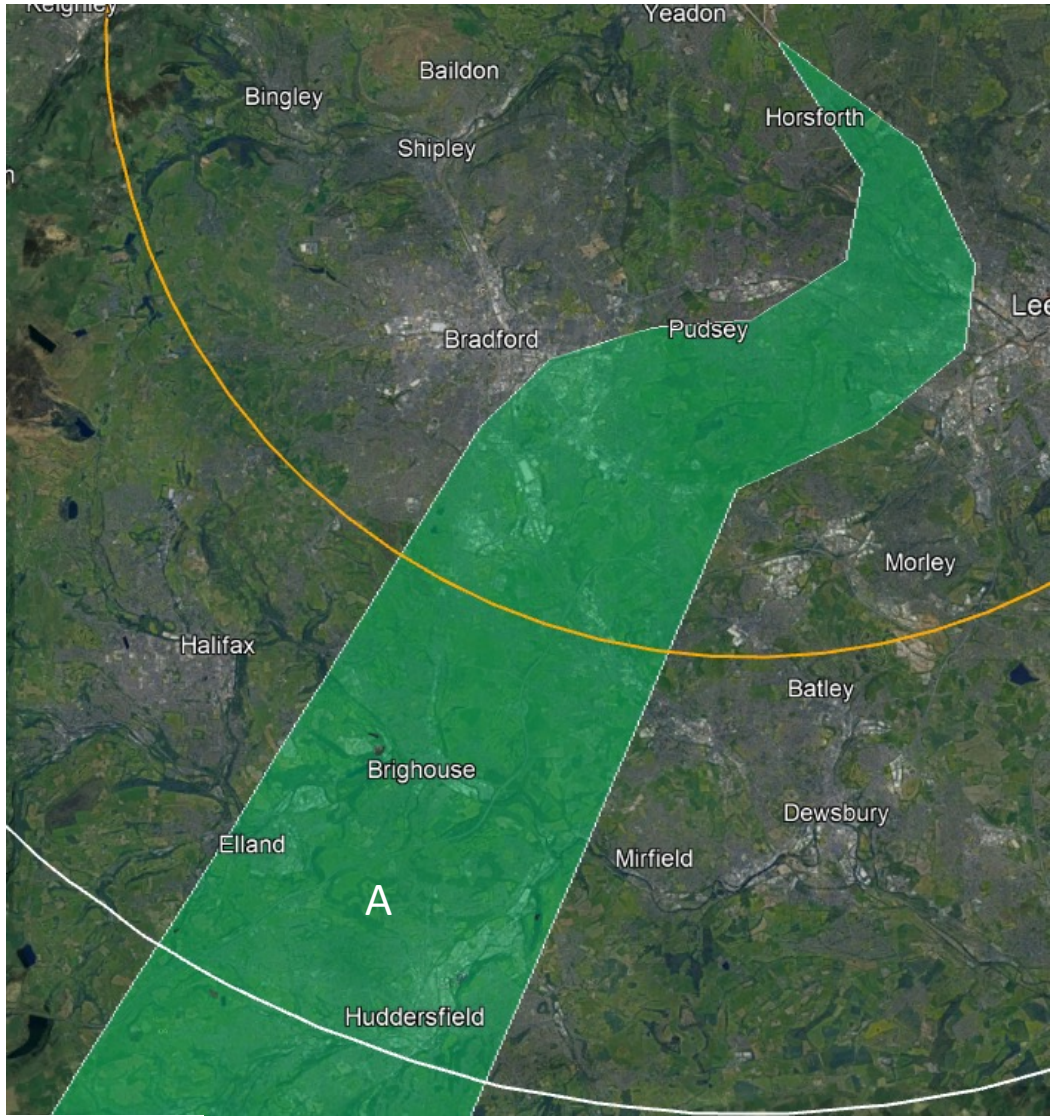
Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14SEA											
14SEB											
14SEC	Considered no longer a viable option and discounted from assessment.										
14SED	Considered no longer a viable option and discounted from assessment.										

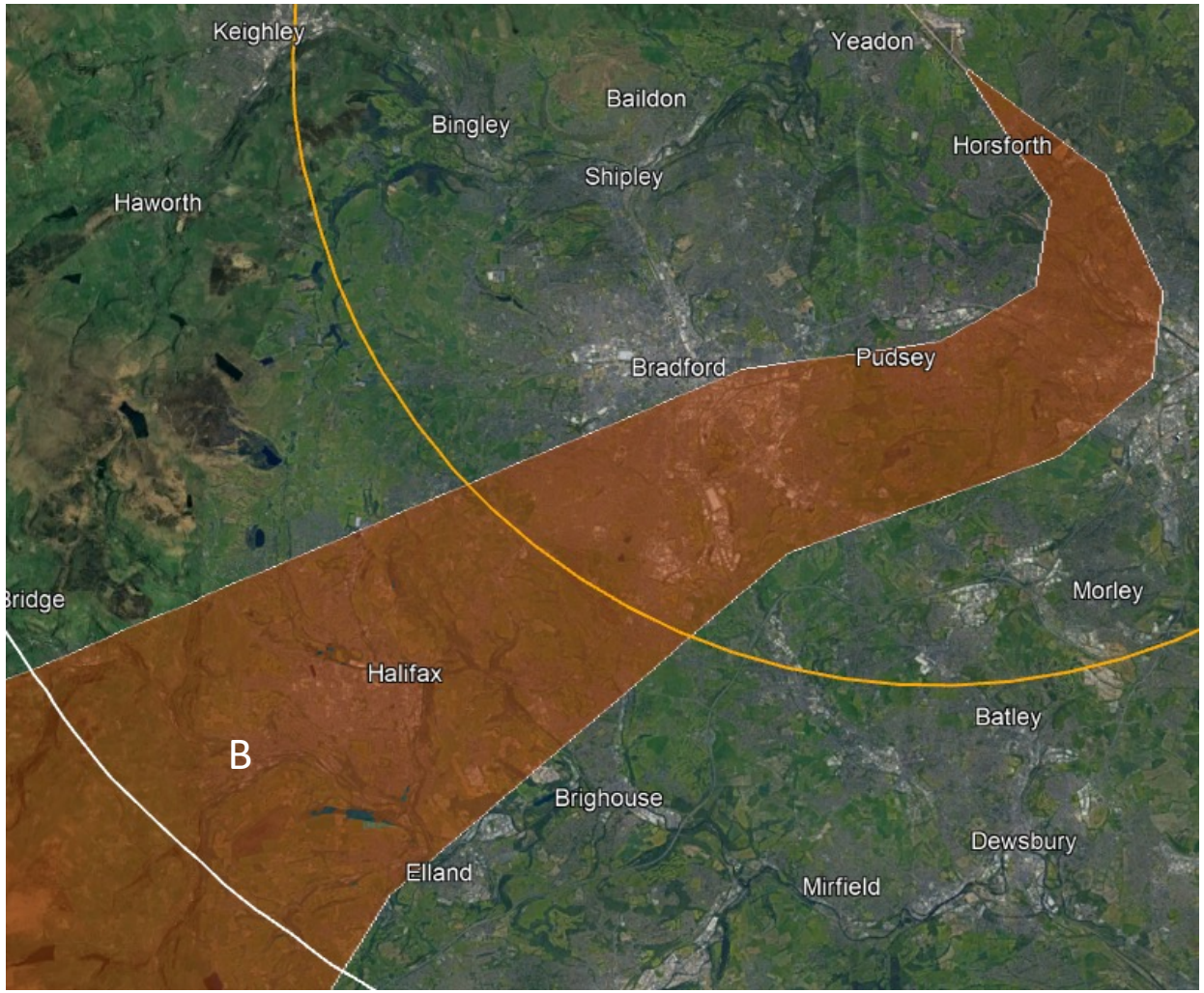
DPE Changes RW14 – South-Easterly Departures - MAMUL

- DP1 – Safety – Option B changed from Amber to Green - *Due to reassessment by SME at LBA. Safety issues caused by additional CAS are now assessed in DP6.*
- DP2 - Noise – No change.
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – Options A and B changed from Green to Amber - *Due to reassessment of track miles.*
- DP5 – Airspace Dimensions – No change
- DP6 – Airspace Complexity – Option B changed from Amber to Green - *Due to reassessment by SME at LBA.*
- DP7 – Technical – No change.
- DP8 – Systemisation – Option B changed from Green to Amber - *Due to reassessment by SME at LBA.*
- DP9 – Operational Cost – Options A and B changed from Green to Amber -*Due to reassessment of track miles as indicator for fuel, and new communities flown over.*
- DP10 – AMS Realisation – Option A and B changed from Green to Amber - *Due to changes in other DPs and the new criteria.*
- DP11 – PBN – No change.

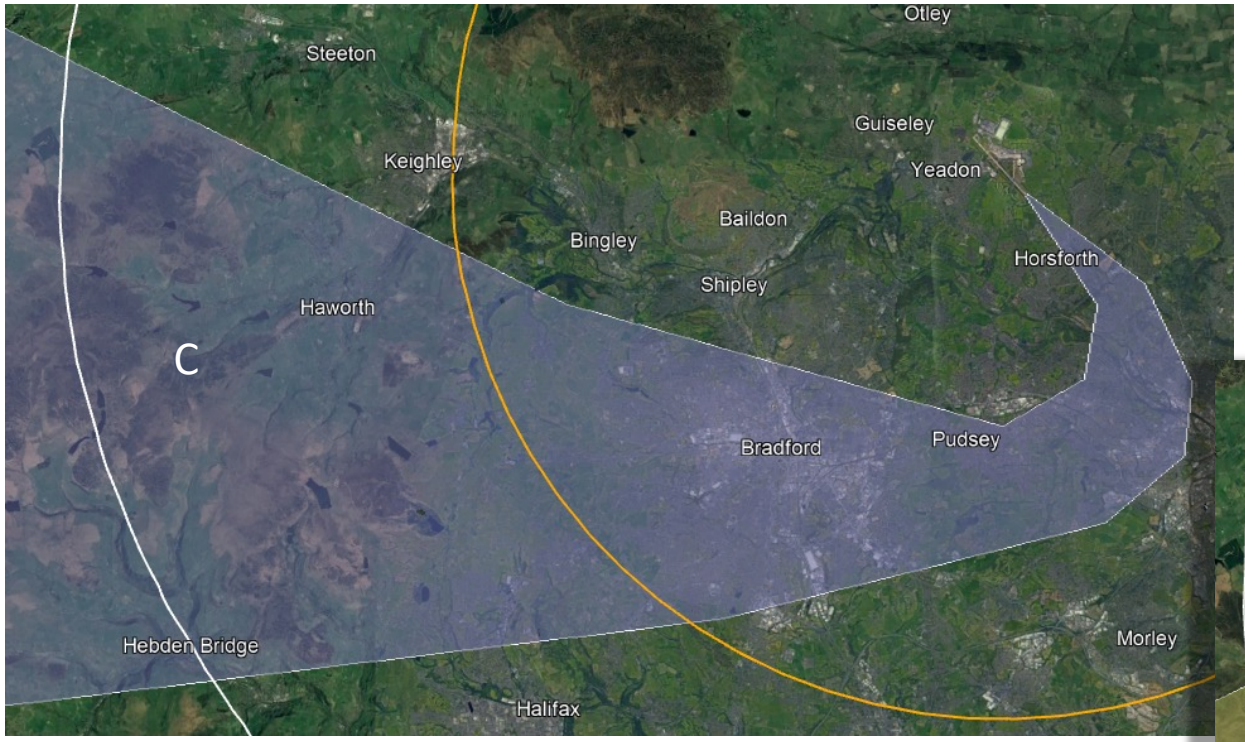
RW14 – South & West Departures – POL/NELSA

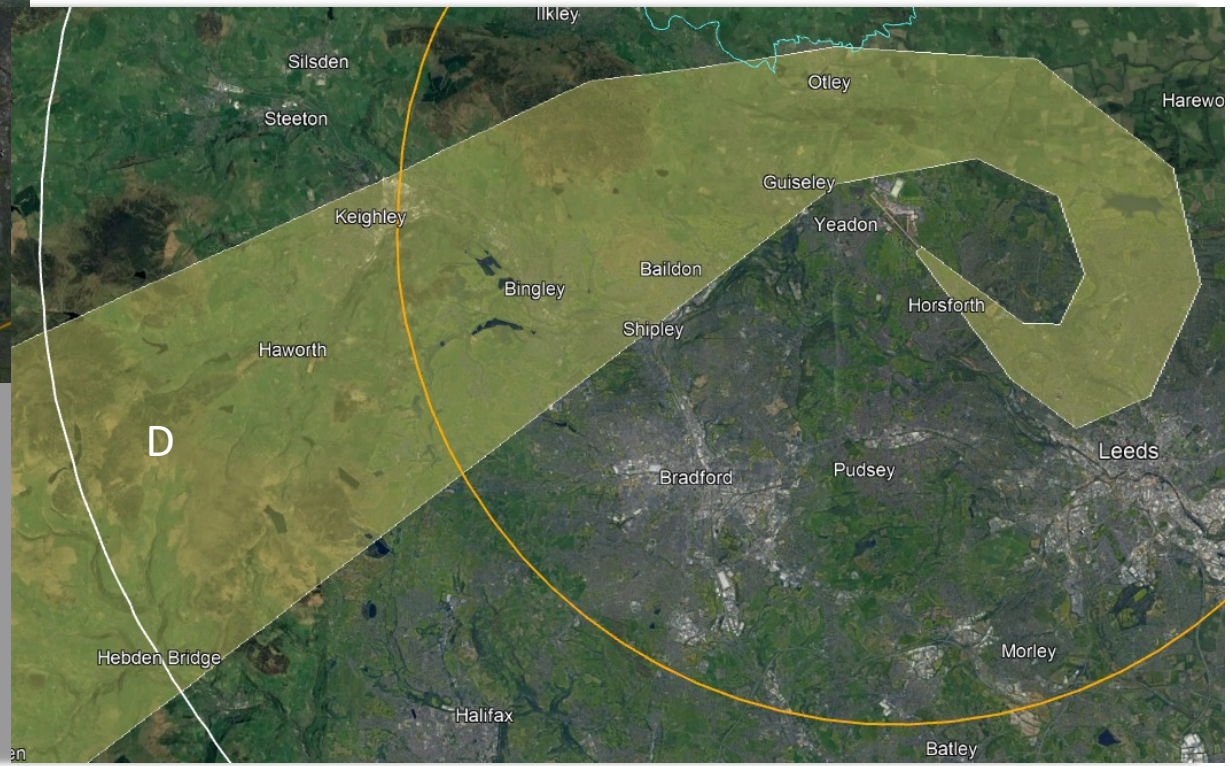
RW14 – South & West Departures – POL/NELSA



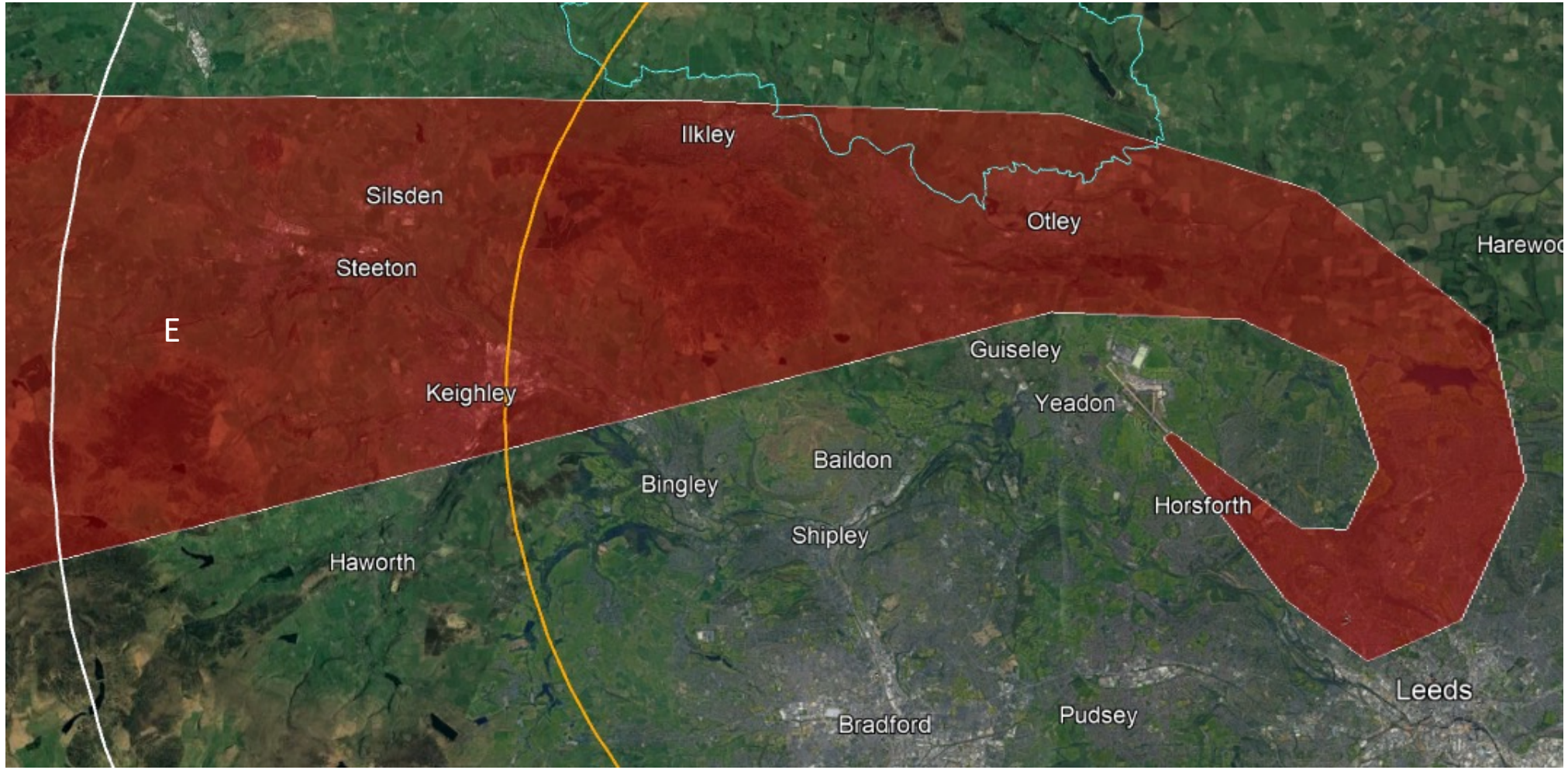


RW14 – South & West Departures – POL/NELSA





RW14 – South & West Departures – POL/NELSA



RW14 – South & West Departures – POL/NELSA (Old)

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14S&WA	Rejected on review as does not route towards the joining point at POL										
14S&WB	Rejected on review as does not route towards the joining point at POL										
14S&WC											
14S&WD											
14S&WE											

RW14 – South & West Departures – POL/NELSA (New)

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
14S&WA	Considered no longer a viable option and discounted from assessment.										
14S&WB	Considered no longer a viable option and discounted from assessment.										
14S&WC											
14S&WD											
14S&WE											

DPE Changes RW14 – South & West Departures – POL/NELSA

- DP1 – Safety – No change.
- DP2 - Noise – Options D and E changed from Red to Amber - *Due to number of people flown over, different communities now accounted for in DP9.*
- DP3 – Tranquillity – Option C changed Green to Amber, Option D changed from Amber to Red - *Due to reassessment of tranquil areas – AONB, NPs and South Pennine Moors only.*
- DP4 – Emissions and Air Quality – Option C changed Green to Amber, Options D and E changed from Amber to Red - *Due to reassessment of track miles.*
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – Options D and E changed from Green to Amber - *Due to reassessment by SME at LBA.*
- DP7 – Technical – No change.
- DP8 – Systemisation – Options D and E changed from Green to Amber - *Due to reassessment by SME at LBA.*
- DP9 – Operational Cost – Option C changed Green to Amber, Options D and E changed from Amber to Red - *Due to reassessment of track miles as indicator for fuel, and new communities flown over.*
- DP10 – AMS Realisation – Options C, D and E changed from Green to Amber - *Due to changes in other DPs and the new criteria..*
- DP11 – PBN – No change.

Leeds Bradford Airport Future Airspace

Thank you for your time. We hope that you find this information on Leeds Bradford Future Airspace useful.

If you have any further queries, please address them to Airspace Change

We are very grateful for your assistance.

The Leeds Bradford ACP Team

Leeds Bradford Airport (LBA) Future Airspace

Step 2a – Design Principle Evaluation Update Brief –May 2025

Part 2: Arrivals

- **IMPORTANT:** This presentation should be read in conjunction with the **'ACP Stakeholder Engagement Update and New Arrival Option'** document.

- This document highlights the changes made to the DPE for all arrival options between the last DPE (November 2023) and the final DPE. (Departures are presented separately in Part 1.)

- Key updates:

    - The wording of three DPE assessment criteria—DP2 (Noise), **DP4** (Emissions and Air Quality) and **DP9** (Operational Cost)—has been revised and reassessed.
    - The methodology for applying other DPs has changed.

- **Additional Option** (Option 11) feedback required.

- This document illustrates **what** has changed and a brief explanation of **why**; please refer to the **Update document** for a further explanation of **why** these changes have been made and **how** the criteria were applied.

Presentation Roadmap

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- **Slides 4 to 8** provide a reminder of the **Design Principles (DP)** and **Design Principle Evaluation Criteria (DPE)**.

- **Slides 9 to 12** recap the **Arrival Directions** and the **Route Network Flow** and LBA environment

- **Slides 13 to 16** review the **Baseline Scenario** (current operations).

- For each subsequent section:
  - A summary of the **options** is presented.
  - Each **design envelope** includes:
    - The **previous DPE**, and **new DPE**,
    - A **list of changes**, highlighting differences between the last and current DPE assessments.

- **New Option** - Option 11 -New Eastern Arrival Transition Option for Runway 32 DPE (slides 60-62)

- Required Navigation Performance Authorisation Required (RNP AR)

Agreed Design Principles (DPs)

DP #	Design Principle
1	**Importance of Safety** – The airspace design and its operation must maintain or where possible, enhance current levels of safety.
2	**Noise** - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.
3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONBs.
4	**Emissions and Air Quality** – The proposed design should minimise CO2 emissions per flight.
5	**Airspace Dimensions** – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.
6	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.
7	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.
8	**Systemisation** – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the Instrument Approach Procedures (IAPs), deconflict with the departure procedures, reducing the requirement for tactical coordination.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.
11	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.

Design Principles Evaluation (DPE) Criteria (DP 1-3)

DP #	Design Principle		
DP1	**Importance of Safety** – The airspace design and its operation must maintain or where possible, enhance current levels of safety.		
Criteria	**Meets:** No safety issues identified.	**Partially Meets:** Issues identified to overcome that would require a significantly more robust safety argument than today's operation.	**Does Not Meet:** Issues identified that would be unlikely to be overcome without prohibitively restrictive safety mitigations.
DP2	**Noise** - The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.		
Criteria	**Meets:** : Limits or has the potential to reduce the number of people flown over.	**Partially Meets:** Impacts of aircraft noise likely to be broadly similar in terms of the number of people flown over although it may be different communities	**Does Not Meet:** Has the potential to increase the number of people flown over.
DP3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONB's.		
Criteria	**Meets:** Limits effects on Noise Sensitive Areas and does not result in any overflight of a AONB or a NP below 7000ft.	**Partially Meets:** May result in overflight of a portion of an AONB or a NP, also may result in overflight of tranquil areas important to local communities such as reservoirs or parks.	**Does Not Meet:** Results in direct and significant overflight of AONBs or NPs and/or various tranquil areas important to local communities.

Design Principles Evaluation (DPE) Criteria (4-6)

DP #	Design Principle		
4	**Emissions and Air Quality** – The proposed design should minimise CO_2 emissions per flight.		
Criteria	**Meets** Has potential to reduce CO2 emissions.	**Partially Meets:** CO_2 emissions likely to be the same or similar to today's operation.	**Does Not Meet:** Has the potential to increase CO_2 emissions.
5	**Airspace Dimensions** – The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.		
Criteria	**Meets:** Allows for either a reduction in the volume of CAS required or does not require any additional CAS.	**Partially Meets:** May result in a need for small amounts of additional CAS but there may be potential to revert some CAS to Class G.	**Does Not Meet:** Large additional volumes of CAS are required to contain the proposed option without the potential to revert to Class G.
6	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.		
Criteria	**Meets:** Does not result in a complex CTA/CTR configuration with numerous different base levels likely to lead to inadvertent CAS penetrations.	**Partially Meets:** Results in changes to the CAS configuration that may cause other aviators some minor challenges.	**Does Not Meet:** Results in a highly complex CAS configuration.

Design Principles Evaluation (DPE) Criteria (7-9)

DP #	Design Principle		
7	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.		
Criteria	**Meets:** Is fully compliant and meets the technical capabilities of almost all airport operators.	**Partially Meets:** Is largely compliant but with reasonable justification for any non-compliance and meets the technical capabilities of most airport operators.	**Does Not Meet:** Has several non-compliances without reasonable justification and does not meet the technical capabilities of several airport operators.
8	**Systemisation** – The new procedures will integrate with the en-route network, as per the FASI(N) programme. If required, the arrival transitions shall integrate with the IAPs, deconflict with the departure procedures, reducing the requirement for tactical coordination.		
Criteria	**Meets:** Integrates seamlessly with the en-route network and is likely to reduce the need for tactical coordination and vectoring within the CTA/CTR.	**Partially Meets:** Integrates seamlessly with the en-route network but may not reduce the need for tactical coordination and vectoring within the CTA/CTR.	**Does Not Meet:** Does not integrate seamlessly with the en-route network and will not decrease the need for tactical coordination and vectoring within the CTA/CTR.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.		
Criteria	**Meets:** Fuel efficiency is optimal without an adverse impact on local communities.	**Partially Meets:** Fuel efficiency is optimal however there is some impact on local communities.	**Does Not Meet:** : Fuel efficiency not optimized and/or the community impact is greater compared with today.

Design Principles Evaluation (DPE) Criteria (10 & 11)

DP #	Design Principle		
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.		
Criteria	**Meets:** Aligned with the AMS.	**Partially Meets:** Partially aligned with the AMS.	**Does Not Meet:** Not aligned with the AMS.
11	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.		
Criteria	**Meets:** Designed to the latest navigation standards that do not require aircraft fleet upgrades.	**Partially Meets:** Designed to the latest navigation standards that may require aircraft fleet upgrades.	**Does Not Meet:** Fails to utilise the latest navigation standards.

Arrivals

Baseline and Eleven Design Options with pattern shown for each Runway Mode (Runways 32 and 14) plus additional option:

- Baseline
- Option 1 - 1 Hold – LBA
- Option 2 - 2 Holds – NELSA & GOLES
- Option 3 - 2 Holds – ‘AIREY’ & ‘WORTH’
- Option 4 - 3 Holds – LBA, ‘AIREY’ & ‘WORTH’
- Option 5 - 3 Holds – NELSA, GOLES & ’UDDER’
- Option 6 – 2 Holds – LBA & GOLES
- Option 7 – 3 Holds – SETEL, LBA & GOLES
- Option 8 – 3 Holds – NW, LBA & GOLES
- Option 9 – 2 Holds – NW & GOLES
- Option 10 – 1 Arrival Hold (GOLES) & Direct Arrivals
- Option 11 - New Eastern Arrival Transition Option for Runway 32
- Additional Option – RNP AR – RW14 and RW32

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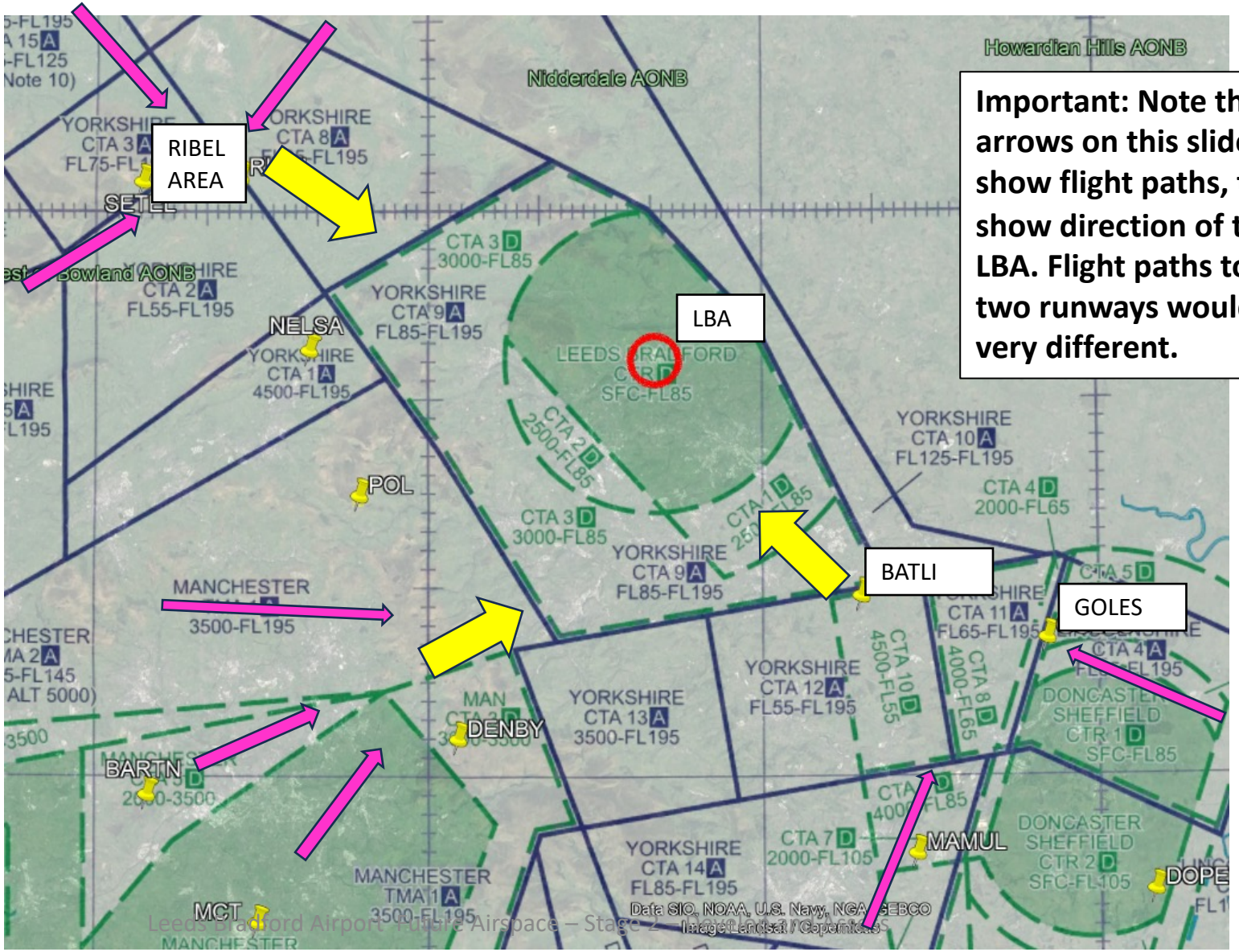
Arrival Directions and the Route Network Flow

Stakeholders have expressed a preference to see Standard Terminal Arrival Routes (STARs) to LBA route via three particular exits from the Route Network:

- Traffic from W, NW and NE via RIBEL area
- Traffic from S and ESE via MAMUL/GOLES
- Traffic from SW and W towards the LBA via existing arrival gates

These points are chosen as they best fit the overall flow of the Manchester Terminal Manoeuvring Area (MTMA) within which aircraft are climbing in and out of various airports.

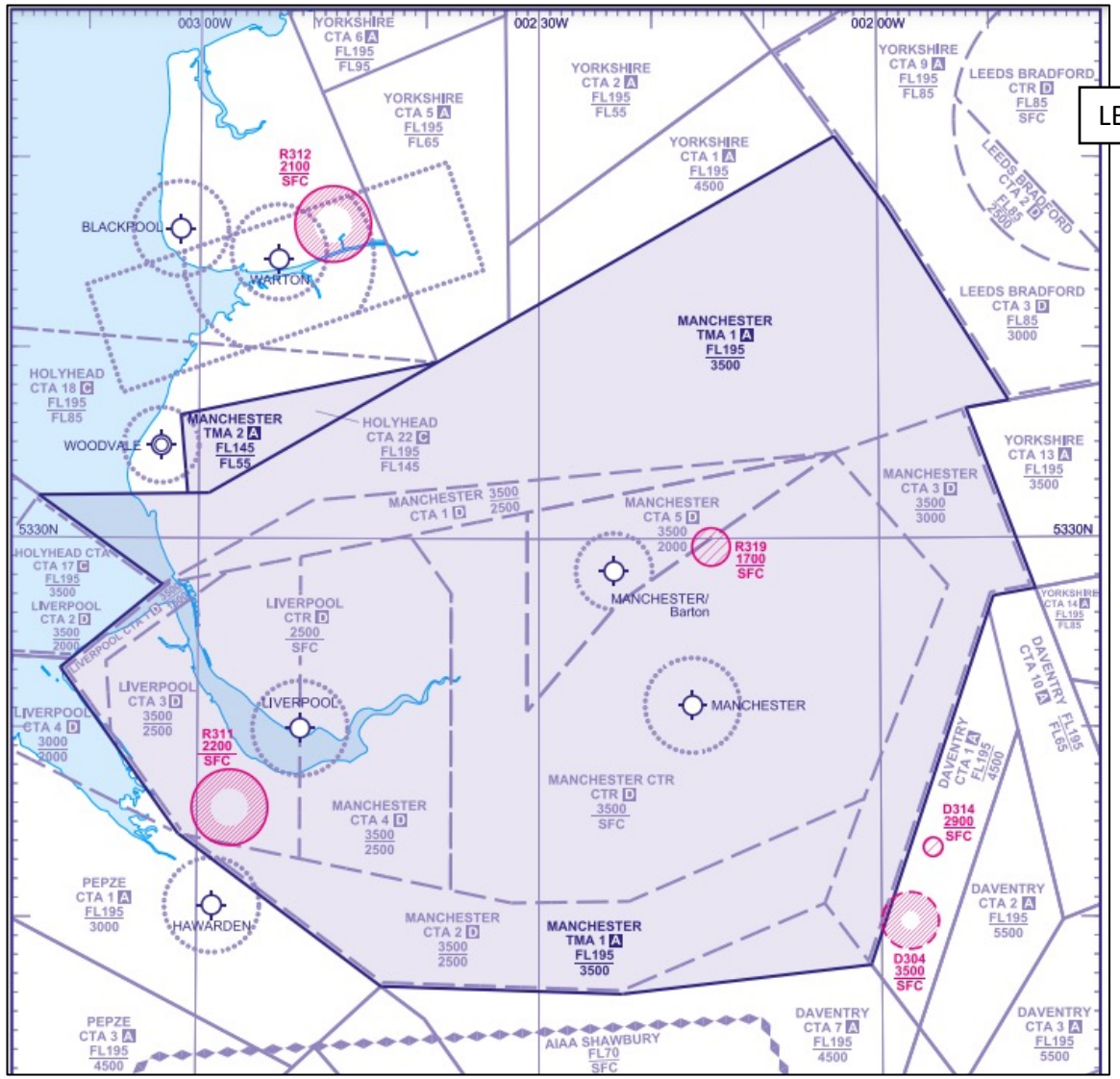


Important: Note that the arrows on this slide do not show flight paths, they show direction of travel to LBA. Flight paths to the two runways would look very different.

MTMA

The points on the previous slides are chosen as they best fit the overall flow of the Manchester Terminal Manoeuvring Area (MTMA) within which aircraft are climbing in and out of various airports, principally:

- Manchester;
- Liverpool;
- East Midlands; and
- Leeds Bradford.



Hold, Missed Approach and Arrival Transition Depictions

Holds

Arrival holding patterns form part of Standard Arrival Route (STAR) procedures and, within the FASI-N programme, form part of those airspace changes taking place above 7,000ft which are defined in the National Air Traffic En-route PLC (NERL) network ACP.

The only difference to this is a Hold that is used for the Missed Approach Procedure (MAP). Such a hold may require a lowest holding altitude of 4-5000ft.

The hold depictions are intended to give stakeholders an idea of how the system might work. These are drawn within blue circles/lozenges surrounding them as the final location is not determined.

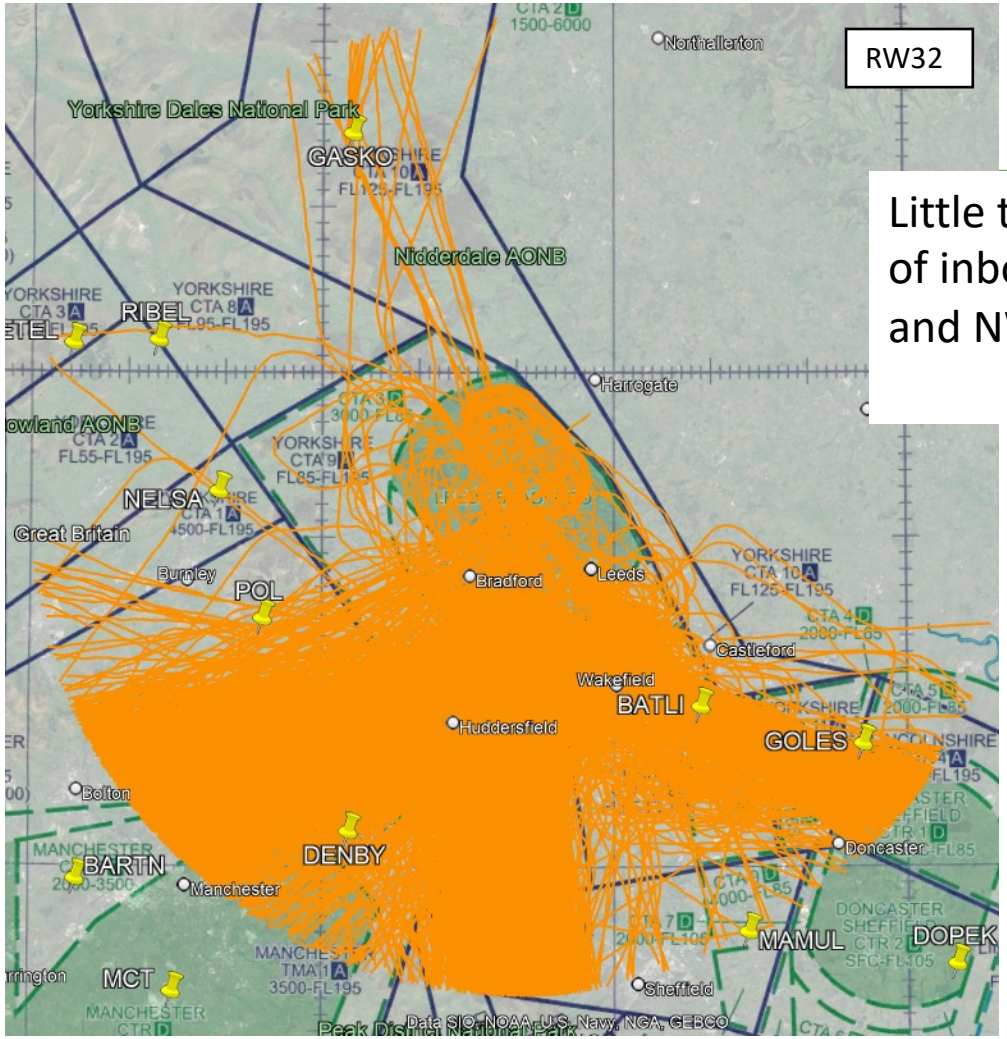
The LBA Hold already exists and this is depicted as it is today.

Arrivals Transitions and Missed Approaches

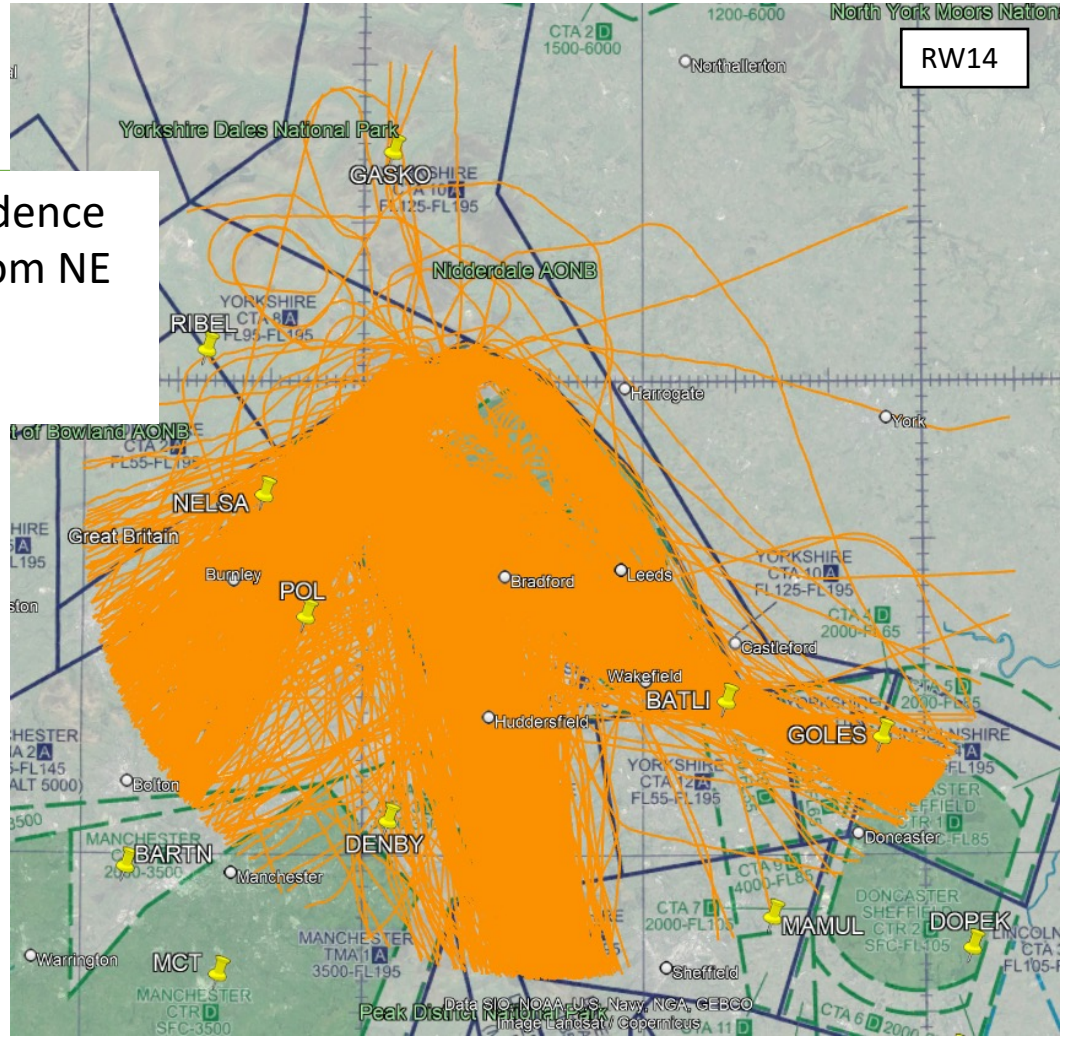
The lines depicting the Arrival Transitions and the Missed Approach Procedures **are not intended to show definitive tracks over the ground**. These are purely intended to provide an indication of how such a system would work. The final procedures would be refined through the consultation process should a given option progress beyond Stage 2 of the process.

Baseline Swathe Development

LBA Baseline Arrival Swathe Creation:
Too cluttered to make any sense over 92 days

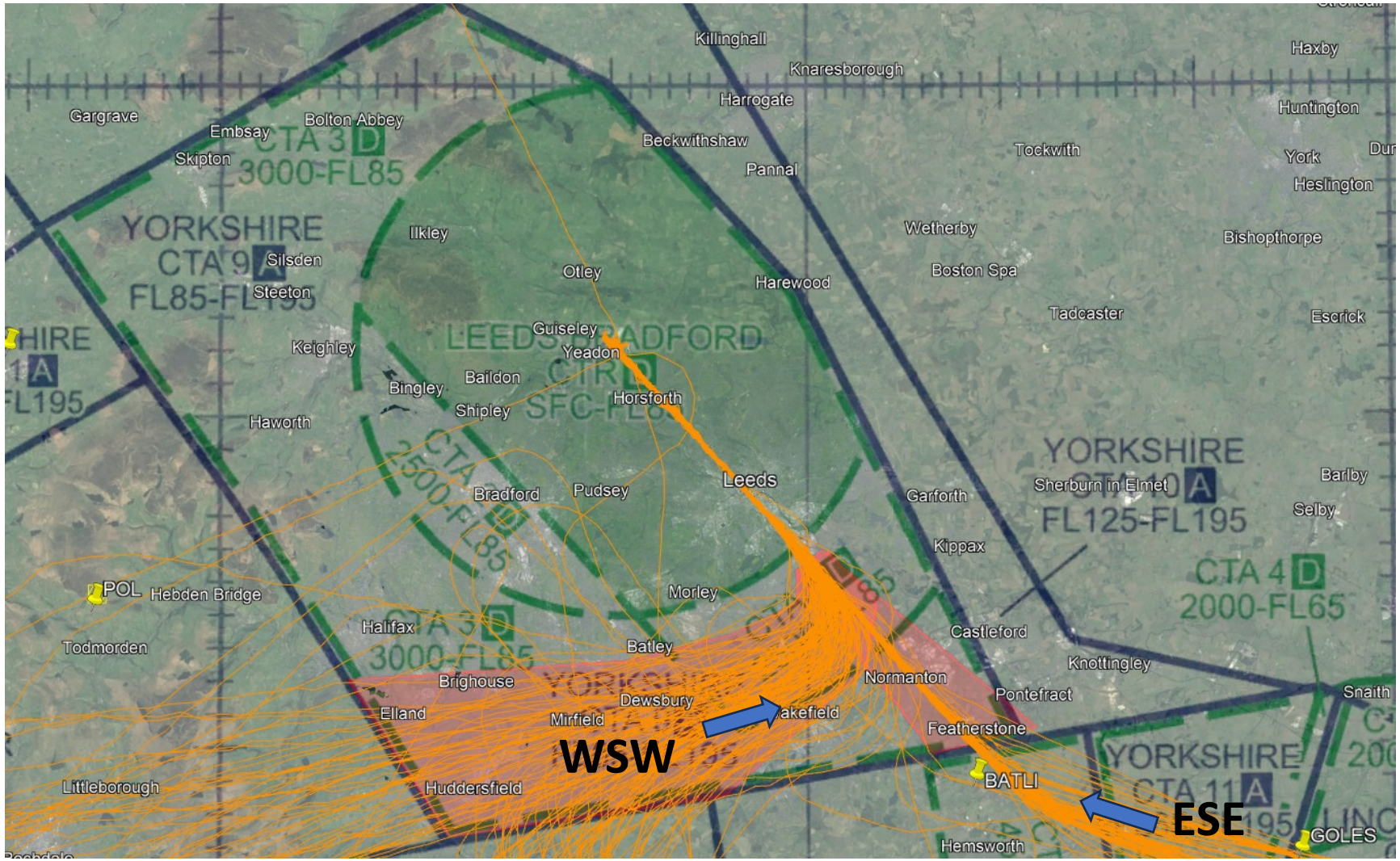


Little to no evidence of inbounds from NE and NW



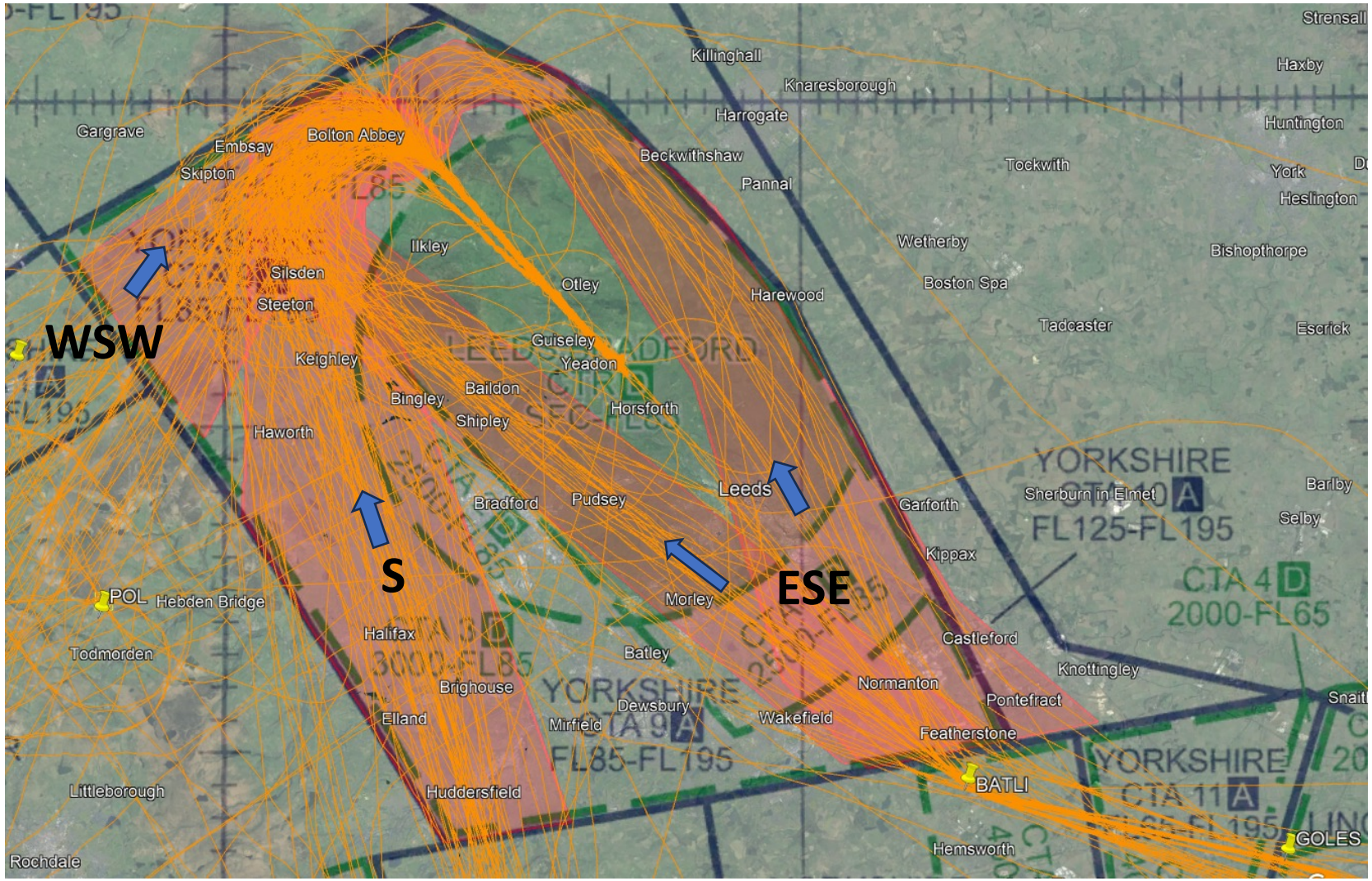
NTMS RW32 & RW14 Arrivals 92-day Summer 2022

LBA RW32 Baseline Arrival Swathe Creation



NTMS RW32 Arrival Data 3rd to 10th July 2022

LBA RW14 Baseline Arrival Swathe Creation



NTMS RW14 Arrival Data 3rd to 10th July 2022

LBA Arrival System Baseline DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Baseline											

There are no changes to the DPE for the Arrival System Baseline, as a DPE was not previously conducted.

Arrival Options

Arrivals – Option 1 - 1 Hold – LBA – RW32 (Status Quo with PBN)

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LBA hold retained as MAP and weather hold

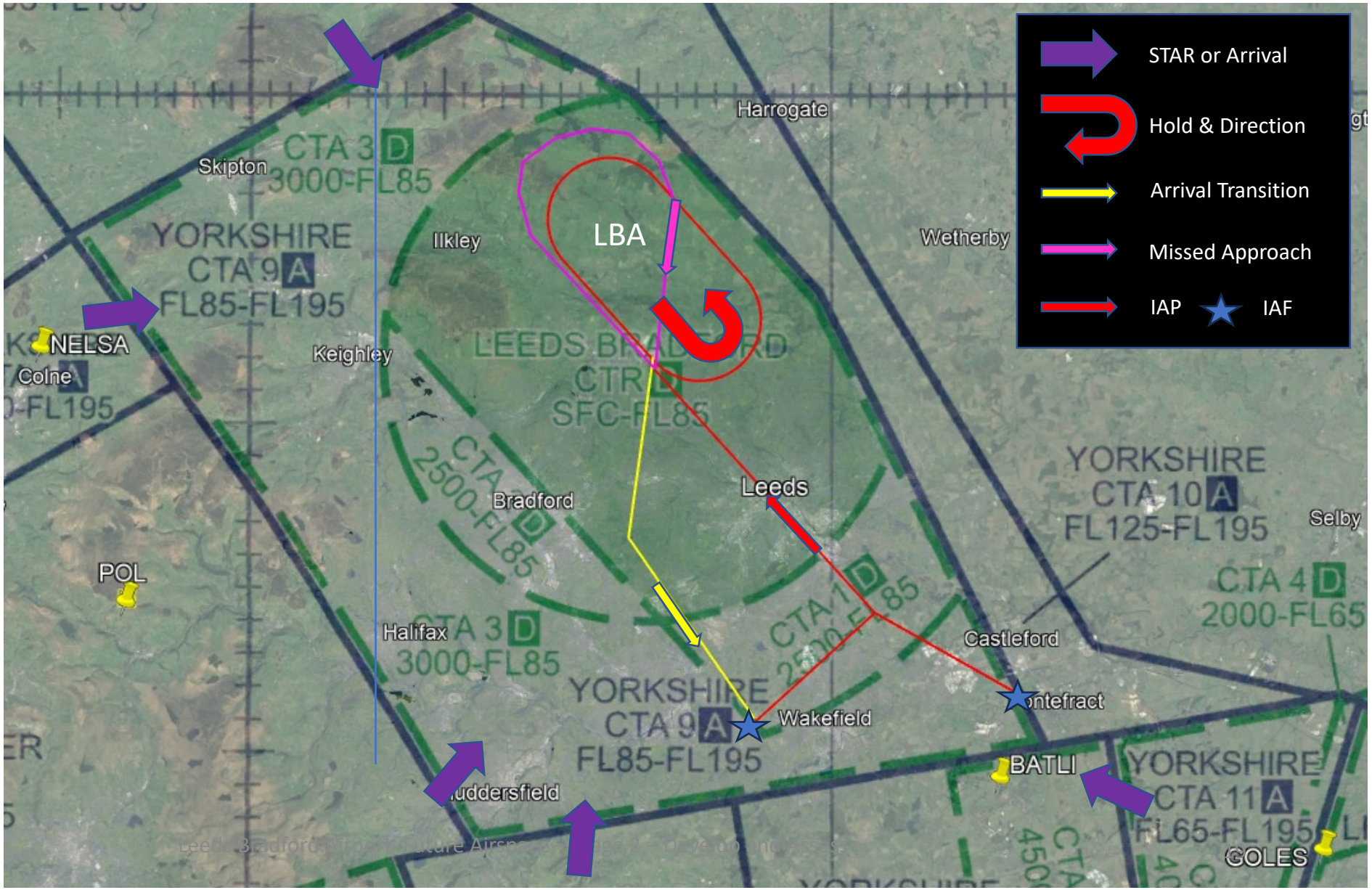
Most traffic would be tactically controlled and would rarely route to the LBA holding fix or follow the arrival transition

One-sided T-Bar or Y-Bar (might be straightened out towards BATLI)

MAP same as existing

Limited flexibility with hold still in overhead

Traffic from the SE likely to be being routed towards MAMUL/GOLES by NERL



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Arrivals – Option 1 - 1 Hold – LBA – RW14 (Status Quo with PBN)

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LBA hold retained as MAP and weather hold

Most traffic would be tactically controlled and would rarely route to the LBA holding fix or follow the arrival transitions

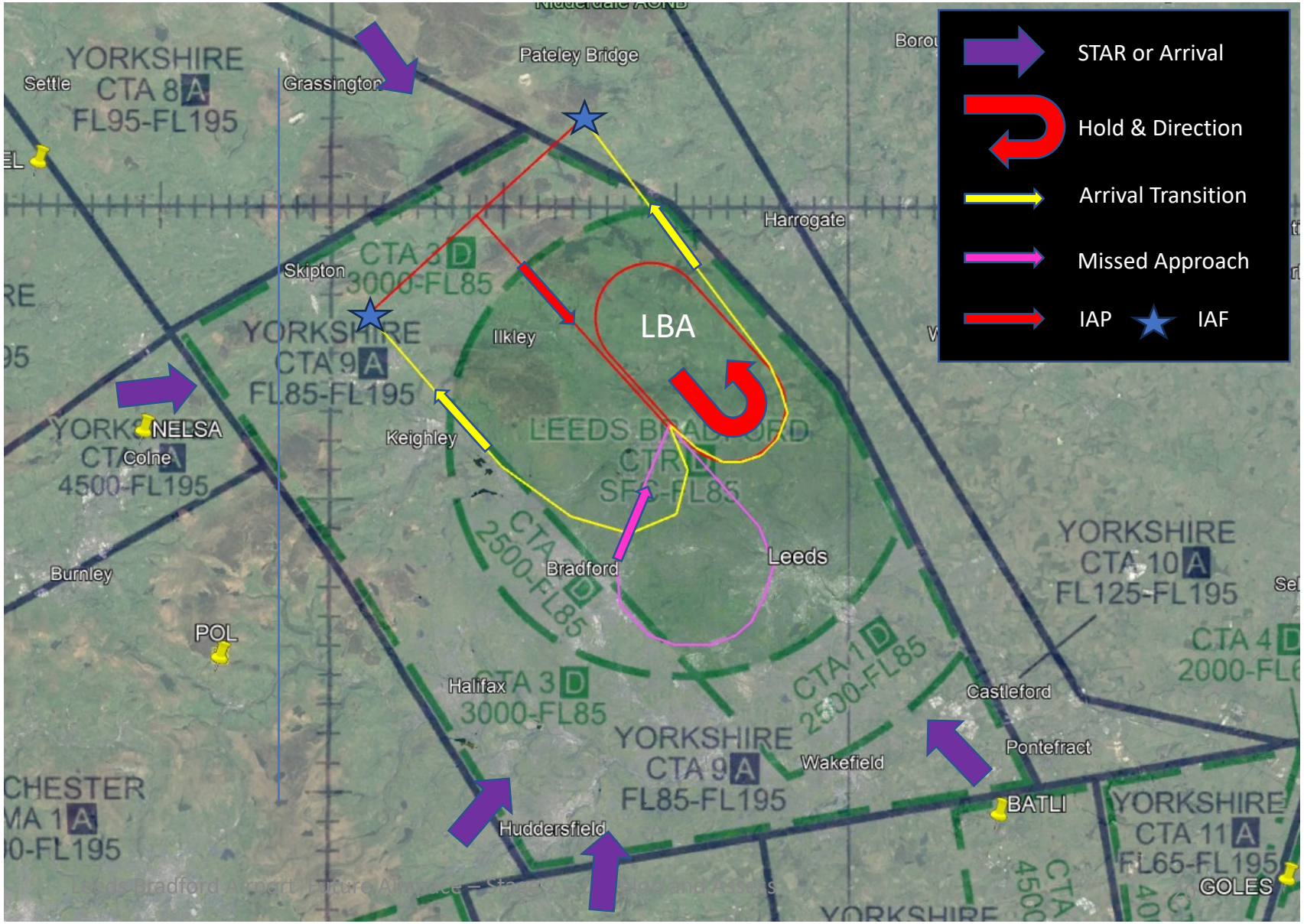
Choice of 2 Arrival Transitions from the LBA (yellow lines)

Eastern 'T' extension & Arrival Transition needs additional CAS

MAP same as existing

Limited flexibility with hold still in overhead

Traffic from the SE likely to be being routed towards MAMUL/GOLES by NERL



Arrivals – Option 1 - 1 Hold – LBA (Status Quo with PBN)

Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 1											

New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 1											

DPE Changes Arrivals – Option 1 - 1 Hold – LBA (Status Quo with PBN)

- DP1 – Safety – No change.
- DP2 - Noise – No change.
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – No change.
- DP5 – Airspace Dimensions – Change from Amber to Green - *Due to reassessment by SME at LBA.*
- DP6 – Airspace Complexity – No change.
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Change from Amber to Green - *Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – No change.
- DP11 – PBN – Change from Green to Red - *Due to reassessment by SME at LBA.*

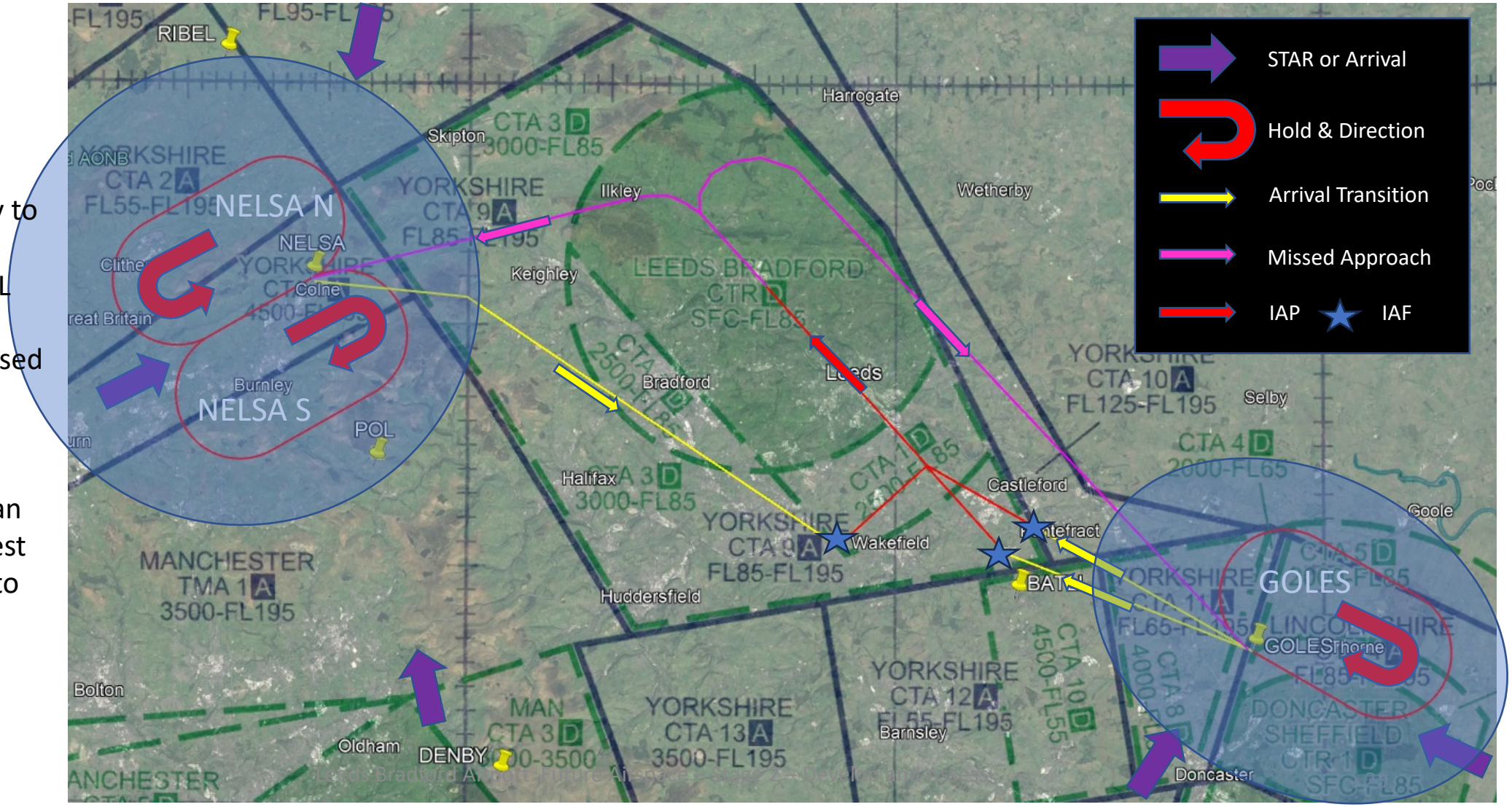
Arrivals – Option 2 - 2 Holds - NELSA/GOLES – RW32

Either NELSA North (left hand) or NELSA South (right hand) - potential Arrival/MAP Hold from 5000ft vice the LBA

Traffic from the SE likely to be routed towards MAMUL/GOLES by NERL

T-Bar or Y-Bar to suit based on airspace and noise considerations

GOLES more likely just an Arrival Hold with a lowest base of FL80 and likely to require additional CAS



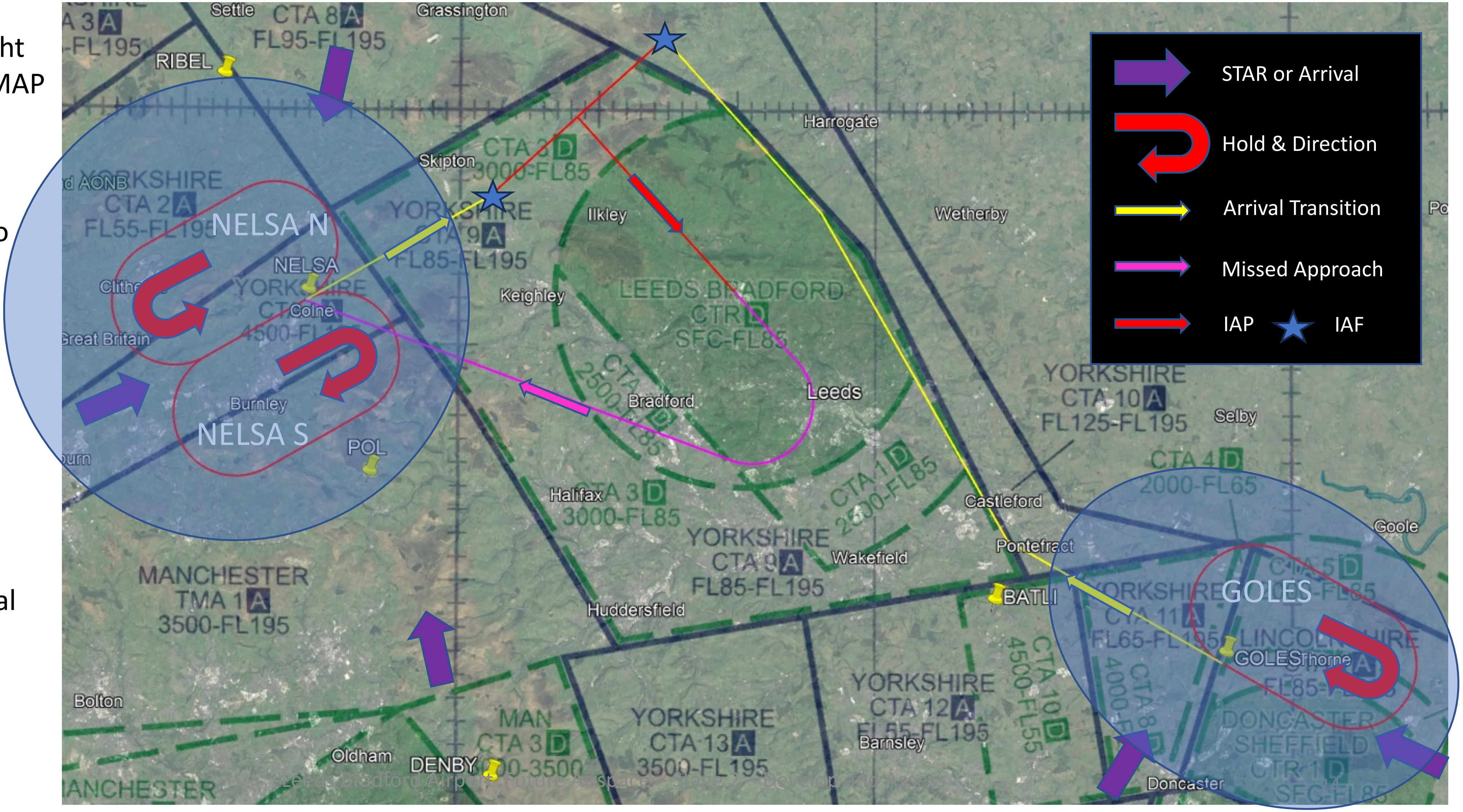
Arrivals – Option 2 - 2 Holds - NELSA/GOLES – RW14

Either NELSA North (left hand) or NELSA South (right hand) - potential Arrival/MAP Hold from 5000ft vice the LBA

Traffic from the SE likely to be routed towards MAMUL/GOLES by NERL

GOLES more likely just an Arrival Hold with a lowest base of FL80 and likely to require additional CAS

Additional CAS will be required for eastern Arrival Transition and T-Bar



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Arrivals – Option 2 - 2 Holds - NELSA/GOLES Old and New DPE

Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 2											

New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 2											

Arrivals – Option 2 - 2 Holds - NELSA/GOLES Old and New DPE

- DP1 – Safety – No change.
- DP2 - Noise – Changed from Green to Amber - *Due to number of people flown over, different communities now accounted for in DP9.*
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – No change.
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – No change.
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Changed from Green to Amber - *Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – Changed from Green to Amber – *Due to changes in other DPs and the new criteria.*
- DP11 – PBN – No change.

Arrivals – Option 3 - 2 Holds – ‘AIREY’ & ‘WORTH’ – RW32

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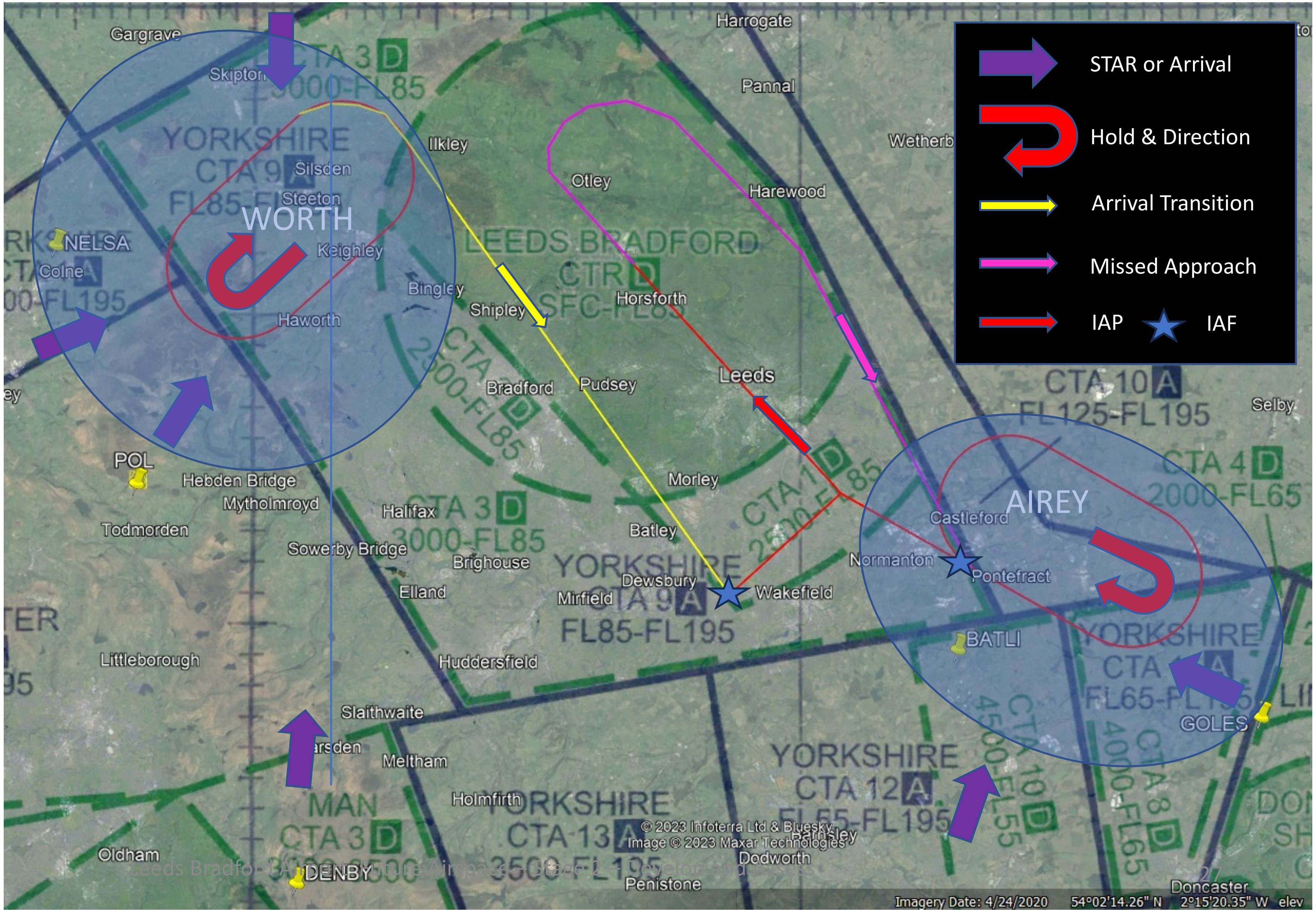
WORTH too close and potentially limiting departures.

AIREY needing additional CAS

T/Y-Bar angle – closer to BATLI, SIE/Leeds East/Burn GC to consider

MAP to AIREY as WORTH potentially in conflict with departures. (Hold base circa 5000ft)

Traffic from the SE likely to be routed towards MAMUL/GOLES by NERL



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Arrivals – Option 3 - 2 Holds – ‘AIREY’ & ‘WORTH’ – RW14

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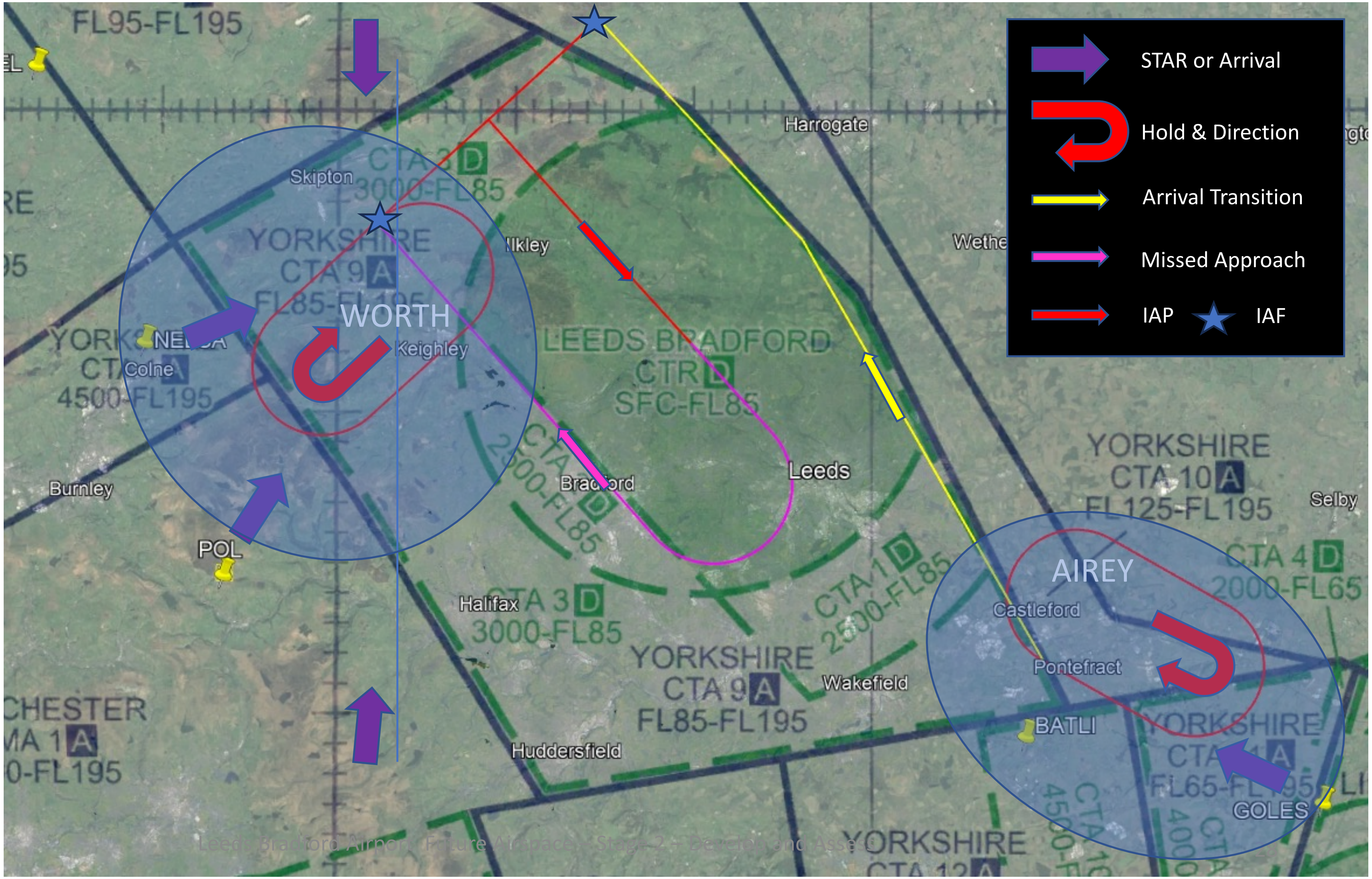
WORTH too close andpotentially limiting departures.

AIREY needing additional CAS and unlikely due to SIE/Leeds East/Burn GC

MAP to WORTH (Hold base circa 5000ft)

Traffic from the SE likely to be routed towards MAMUL/GOLES by NERL



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Arrivals – Option 3 - 2 Holds – ‘AIREY’ & ‘WORTH’

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Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 3											

New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 3											

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Arrivals – Option 3 - 2 Holds – ‘AIREY’ & ‘WORTH’

- DP1 – Safety – No change.
- DP2 - Noise – Changed from Green to Amber - *Due to number of people flown over, different communities now accounted for in DP9.*
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – Changed from Amber to Green - *Due to reassessment of track miles .*
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – Changed from Amber to Red - *Due to reassessment by SME at LBA.*
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Changed from Green to Amber - *Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – Changed from Green to Amber - *Due to changes in other DPs and number of Red assessments.* DP11 – PBN – No change.

Arrivals – Option 4 - 3 Holds – LBA with ‘AIREY’ & ‘WORTH’ – RW32

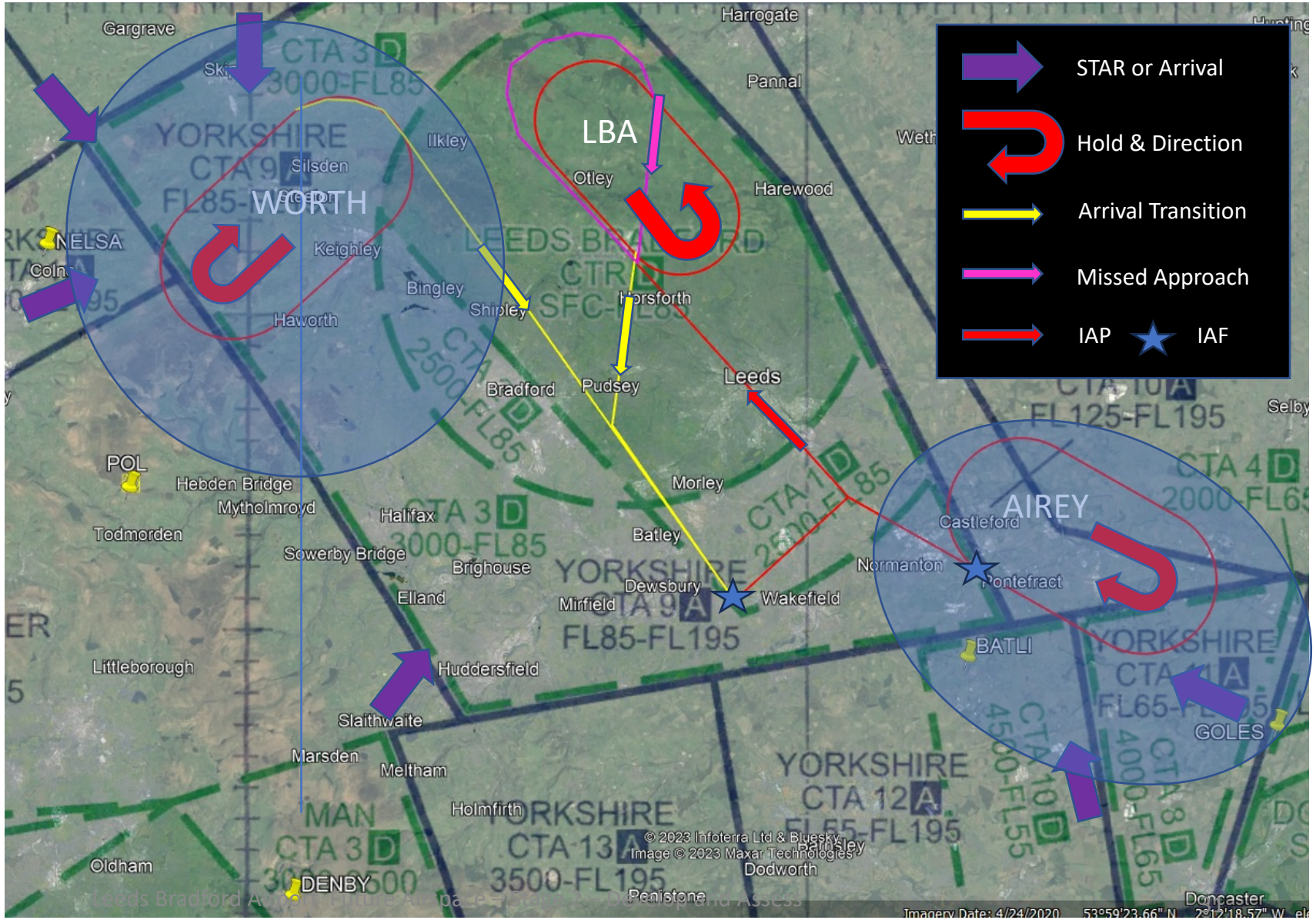
Traffic from SW still inbound via arrival gates towards the LBA and likely to be tactically controlled direct to the IAF

WORTH too close and potentially limiting departures.

AIREY needing additional CAS and unlikely due to Sherburn-in-Elmet, Leeds East and Burn GC.

T/Y-Bar angle –the IAF could potentially be closer to BATLI.

MAP for LBA or AIREY.



Arrivals – Option 4 - 3 Holds – LBA with ‘AIREY’ & ‘WORTH’ – RW14

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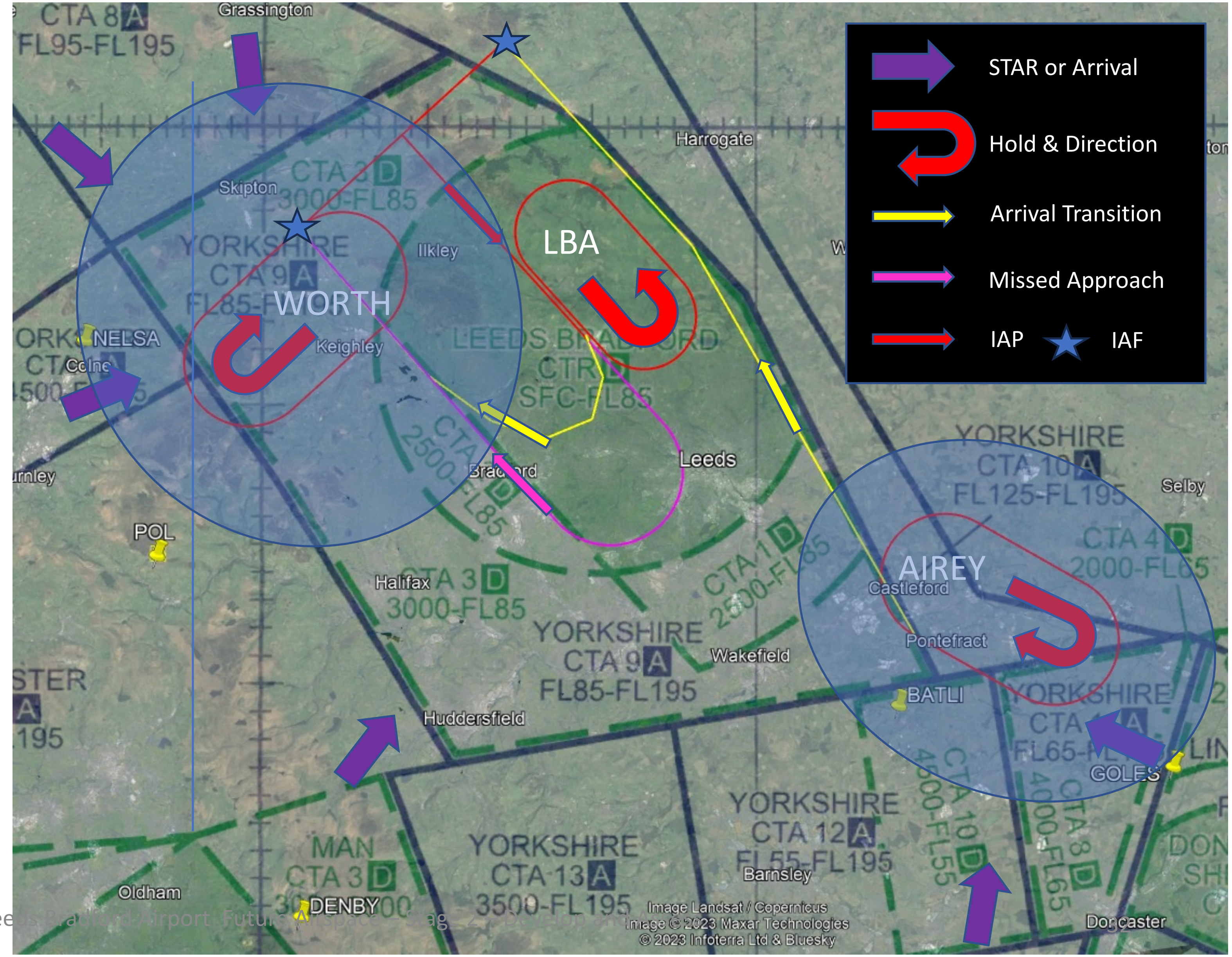
Traffic from SW still inbound via arrival gates towards the LBA and likely to be given own navigation or vectored towards the IAF

AIREY needing additional airspace and unlikely due to Leeds East, Burn Gliders etc.

MAP for LBA or AIREY.



CYRRUS

Arrivals – Option 4 - 3 Holds – LBA with 'AIREY' & 'WORTH'

Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 4											

New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 4											

Arrivals – Option 4 - 3 Holds – LBA with ‘AIREY’ & ‘WORTH’

- DP1 – Safety – No change..
- DP2 - Noise – Changed from Green to Amber - *Due to number of people flown over, different communities now accounted for in DP9.*
- DP3 – Tranquillity – No change
- DP4 – Emissions and Air Quality – Changed from Amber to Green - *Due to reassessment of track miles .*
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – Changed from Amber to Red - *Due to reassessment by SME at LBA.*
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Changed from Green to Amber - *Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – Changed from Green to Amber - *Due to changes in other DPs and the new criteria.*
- DP11 – PBN – No change.

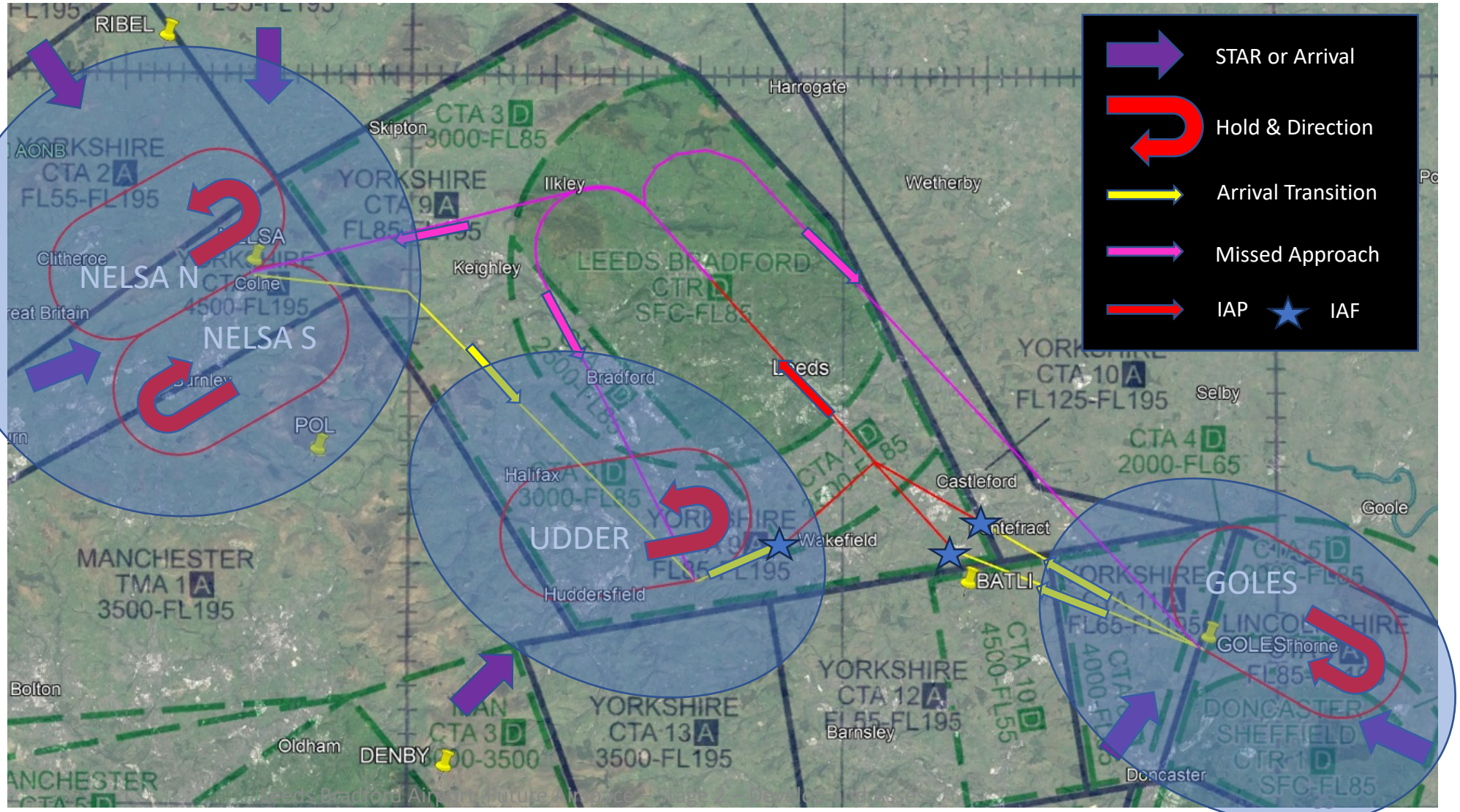
Arrivals – Option 5 - 3 Holds – NELSA/'UDDER'/GOLES – RW32

Either NELSA North (LH) or NELSA South (RH) – potential Arrival/MAP Hold from 5000ft

Arrivals from the SW now have 'UDDER' option (Note: Traffic from SE likely to be being routed towards MAMUL/GOLES by NERL)

GOLES additional CAS required

GOLES & UDDER Arrival Holds FL80 upwards



Arrivals – Option 5 - 3 Holds – NELSA/'UDDER'/GOLES – RW14

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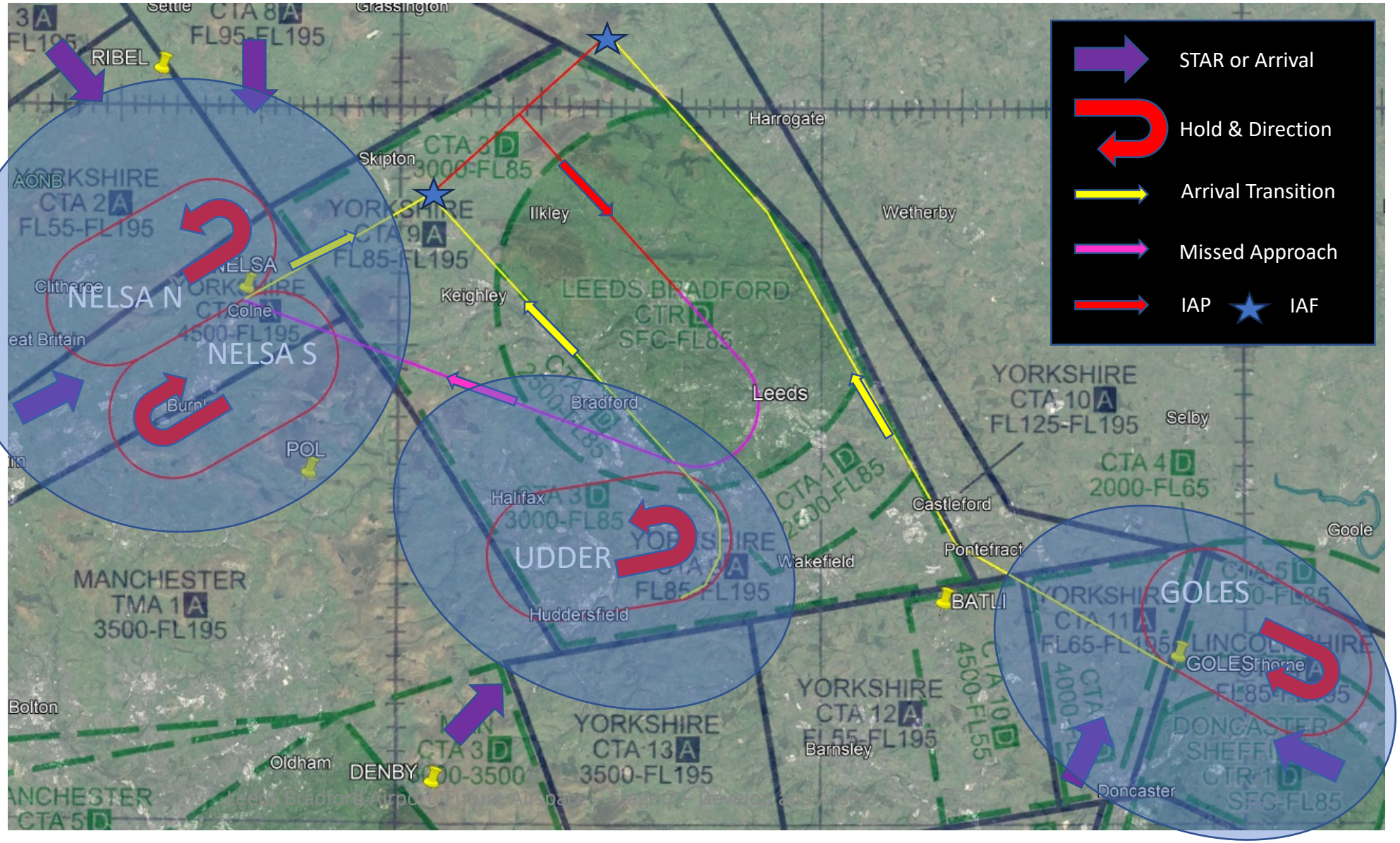
Either NELSA North (LH) or NELSA South (RH) - potential Arrival/MAP Hold from 5000ft

Arrivals from the SW now have 'UDDER' option (Note: Traffic from SE likely to be being routed towards MAMUL/GOLES by NERL)

'UDDER' – Potential conflict with departures to South and West off RW14

GOLES additional CAS required

GOLES & UDDER Arrival Holds FL80 upwards



Arrivals – Option 5 - 3 Holds – NELSA/'UDDER'/GOLES

Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 5											

New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 5											

Arrivals – Option 5 - 3 Holds – NELSA/'UDDER'/GOLES

- DP1 – Safety – Changed from Green to Amber.
- DP2 - Noise – Changed from Green to Amber - *Due to number of people flown over, different communities now accounted for in DP9.*
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – Changed from Amber to Green - *Due to reassessment of track miles .*
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – No change.
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Changed from Green to Amber - *Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – Changed from Green to Amber – *Due to changes in other DPs and the new criteria.*
- DP11 – PBN – No change.

Arrivals – Option 6 - 2 Holds - LBA/GOLES – RW32

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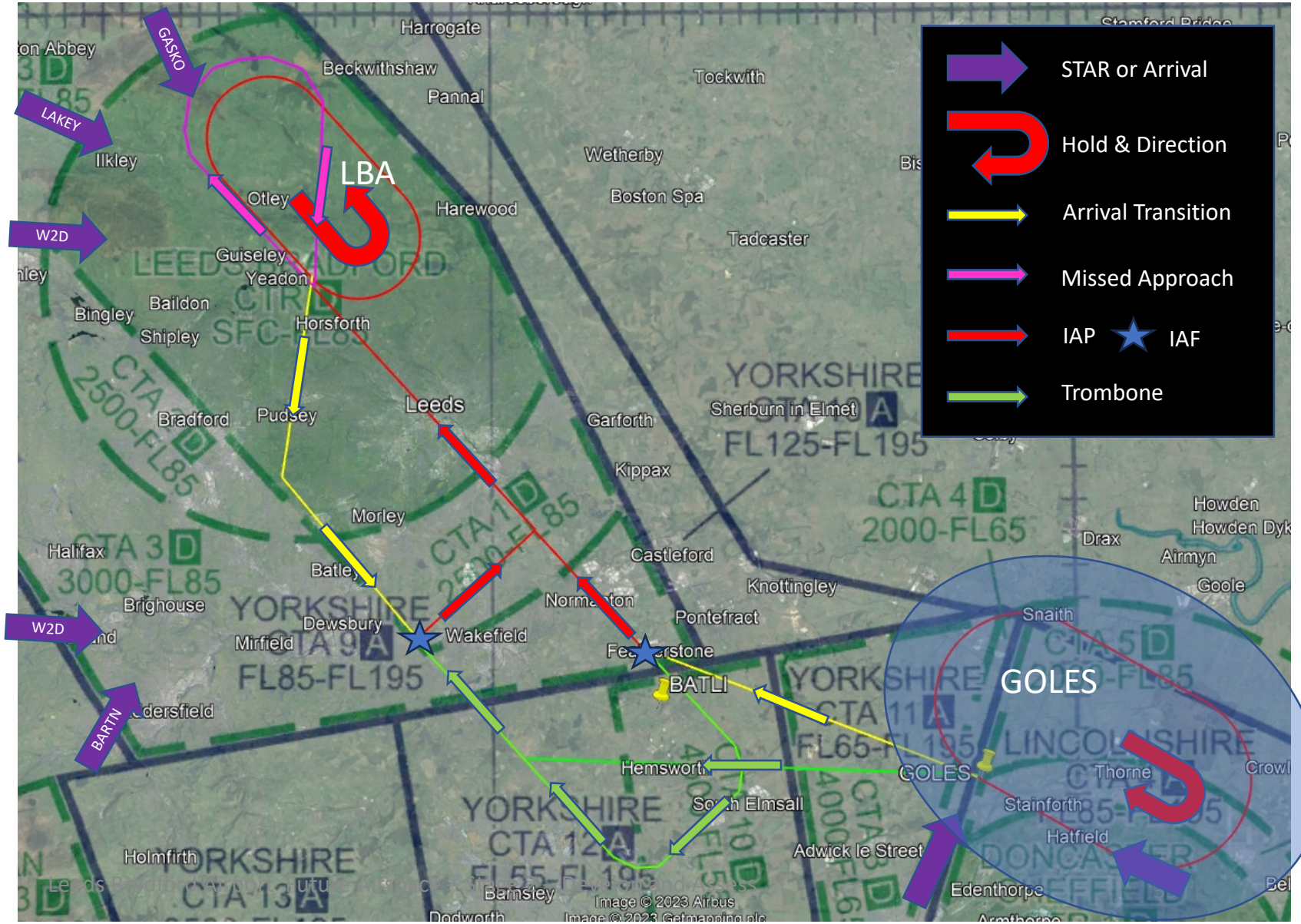
MAP to 5000ft turning right back towards the LBA at circa 4.5nm

Traffic from the South likely to be being routed towards MAMUL/GOLES by NERL

GOLES just an Arrival Hold with a base of FL90 and likely to require additional CAS

Two overflow extensions (Trombones) for sequencing; one from the LBA and one from GOLES



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Arrivals – Option 6 - 2 Holds - LBA/GOLES – RW14

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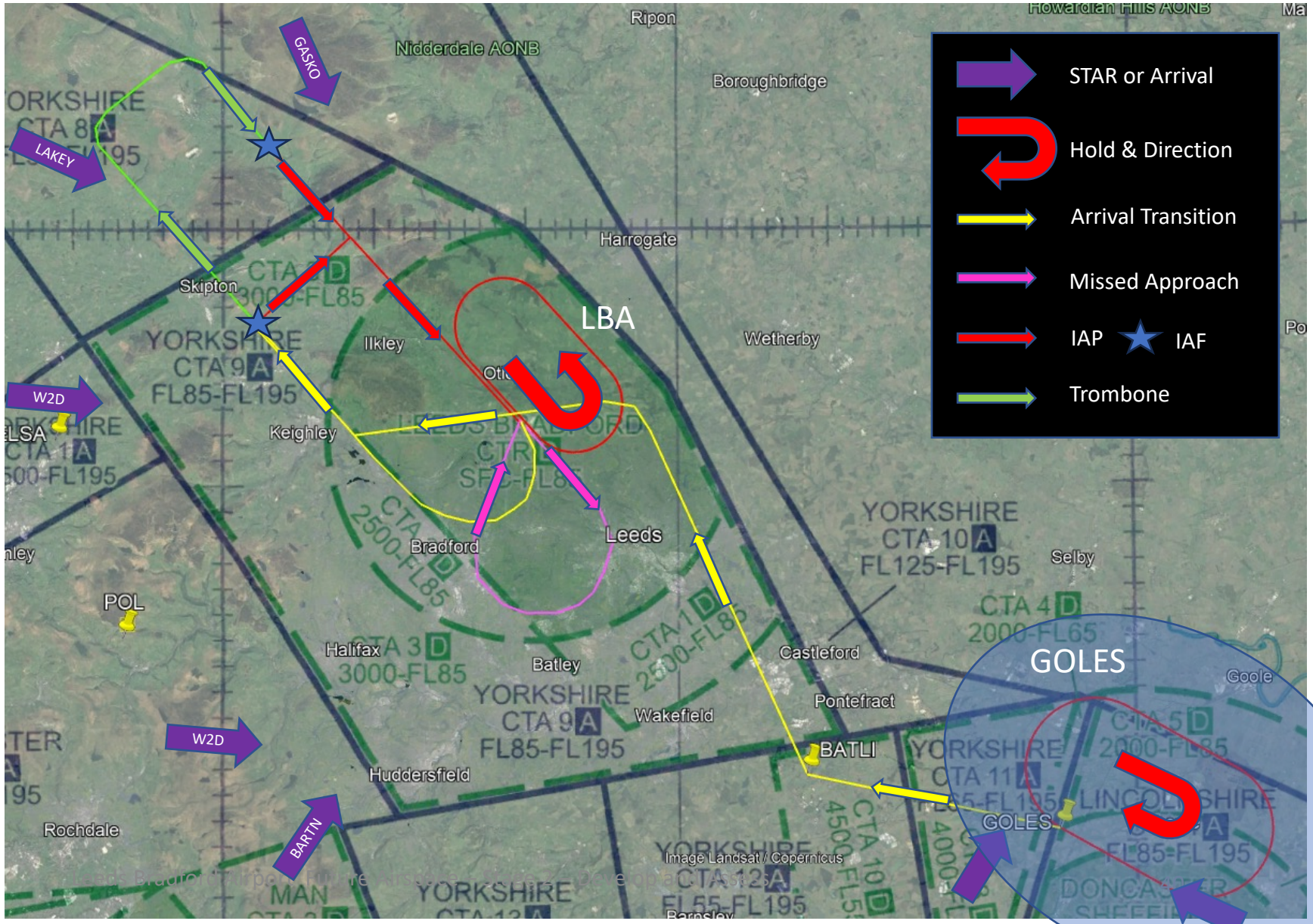
MAP mirror image of RW32

RH Arrival Transitions from both Arrival Holds

Traffic from the South likely to be being routed towards GOLES by NERL

GOLES Hold just an Arrival Hold from FL90 up and likely to require additional CAS

Additional CAS will be required for overflow extension (Trombone) to a 15nm final required for sequencing



CYRRUS

Arrivals – Option 6 - 2 Holds – LBA/GOLES

Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 6											

New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 6											

Arrivals – Option 6 - 2 Holds – LBA/GOLES

- DP1 – Safety – No change.
- DP2 - Noise – No change.
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – No change.
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – No change.
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – No change.
- DP10 – AMS Realisation – No change.
- DP11 – PBN – No change.

Arrivals – Option 7 - 3 Holds – NW Hold/LBA/GOLES – RW32

MAP to 5000ft turning right back towards the LBA at circa 4.5nm

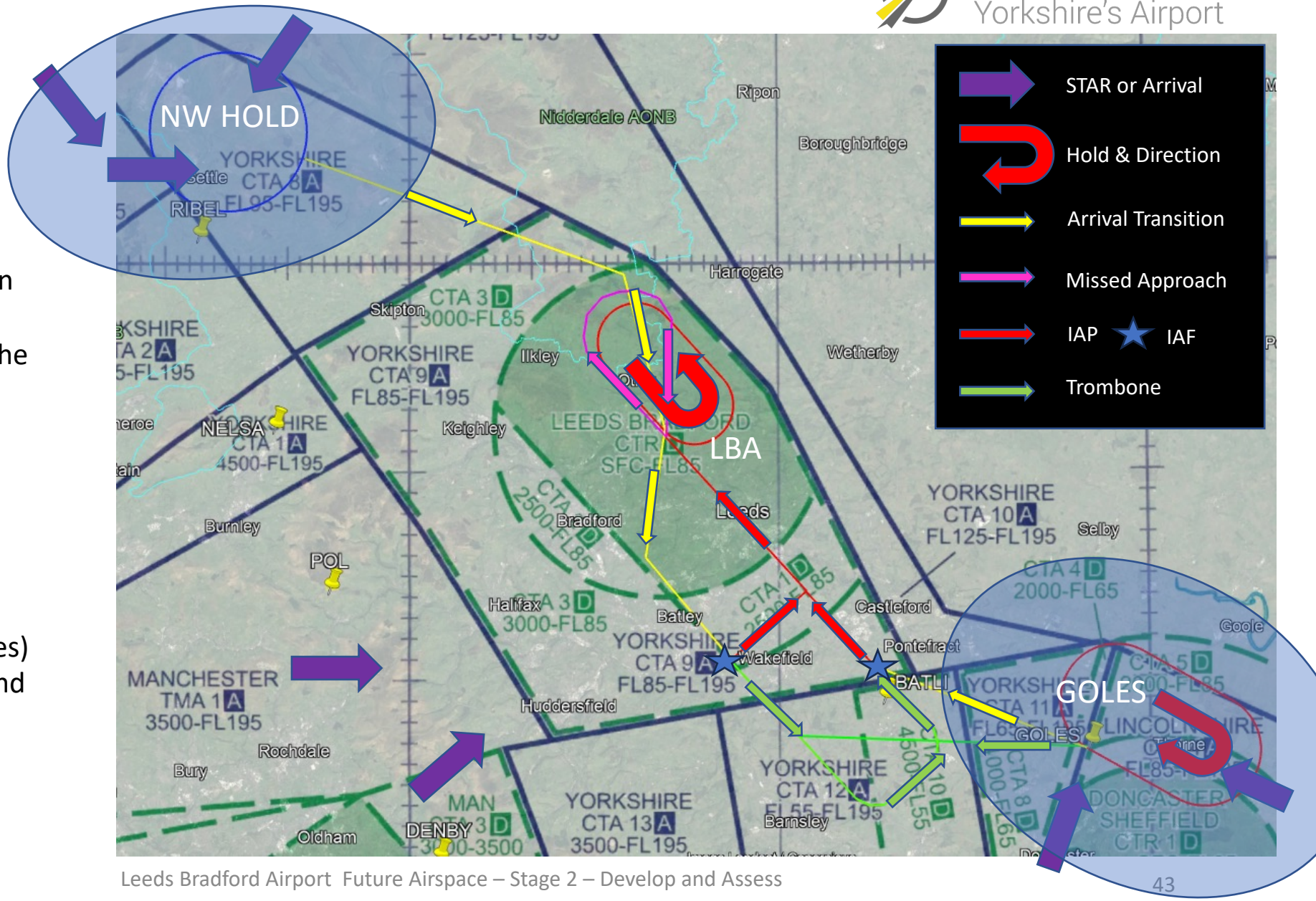
From the SE: MAMUL/GOLES

Arrival Gates for SW/W, direct to western IAF or via LBA and transition

From the NW and NE: NW Hold to the LBA then transition or direct to western IAF

Arrival Holds with a base of at least FL90 and likely to require additional CAS

Two overflow extensions (Trombones) for sequencing; one from the LBA and one from GOLES



Arrivals – Option 7 - 3 Holds – NW HOLD/LBA/GOLES – RW14

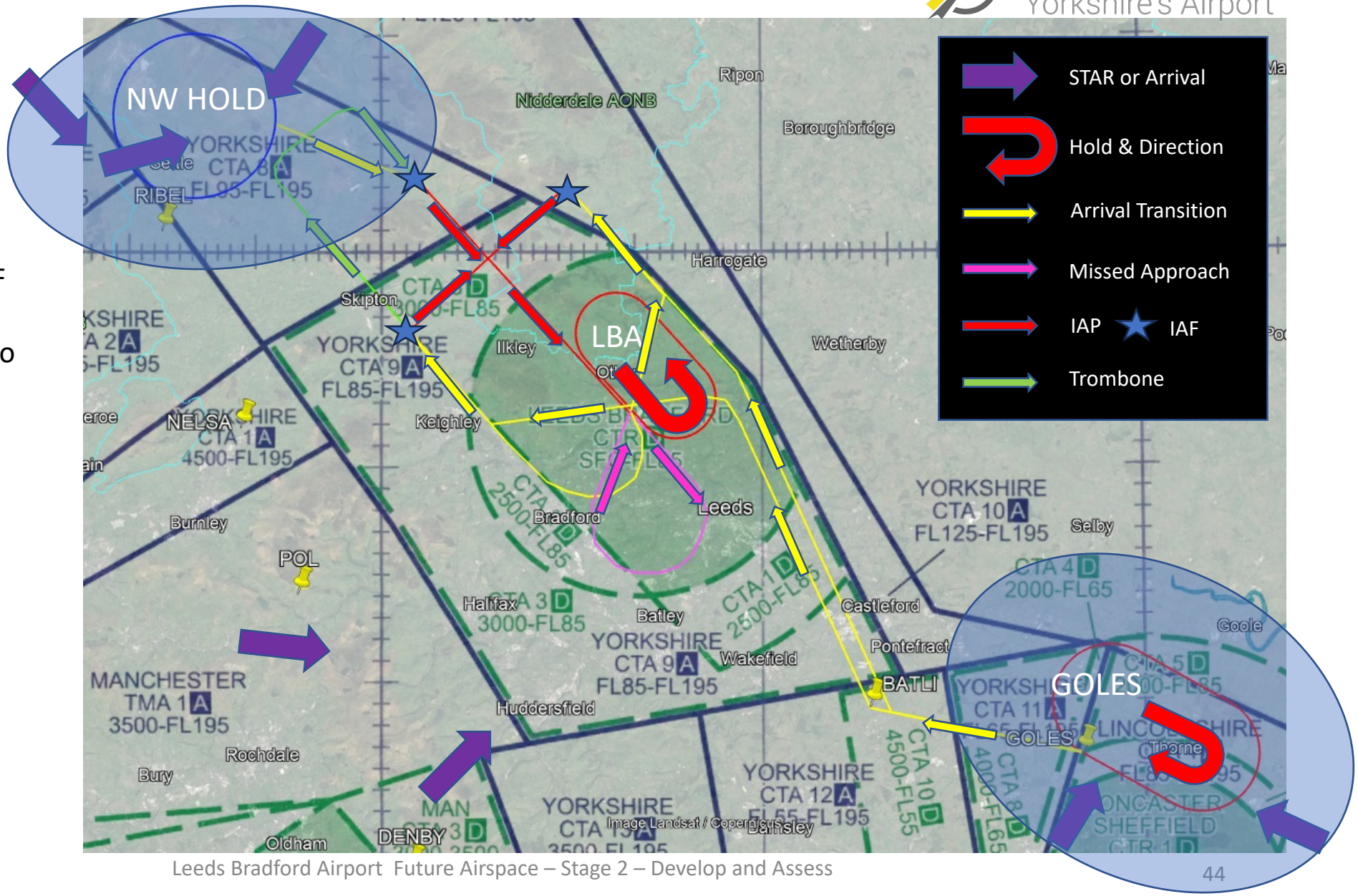
From the SE: MAMUL/GOLES - arrival transition through the overhead or downwind left

Arrival Gates for SW/W and Arrival Transition downwind left from LBA or direct to western IAF

From the NW and NE: NW Hold to 15nm straight-in final

Arrival Holds with a base of at least FL90 and likely to require additional CAS

One overflow extension (Trombone) from the LBA for sequencing



Arrivals – Option 7 - 3 Holds – NW Hold/LBA/GOLES

Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 7											

New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 7											

Arrivals – Option 7 - 3 Holds – NW Hold/LBA/GOLES

- DP1 – Safety – Changed from Red to Green - *Due to reassessment by SME at LBA. Safety issues caused by additional CAS are now assessed in DP6.*
- DP2 - Noise – No change.
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – No change.
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – No change.
- DP7 – Technical – No change.
- DP8 – Systemisation – Changed from Red to Amber - *Due to reassessment by SME at LBA.*
- DP9 – Operational Cost – No change.
- DP10 – AMS Realisation – No change.
- DP11 – PBN – No change.

Arrivals – Option 8 - 2 Arrival Holds – NW Hold/GOLES – RW32

MAP to 5000ft turning right back towards the LBA (purely MAP Hold) at circa 4.5nm

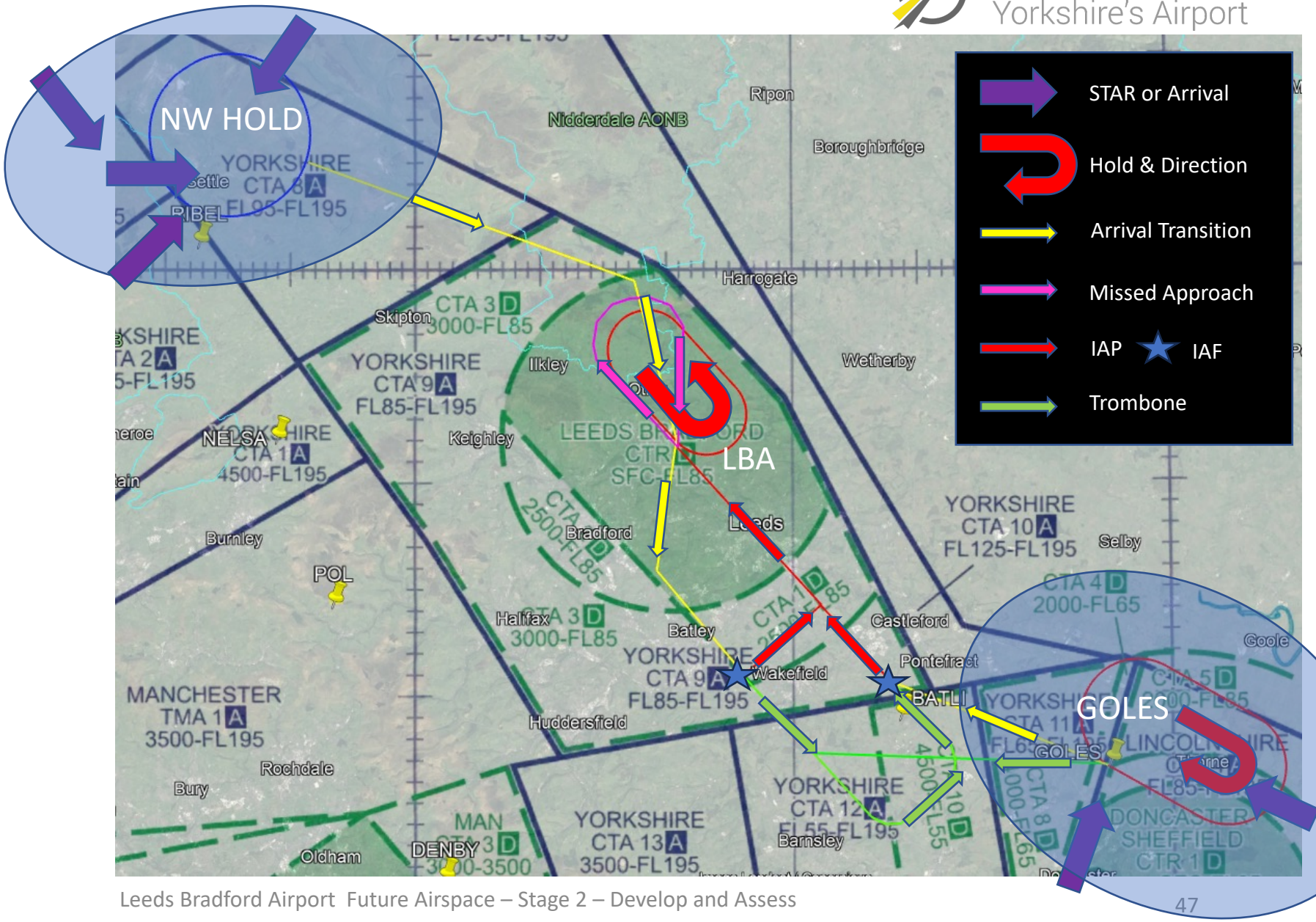
No Arrival Gates

From the SW and SE: MAMUL/GOLES

From the W, NW and NE: NW Hold to the LBA then transition or direct to western IAF

Arrival Holds with a base of at least FL90 and likely to require additional CAS

Two overflow extensions (Trombones) for sequencing; one from the LBA and one from GOLES



Arrivals – Option 8 – 2 Arrival Holds – NW HOLD/GOLES – RW14

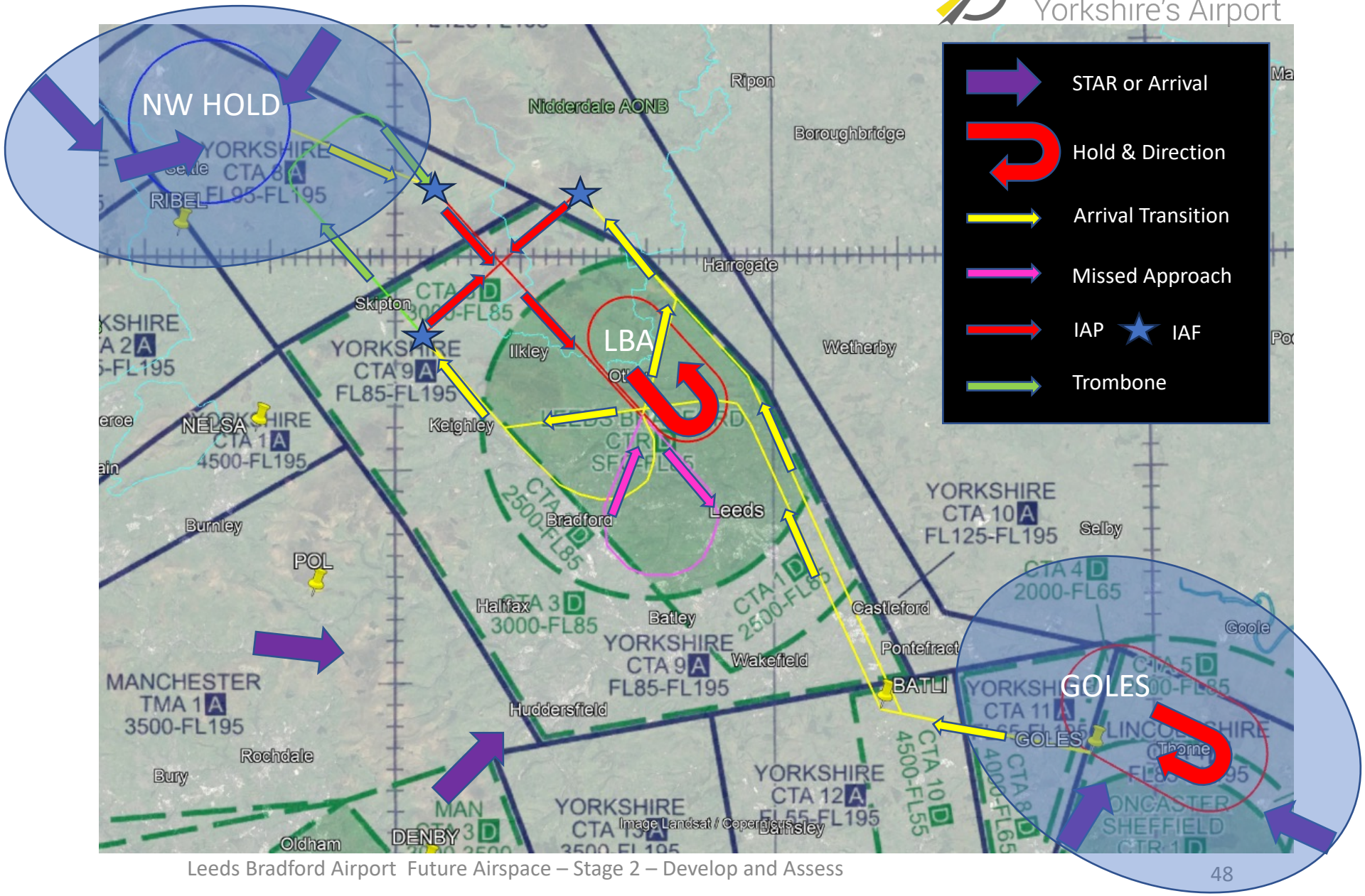
From the SW and SE: MAMUL/GOLES - arrival transition through the overhead or downwind left

No Arrival Gates

From the W, NW and NE: NW Hold to 15nm straight-in final

Arrival Holds with a base of at least FL90 and likely to require additional CAS

One overflow extension (Trombone) from the LBA for sequencing



Arrivals – Option 8 - 2 Holds – SETEL/LBA/GOLES

Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 8											

New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 8											

Arrivals – Option 8 - 2 Holds – SETEL/LBA/GOLES

- DP1 – Safety – No change.
- DP2 - Noise – No change.
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – No change.
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – Changed from Green to Amber - *Due to reassessment by SME at LBA.*
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Changed from Green to Amber - *Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – Changed from Green to Amber - *Due to changes in other DPs and the new criteria.*
- DP11 – PBN – No change.

Arrivals – Option 9 - 2 Holds – ’UDDER’/GOLES – RW32

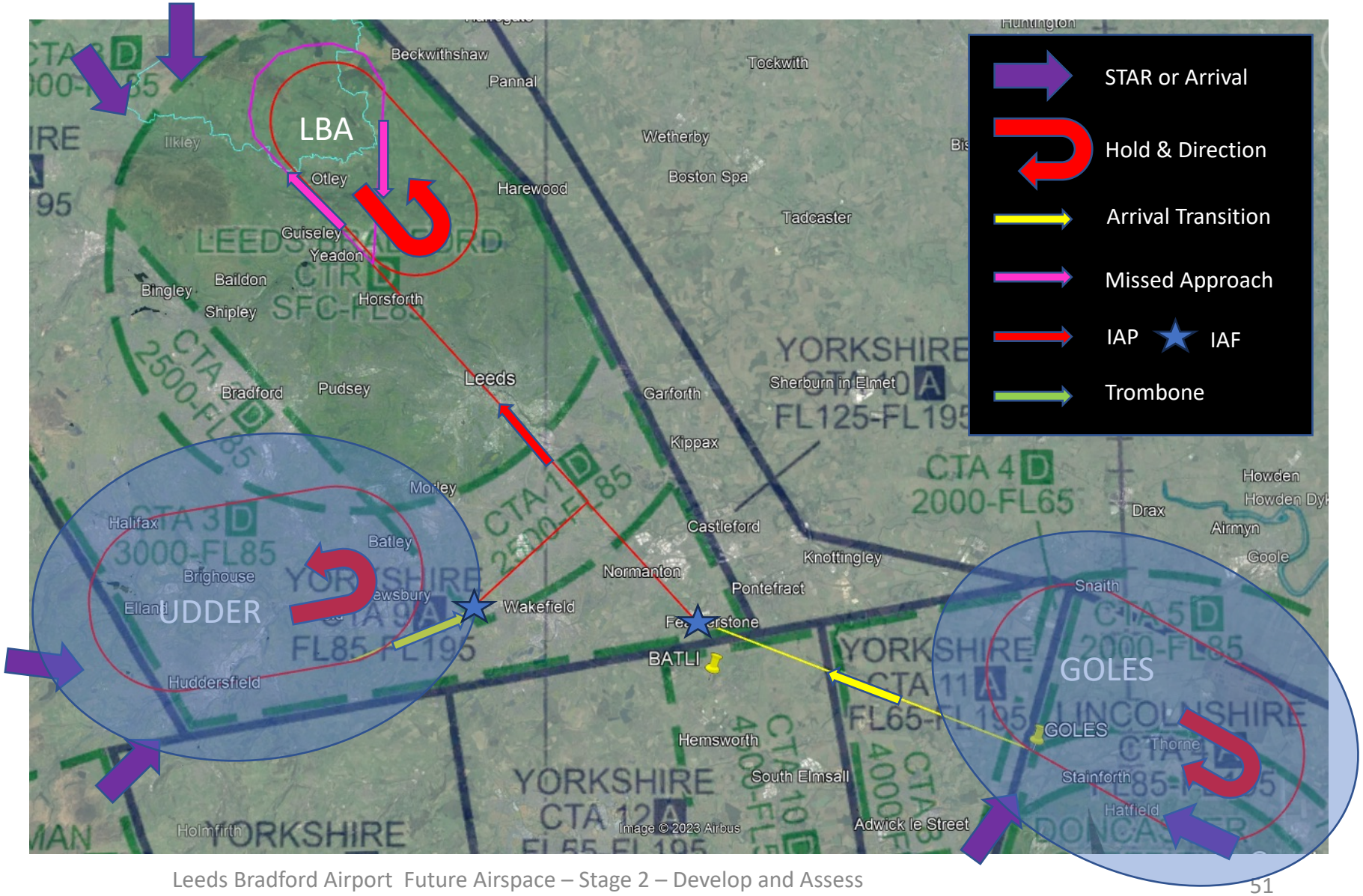
LBA purely MAP Hold

Arrivals from the W and SW now have ‘UDDER’ option (Note: Traffic from SE likely to be being routed towards MAMUL/GOLES by NERL)

GOLES additional CAS required

GOLES & UDDER Arrival Holds FL80 upwards

Arrivals from NW and NE tactically managed



Arrivals – Option 9 - 2 Holds – ’UDDER’/GOLES – RW14

LBA purely MAP Hold

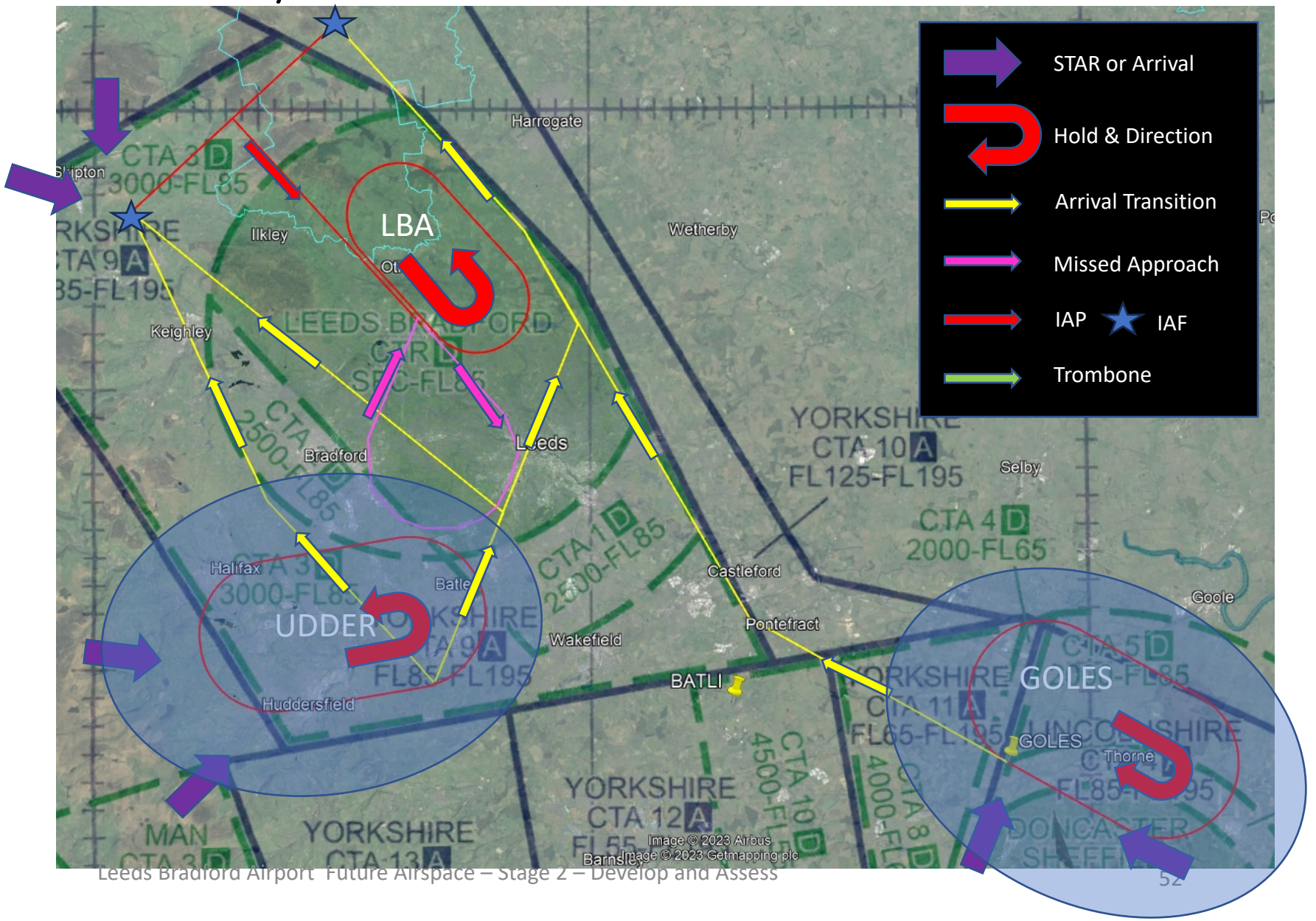
Arrivals from the W and SW now have ‘UDDER’ option (Note: Traffic from SE likely to be being routed towards MAMUL/GOLES by NERL)

GOLES additional CAS required

GOLES & UDDER Arrival Holds FL80 upwards

Arrivals from NW and NE tactically managed

Arrival transition options: wide downwind right for when no POL/NELSA departures, closer downwind right and downwind left for when there are departures to LAMIX or POL/NELSA



Arrivals – Option 9 - 2 Holds - ’UDDER’/GOLES

Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 9											

New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 9											

Arrivals – Option 9 - 2 Holds - ’UDDER’/GOLES

- DP1 – Safety – Changed from Green to Amber - *Due to reassessment by SME at LBA.*
- DP2 - Noise – No change.
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – No change.
- DP5 – Airspace Dimensions – No change.
- DP6 – Airspace Complexity – No change.
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Changed from Green to Amber - *Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – Changed from Green to Amber - *Due to changes in other DPs and the new criteria.*
- DP11 – PBN – No change.

Rationale behind Option 10

UK Policy on STARs versus the AMS

UK policy requires that STARs conclude at a holding fix with an associated arrival hold. From this holding fix, arrival transitions can be designed to take aircraft directly to the various IAFs from which to commence their final approach.

Holds take up significant volumes of airspace and the protection required around them exacerbates this still further. Therefore, finding suitable volumes of airspace within which to contain the holds required for the required STARs into LBA has become a challenge.

One of the objectives of the AMS is to systemise airspace to an optimal extent, providing repeatable, predictable and efficient procedures that are all linked. Adherence to UK policy on STARs whilst seeking to meet the demands of the AMS is proving challenging at LBA due to the limitations on where holds can go.

CAP785B

The above-named Civil Aviation Publication written by the CAA gives sponsors the option to develop STARs that do not have holding fixes or holds but instead route directly to the IAFs. These 'Direct Arrivals' require the Sponsor to provide the CAA's IFP Regulator sufficient justification for why they do not wish to adhere to normal policy.

Option 10 is an attempt to systemise the LBA operation without having STARs (that have holding fixes and holds) for every arrival direction. Instead, only traffic from the South and East would have a STAR ending at a holding fix (GOLES). Traffic from all other arrival directions would have direct arrivals to the respective IAFs contained within the swathes depicted on the following slides.

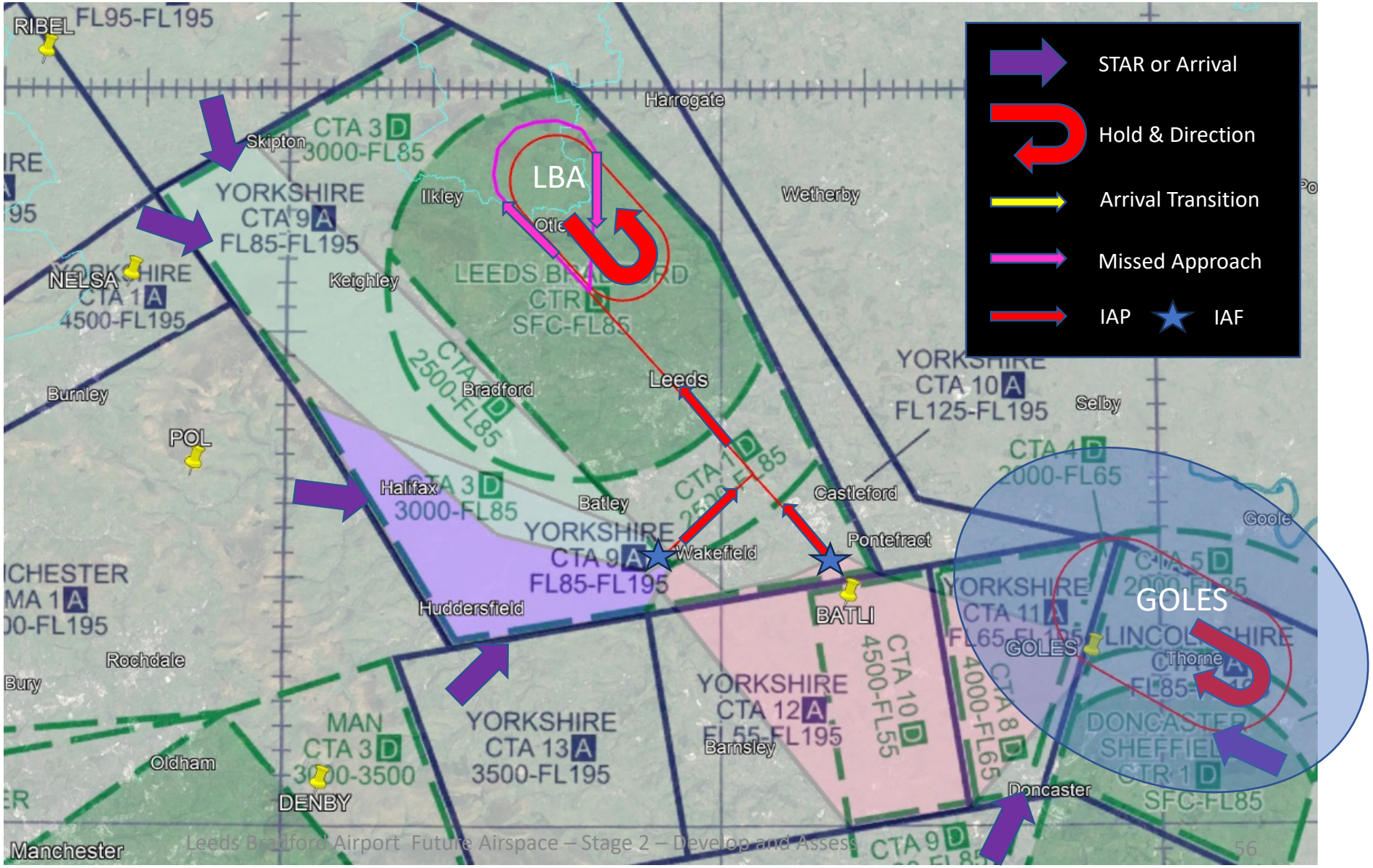
Arrivals – Option 10 – 1 Arrival Hold – GOLES & Direct Arrivals – RW32

LBA MAP and weather hold. GOLES arrival and weather hold with transitions to the approach

Coloured swathes depict containment for other arrival transitions with purple arrows depicting the likely origin of that traffic into the LBA CTA

Airspace to the west of GOLES intended to contain potential 'trombone' procedure to facilitate the sequencing of arrivals

GOLES additional CAS required and likely base FL80



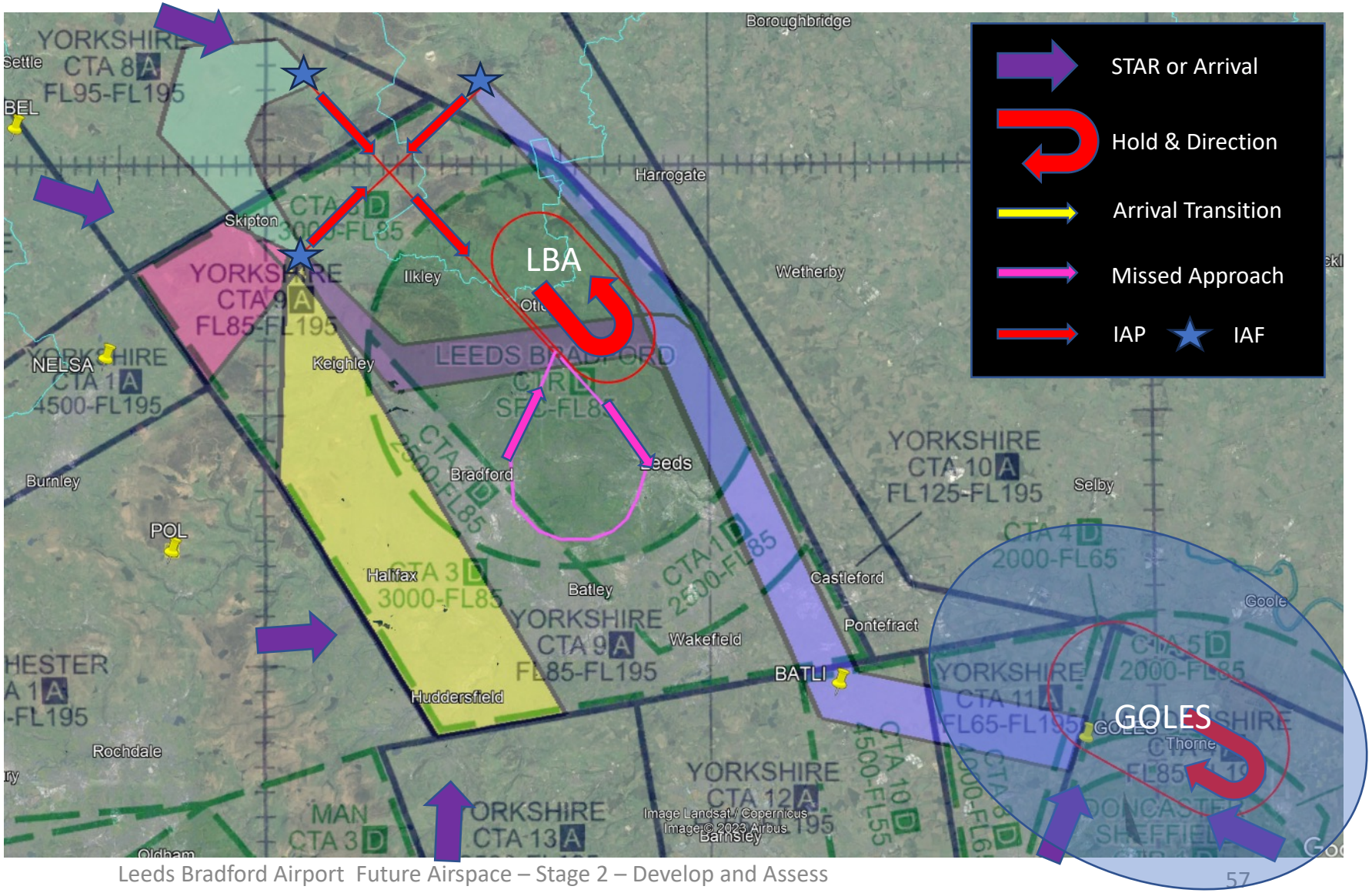
Arrivals – Option 10 – 1 Arrival Hold – GOLES & Direct Arrivals – RW14

LBA MAP and weather hold. GOLES arrival and weather hold with transitions to the approach

Coloured swathes depict containment for other arrival transitions with purple arrows depicting the likely origin of that traffic into the LBA CTA

Airspace to the NW intended to contain potential ‘trombone’ procedure to facilitate the sequencing of arrivals

GOLES additional CAS required and likely base FL80



Arrivals – Option 10 – 1 Arrival Hold – GOLES & Direct Arrivals

Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 10											

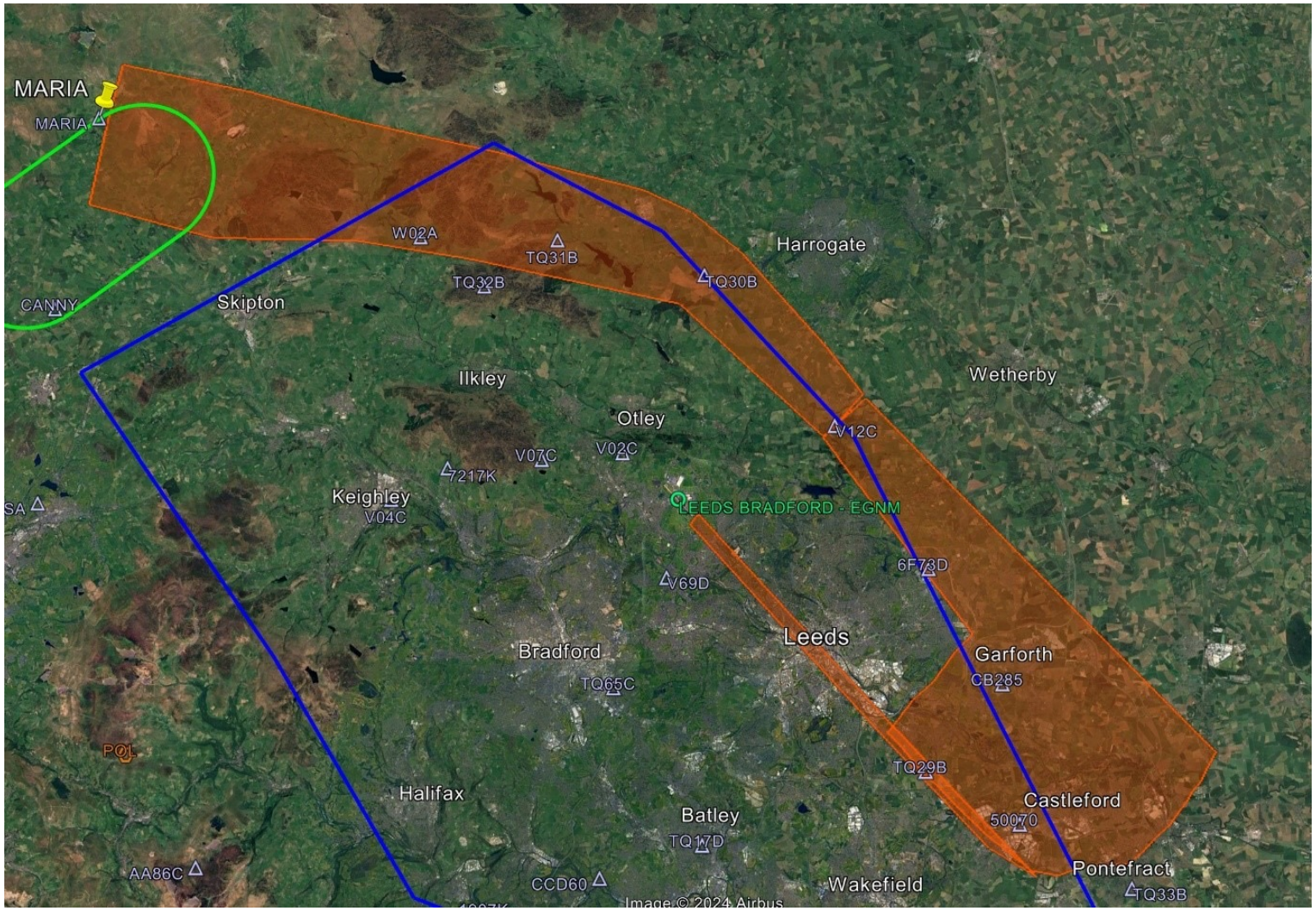
New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 10											

Arrivals – Option 10 – 1 Arrival Hold – GOLES & Direct Arrivals

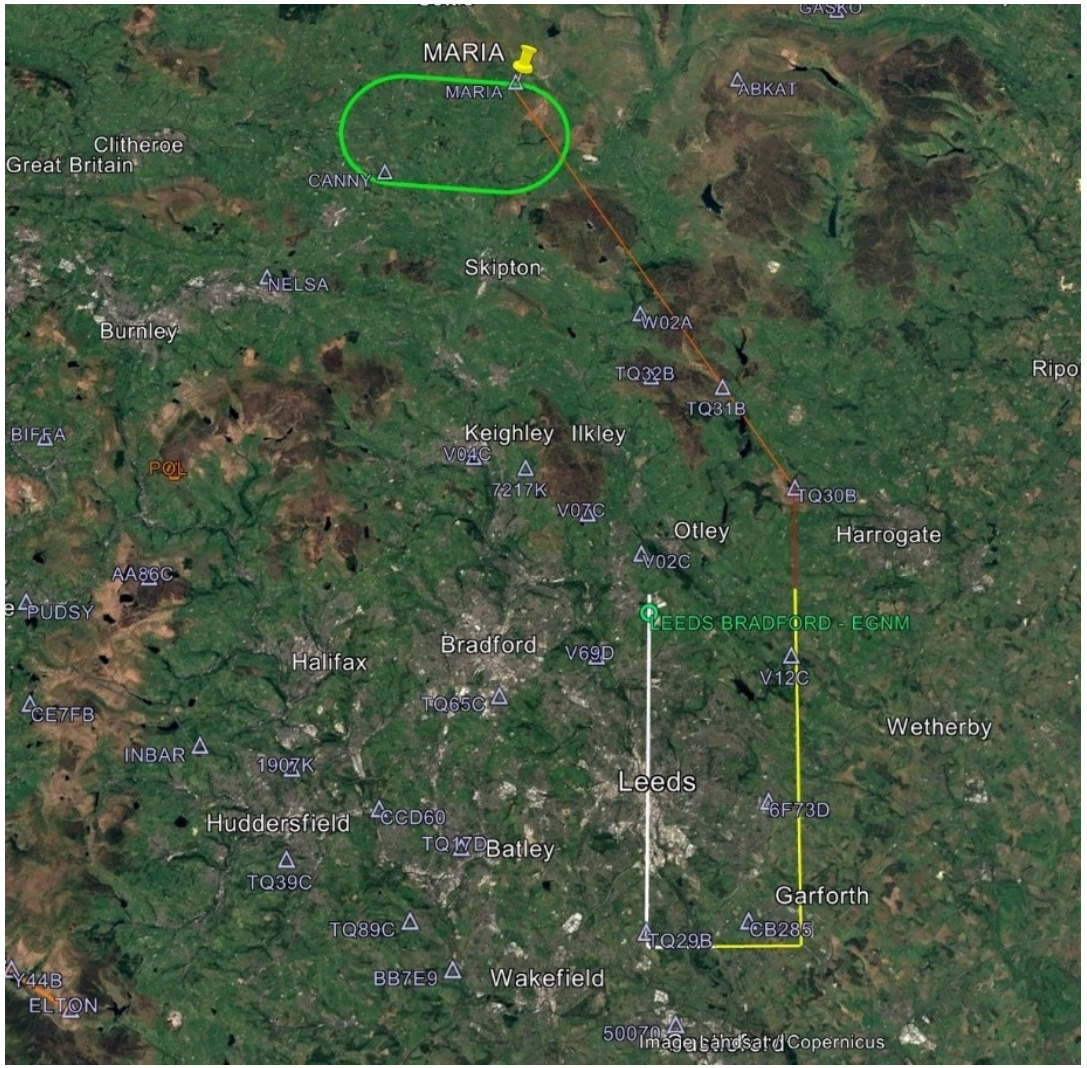
- DP1 – Safety – No change.
- DP2 - Noise – Changed from Green to Amber - *Due to number of people flown over, different communities now accounted for in DP9.*
- DP3 – Tranquillity – No change.
- DP4 – Emissions and Air Quality – Changed from Amber to Green - *Due to reassessment of track miles .*
- DP5 – Airspace Dimensions – Changed from Amber to Red - *Due to reassessment by SME at LBA.*
- DP6 – Airspace Complexity – No change.
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – Changed from Green to Amber - *Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – Changed from Green to Amber - *Due to changes in other DPs and the new criteria.*
- DP11 – PBN – No change.

Arrivals - Option 11 -New Eastern Arrival Transition Option for Runway 32



The proposed Easterly MARIA transition. The orange swath indicates the proposed area that the transition may encompass. The blue line indicates the current boundary of controlled airspace.

Arrivals - Option 11 - New Eastern Arrival Transition Option for Runway 32



Approximate Height profile of the proposed MARIA Easterly transition. Tracks and altitudes are shown for demonstrative purposes only.

Red Line: At or above 8000 feet

Yellow Line : Between 8000 and 4000 feet

White Line : Below 4000 feet.

Arrivals - Option 11 -New Eastern Arrival Transition Option for Runway 32

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
Option 11											

- This is the new option and therefore no previous DPE conducted.
- More information regarding this option is in the accompanying document **ACP Stakeholder Engagement Update and New Arrival Option**
- Do you think we have applied the DPs (slides 4-8) correctly to this new option? Please provide feedback to acp@lba.co.uk

Required Navigation Performance Authorisation Required (RNP AR)

Cutting-edge satellite-based technology utilised by the most up to date aircraft fleets.

Highly accurate track monitoring enables shorter final approaches and manoeuvres around built-up areas.

LBA would be the first UK airport to propose such ambitious eco-friendly approaches, but these have been safely proven around the world for over a decade.

Limited aircraft certified to fly such approaches in Instrument Meteorological Conditions in the UK at this time, however forecast to increase rapidly in the next 2-5 years.

Could potentially be flown under Visual Meteorological Conditions by non-certified operators.

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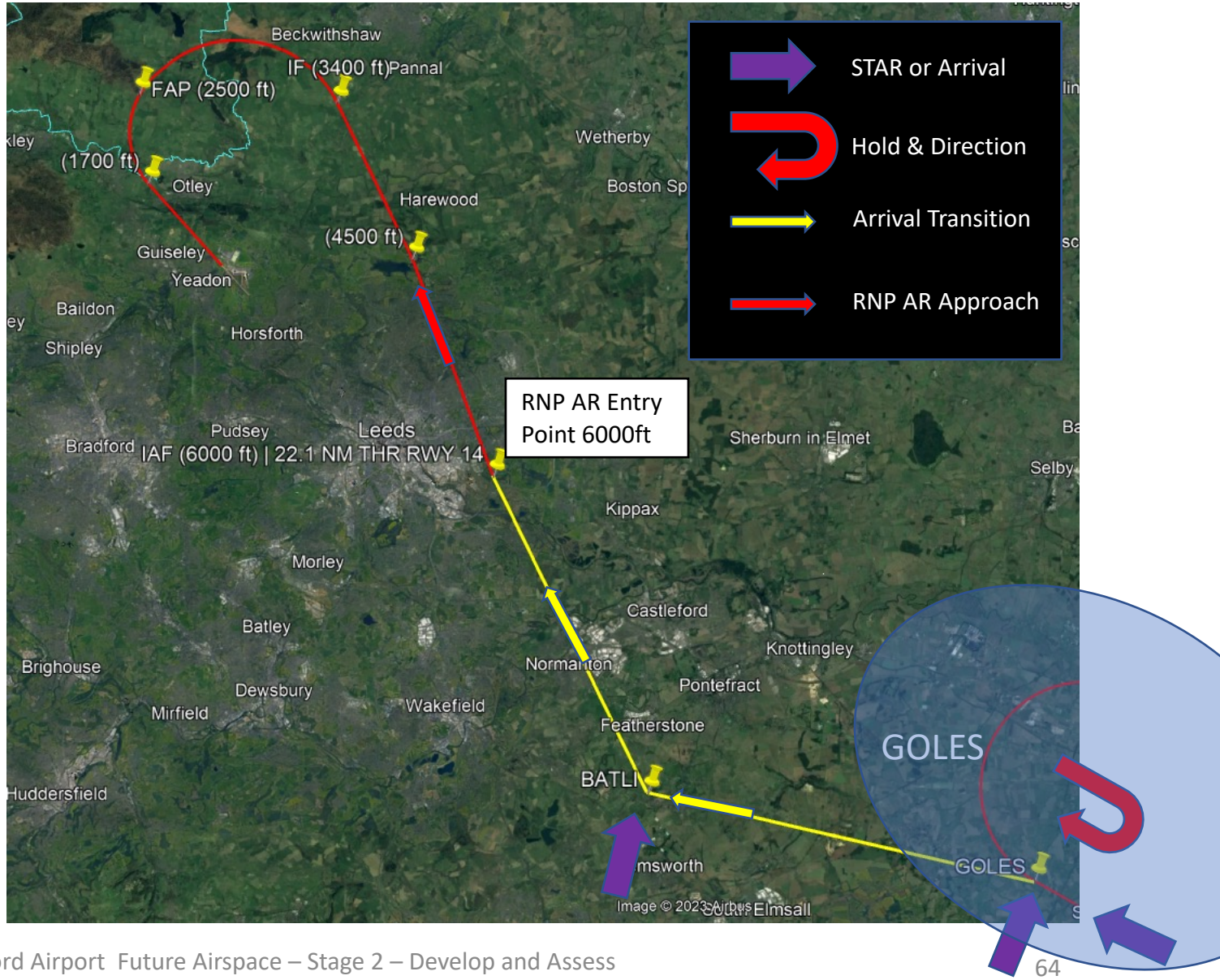
Additional Option – RNP AR - RW14

More environmentally friendly approach providing a shorter route to RW14 from the SE

Significantly shorter than the standard arrival and, as a result, significant fuel and CO_2 saved on each arrival

Eastern suburbs of Leeds overflown not below 5000 feet at continuous descent on idle power, further descent over open countryside until final approach



Additional Option – RNP AR - RW14

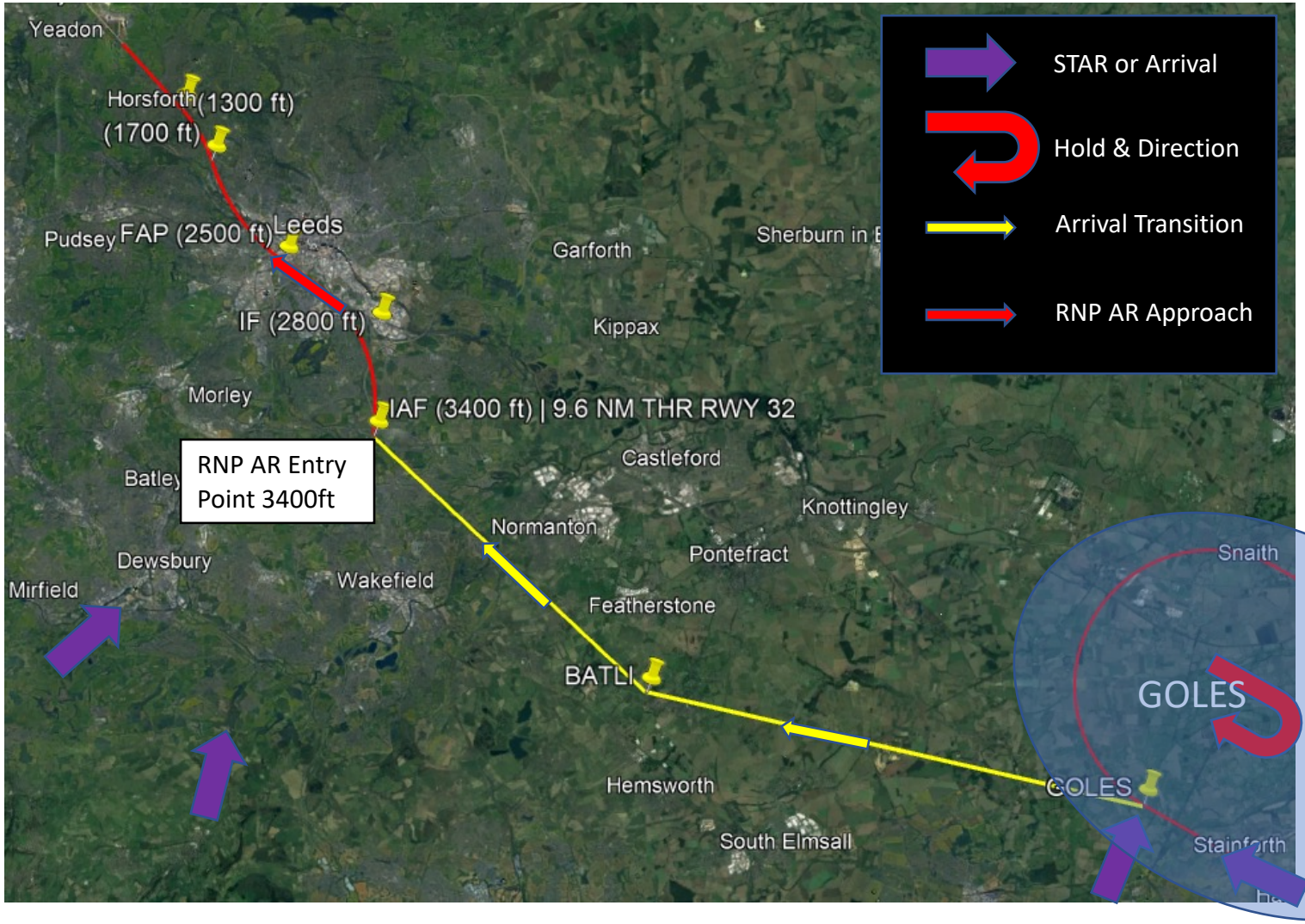
Important Note: Concept Only - Track only an indication of what might be possible. It would be optimised for noise, fuel and emissions reduction before final proposals are developed for consultation

Additional Option – RNP AR – RW32

Approach offset intended to avoid overflying central Leeds Residential district, Headingley, Hyde Park Districts

Potential respite option that could be alternated with standard approach on rotation

Potential for arrival transitions to the IAF from other arrival directions, not just GOLES



Additional Option – RNP AR – RW32

Important Note: Concept Only - Track only an indication of what might be possible. It would be optimised for noise, fuel and emissions reduction before final proposals are developed for consultation

Additional Option – RNP AR – RW14 and RW32

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Old DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
RW14											
RW32											

New DPE

Option	DP1 Safety	DP2 Noise	DP3 Tranquillity	DP4 Emissions & Air Quality	DP5 Airspace Dimensions	DP6 Airspace Complexity	DP7 Technical	DP8 Systemisation	DP9 Operational Cost	DP10 AMS Realisation	DP11 PBN
RW14											
RW32											

Additional Option – RNP AR – RW14 and RW32

- DP1 – Safety – No change.
- DP2 - Noise – No change.
- DP3 – Tranquillity – RW14 changed from Green to Red - *Due to reassessment of tranquil areas – AONB, NPs and South Pennine Moors only.*
- DP4 – Emissions and Air Quality – No change.
- DP5 – Airspace Dimensions – RW14 changed from Green to Amber - *Due to reassessment by SME at LBA..*
- DP6 – Airspace Complexity – RW14 changed from Green to Amber - *Due to reassessment by SME at LBA*
- DP7 – Technical – No change.
- DP8 – Systemisation – No change.
- DP9 – Operational Cost – RW14 and RW32 changed from Green to Amber - *Due to reassessment of track miles as indicator for fuel, and/or new communities flown over.*
- DP10 – AMS Realisation – No change.
- DP11 – PBN – No change.

Leeds Bradford Airport Future Airspace

Thank you for your time. We hope that you find this information on Leeds Bradford Future Airspace useful.

If you have any further queries, please address them to Airspace Change

We are very grateful for your assistance.

The Leeds Bradford ACP Team