

DESIGN PRINCIPLE EVALUATION METHODOLOGY

DESIGN PRINCIPLE		How it is evaluated		Met	Partially Met	Not Met
Must be safe		Qualitative SME assessment which highlights any potential safety concerns and an estimation of if they could be overcome ahead of ACP submission		No safety concerns at this time	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	Acceptable safety assurances not likely to be met and therefore option discounted
Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.		<p>This principle is very difficult to evaluate qualitatively and without a complete design with full noise modelling. In addition, the aims of the NPSe are aims and not concrete requirements. For example, reducing adverse effects from noise, reducing CO2 emissions and minimising local air quality emissions are the goal of the aims but the altitude based priorities within ANG2017 state that Noise is the priority below 4000ft and also 7000ft which therefore does allow for an increase in CO2 at those levels.</p> <p>ANG states that the LOAEL is regarded as the point at which adverse effects begin to be seen on a community basis. At this stage we don't see any reason for an increase in the size of the LOAEL as typically, the airspace design and position of routes don't affect the size of the LOAEL (the size is driven more by movement numbers and fleet mix) but it does affect the position of the LOAEL and therefore the population numbers within it.</p> <p>Steeper Approaches could reduce the size of the LOAEL but these are unlikely to be an option at Luton due to the length of the runway; we will confirm this in Stage 3. Typically at Luton, the LOAEL extends to c.4000ft and Luton's departures already climb continuously and quite quickly (due to the fleet mix and runway length) to at least 4000ft, normally 5000ft. Therefore, enabling continuous climb above 5000ft in a future design could have limited effect on reducing the size of the LOAEL.</p> <p>An increase in the size of the SOAEL (as referenced in NPSe) is unlikely apart from options where SIDs fly straight out (over final approach) that don't today due to the cumulative effects of overflight.</p> <p>The qualitative assessment of this Design Principle is based on the extent to which we anticipate, at this stage, each option will perform against the Government's key environmental objectives:</p> <ul style="list-style-type: none"> - Whether at this stage, we think there is a risk of increase in adverse effects. This assessment is based on if we think the population numbers within the day or night time LOAELs could increase as a result of the new flight paths. - We provide an indication of whether we expect there to be an increase or decrease in CO2 emissions - We provide an indication of whether it could be expected to increase local air quality emissions. - Finally we provide an indication of if there is likely to be an increase in overflight of AONBs or National Parks. 	Reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise	Option has potential to reduce the population number within the day or night LOAEL	Option is expected to maintain the population number within the day or night LOAEL	Option has potential to increase the population number within the day or night LOAEL
			Make a significant and cost-effective contribution towards reducing global emissions	Option has potential to contribute to a reduction in CO2	Option is expected to maintain the same level of CO2 emissions	Option has potential to contribute to an increase in CO2 emissions
			Minimise local air quality emissions	Option has potential to reduce the level of local air quality emissions	Option is expected to maintain the same level of local air quality emissions	Option has potential to increase the level of local air quality emissions
			Routes below 7,000 feet should seek to avoid flying over Areas of Outstanding Natural Beauty (AONB) and National Parks	Option has potential to reduce the overflight of AONBs or National Parks	Option is expected to maintain the same level of overflight of AONBs or National Parks	Option has potential to increase the amount of overflight of AONBs or National Parks
Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met		Qualitative SME assessment of whether the option is expected to degrade, maintain or enhance Luton's operational performance.		Is expected to enhance Luton's operational performance in the future	Is expected to maintain Luton's operational performance in the future	Is expected to degrade Luton's operational performance in the future
Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that		Qualitative SME assessment of whether the option could be reasonably expected to enable CCO/CDO to/from 7000ft based either on existing airspace arrangements (for an option with no dependencies on other airports) or for those options with dependencies, based on the arrival and departure areas of adjacent airports contained within the Masterplan Iteration 2		Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	Unclear whether it would enable CCO or CDO to/from 7000ft	Would not enable CCO or CDO to/from 7000ft
Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	A description of whether the option makes use of multiple routes for the same traffic flow to share the noise more equitably		Option does see the use of multiple routes	N/A (this is a met or not met assessment)	Option doesn't see the use of multiple routes
	New route structures	A description of whether the option generates routes that are substantially different to today, to distribute the noise more equitably		Option does contain new route structures to share noise more equitably	N/A (this is a met or not met assessment)	Option doesn't contain new route structures to share noise more equitably
	Options (mechanisms) for predictable respite	A description of whether the option has options for turning routes on/off to provide predictable respite for communities		Option does contain mechanism for predictable respite	N/A (this is a met or not met assessment)	Option doesn't contain mechanism for predictable respite
Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft		Qualitative SME assessment of whether the option could result in overflight of the same communities with Luton's and other airports' routes below 7000ft. This is based either on existing airspace arrangements (for an option with no dependencies on other airports) or for those options with dependencies, based on the arrival and departure areas of adjacent airports contained within the Masterplan Iteration 2		Option is expected to reduce the overflying of some communities with multiple routes	Option is not expected to change the overflying of communities with multiple routes	Option could increase overflying of the same communities with multiple routes
Should minimise tactical intervention by ATC below 7000ft		Qualitative SME assessment of whether the option is likely to reduce the amount of tactical intervention compared to the existing baseline scenario. For options with dependencies, the assessment is informed by the arrival and departure areas of adjacent airports contained within the Masterplan Iteration 2		Option is expected to reduce the amount of tactical intervention compared to today	Option is expected to maintain the amount of tactical intervention compared to today	Option is expected to increase the amount of tactical intervention compared to today
Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	Whether the option is expected to require any more, less or the same volume of CAS than today. This assessment is linked closely to whether the option enables CCO/CDO (DP4) or not. It is assumed that CCO/CDO will enable a reduction in CAS.		Option could be expected to require less CAS	Option could be expected to require no more CAS	Option could be expected to require more CAS
	Simple airspace boundaries	Qualitative SME assessment of whether the option offers the potential to simplify boundaries, offers no potential to simplify boundaries or if it offers potential to increase the complexity of airspace boundaries. This assessment is linked closely to the row above.		Option offers potential to simplify airspace boundaries	Option offers no potential to simplify airspace boundaries	Option offers potential to increase complexity of airspace boundaries
	Allowing flexible use of airspace, where possible	Whether the option would maintain, improve or degrade the same level of airspace sharing arrangement with Dunstable Gliding as today. The assumption is that no options that utilise the airspace currently available for Dunstable Gliding would do so between the hours of 0700-2100 local. This is different to the existing Dusk to Dawn arrangement.		Option would not change the existing airspace sharing arrangement	Option would require altering the timings of the existing airspace sharing arrangement	Option would not cater for any continued airspace sharing arrangement

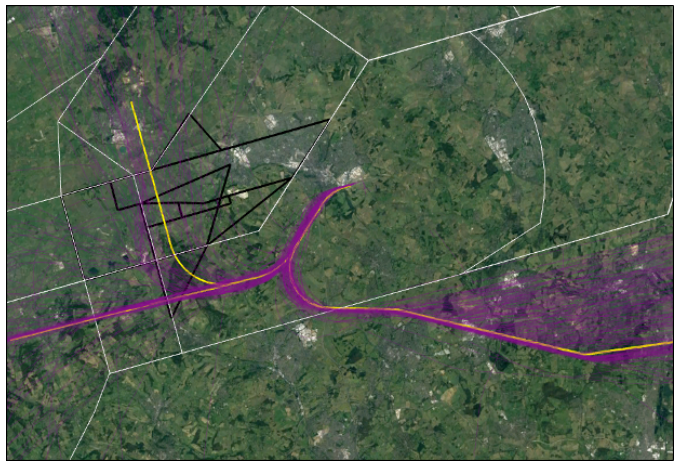
Westerly SID Group Options			IS OPTION DEPENDENT ON CHANGES TO OTHER AIRPORTS' ROUTES?							
PRIORITY	DESIGN PRINCIPLE		NO	NO	NO	NO	YES	YES	YES	YES
			W SID Group 1	W SID Group 2	W SID Group 3	W SID Group 4	W SID Group 5	W SID Group 6	W SID Group 7	W SID Group 8
1	Must be safe									
2	Must meet the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

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

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

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

Description of Option	This option represents the do nothing scenario for Luton Westerly SIDs.
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DESIGN PRINCIPLE EVALUATION: Westerly SID Option 1 (Do Nothing)

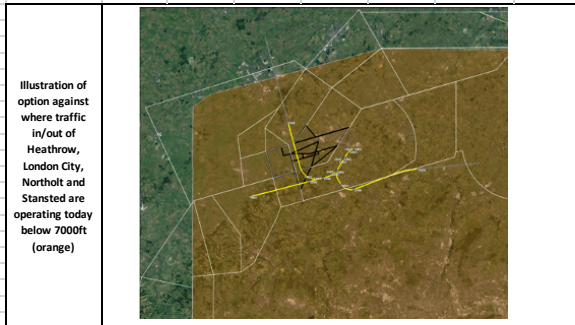
PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	No safety concerns with the status quo at Luton subject to forecast traffic growth in the LTMA being capped to maintain levels of safety	No safety concerns at this time	10	
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		CO2	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		Air Quality	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		AONB/Nat Parks	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	Forecast traffic levels will require increased use of flow regulations to maintain levels of safety within this airspace which will constrain airport capacity at Luton. No change to airspace at Luton may also inhibit the wider FASI programme of change and AMS benefits associated with the programme.	Would degrade operational performance in the future	0	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	No change to existing arrangements. Continuous climb only guaranteed to 4,000ft or 5000ft. Guaranteed CDA/CCO from/to 5000ft+ is not possible in the existing airspace arrangement	Would not enable CCO or CDO to/from 7000ft	0	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	The existing arrangement does not make use of multiple routes for the same departures to share the noise more equitably	Option doesn't see the use of multiple routes	0
		New route structures	The existing arrangement does not contain new route structures to share noise more equitably	Option doesn't contain new route structures to share noise more equitably	0
		Options (mechanisms) for respite	The existing arrangement does not have mechanisms for turning routes on/off to provide respite for communities	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	The existing arrangement will not change the overflying of communities with multiple routes. All the Westerly SIDs follow the same track until abeam Flamstead	Option is not expected to change the overflying of communities with multiple routes	2.5	
7	Should minimise tactical intervention by ATC below 7000ft	The existing arrangement will maintain the amount of tactical intervention compared to today as illustrated in the image above. However, if this option was progressed it is likely that changes to the wider LTMA airspace through other FASI ACPs could drive changes in vectoring behaviour of ATC once above the NPR.	Option is expected to maintain the amount of tactical intervention compared to today	2	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	The existing arrangement will require no more CAS	Option could be expected to require no more CAS	1.5
		Simple airspace boundaries	Doing nothing offers no potential to simplify airspace boundaries	Option offers no potential to simplify airspace boundaries	1.5
		Allowing flexible use of airspace, where possible	Doing nothing would not change the existing airspace sharing arrangement with Dunstable Gliding Club	Option would not change the existing airspace sharing arrangement	3
				38.5	

This option would see a replication of the existing OLY and CPT SIDs and a change to the latter part of the MATCH SID to keep to the North of BPK, away from existing Heathrow and Northolt SIDs to enable more frequent, tactical climb. This could take the MATCH SID slightly closer to Hemel Hempstead however it might be possible to refine that in Stage 3, especially if RNP+RF is considered.

Subject to safety assurances, it is expected this option could be implemented within the current airspace, without affecting adjacent airports as the published vertical profile of the SIDs would be the same as today and the lateral tracks no further south. However, on the MATCH route, we estimate c.10% of the departures which currently level at 5000ft would receive tactical climb continuously to 7000ft+. This is because the route goes where ATC want the majority of Luton's MATCH departures to go (north of BPK) so they wouldn't need to vector as much and could climb above 5000ft on first call more frequently.

The lateral dispersion currently experienced would be similar to today as ATC would vector just as frequently as they currently do. The exception to this would be the MATCH SID where the new positioning north of BPK is expected to result in aircraft being left on the new SID centreline more frequently. However, vectoring south of the new track would still be expected when ATC need to position to the South of Heathrow departures, based on where the respective aircraft are leaving UK airspace.

This option is not expected to be dependent on changes at neighbouring airports.



DESIGN PRINCIPLE EVALUATION: W SID Group 2

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	The only change of note from the baseline scenario is the move of the MATCH route to the North of BPK. Subject to the published SID vertical profile remaining the same as today and ensuring separation against final approach there are no concerns from a safety perspective at this stage	No safety concerns at this time	10	
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	There will be changes to the LOAEL but nothing obvious to suggest, qualitatively, that there will be a significant change the population numbers within the day/night LOAEL	Option expected to maintain the population number within the day or night LOAEL	4.5
		CO2	Similar mileage to abeam MATCH than existing SID to MATCH but the route positioning is expected to increase frequency of tactical CCO	Option has potential to contribute to a reduction in CO2	9
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Not expected to change the amount of overflight of AONBs or National Parks.	Option expected to maintain the same level of overflight of AONBs or National Parks	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	This option could be expected to marginally improve capacity in the LTMA, owing to the repositioning of the MATCH SID towards where it is routinely vectored today and away from BPK and therefore away from Heathrow and Northolt BPK departures.	is expected to enhance Luton's operational performance in the future	8	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	We would not expect any improvement to vertical profile for the CPT and OLY departures. However we would expect a small improvement in CCO performance for MATCH departures. This is because the new positioning would require less vectoring by ATC and therefore lower R/T loading. As the route would be positioned to the North of Northolt and Heathrow BPK departures, we would expect ATC to more routinely climb above SID altitudes on first call.	Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option does not see the use of multiple routes	Option doesn't see the use of multiple routes	0
		New route structures	The new route structures do not offer any more or less equitable distribution of traffic. The MATCH centreline, when heading East, overflies new areas (5-7000ft) not currently routinely overflown by Luton traffic.	Option doesn't contain new route structures to share noise more equitably	0
		Options (mechanisms) for respite	This option doesn't contain mechanism for respite	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	The move of the MATCH route would remove aircraft from BPK and further from Heathrow and Northolt BPK departures. We therefore expect this would reduce the overflight of some communities further from Luton with multiple routes from Luton, Heathrow and Northolt between Hatfield and Harlow.	Option is expected to reduce the overflying of some communities with multiple routes	5	
7	Should minimise tactical intervention by ATC below 7000ft	We would expect the level of tactical intervention on the MATCH route to be significantly lower than today. There would be no change to the level of intervention on the CPT and OLY routes	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	Owing to the vertical profile remaining as today, we would not expect this change to enable a reduction on the volume of CAS	Option could be expected to require no more CAS	1.5
		Simple airspace boundaries	Owing to the vertical profile remaining as today, we would not expect this change to enable a change to CAS boundaries	Option offers no potential to simplify airspace boundaries	1.5
		Allowing flexible use of airspace, where possible	This option would not change the existing FUA airspace sharing arrangement with Dunstable	Option would not change the existing airspace sharing arrangement	3
				62.5	

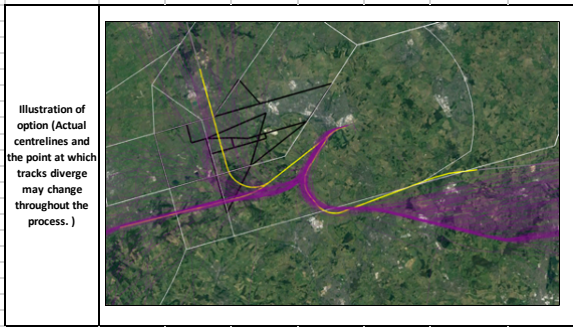
Description of Option

This option would see the initial SID departure tracks split earlier than today to diverge MATCH from OLY+CPT departures and also a change to the latter part of the MATCH SID to keep to the North of BPK, away from existing Heathrow and Northolt SIDs to enable more frequent, tactical climb. This could take the MATCH SID slightly closer to Hemel Hempstead however it might be possible to refine that in Stage 3, especially if RNP+RF is considered.

The CPT+OLY tracks are closer to the Dunstable gliding airspace but still remain over 1.5nm away. This would require additional safety assurance work to ensure this is safe against the gliding airspace.

Subject to safety assurances, it is expected this option could be implemented within the current airspace, without affecting adjacent airports as the published vertical profile of the SIDs would be the same as today and the lateral tracks no further south. However, on the MATCH route, we estimate c.10% of the departures which currently level at 5000ft would receive tactical climb continuously to 7000ft+. This is because the route goes where ATC want the majority of Luton's MATCH departures to go (north of BPK) so they wouldn't need to vector as much and could climb above 5000ft on first call more frequently. However, vectoring south of the new MATCH track would still be expected when ATC need to position to the South of Heathrow departures, based on where the respective aircraft are leaving UK airspace. We would not expect the new CPT+OLY paths to enable any more CCO than today.

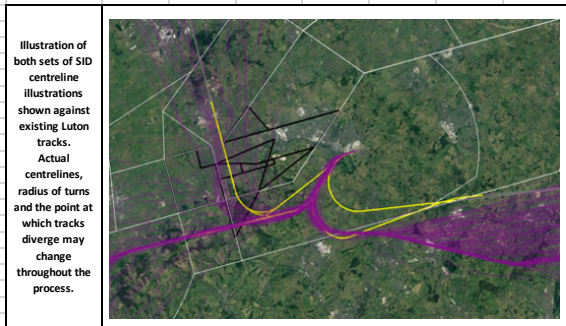
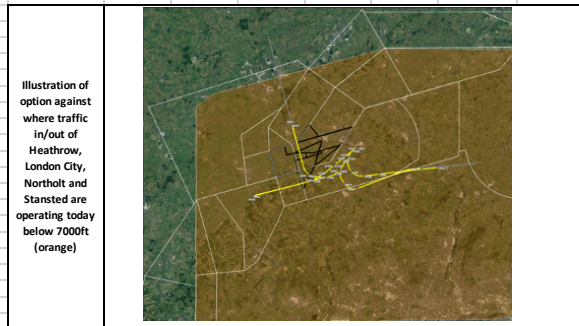
This option is not expected to be dependent on changes at neighbouring airports.



DESIGN PRINCIPLE EVALUATION: W SID Group 3

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	MATCH: Subject to the published SID vertical profile remaining the same as today and ensuring separation against final approach there are no concerns from a safety perspective at this stage CPT+OLY: This route requires the SID centrelines to be closer to Dunstable Gliding Area. There are no prescribed separations from the area at present, controllers can vector 'right to the line'. The existing centrelines is 1.7nm from the gliding area (measured at the first turn at altitude waypoint) with aircraft tracks seen to be regularly 1.3nm from the gliding area at this point. This is partly as a result of the turn at altitude, not providing a guaranteed turn point. The proposed centrelines is 1.7nm from the gliding area measured at the first turn at altitude waypoint) then remaining 1.6nm thereafter until vertical separation provided. New safety assurances will therefore be required but an acceptable safety argument is envisaged to be achievable	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NP5e, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	There will be changes to the LOAEL but nothing obvious to suggest, qualitatively, that there will be a significant change the population numbers within the day/night LOAEL	Option expected to maintain the population number within the day or night LOAEL	4.5
		CO2	Slightly shorter track miles to CPT and OLY is expected to reduce CO2 emissions	Option has potential to contribute to a reduction in CO2	9
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Not expected to change the amount of overflight of AONBs or National Parks.	Option expected to maintain the same level of overflight of AONBs or National Parks	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	This option could be expected to marginally improve capacity in the LTMA, owing to the repositioning of the MATCH SID towards where it is routinely vectored today and away from BPK and therefore away from Heathrow and Northolt BPK departures. In addition the divergence between CPT/OLY and MATCH, whilst not 45° may provide opportunity to reduce departure separations to less than 2 mins between successive MATCH + OLY/CPT departures.	Is expected to enhance Luton's operational performance in the future	8	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	We would not expect any improvement to vertical profile for the CPT and OLY departures. However we would expect a small improvement in CCO performance for MATCH departures. This is because the new positioning would require less vectoring by ATC and therefore lower R/T loading. As the route would be positioned to the North of Northolt and Heathrow BPK departures, we would expect ATC to more routinely climb above SID altitudes on first call.	Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.:	Use of multiple routes	This option does not see the use of multiple routes for the same departures to share the noise more equitably	Option doesn't see the use of multiple routes	0
		New route structures	This option generates routes that are substantially different to today, to distribute the noise more equitably	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	This option does not provide opportunity for turning routes on/off to provide respite for communities	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	The move of the MATCH route would remove aircraft from BPK and further from Heathrow and Northolt BPK departures. We therefore expect this would reduce the overflight of some communities further from Luton with multiple routes from Luton, Heathrow and Northolt between Hatfield and Harlow. The move of the OLY+CPT route would not expect to reduce the overflight of the same communities by routes to/from other airports however some communities under the initial portion of the existing CPT/MATCH/OLY route would now not be overflown to the same extent by the CPT/OLY departures, pushing the CPT/OLY tracks closer to Markyate and Cheverell's Green	Option is expected to reduce the overflying of some communities with multiple routes	5	
7	Should minimise tactical intervention by ATC below 7000ft	We would expect the level of tactical intervention on the MATCH route to be significantly lower than today. This option is expected to maintain the amount of tactical intervention compared to today on the CPT/OLY as it is assumed this could be implemented ahead of the wider LTMA FASI deployments. Once above the gliding areas, we would expect OLY departures to be vectored north away from the SID centrelines as today. No change to tactical intervention on CPT.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	Owing to the vertical profile remaining as today, we would not expect this change to enable a reduction on the volume of CAS	Option could be expected to require no more CAS	1.5
		Simple airspace boundaries	Owing to the vertical profile remaining as today, we would not expect this change to enable a change to CAS boundaries	Option offers no potential to simplify airspace boundaries	1.5
		Allowing flexible use of airspace, where possible	This option would not change the existing FUA airspace sharing arrangement with Dunstable	Option would not change the existing airspace sharing arrangement	3
				63.5	

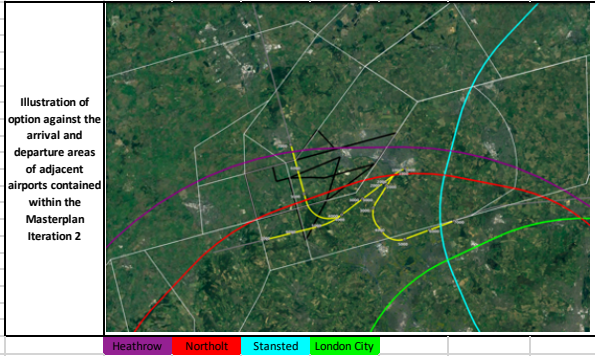
Description of Option	<p>This option would see 2 x sets of SIDs which turn to the South of Luton that would alternate, in pairs at a set time of day or day of the week. For the Design Principle Evaluation and Initial Options Appraisal, we assume they alternate once per day for a period of 24H, therefore each set of SIDs is in operation an equal amount over a year. The CPT-OLY tracks are closer to the Dunstable gliding airspace but still remain over 1.5nm away. This would require additional safety assurance work to ensure this is safe against the gliding airspace.</p> <p>Note the MATCH SID in Period 1 represented in the illustration is the earliest and tightest turn possible using RNP+RF within PANS OPS. This particular illustration would result in overflight of Harpenden.</p>
	<p>Subject to safety assurances, it is expected this option could be implemented within the current airspace, without affecting adjacent airports as the published vertical profile of the SIDs would be the same as today and the lateral tracks no further south. However, on the MATCH route, we estimate c.10% of the departures which currently level at 5000ft would receive tactical climb continuously to 7000ft+. This is because the route goes where ATC want the majority of Luton's MATCH departures to go (north of BPK) so they wouldn't need to vector as much and could climb above 5000ft on first call more frequently. However, vectoring south of the new MATCH track would still be expected when ATC need to position to the South of Heathrow departures, based on where the respective aircraft are leaving UK airspace. We would not expect the new CPT-OLY paths to enable any more CCO than today.</p> <p>This option is not expected to be dependent on changes at neighbouring airports.</p>



DESIGN PRINCIPLE EVALUATION: W SID Group 4

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	<p>MATCH: Subject to the published SID vertical profile remaining the same as today and ensuring separation against final approach there are no concerns from a safety perspective at this stage</p> <p>CPT-OLY: One of the routes requires the SID centreline to be closer to Dunstable Gliding Area. There are no prescribed separations from the area at present, controllers can vector 'right to the line'. The existing centreline is 1.7nm from the gliding area (measured at the first turn at altitude waypoint) with aircraft tracks seen to be regularly 1.3nm from the gliding area at this point. This is partly as a result of the turn at altitude, not providing a guaranteed turn point. The proposed centreline is 1.7nm from the gliding area measured at the first turn at altitude waypoint) then remaining 1.6nm thereafter until vertical separation provided. New safety assurances will therefore be required but an acceptable safety argument is envisaged to be achievable</p> <p>SID Switching: Would be new to Luton and the LTMA. The risk of an aircraft selecting the incorrect SID needs to be managed. For example if the first MATCH departure was issued and flew the longer SID and then the subsequent MATCH departure was issued the longer SID but flew the shorter SID, there would be a catch up situation.</p>	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	There will be changes to the LOAEL but nothing obvious to suggest, qualitatively, that there will be a significant change the population numbers within the day/night LOAEL at this stage.	Option expected to maintain the population number within the day or night LOAEL	4.5
		CO2	The period 1 SIDs will have slightly shorter track miles to CPT and OLY. The Period 1 MATCH SID is expected to be significantly shorter (c.3-4nm)	Option has potential to contribute to a reduction in CO2	9
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Option expected to slightly increase over flight of Chilterns AONB due to the twin CPT/OLY tracks.	Option has potential to increase the amount of overflight of AONBs or National Parks	0
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	This option could be expected to marginally improve capacity in the LTMA, owing to the repositioning of the MATCH SID towards where it is routinely vectored today and away from BPK and therefore away from Heathrow and Northolt BPK departures. In addition the divergence between CPT/OLY and MATCH, whilst not 45° may provide opportunity to reduce departure separations to less than 2 mins between successive MATCH + OLY/CPT departures.	Is expected to enhance Luton's operational performance in the future	8	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	We would not expect any improvement to vertical profile for the CPT and OLY departures. However we would expect a small improvement in CCO performance for MATCH departures. This is because the new positioning would require less vectoring by ATC and therefore lower R/T loading. As the route would be positioned to the North of Northolt and Heathrow BPK departures, we would expect ATC to more routinely climb above SID altitudes on first call.	Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.:	Use of multiple routes	This option makes use of multiple routes for the same departures to share the noise more equitably	Option does see the use of multiple routes	6
		New route structures	This option generates routes that are substantially different to today, to distribute the noise more equitably	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	This option does provide opportunity for turning routes on/off to provide respite for communities	Option does contain mechanism for respite	6
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	<p>The move of the MATCH route would remove aircraft from BPK and further from Heathrow and Northolt BPK departures. We therefore expect this would reduce the overflight of some communities further from Luton with multiple routes from Luton, Heathrow and Northolt between Hatfield and Harlow.</p> <p>The move of the OLY+CPT route would not expect to reduce the overflight of the same communities by routes to/from other airports however some communities under the initial portion of the existing CPT/MATCH/OLY route would now not be overflown to the same extent by the CPT/OLY departures, pushing the CPT/OLY tracks closer to Markyate and Cheverell's Green</p>	Option is expected to reduce the overflying of some communities with multiple routes	5	
7	Should minimise tactical intervention by ATC below 7000ft	We would expect the level of tactical intervention on the MATCH routes to be significantly lower than today. This option is expected to maintain the amount of tactical intervention compared to today on the CPT/OLY as it is assumed this could be implemented ahead of the wider LTMA FASI deployments. Once above the gliding areas, we would expect OLY departures to be vectored north away from the SID centreline as today. No change to tactical intervention on CPT. Note we'd expect controllers to not do this until north of Frithsden otherwise the purpose of the respite could be negated	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	Owing to the vertical profile remaining as today, we would not expect this change to enable a reduction on the volume of CAS	Option could be expected to require no more CAS	1.5
		Simple airspace boundaries	Owing to the vertical profile remaining as today, we would not expect this change to enable a change to CAS boundaries	Option offers no potential to simplify airspace boundaries	1.3
		Allowing flexible use of airspace, where possible	This option would not change the existing FUA airspace sharing arrangement with Dunstable	Option would not change the existing airspace sharing arrangement	3
				70.8	

Description of Option	<p>This option is exactly the same laterally as Westerly SID Group 3 with initial SID departure tracks that split early to diverge MATCH from OLY+CPT departures as soon as possible and a change to the latter part of the MATCH SID to keep to the North of BPK. However, in this option, we assume all departures now experience guaranteed climb to above 5,000ft. This is because we assume Heathrow, Northolt and London City departures are deconflicted in a new FASI design enabling CCO. There is therefore a dependency on the adjacent airports' FASI route design.</p> <p>We would expect aircraft to follow the centrelines more regularly because there is less requirement for controller intervention in this design (due to deconfliction from adjacent SIDs).</p>
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DESIGN PRINCIPLE EVALUATION: W SID Group 5

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	All SIDs: Climb above 5000ft will require additional safety assurances to assure LTMA separations. CPT+OLY: This route requires the SID centreline to be closer to Dunstable Gliding Area. There are no prescribed separations from the area at present, controllers can vector 'right to the line'. The existing centreline is 1.7nm from the gliding area (measured at the first turn at altitude waypoint) with aircraft tracks seen to be regularly 1.3nm from the gliding area at this point. This is partly as a result of the turn at altitude, not providing a guaranteed turn point. The proposed centreline is 1.7nm from the gliding area measured at the first turn at altitude waypoint then remaining 1.6nm thereafter until vertical separation provided. New safety assurances will therefore be required but an acceptable safety argument is envisaged to be achievable. Proximity of Luton's routes to those of adjacent routes from FASI airports will also require safety assurances.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	There will be changes to the LOAEL but nothing obvious to suggest, qualitatively, that there will be a significant change the population numbers within the day/night LOAEL	Option is expected to maintain the population number within the day or night LOAEL	4.5
		CO2	Slightly shorter track miles to CPT and OLY is expected to reduce CO2 emissions plus improved CCO expected	Option has potential to contribute to a reduction in CO2	9
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Not expected to change the amount of overflight of AONBs or National Parks.	Option is expected to maintain the same level of overflight of AONBs or National Parks	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	In isolation, this option could be expected to marginally improve capacity in the LTMA, owing to the repositioning of the MATCH SID towards where it is routinely vectored today and away from BPK and therefore away from Heathrow and Northolt BPK departures. In addition the divergence between CPT/OLY and MATCH, whilst not 45° may provide opportunity to reduce departure separations to less than 2 mins between successive MATCH + OLY/CPT departures. We assume that as CCO is enabled above 5000ft, that the LTMA has been modernised and realised the capacity anticipated though airspace modernisation.	Is expected to enhance Luton's operational performance in the future	8	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	Option will most likely enable CCO above 5000ft on all routes but whether or not guaranteed climb to 7000ft is achievable is dependent on the changes to the wider airspace. Departure routes to the South are likely to still interact with Heathrow, Northolt and London City departures so climb is dependent on their changes	Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through eg;	Use of multiple routes	This option does not see the use of multiple routes for the same departures to share the noise more equitably	Option doesn't see the use of multiple routes	0
		New route structures	This option generates routes that are substantially different to today, to distribute the noise more equitably	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	This option does not provide opportunity for turning routes on/off to provide respite for communities	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	We would expect the wider LTMA re-design to have procedurally deconflicted routes to/from adjacent airports and therefore reduce the overflight of the same communities by multiple routes. Whether or not the same communities are not overflown by Luton's routes depends on the Easterly SID configuration taken forward to partner this westerly configuration	Option is expected to reduce the overflying of some communities with multiple routes	5	
7	Should minimise tactical intervention by ATC below 7000ft	We would expect the level of tactical intervention on all the departure routes to be significantly lower than today owing to the wider LTMA airspace being modernised and routes procedurally deconflicted from Luton's routes.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	This option could be expected to require less CAS owing to CCO above 5000ft enabled by the wider LTMA FASI design.	Option could be expected to require less CAS	3
		Simple airspace boundaries	Option offers potential to simplify airspace boundaries owing to CCO and the assumption of wider FASI change	Option offers potential to simplify airspace boundaries	3
		Allowing flexible use of airspace, where possible	This option would not change the existing FUA airspace sharing arrangement with Dunstable	Option would not change the existing airspace sharing arrangement	3
				66.5	

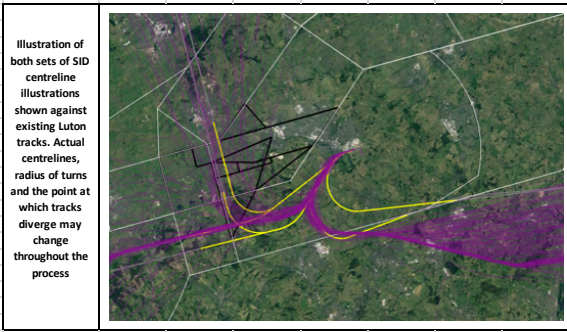
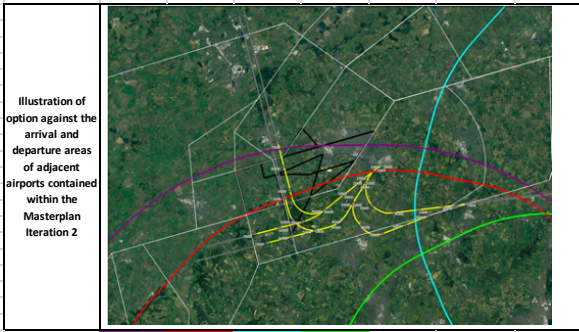
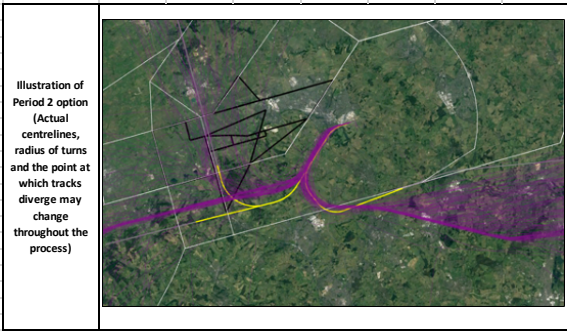
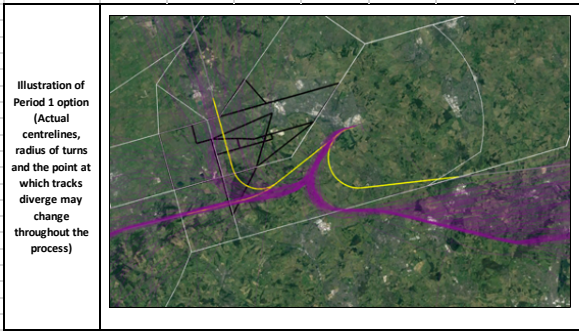
Description of Option

This is the same laterally as W SID Group 4 except that the Period 2 CPT and OLY SIDs are positioned further to stay apart from the Period 1 SIDs for longer. As these are closer to Heathrow and Northolt it is assumed these could only be implemented with changes to those airports' SIDs and is therefore dependent on wider FASI change, also enabling CCO.

Note the MATCH SID in illustrated in Period 1 would only be possible using RNP+RF. The centreline used to illustrate this option is the tightest RF turn possible within PANS OPS. This particular illustration would result in overflight of Harpenden.

As with W SID Group 4, this option would see 2 x sets of SIDs which turn to the South of Luton that would alternate, in pairs at a set time of day or day of the week. For the Design Principle Evaluation and Initial Options Appraisal, we assume they alternate once per day for a period of 24H, therefore each set of SIDs is in operation an equal amount over a year.

We would expect aircraft to follow the centrelines more regularly because there is less requirement for controller intervention in this design (due to deconfliction from adjacent SIDs).



Heathrow Northolt Stansted London City

DESIGN PRINCIPLE EVALUATION: W SID Group 6

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	All SIDs: Climb above 5000ft will require additional safety assurances to assure LTMA separations. CPT+OLY: This route requires the 'Period 1' SID centreline to be closer to Dunstable Gliding Area. There are no prescribed separations from the area at present, controllers can vector 'right to the line'. The existing centreline is 1.7nm from the gliding area (measured at the first turn at altitude waypoint) with aircraft tracks seen to be regularly 1.3nm from the gliding area at this point. This is partly as a result of the turn at altitude, not providing a guaranteed turn point. The proposed centreline is 1.7nm from the gliding area measured at the first turn at altitude waypoint) then remaining 1.6nm thereafter until vertical separation provided. The Period 1 MATCH SID relies on RF so procedures will be required to cater for non-RF aircraft. New safety assurances will therefore be required but an acceptable safety argument is envisaged to be achievable. The Period 2 OLY/CPT routes are further south than today and therefore closer to Northolt and Heathrow. This means the option could not be implemented ahead of changes at those airports. SID Switching: Would be new to Luton and the LTMA. The risk of an aircraft selecting the incorrect SID needs to be managed. For example if the first MATCH departure was issued and flew the longer SID and then the subsequent MATCH departure was issued the longer SID but flew the shorter SID, there would be a catch up situation. Proximity of Luton's routes to those of adjacent routes from FASI airports will all require safety assurances subject to their final locations.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	There will be changes to the LOAEL but nothing obvious to suggest, qualitatively, that there will be a significant change the population numbers within the day/night LOAEL	Option is expected to maintain the population number within the day or night LOAEL	4.5
		CO2	Slightly shorter track miles to CPT and OLY on Period 1 SIDs is expected to reduce CO2 emissions plus improved CCO expected	Option has potential to contribute to a reduction in CO2	9
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Option expected to slightly increase over flight of Chilterns AONB due to the twin CPT/OLY tracks.	Option has potential to increase the amount of overflight of AONBs or National Parks	0
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	In isolation, this option could be expected to marginally improve capacity in the LTMA, owing to the repositioning of the MATCH SID towards where it is routinely vectored today and away from BPK and therefore away from Heathrow and Northolt BPK departures. In addition the divergence between CPT/OLY and MATCH, whilst not 45' may provide opportunity to reduce departure separations to less than 2 mins between successive MATCH + OLY/CPT departures. We assume that as CCO is enabled above 5000ft, that the LTMA has been modernised and realised the capacity anticipated though airspace modernisation.	Is expected to enhance Luton's operational performance in the future	8	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	Option will most likely enable CCO above 5000ft on all routes but whether or not guaranteed climb to 7000ft is achievable is dependent on the changes to the wider airspace. Departure routes to the South are likely to still interact with Heathrow, Northolt and London City departures so climb is dependent on their changes	Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option makes use of multiple routes for the same departures to share the noise more equitably	Option does see the use of multiple routes	6
		New route structures	This option generates routes that are substantially different to today, to distribute the noise more equitably	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	This option does provide opportunity for turning routes on/off to provide respite for communities	Option does contain mechanism for respite	6
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	We would expect the wider LTMA re-design to have procedurally deconflicted routes to/from adjacent airports and therefore reduce the overflight of the same communities by multiple routes. Whether or not the same communities are not overflown by Luton's routes depends on the Easterly SID configuration taken forward to partner this westerly configuration	Option is expected to reduce the overflying of some communities with multiple routes	5	
7	Should minimise tactical intervention by ATC below 7000ft	We would expect the level of tactical intervention on all the departure routes to be significantly lower than today owing to the wider LTMA airspace being modernised and routes procedurally deconflicted from Luton's routes.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	This option could be expected to require less CAS owing to CCO above 5000ft enabled by the wider LTMA FASI design.	Option could be expected to require less CAS	3
		Simple airspace boundaries	Option offers potential to simplify airspace boundaries owing to CCO and the assumption of wider FASI change	Option offers potential to simplify airspace boundaries	3
		Allowing flexible use of airspace, where possible	This option would not change the existing FUA airspace sharing arrangement with Dunstable	Option would not change the existing airspace sharing arrangement	3
				74	

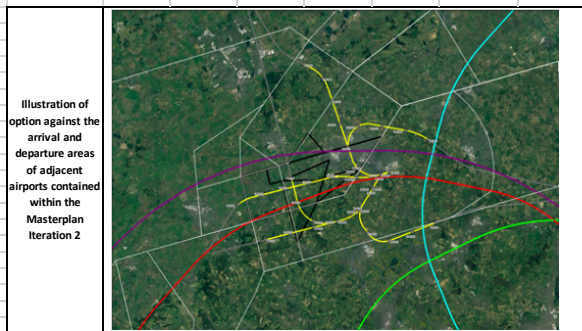
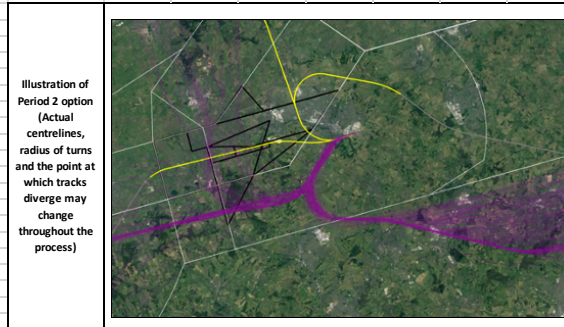
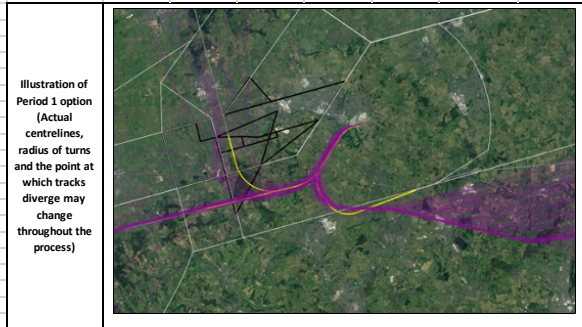
Description of Option

This option sees 2 very different sets of SIDs for use when the Dunstable gliding area is inactive. At this stage, we have assumed this is standardised to a 2100-0700 time period but that is subject to negotiation and agreement with multiple industry organisations. During this time, the Period 2 MATCH and OLY SIDs turn right shortly after departure to try and follow the MI as closely as possible, as suggested by community stakeholders.

The CPT SID doesn't go straight ahead, but turns to the north of RWY07 final approach before turning south once above 7000ft. This is to not overfly the same communities with multiple routes and to try and distribute noise more equitably.

This option is dependent on guaranteed CCO above 6,000ft to enable the Period 2 MATCH SIDs to outclimb arrivals to RWY 25 and therefore dependent on changes to adjacent airports.

We would expect aircraft to follow the centrelines more regularly because there is less requirement for controller intervention in this design (due to deconfliction from adjacent SIDs) and would expect published SID levels above 5,000ft to the South

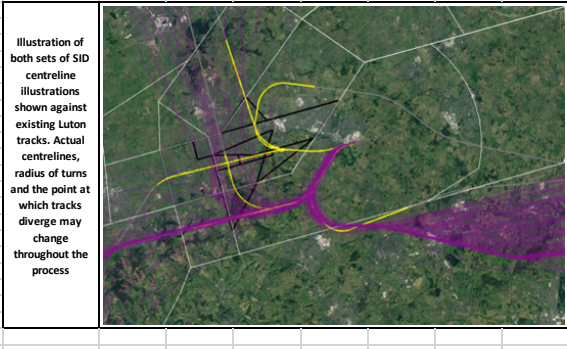
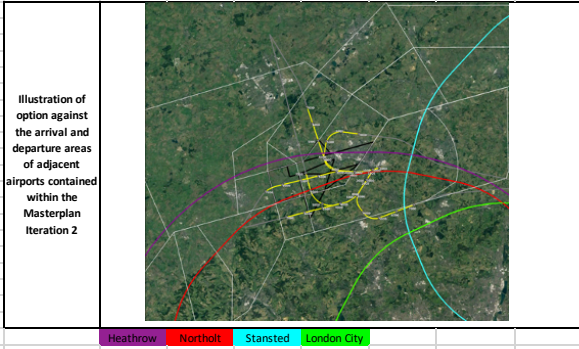
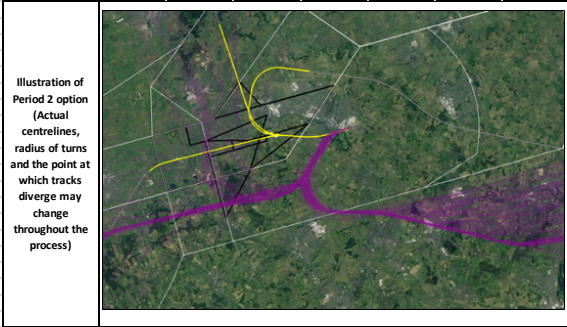
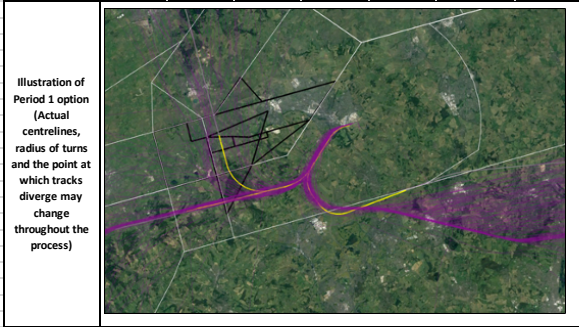


Heathrow Northolt Stansted London City

DESIGN PRINCIPLE EVALUATION: W SID Group 7

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	SID Switching: Would be new to Luton and the LTMA. The risk of an aircraft selecting the incorrect SID needs to be managed. For example if an aircraft was to inadvertently fly a Period 2 SID during times of Gliding Activity. In addition SIDs going substantially different ways, with differing track miles between them albeit connecting to the network at the same point is a new concept of operation within the LTMA.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	This option will increase the population numbers within the Day and Night LOAEL due to the Period 2 SIDs routing over Luton and Dunstable. In addition, the Period 2 SIDs fly straight ahead on departure for a while before turning and this is likely to increase the size of the SOEAL owing to the combination effect of arrivals and departures.	Option has potential to increase the population number within the day or night LOAEL	0
		CO2	The Period 2 OLY SID is much shorter however OLY departures only make up 10% of departures. The Period 2 MATCH SID is slightly longer by going north. This increase and decrease will likely balance into a neutral effect.	Option is expected to maintain the same level of CO2 emissions	4.5
		Air Quality	There could be a very small change to flightpaths below 1000ft on the Period 2 SIDs. However the rate of climb in that phase of flight is very high and the ground level drops quickly out to the west so aircraft might be 1000ft AGL before any lateral change to flight paths. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Option expected to slightly increase over flight of Chilterns AONB due to the Period 2 SIDs	Option has potential to increase the amount of overflight of AONBs or National Parks	0
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	In isolation, this option could be expected to marginally improve capacity in the LTMA, owing to the repositioning of the MATCH SID towards where it is routinely vectored today and away from BPK and therefore away from Heathrow and Northolt BPK departures. We assume that as CCO is enabled above 5000ft, that the LTMA has been modernised and realised the capacity anticipated though airspace modernisation. This option could enable 1 min departure separations between the Period 2 CPT and MATCH/OLY SIDs however owing to night time use the benefit is expected to be low.	Is expected to enhance Luton's operational performance in the future	8	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	Period 1 SIDs will most likely enable CCO above 5000ft but whether or not guaranteed climb to 7000ft is achievable is dependent on the changes to the wider airspace. Departure routes to the South are likely to still interact with Heathrow, Northolt and London City departures so climb is dependent on their changes. The Period 2 routes are more likely to achieve CCO as they are further from Heathrow, Northolt and London City departures and for this option to work, it relies on CCO to at least 7000ft.	Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option makes use of multiple routes for the same departures to share the noise more equitably although would not be a 50/50 share between right and left turn departures owing to availability of gliding airspace.	Option does see the use of multiple routes	6
		New route structures	This option generates routes that are substantially different to today, to distribute the noise more equitably although would not be a 50/50 share between right and left turn departures owing to availability of gliding airspace.	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	This option does provide opportunity for turning routes on/off to provide respite for communities	Option does contain mechanism for respite	6
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	The CPT route for Period 2 will overfly those communities also under arrivals on base-leg to RWY07 and also under the Period 1 OLY route. The OLY SID, and to a lesser extent MATCH, for Period 2 would overfly those communities under arrivals downwind to RWY07. We would expect the wider LTMA re-design to have procedurally deconflicted routes to/from adjacent airports and therefore reduce the overflight of the same communities by multiple routes from different airports. Whether or not the same communities are not overflown by Luton's own routes depends on the Easterly SID configuration taken forward to partner this westerly configuration for example, if used with East SID Group 4, communities to the North of Luton would be overflown more frequently. However departure routes to the North of Luton are likely to reduce the interactions with Heathrow, Northolt and London City traffic below 7000ft.	Option could increase overflying of the same communities with multiple routes	0	
7	Should minimise tactical intervention by ATC below 7000ft	We would expect the level of tactical intervention on all the departure routes to be significantly lower than today owing to the wider LTMA airspace being modernised and routes procedurally deconflicted from Luton's routes.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	The Period 2 SID could require more CAS and a lowering of CTAS if we can't guarantee CAS containment for the MATCH/OLY SIDs. These would require a very high rate of climb to make 4000ft. in time	Option could be expected to require more CAS	0
		Simple airspace boundaries	The Period 2 SIDs being so different will decrease the opportunity to simplify boundaries and could result in more segmentation to contain the Period 2 CPT/OLY SIDs	Option offers potential to increase complexity of airspace boundaries	0
		Allowing flexible use of airspace, where possible	This option would be dependent on a small change to the sharing agreement with Dunstable gliding club. Instead of Dusk to Dawn, Luton would need a more rigid agreement, such as the 0700-2100 assumption within this option.	Option would require altering the timings of the existing airspace sharing arrangement	1.5
				52.5	

Description of Option	This option is similar to W SID Group 7 but during Period 2, the MATCH and OLY SIDs turn right shortly after departure but not as early as in Option 7, to avoid the populated areas of Luton and Dunstable.
	The CPT SID is the same as In W SID Group 7.
	This option is dependent on guaranteed CCO above 6,000ft to enable the Period 2 MATCH SIDs to outclimb arrivals to RWY 25 and therefore dependent on changes to adjacent airports. We would expect aircraft to follow the centrelines more regularly because there is less requirement for controller intervention in this design (due to deconfliction from adjacent SIDs) and would expect published SID levels above 5,000ft to the South.

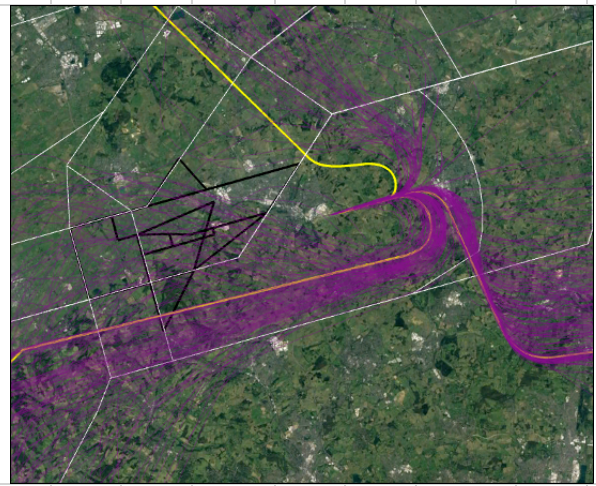


Heathrow Northolt Stansted London City

DESIGN PRINCIPLE EVALUATION: W SID Group 8

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	SID Switching: Would be new to Luton and the LTMA. The risk of an aircraft selecting the incorrect SID needs to be managed. For example if an aircraft was to inadvertently fly a Period 2 SID during times of Gliding Activity. In addition SIDs going substantially different ways, with differing track miles between them albeit connecting to the network at the same point is a new concept of operation within the LTMA.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	This option is will increase the population numbers within the Day and Night LOAEL due to the Period 2 SIDs routing over Luton and Dunstable. In addition, the Period 2 SIDs fly straight ahead on departure for a while before turning and this is likely to increase the size of the SOEAL owing to the combination effect of arrivals and departures. Probably lower numbers than Option 7 but still an increase over today.	Option has potential to increase the population number within the day or night LOAEL	0
		CO2	The Period 2 OLY SID is much shorter however OLY departures only make up 10% of departures. The Period 2 MATCH SID is significantly longer by going around Dunstable and then north.	Option has potential to contribute to an increase in CO2 emissions	0
		Air Quality	There could be a very small change to flightpaths below 1000ft on the Period 2 SIDs. However the rate of climb in that phase of flight is very high and the ground level drops quickly out to the west so aircraft might be 1000ft AGL before any lateral change to flight paths.. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Option expected to slightly increase over flight of Chilterns AONB due to the Period 2 SIDs	Option has potential to increase the amount of overflight of AONBs or National Parks	0
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	In isolation, this option could be expected to marginally improve capacity in the LTMA, owing to the repositioning of the MATCH SID towards where it is routinely vectored today and away from BPK and therefore away from Heathrow and Northolt BPK departures. We assume that as CCO is enabled above 5000ft, that the LTMA has been modernised and realised the capacity anticipated though airspace modernisation.	Is expected to enhance Luton's operational performance in the future	8	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	Period 1 SIDs will most likely enable CCO above 5000ft but whether or not guaranteed climb to 7000ft is achievable is dependent on the changes to the wider airspace. Departure routes to the South are likely to still interact with Heathrow, Northolt and London City departures so climb is dependent on their changes. The Period 2 routes are more likely to achieve CCO as they are further from Heathrow, Northolt and London City departures and for this option to work, it relies on CCO to at least 7000ft.	Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option makes use of multiple routes for the same departures to share the noise more equitably although would not be a 50/50 share between right and left turn departures owing to availability of gliding airspace.	Option does see the use of multiple routes	6
		New route structures	This option generates routes that are substantially different to today, to distribute the noise more equitably although would not be a 50/50 share between right and left turn departures owing to availability of gliding airspace.	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	This option does provide opportunity for turning routes on/off to provide respite for communities	Option does contain mechanism for respite	6
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	The CPT route for Period 2 will overfly those communities also under arrivals on base-leg to RWY07 and also under the Period 1 OLY route. The OLY and MATCH SIDs for Period 2 would overfly those communities under arrivals downwind to RWY07. We would expect the wider LTMA re-design to have procedurally deconflicted routes to/from adjacent airports and therefore reduce the overflight of the same communities by multiple routes from different airports. Whether or not the same communities are not overflown by Luton's own routes depends on the Easterly SID configuration taken forward to partner this westerly configuration for example, if used with East SID Group 4, communities to the North of Luton would be overflown more frequently. However departure routes to the North of Luton are likely to reduce the interactions with Heathrow, Northolt and London City traffic below 7000ft.	Option could increase overflying of the same communities with multiple routes	0	
7	Should minimise tactical intervention by ATC below 7000ft	We would expect the level of tactical intervention on all the departure routes to be significantly lower than today owing to the wider LTMA airspace being modernised and routes procedurally deconflicted from Luton's routes.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	The Period 2 SID is unlikely to require more CAS as there are more track miles (compared to W SID Group 7) to reach 4000ft by CTA5. CCO is generally more likely to enable a reduction on CAS boundaries however the lower track miles on the Period 2 OLY SIDs is less likely to enable a raising of CTA6	Option could be expected to require no more CAS	1.5
		Simple airspace boundaries	The Period 2 SIDs being so different will decrease the opportunity to simplify boundaries. The lower track miles on the Period 2 OLY SIDs is less likely to enable a raising of CTA6	Option offers no potential to simplify airspace boundaries	1.5
		Allowing flexible use of airspace, where possible	This option would be dependent on a small change to the sharing agreement with Dunstable gliding club. Instead of Dusk to Dawn, Luton would need a more rigid agreement, such as the 0700-2100 assumption within this option.	Option would require altering the timings of the existing airspace.	1.5
				51	

	This option represents the do nothing scenario for Luton Easterly SIDs. There is quite a variation from the existing centrelines which is for a few reasons:
Description of Option	<ul style="list-style-type: none"> •They are nominal centrelines, with turns greater than 90°, based on conventional navigation i.e. they are made up of a mix of radials from different ground-based navigation aids and these can be quite different to what is flyable. The greatest difference is seen on the OLY SID where it's clear there are no aircraft that can fly the first turn which is so tight. •The OLY SID is not wholly contained within Controlled Airspace so ATC are forced to vector and climb, they cannot be left on the SID. •There is an ATC requirement to vector CPT departures to the south of the SID track (after the first turn) to ensure separation against arrivals on approach to RWY07.



DESIGN PRINCIPLE EVALUATION: Easterly SID Option 1 (Do Nothing)

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	No safety concerns with the status quo at Luton subject to forecast traffic growth in the LTMA being capped to maintain levels of safety	No safety concerns at this time	10	
2	Must meet the 3 aims of the NPSE, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		CO2	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		Air Quality	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		AONB/Nat Parks	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	Forecast traffic levels will require increased use of flow regulations to maintain levels of safety within this airspace which will constrain airport capacity at Luton. No change to airspace at Luton may also inhibit the wider FASI programme of change and AMS benefits associated with the programme.	Would degrade operational performance in the future	0	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	No change to existing arrangements. Continuous climb only guaranteed to 4,000ft or 5000ft. Guaranteed CDA/CCO from/to 5000ft+ is not possible in the existing airspace arrangement	Would not enable CCO or CDO to/from 7000ft	0	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	The existing arrangement does not make use of multiple routes for the same departures to share the noise more equitably	Option doesn't see the use of multiple routes	0
		New route structures	The existing arrangement does not contain new route structures to share noise more equitably	Option doesn't contain new route structures to share noise more equitably	0
		Options (mechanisms) for respite	The existing arrangement does not have mechanisms for turning routes on/off to provide respite for communities	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	The existing arrangement will not change the overflying of communities with multiple routes.	Option is not expected to change the overflying of communities with multiple routes	2.5	
7	Should minimise tactical intervention by ATC below 7000ft	The existing arrangement will maintain the amount of tactical intervention compared to today as illustrated in the image above. However, if this option was progressed it is likely that changes to the wider LTMA airspace through other FASI ACPs could drive changes in vectoring behaviour of ATC once above the NPR.	Option is expected to maintain the amount of tactical intervention compared to today	2	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	The existing arrangement will require no more CAS	Option could be expected to require no more CAS	1.5
		Simple airspace boundaries	Doing nothing offers no potential to simplify airspace boundaries	Option offers no potential to simplify airspace boundaries	1.5
		Allowing flexible use of airspace, where possible	Doing nothing would not change the existing airspace sharing arrangement with Dunstable Gliding Club	Option would not change the existing airspace sharing arrangement	3
				38.5	

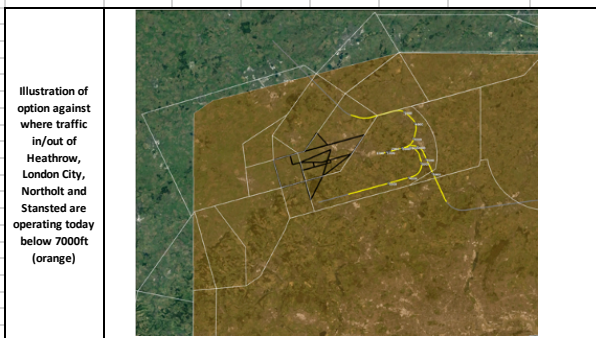
Description of Option

This option would see a replication of the existing MATCH SIDs and a refinement to the CPT SID to keep the route laterally separated from final approach. The OLY SID would be redesigned to a flyable centreline however this would position the route over the heavily populated town of Hitchin. Therefore, the route has been proposed to go between Hitchin and Letchworth Garden City.

Subject to safety assurances, it is expected this option could be implemented within the current airspace, without affecting adjacent airports as the published vertical profile of the SIDs would be the same as today and no significant change to the lateral tracks.

We would expect to see minimal change to the swathe of MATCH departures but a concentration of aircraft on the CPT SIDs. The OLY SID would see a shift in concentration around the initial part of the first turn however there would still be a heavy reliance on ATC vectoring making consultation very difficult/confusing i.e. implementing a new SID centreline that wouldn't be flown routinely.

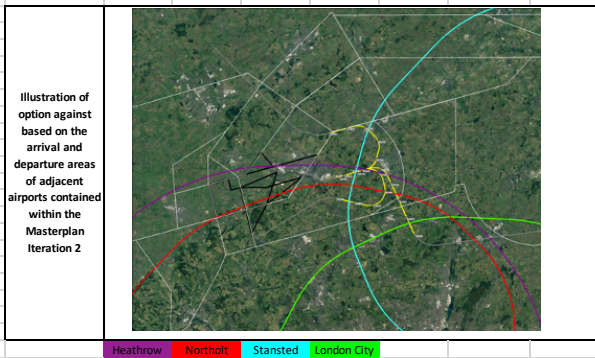
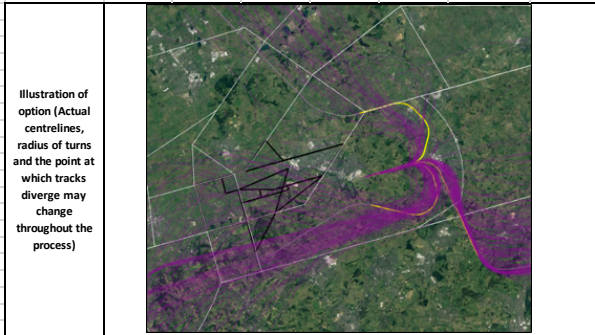
This option is not expected to be dependent on changes at neighbouring airports.



DESIGN PRINCIPLE EVALUATION: E SID Group 2

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	As the vertical profile and published centrelines of the SIDs would be the similar as today there are no significant safety concerns at this stage.	No safety concerns at this time	10	
2	Must meet the 3 aims of the NPS, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	Unlikely to be any change to the LOAEL	Option is expected to maintain the population number within the day or night LOAEL	4.5
		CO2	Would not expect any change in practice to track miles flown on CPY/OLY SID due to reliance on vectoring but flight plannable miles would increase on the new SID which would require a greater fuel uplift for some carriers	Option has potential to contribute to an increase in CO2 emissions	0
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Would not expect a change in the amount of overflight of Chilterns AONB	Option is expected to maintain the same level of overflight of AONBs or National Parks	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	This option would not expect to enhance or degrade Luton's operational capacity.	Is expected to maintain Luton's operational performance in the future	4	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	We would not expect any improvement to vertical profile for any of the easterly departures without any changes at neighbouring airports	Would not enable CCO or CDO to/from 7000ft	0	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option does not see the use of multiple routes	Option doesn't see the use of multiple routes	0
		New route structures	The new route structures do not offer any more or less equitable distribution of traffic.	Option doesn't contain new route structures to share noise more equitably	0
		Options (mechanisms) for respite	This option doesn't contain mechanism for respite	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	This option progressed independently of changes at other airports is not expected to result in overflight of the same communities with multiple routes to/from Luton or other airports below 7000ft	Option is not expected to change the overflying of communities with multiple routes	2.5	
7	Should minimise tactical intervention by ATC below 7000ft	This option progressed independently of changes at other airports is not expected to result in any more or less tactical intervention compared today.	Option is expected to maintain the amount of tactical intervention compared to today.	2	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	Owing to the vertical profile remaining as today, we would not expect this change to enable a reduction on the volume of CAS	Option could be expected to require no more CAS	1.5
		Simple airspace boundaries	Owing to the vertical profile remaining as today, we would not expect this change to enable a change to CAS boundaries	Option offers no potential to simplify airspace boundaries	1.5
		Allowing flexible use of airspace, where possible	This option would not change the existing FUA airspace sharing arrangement with Dunstable	Option would not change the existing airspace sharing arrangement	3
				38	

Description of Option	<p>This option is the same as E SID Group 2 but with a CPT departure to the south of the aerodrome that avoids Harpenden. This is only possible with guaranteed CCO to above 5,000ft. This is because the route bends back towards final approach and would not be safe against a Missed Approach, Final Approach or subsequent departures without guaranteed climb.</p> <p>For this reason such an option is dependent on changes at other airports. As a result we would expect the OLY and MATCH routes would experience more concentration but also improved CCO as a result of the wider FASI deployment.</p>
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DESIGN PRINCIPLE EVALUATION: E SID Group 3

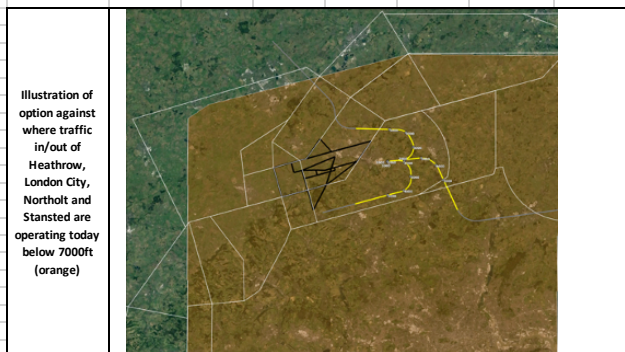
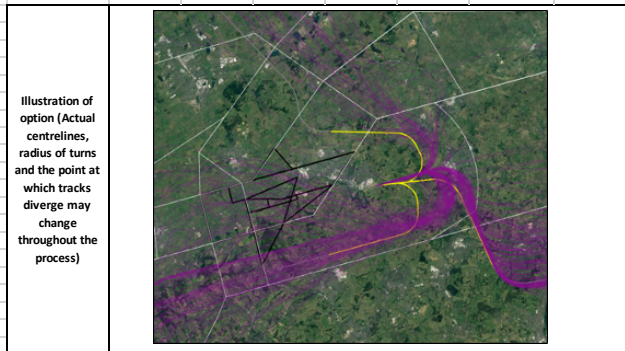
PRIORITY	DESIGN PRINCIPLE		SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS
1	Must be safe		There are no safety concerns identified with the MATCH and OLY SIDs however the CPT departure turning back towards final approach and climb out will require additional safety assurances although they are not considered insurmountable at this stage.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	Unlikely to be any change to the LOAEL	Option is expected to maintain the population number within the day or night LOAEL	4.5
		CO2	Could expect a reduction in CO2 due to CCO enabled by FASI.	Option has potential to contribute to a reduction in CO2	9
		Air Quality	There would be a change to flightpaths below 1000ft due to the offset departure although increase to air quality emissions not expected a result. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Would not expect a change in the amount of overflight of Chilterns AONB	Option is expected to maintain the same level of overflight of AONBs or National Parks	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met		This option would not expect to enhance or degrade Luton's operational capacity however it could degrade if the safety risk of flying back towards climb out (and subsequent departures) cannot be designed out. That could result in greater departure durations after a CPT departure. We assume in this appraisal that it has been designed out.	Is expected to maintain Luton's operational performance in the future	4
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that		As this option relies on changes to the wider LTMA airspace design, we would expect an improvement on CCO performance from Luton. Whether or not guaranteed climb to 7000ft is achievable is dependent on the changes to the wider airspace. Departure routes to the South are likely to still interact with Heathrow, Northolt and London City departures so climb is dependent on their changes. There is also a chance that MATCH and OLY departures CCO would be constrained by the CPT SID which turns back at climb out.	Unclear whether it would enable CCO or CDO to/from 7000ft	3.5
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option does not see the use of multiple routes	Option doesn't see the use of multiple routes	0
		New route structures	The new route structures do not offer any more or less equitable distribution of traffic.	Option doesn't contain new route structures to share noise more equitably	0
		Options (mechanisms) for respite	This option doesn't contain mechanism for respite	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft		We would expect the wider LTMA re-design to have procedurally deconflicted routes to/from adjacent airports and therefore reduce the overflight of the same communities by multiple routes. Whether or not the same communities are not overflown by Luton's routes depends on the Westerly SID configuration taken forward to partner this westerly configuration.	Option is expected to reduce the overflying of some communities with multiple routes	5
7	Should minimise tactical intervention by ATC below 7000ft		We would expect the level of tactical intervention on all the departure routes to be significantly lower than today owing to the wider LTMA airspace being modernised and routes procedurally deconflicted from Luton's routes.	Option is expected to reduce the amount of tactical intervention compared to today	4
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	This option could be expected to require less CAS owing to CCO above 5000ft enabled by the wider LTMA FASI design.	Option could be expected to require less CAS	3
		Simple airspace boundaries	Option offers potential to simplify airspace boundaries owing to CCO and the assumption of wider FASI change	Option offers potential to simplify airspace boundaries	3
		Allowing flexible use of airspace, where possible	This option would not change the existing FUA airspace sharing arrangement with Dunstable	Option would not change the existing airspace sharing arrangement	3
					53

Description of Option

This option sees all departures offset to the right (south) of final approach to help avoid Breachwood Green and to provide some respite to those under RWY25 final approach. OLY departures would however be required to cross back over final approach.

The CPT departure could turn back west earlier than today to reduce track miles/CO2. This earlier turn would also help to enable reduced departure separations therefore a reduction in ground holding. However, it would result in overflight of Harpenden at lower altitudes than today. The offset right OLY departure would enable an OLY SID which could stay to the West of Hitchin and keep that part of the turn closer to the existing OLY tracks flown today. Although routine vectoring would still be expected above the NPR.

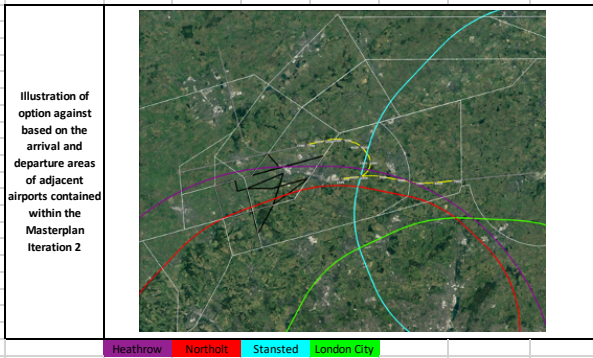
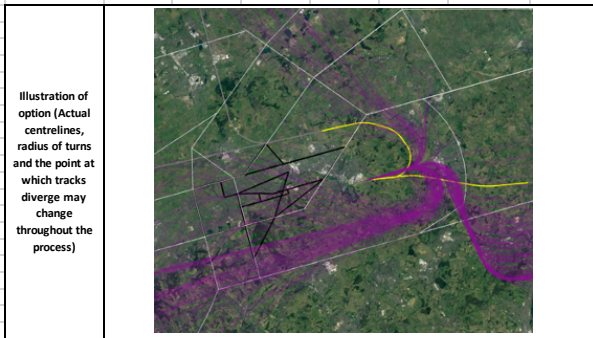
Subject to safety assurances, it is expected this option could be implemented within the current airspace, without affecting adjacent airports as the published vertical profile of the SIDs would be the same as today and the lateral tracks not significantly further south. We would therefore expect similar CCO performance across these routes.



DESIGN PRINCIPLE EVALUATION: E SID Group 4

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	Offset departures (known as track adjustments) are available within PANS OPS but would require additional safety assurances compared to day. Other than that, there are no safety concerns at this time.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	The offset departure could be expected to reduce population within the day LOAEL because it avoids Breachwood Green and moving the departures away from Final Approach will reduce the cumulative effect and therefore has potential to shrink the LOAEL. However the early turn on the CPT SID is likely to increase the night time LOAEL to extend over Harpenden although the number of CPT departures in the night are low. These could balance each other out but it's not possible to tell at this stage so we have assessed as having potential to increase the population numbers within the LOAEL	Option has potential to increase the population number within the day or night LOAEL	0
		CO2	The earlier turn of the CPT SID will reduce track miles by c.3nm and the offset departure will slightly reduce track miles on the MATCH SID	Option has potential to contribute to a reduction in CO2	9
		Air Quality	There would be a change to flightpaths below 1000ft due to the offset departure although increase to air quality emissions not expected a result.. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	The earlier turn on the CPT SID has potential to increase overflight of the Chilterns AONB below 7000ft.	Option has potential to increase the amount of overflight of AONBs or National Parks	0
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	The earlier turn on the CPT departure could be expected to enhance capacity at Luton by enabling a reduction in departure separations.	Is expected to enhance Luton's operational performance in the future	8	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	We would not expect any improvement to vertical profile for any of the easterly departures without any changes at neighbouring airports	Would not enable CCO or CDO to/from 7000ft	0	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option does not see the use of multiple routes	Option doesn't see the use of multiple routes	0
		New route structures	The offset departure to the south of final approach would be to distribute traffic more equitably	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	This option does not provide opportunity for turning routes on/off to provide respite for communities	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	The offset departure would avoid overflying the same communities (under RWY25 final approach) with multiple routes.	Option is expected to reduce the overflying of some communities with multiple routes	5	
7	Should minimise tactical intervention by ATC below 7000ft	This option progressed independently of changes at other airports is not expected to result in any more or less tactical intervention compared today.	Option is expected to maintain the amount of tactical intervention compared to today	2	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	Owing to the vertical profile remaining as today, we would not expect this change to enable a reduction in the volume of CAS	Option could be expected to require no more CAS	1.5
		Simple airspace boundaries	Owing to the vertical profile remaining as today, we would not expect this change to enable a change to CAS boundaries	Option offers no potential to simplify airspace boundaries	1.5
		Allowing flexible use of airspace, where possible	This option would not change the existing FUA airspace sharing arrangement with Dunstable	Option would not change the existing airspace sharing arrangement	3
				45.5	

Description of Option	<p>As with E SID Group 4, this option illustration has all departures offset to the right (south) of final approach to help avoid Breachwood Green and to provide some respite to those under RWY25 final approach although the option is not reliant on that offset. However, this version has CPT departures then turning left to go north of the airport. This will increase the chances of CCO (because the routes will be further away from Heathrow, London City and Northolt northbound departures) but also provide respite for those communities to the South of Luton during easterly operations, who would also be overflown by westerly departures. The OLY and CPT tracks would share the same initial track with the OLY departures tracking to the West for longer.</p> <p>The MATCH SID is more direct rather than tracking towards BPK. Such CPT, OLY and MATCH SIDs are only possible with guaranteed CCO above 5,000ft. For MATCH this is so the departures can outclimb Stansted Airspace. For CPT and OLY this is because they have to outclimb Luton's arrivals to Runway 07. To enable this, the Luton arrivals would need to have their downwind tracks moved much further north. We would expect greater concentration along all these routes and less routine vectoring.</p> <p>This option would only be viable with changes to other airports' routes to guarantee CCO above 5,000ft and a move to Luton's own arrivals. See Easterly Arrival Options 3 and 4 which were generated to enable this E SID Group 5 option.</p>
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DESIGN PRINCIPLE EVALUATION: E SID Group 5

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	Offset departures (known as track adjustments) are available within PANS OPS but would require additional safety assurances compared to day. All the SIDs are dependent on CCO above 5000ft which we assume is enabled due to deconfliction from adjacent airport' flight paths. Climb above 5000ft will require additional safety assurances to assure LTMA separations. We have not identified any other safety concerns.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPS, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	The offset departure could be expected to reduce population within the day LOAEL because it avoids Breachwood Green and moving the departures away from Final Approach will reduce the cumulative effect and therefore has potential to shrink the LOAEL	Option has potential to reduce the population number within the day or night LOAEL	9
		CO2	The MATCH route would be c.6nm shorter however the CPT and OLY SIDs would each be c.3nm longer. There's an approximate 50/50 split between MATCH and CPT/OLY so these differences would cancel each other out. However when considering the CCO enabled by turning to the North of Luton, and further from Heathrow, London City and Northolt routes, there is expected to be an overall reduction in CO2 emissions.	Option has potential to contribute to a reduction in CO2	9
		Air Quality	There would be a change to flightpaths below 1000ft due to the offset departure although increase to air quality emissions not expected a result.. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Option will increase the frequency of overflight of the NW section of the Chilterns AONB and that traffic would be expected to be regularly left on the SID until above 7000ft to ensure separation from arrivals to RWY07	Option has potential to increase the amount of overflight of AONBs or National Parks	0
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	The CPT route would split from the MATCH SID earlier than today and the CPT departure turning north (and separated from subsequent SIDs) which could enable a reduced departure separation and enhance Luton's departure throughput.	Is expected to enhance Luton's operational performance in the future	8	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	Option will most likely enable CCO above 5000ft on all routes but whether or not guaranteed climb to 7000ft is achievable is dependent on the changes to the wider airspace. However routing CPT departure routes to the north are less likely to interact with Heathrow, Northolt and London City departures and therefore this option is expected to be more likely to enable CCO to 7000ft.	Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option does not see the use of multiple routes	Option doesn't see the use of multiple routes	0
		New route structures	The offset departure to the south of final approach combined with routing CPT departures north of Luton would share noise more equitably.	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	This option does not provide opportunity for turning routes on/off to provide respite for communities	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	The offset departure would avoid overflying the same communities (under RWY25 final approach) with multiple routes. Routing CPT departures north of Luton keeps them further from London City, Northolt and Heathrow airports and is therefore likely reduce overflight of the same communities with those routes.	Option is expected to reduce the overflying of some communities with multiple routes	5	
7	Should minimise tactical intervention by ATC below 7000ft	We would expect the level of tactical intervention on all the departure routes to be significantly lower than today owing to the wider LTMA airspace being modernised and routes procedurally deconflicted from Luton's routes.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	The CCO and also the lack of a CPT departure route to the south of the airport may offer opportunity to reduce the volume of Luton's CAS	Option could be expected to require less CAS	3
		Simple airspace boundaries	Option offers potential to simplify airspace boundaries owing to CCO and the assumption of wider FASI change	Option offers potential to simplify airspace boundaries	3
		Allowing flexible use of airspace, where possible	This option would not change the existing FUA airspace sharing arrangement with Dunstable	Option would not change the existing airspace sharing arrangement	3
				66.5	

Description of Option	<p>This option is similar to E SID Group 5 but sees 2 x sets of SIDs that would alternate, in pairs at a set time of day or day of the week. For the Design Principle Evaluation and Initial Options Appraisal, we assume they alternate once per day for a period of 24H, therefore each set of SIDs is in operation an equal amount over a year.</p> <p>As with E SID Group 5, this option would only be viable with changes to other airports' routes to guarantee CCO above 5,000ft and a move to Luton's own arrivals. See Easterly Arrival Options 3 and 4 which were generated to enable this E SID Group 5 option.</p>
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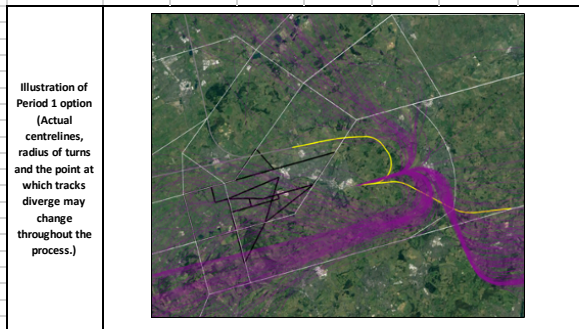


Illustration of Period 2 option (Actual centrelines, radius of turns and the point at which tracks diverge may change throughout the process.)

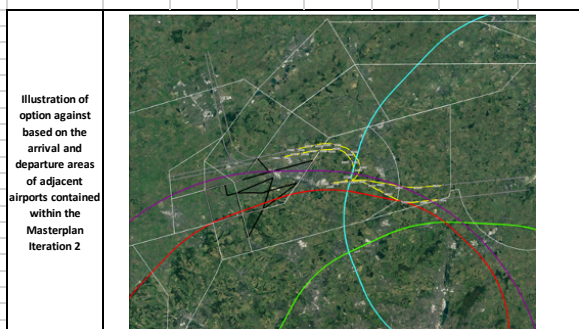
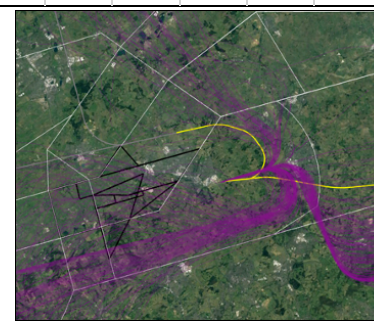
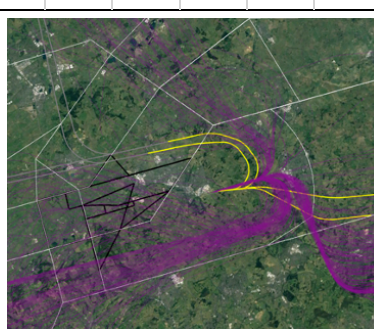


Illustration of both sets of SID centreline illustrations shown against existing Luton tracks. Actual centrelines, radius of turns and the point at which tracks diverge may change throughout the process.

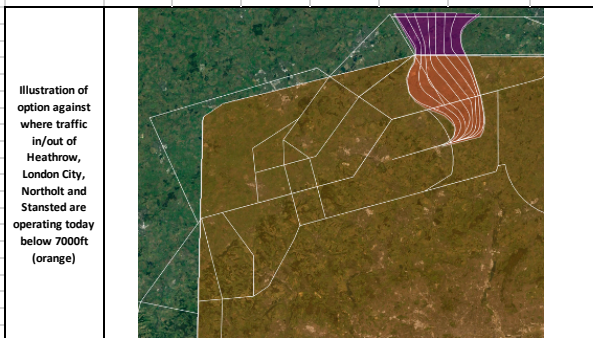
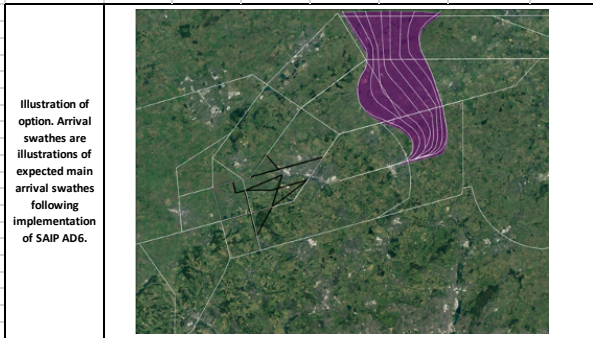


Heathrow Northolt Stansted London City

DESIGN PRINCIPLE EVALUATION: E SID Group 6

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	All SIDs: Offset departures (known as track adjustments) are available within PANS OPS but would require additional safety assurances compared to day. Climb above 5000ft will require additional safety assurances to assure LTMA separations. SID switching would be new to Luton and the LTMA. The risk of an aircraft selecting the incorrect SID needs to be managed. For example if an aircraft was to inadvertently fly a Period 1 CPT following a previous Period 2 CPT there would be a catch up situation	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	The offset departure could be expected to reduce population within the day LOAEL because it avoids Breachwood Green and moving the departures away from Final Approach will reduce the cumulative effect and therefore has potential to shrink the LOAEL.	Option has potential to reduce the population number within the day or night LOAEL	9
		CO2	The MATCH route would be c.6nm shorter however the CPT and OLY SIDs would each be c.3nm longer. There's an approximate 50/50 split between MATCH and CPT/OLY so these differences would cancel each other out. However when considering the CCO enabled by turning to the North of Luton, and further from Heathrow, London City and Northolt routes, there is expected to be an overall reduction in CO2 emissions.	Option has potential to contribute to a reduction in CO2	9
		Air Quality	There would be a change to flightpaths below 1000ft due to the offset departure although increase to air quality emissions not expected a result.. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Option will increase the frequency of overflight of the NW section of the Chilterns AONB and that traffic would be expected to be regularly left on the SID until above 7000ft to ensure separation from arrivals to RWY07	Option has potential to increase the amount of overflight of AONBs or National Parks	0
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	The CPT route would split from the MATCH SID earlier than today and the CPT departure turning north (and separated from subsequent SIDs) which could enable a reduced departure separation and enhance Luton's departure throughput.	Is expected to enhance Luton's operational performance in the future	8	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	Option will most likely enable CCO above 5000ft on all routes but whether or not guaranteed climb to 7000ft is achievable is dependent on the changes to the wider airspace. However routing CPT departure routes to the north and keeping MATCH departures away from BPK are less likely to interact with Heathrow, Northolt and London City departures and therefore this option is expected to be likely to enable CCO to 7000ft.	Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option makes use of multiple routes for the same departures to share the noise more equitably.	Option does see the use of multiple routes	6
		New route structures	This option generates routes that are substantially different to today, to distribute the noise more equitably.	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	This option does provide opportunity for turning routes on/off to provide respite for communities	Option does contain mechanism for respite	6
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	The offset departure would avoid overflying the same communities (under RWY25 final approach) with multiple routes. Routing CPT departures north of Luton and keeping MATCH departures away from BPK keeps them further from London City, Northolt and Heathrow airports and is therefore likely reduce overflight of the same communities with those routes.	Option is expected to reduce the overflying of some communities with multiple routes	5	
7	Should minimise tactical intervention by ATC below 7000ft	We would expect the level of tactical intervention on all the departure routes to be significantly lower than today owing to the wider LTMA airspace being modernised and routes procedurally deconflicted from Luton's routes. The MATCH departure going more direct to the East is less likely to result in tactical vectoring.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	The CCO and also the lack of a CPT departure route to the south of the airport may offer opportunity to reduce the volume of Luton's CAS. However multiple routes could result in less CAS being released compared to options with single routes.	Option could be expected to require less CAS	3
		Simple airspace boundaries	Option offers potential to simplify airspace boundaries owing to CCO and the assumption of wider FASI change	Option offers potential to simplify airspace boundaries	3
		Allowing flexible use of airspace, where possible	This option would not change the existing FUA airspace sharing arrangement with Dunstable	Option would not change the existing airspace sharing arrangement	3
				78.5	

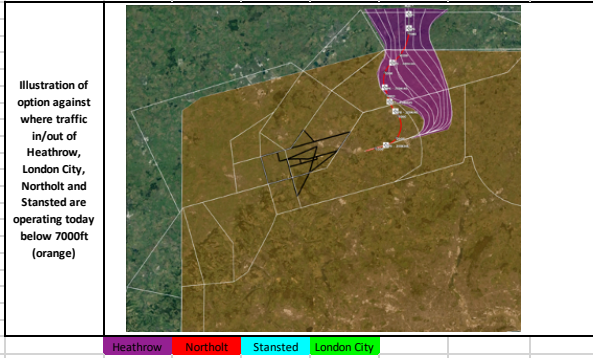
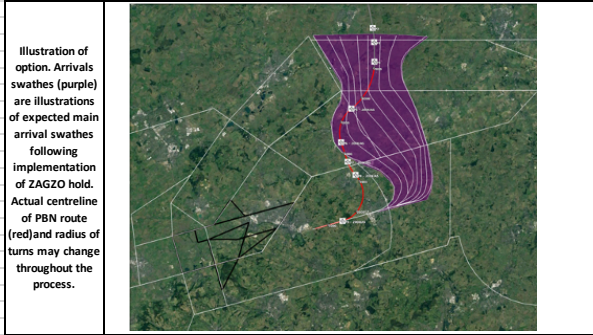
Description of Option	<p>This option would see all arrivals vectored from ZAGZO exactly as per SAIP AD6, with the same vertical profiles. This is a Do Nothing Scenario for RWY25 arrivals and therefore not dependent on changes to other airports' routes.</p> <p>At the time of generating this list of options, the AD6 airspace has not been implemented and therefore the illustration cannot be generated using actual radar track plots.</p>
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DESIGN PRINCIPLE EVALUATION: W Arrival 1 (Do Nothing)

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS
1	Must be safe	There are no safety concerns with this option as it is already in operation.	No safety concerns at this time	10
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		CO2 If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		Air Quality If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		AONB/Nat Parks If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	This option is expected to adequately cater for forecast demand	Is expected to maintain Luton's operational performance in the future	4
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	This option does not cater for CDA from 7000ft owing to the existing RMA requiring level flight at 5000ft.	Would not enable CDO or CDO to/from 7000ft	0
5	Should provide an equitable distribution of traffic where possible, through eg;	Use of multiple routes Whilst this option does not use specific routes, tactical vectoring does provide a distribution of traffic, not concentration. For this reason we have evaluated this option as using multiple routes (via the provision of randomised vectoring). Note also the consultation on AD6 provided feedback that vectoring of arrivals is preferable to concentration.	Option does see the use of multiple routes	6
		New route structures This option sees no new route structures	Option doesn't contain new route structures to share noise more equitably	0
		Options (mechanisms) for respite This option doesn't contain options for turning routes on/off to provide respite for communities	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	This option would not change the overflight of communities under RWY25 arrivals	Option is not expected to change the overflying of communities with multiple routes	2.5
7	Should minimise tactical intervention by ATC below 7000ft	This option relies on vectoring and therefore does not minimise tactical intervention below 7000ft.	Option is expected to maintain the amount of tactical intervention compared to today	2
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum The existing arrangement will require no more CAS	Option could be expected to require no more CAS	1.5
		Simple airspace boundaries Doing nothing offers no potential to simplify airspace boundaries	Option offers no potential to simplify airspace boundaries	1.5
		Allowing flexible use of airspace, where possible Doing nothing would not change the existing airspace sharing arrangement with Dunstable Gliding Club (although Westerly arrivals do not affect this arrangement)	Option would not change the existing airspace	3
				48.5

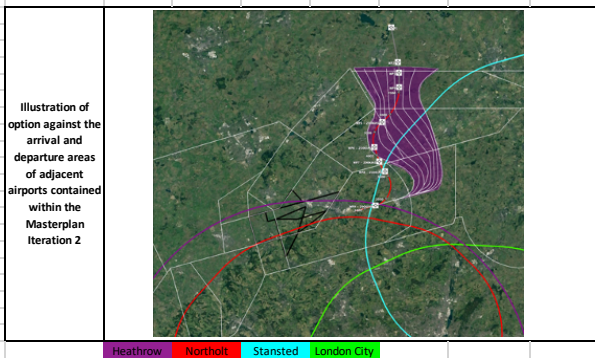
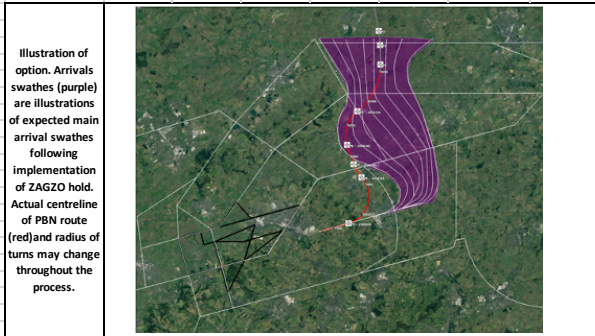
Description of Option	<p>This option would see the majority of all arrivals vectored from ZAGZO as per SAIP AD6, with the same profiles as in AD6, but we also introduce a PBN (RNP-AR) arrival route which some arrivals could use during periods of low traffic. This will reduce CO2 and help to reduce the frequency of overflight for those under final approach outside c.6nm and reduce overflight of Stevenage. A lowering of the base of CTA 7 would be required to accommodate this route.</p> <p>Aircraft using the RNP-AR route would be concentrated on the centreline with no vectoring. The profile of the RNP-AR route would be contained within the existing (AD6) Luton RMA and is therefore not expected to have a dependency on other airports. Note that operator approvals are required for such a route therefore not all operators would be able to use it.</p> <p>Unlike with SIDs which have to be managed on a more scheduled basis, this arrival could be made available by Luton Approach ad hoc and/or at relatively short notice.</p>
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DESIGN PRINCIPLE EVALUATION: W Arrival 2

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	New safety assurances would be required for the RNP-AR arrivals which have not yet been implemented in the UK.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPS, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	Whilst the total population overflown is expected to increase in this option, we do not anticipate any major changes to population numbers within the day LOAEL. If the RNP-AR arrival was to be used by arrivals in the night period, it could significantly reduce the population numbers within the night LOAEL as it would reduce in size over Stevenage. It would extend up the North instead but the population numbers are much lower	Option has potential to reduce the population number within the day or night LOAEL	9
		CO2	The shorter RNP-AR arrival would reduce CO2 emissions	Option has potential to contribute to a reduction in CO2	9
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	We would not expect a change to overflight of AONBs or National Parks	Option is expected to maintain the same level of overflight of AONBs or National Parks	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	This option is expected to adequately cater for forecast demand. Not the RNP-AR route would not be expected to enhance Luton's capacity but would be for noise sharing purposes and CO2 reductions.	Is expected to maintain Luton's operational performance in the future	4	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	This option does not cater for CDA from 7000ft for the vectored traffic owing to the existing RMA requiring level flight at 5000ft. However for the RNP-AR route, the shorter miles means a CDA could potentially be achievable even without changes to other airports' routes.	Option will most likely enable CCD or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	Whilst vectoring does not use specific routes, it does provide a distribution of traffic, not concentration. For this reason we have evaluated this option as using multiple routes (via the provision of randomised vectoring). Note also the consultation on AD6 provided feedback that vectoring of arrivals is preferable to concentration. The RNP-AR route enables sharing of the noise more equitably	Option does see the use of multiple routes	6
		New route structures	The RNP-AR route is substantially different to today, to distribute the noise more equitably	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	The RNP-AR route could be used only at certain times of day however the operator equipage requirement combined with only being used during periods of low traffic levels, means it is likely to mean this can't be offered in practise	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	The RNP-AR route as illustrated in this option would overfly some communities already overflown by RWY07 OLY departures where those communities experience no overflight during westerly operations.	Option could increase overflying of the same communities with multiple routes	0	
7	Should minimise tactical intervention by ATC below 7000ft	The RNP-AR route would minimise tactical intervention below 7000ft for those arrivals.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	The RNP-AR route would require additional airspace in part of CTA7 as the aircraft would need to descend below 4000ft before passing the CTA7/CTR boundary	Option could be expected to require more CAS	0
		Simple airspace boundaries	The additional CAS requirement for the RNP-AR route could result in more fragmentation of existing boundaries	Option offers potential to increase complexity of airspace boundaries	0
		Allowing flexible use of airspace, where possible	Doing nothing would not change the existing airspace sharing arrangement with Dunstable Gliding Club (although Westerly arrivals do not affect this arrangement)	Option would not change the existing airspace sharing arrangement	3

Description of Option	<p>This option is the same as W Arrival Option 2 except that the vertical profiles are improved to allow improved CDA performance for the main vectored arrival swathe. This could only be possible with changes to routes to/from adjacent airports.</p> <p>We would not expect an improvement to the vertical profile of the RNP-AR arrival as the shorter track miles (compared to the main vectored arrival swathe) means staying higher for longer is not possible. Therefore, even with a higher Luton RMA, the RNP-AR arrival would still require a lowering to the base of CTA 7.</p>
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DESIGN PRINCIPLE EVALUATION: W Arrival 3

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	New safety assurances would be required for the RNP-AR arrivals which have not yet been implemented in the UK and that other routes within LTMA enable CDA from 7000ft for the vectored arrivals	Additional work required to generate acceptable safety argument but that	5	
2	Must meet the 3 aims of the NPS, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	We do not anticipate any major changes to population numbers within the day LOAEL. If the RNP-AR arrival was to be used by arrivals in the night period, it could significantly reduce the population numbers within the night LOAEL as it would reduce in size over Stevenage. It would extend up the North instead but the population numbers are much lower	Option has potential to reduce the population number within the day or night LOAEL	9
		CO2	The shorter RNP-AR arrival together with improved CO2 would be expected to reduce CO2 emissions	Option has potential to contribute to a reduction in CO2	9
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	We would not expect a change to overflight of AONBs or National Parks	Option is expected to maintain the same level of overflight of AONBs or National Parks	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	This option is expected to adequately cater for forecast demand. Not the RNP-AR route would not be expected to enhance Luton's capacity but would be for noise sharing purposes and CO2 reductions.	Is expected to maintain Luton's operational performance in the future	4	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	This option does assume CDA from 7000ft for the vectored traffic owing to the redesign of adjacent airport's routes as part of FASI. For the RNP-AR route, the shorter miles means a CDA could potentially be achievable even without changes to other airports' routes.	Option will most likely enable CDO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	Whilst vectoring does not use specific routes, it does provide a distribution of traffic, not concentration. For this reason we have evaluated this option as using multiple routes (via the provision of randomised vectoring). Note also the consultation on AD6 provided feedback that vectoring of arrivals is preferable to concentration. The RNP-AR route enables sharing of the noise more equitably	Option does see the use of multiple routes	6
		New route structures	The RNP-AR route is substantially different to today, to distribute the noise more equitably	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	The RNP-AR route could be used only at certain times of day however the operator equipage requirement combined with only being used during periods of low traffic levels, means it is likely to mean this can't be offered in practise	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	If this option was used in conjunction with E SID Group 1 or 2, the RNP-AR route as illustrated would overfly the same areas as those CPT/OLY SIDs	Option could increase overflying of the same communities with multiple routes	0	
7	Should minimise tactical intervention by ATC below 7000ft	The RNP-AR route would minimise tactical intervention below 7000ft for those arrivals.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	The RNP-AR route would require additional airspace in part of CTA7 as the aircraft would need to descend below 4000ft before passing the CTA7/CTR boundary	Option could be expected to require more CAS	0
		Simple airspace boundaries	The additional CAS requirement for the RNP-AR route could result in more fragmentation of existing boundaries	Option offers potential to increase complexity of airspace boundaries	0
		Allowing flexible use of airspace, where possible	Doing nothing would not change the existing airspace sharing arrangement with Dunstable Gliding Club (although Westerly arrivals do not affect this arrangement)	Option would not change the existing airspace sharing arrangement	3
				62	

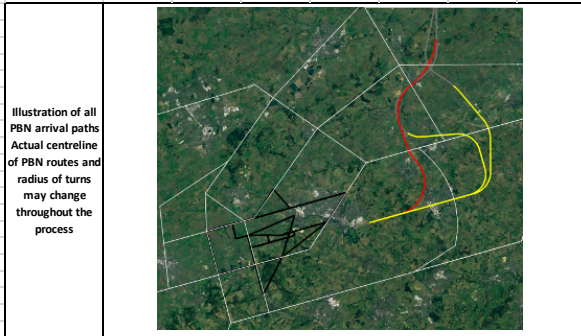
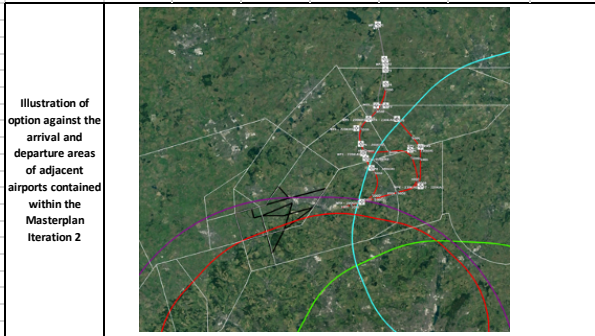
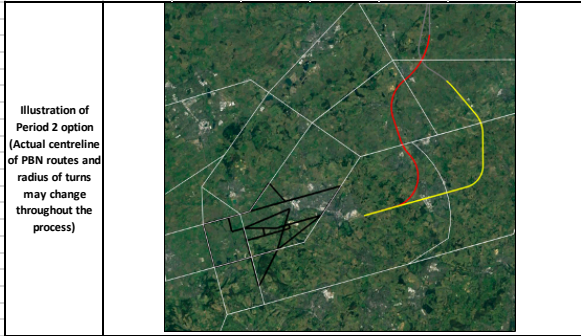
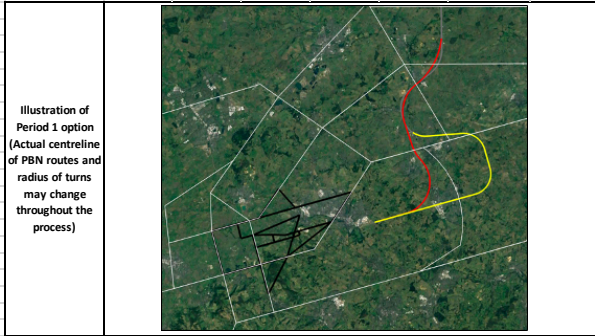
Description of Option

This option would see the use of 2 x PBN Approach Transitions used in rotation instead of a reliance on just vectoring. In addition, the RNP-AR route from W Arrival 2 and 3 would also be available for periods of low traffic for those operators equipped and approved.

As we assume CDA from 7000ft on all three PBN approaches, this introduces a dependency on other airports. The 2 x PBN Approach Transitions would be used in rotation that would alternate at a set time of day or day of the week.

We estimate at this stage that the split of traffic is 45% on each of the PBN approach Transitions and c.10% on the RNP-AR route to the shorter final.

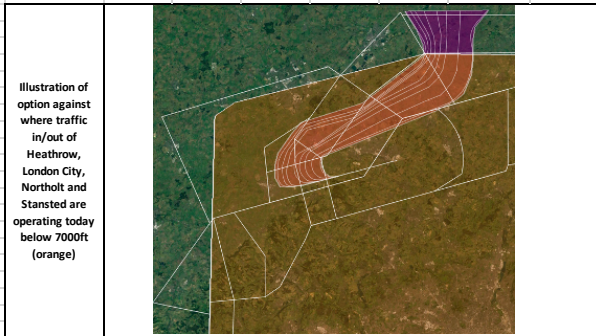
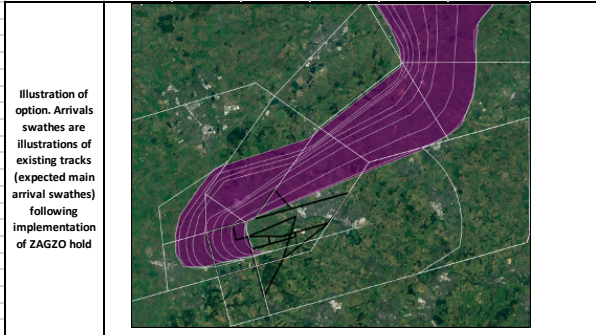
Aircraft would be largely concentrated on the PBN Transitions however, we couldn't guarantee this as in peak arrival flows there would be a reliance on vectoring to deliver the required spacing between pairs of arrivals to the runway. Approach control would continue to need to be able to react to variable spacing requirements from the airport. However, those aircraft on the RNP-AR route would be concentrated on the route with no vectoring.



DESIGN PRINCIPLE EVALUATION: W Arrival 4

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	New safety assurances would be required for the RNP-AR arrivals which have not yet been implemented in the UK. The risk of an aircraft incorrectly selecting the wrong arrival route needs to be managed.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPS, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	Whilst the total population overflown is expected to decrease in this option, we do not anticipate any major changes to population numbers within the day LOAEL as the main PBN arrival routes would join final approach east of Stevenage. If the RNP-AR arrival was to be used by arrivals in the night period, it could significantly reduce the population numbers within the night LOAEL as it would reduce in size over Stevenage. It would extend up the North instead but the population numbers are much lower	Option has potential to contribute to a reduction in CO2	9
		CO2	The shorter RNP-AR arrival together with improved CO2 would be expected to reduce CO2 emissions. However the longer PBN transition used 50% of the time is approx. 8nm longer than the other route. Therefore it's not clear if this option would result in reduced CO2 emissions	Option is expected to maintain the same level of CO2 emissions	4.5
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	We would not expect a change to overflight of AONBs or National Parks	Option is expected to maintain the same level of overflight of AONBs or National Parks	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	So long as ATC retain the ability to vector arrivals to ensure accurate and safe final approach spacing, capacity is not expected to be constrained with this option. None of the PBN arrival routes would be expected to enhance Luton's capacity but would be for noise sharing purposes and in the case of RNP-AR, CO2 reductions.	Is expected to maintain Luton's operational performance in the future	4	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	This option does assume CDA from 7000ft for the vectored traffic owing to the redesign of adjacent airport's routes as part of FASI. For the RNP-AR route, the shorter miles means a CDA could potentially be achievable even without changes to other airports' routes.	Option will most likely enable CCO or CDO to/from 7000ft on some or all routes (but not	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option sees multiple routes to share noise	Option does see the use of multiple routes	6
		New route structures	All the route structures would be new to share noise more equitably	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	The two transition routes would be used in rotation to provide respite however it would be expected that the RNP-AR route would be available all the time in periods of low traffic (exact usage to be determined through stakeholder engagement)	Option does contain mechanism for respite	6
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	If this option was used in conjunction with E SID Group 1 or 2, the RNP-AR route as illustrated would overfly the same areas as those CPT/OLY SIDs.	Option could increase overflying of the same communities with multiple routes	0	
7	Should minimise tactical intervention by ATC below 7000ft	Use of PBN would reduce the amount of tactical intervention compared to today however there would be a requirement for ATC to still vector to ensure safe and accurate final approach spacing.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	The RNP-AR route would require additional airspace in part of CT47 as the aircraft would need to descend below 4000ft before passing the CT47/CTR boundary	Option could be expected to require more CAS	0
		Simple airspace boundaries	The additional CAS requirement for the RNP-AR route could result in more fragmentation of existing boundaries	Option offers potential to increase complexity of airspace boundaries	0
		Allowing flexible use of airspace, where possible	Doing nothing would not change the existing airspace sharing arrangement with Dunstable Gliding Club (although Westerly arrivals do not affect this arrangement)	Option would not change the existing airspace sharing arrangement	3
				63.5	

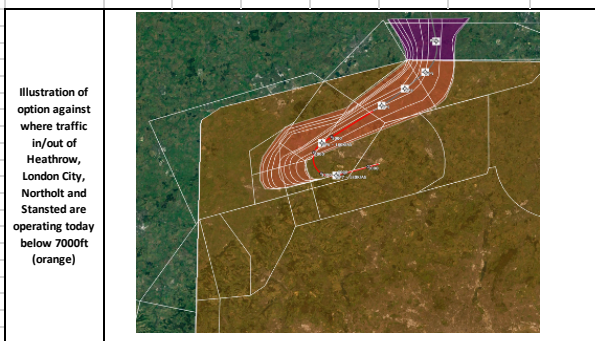
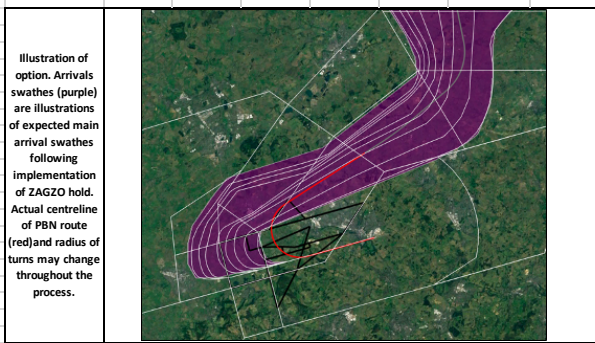
Description of Option	This option would see all arrivals vectored from ZAGZO exactly as per SAIP AD6, with the same vertical profiles. This is a Do Nothing Scenario for RWY25 arrivals and therefore not dependent on changes to other airports' routes.
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DESIGN PRINCIPLE EVALUATION: E Arrival 1 (Do Nothing)

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	There are no safety concerns with this option as it is already in operation.	No safety concerns at this time	10	
2	Must meet the 3 aims of the NPSE, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		CO2	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		Air Quality	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
		AONB/Nat Parks	If no changes are made, there is nothing to assess against the NPSE, ANG 2017 or other policies	Not applicable as no change	4.5
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	This option is expected to adequately cater for forecast demand	Is expected to maintain Luton's operational performance in the future	4	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	This option does not cater for CDA from 7000ft owing to the existing RMA requiring level flight at 5000ft.	Would not enable CDO or CDO to/from 7000ft	0	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	Whilst this option does not use specific routes, tactical vectoring does provide a distribution of traffic, not concentration. For this reason we have evaluated this option as using multiple routes (via the provision of randomised vectoring). Note also the consultation on AD6 provided feedback that vectoring of arrivals is preferable to concentration.	Option does see the use of multiple routes	6
		New route structures	This option sees no new route structures	Option doesn't contain new route structures to share noise more equitably	0
		Options (mechanisms) for respite	This option doesn't contain options for turning routes on/off to provide respite for communities	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	This option would not change the overflight of communities under RWY25 arrivals	Option is not expected to change the overflying of communities with multiple routes	2.5	
7	Should minimise tactical intervention by ATC below 7000ft	This option relies on vectoring and therefore does not minimise tactical intervention below 7000ft.	Option is expected to maintain the amount of tactical intervention compared to today	2	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	The existing arrangement will require no more CAS	Option could be expected to require no more CAS	1.5
		Simple airspace boundaries	Doing nothing offers no potential to simplify airspace boundaries	Option offers no potential to simplify airspace	1.5
		Allowing flexible use of airspace, where possible	Doing nothing would not change the existing airspace sharing arrangement with Dunstable Gliding Club	Option would not change the existing airspace	3
				48.5	

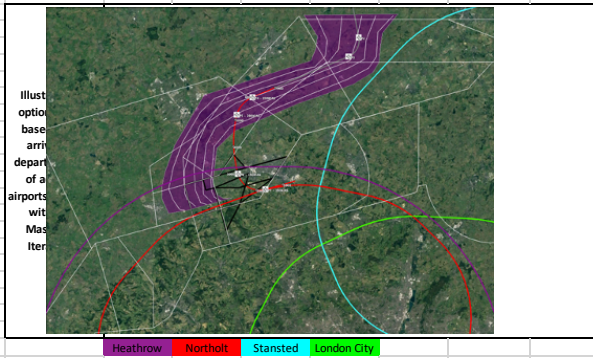
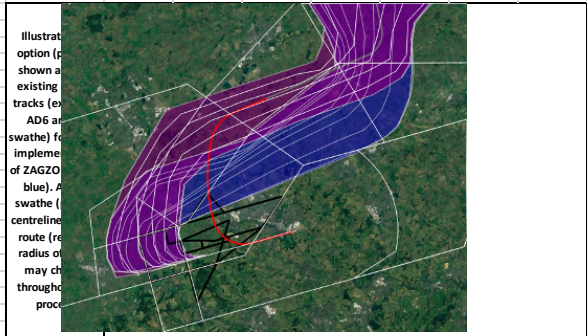
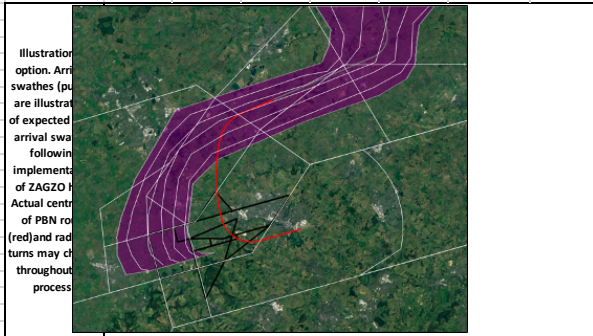
Description of Option	<p>This option would see the majority of all arrivals vectored from ZAGZO as per SAIP AD6, with the same profiles as in AD6, but we also introduce a PBN (RNP-AR) arrival route which some arrivals could use during periods of low traffic. This will reduce CO2 and help to reduce the frequency of overflight for those under final approach outside c.6nm. This RNP-AR route would only be available when the Dunstable gliding area is inactive. Unlike with SIDs which have to be managed on a more scheduled basis, this arrival could be made available by Luton Approach ad hoc and/or at relatively short notice for example, on days when the gliding areas aren't being used due to the weather. Ad-hoc use of a route could be problematic from a consultation perspective as we wouldn't say exactly when the route would be used. Also ad-hoc use of a route through flexible airspace used by aircraft (when available) without transponders would require increased safety assurances. However, for the purposes of the Design Principle Evaluation and Initial Options Appraisal, we have assumed use of this route is standardised to a 2100-0700 time period but that is subject to negotiation and agreement with multiple industry organisations.</p> <p style="text-align: center;">Such an RNP-AR arrival would require a lowering of part of CTAS and possibly CTA6.</p> <p>Aircraft using the RNP-AR route would be concentrated on the centreline with no vectoring. The profile of the RNP-AR route would be contained within the existing (AD6) Luton RMA and is therefore not expected to have a dependency on other airports. Note that operator approvals are required for such a route therefore not all operators will be able to use it.</p>
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DESIGN PRINCIPLE EVALUATION: E Arrival 2

PRIORITY	DESIGN PRINCIPLE		SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS
1	Must be safe		New safety assurances would be required for the RNP-AR arrivals which have not yet been implemented in the UK. The risk of an aircraft incorrectly selecting the RNP-AR arrival during times of Gliding Activity needs to be investigated further.	Additional work required to generate acceptable safety argument but that is envisaged to be	5
2	Must meet the 3 aims of the NPS, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	We wouldn't expect a significant change to the day or night LOAEL with this option as those LOAELs do not currently extend far enough west for the RNP-AR route to make a difference.	Option is expected to maintain the population number within the day or night LOAEL	4.5
		CO2	The shorter RNP-AR arrival would reduce CO2 emissions	Option has potential to contribute to a reduction in CO2	9
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	The RNP-AR route could be designed to avoid the NW section of the Chiltern AONB altogether and so would reduce in the frequency of overflight of the AONB albeit during the night. The main vectored arrival swathes would still overfly the AONB to the same extent.	Option has potential to reduce the overflight of AONBs or National Parks	9
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met		This option is expected to adequately cater for forecast demand. Note the RNP-AR route would not be expected to enhance Luton's capacity but would be for noise sharing purposes and CO2 reductions.	Is expected to maintain Luton's operational performance in the future	4
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that		This option does not cater for CDA from 7000ft owing to the existing RMA requiring level flight at 5000ft for both RNP-AR and vectored arrivals	Would not enable CCO or CDO to/from 7000ft	0
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	Whilst vectoring does not use specific routes, it does provide a distribution of traffic, not concentration. For this reason we have evaluated this option as using multiple routes (via the provision of randomised vectoring). Note also the consultation on AD6 provided feedback that vectoring of arrivals is preferable to concentration. The RNP-AR route enables sharing of the noise more equitably	Option does see the use of multiple routes	6
		New route structures	The RNP-AR route is substantially different to today, to distribute the noise more equitably	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	The RNP-AR route could be used only 2100-0700 and in theory could be mandatory between certain hours. However the operator equipage requirement combined with only being used during periods of low traffic levels, means it is likely to mean this can't be offered in practise	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft		This option is unlikely to change the frequency of communities being overflown with multiple routes below 7000ft	Option is not expected to change the overflying of communities with multiple routes	2.5
7	Should minimise tactical intervention by ATC below 7000ft		The RNP-AR route would minimise tactical intervention below 7000ft for those arrivals.	Option is expected to reduce the amount of tactical intervention compared to today	4
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	An RNP-AR arrival to RWY07 that joins final approach closer than today would most likely require a lowering of part of CTAS and possibly CTA6	Option could be expected to require more CAS	0
		Simple airspace boundaries	The additional CAS requirement for the RNP-AR route could result in more fragmentation of existing boundaries	Option offers potential to increase complexity of airspace boundaries	0
		Allowing flexible use of airspace, where possible	This option would be dependent on a small change to the sharing agreement with Dunstable gliding club. Instead of Dusk to Dawn, Luton would need a more rigid agreement, such as the 0700-2100 assumption within this option. In addition the RNP-AR arrival would require more CAS so that would require a wider FUA arrangement with all aviation to provide CAS containment during 2011-0700.	Option would require altering the timings of the existing airspace sharing arrangement	1.5
					56

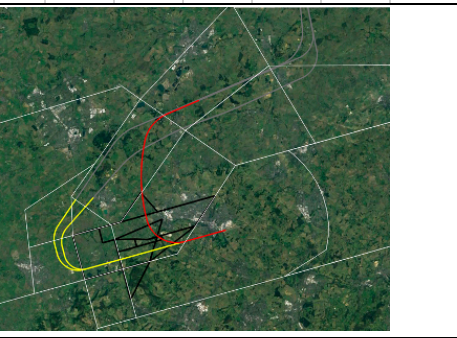
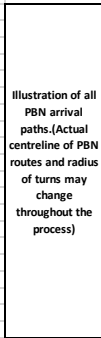
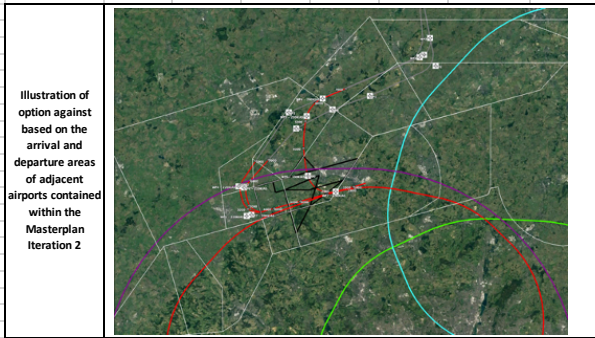
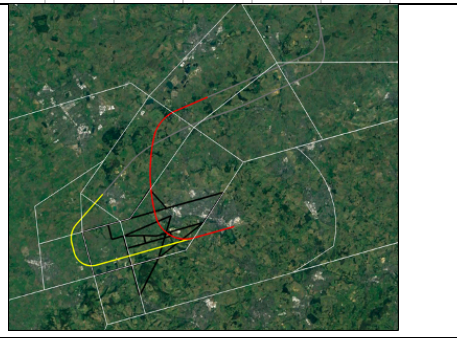
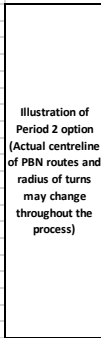
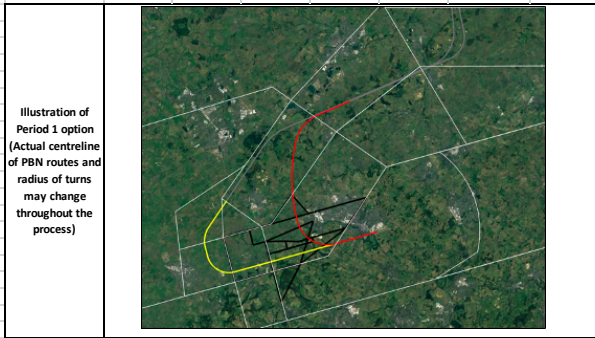
Description of Option	This option would see the majority of arrivals from ZAGZO vectored but with the swathe moved significantly further north and also with improved CDA from above 5,000ft. This shift in the arrival traffic to the north is to enable E SID Groups 5 and 6.
	The CPT+OLY departures turn left to the North of the airport to climb continuously to at least 6,000ft+ and outclimb the Luton arrivals to RWY07. Those vectored arrivals would join final approach in the same place as today (AD6).
	There could also be a PBN (RNP-AR) route that could be used when the gliding area is not active to reduce CO2 and help to reduce the frequency of overflight for those under final approach outside c.6nm. This route could only be used when the gliding airspace isn't being used by the gliders (2100-0700) as per Easterly Arrival Option 2.
	This option is dependent on changes to other airports' routes to enable CDA and not require more Controlled airspace to facilitate the move to the main arrival swathe. A lowering of CTA 5 and 6 would still be required for an RNP-AR arrival.



DESIGN PRINCIPLE EVALUATION: E Arrival 3

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	New safety assurances would be required for the RNP-AR arrivals which have not yet been implemented in the UK and that other routes within LTMA enable CDA from 7000ft for the vectored arrivals. The risk of an aircraft incorrectly selecting the RNP-AR arrival during times of Gliding Activity needs to be investigated further.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPSe, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	We wouldn't expect a significant change to the day or night LOAEL with this option as those LOAELs do not currently extend far enough west for the RNP-AR route to make a difference.	Option is expected to maintain the population number within the day or night LOAEL	4.5
		CO2	The RNP-AR arrival would reduce CO2 emission but the move of the vectored swathe will result in the same track miles from ZAGZO for the majority of arrivals. CDO would help to enable more CO2 reductions	Option has potential to contribute to a reduction in CO2	9
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Moving the Vectored swathe north would result in much less overflight of the NW section of the Chilterns AONB. The RNP-AR route would also avoid the NW section of the Chiltern AONB albeit during the night. Final approach would still overfly the other sections of the AONB.	Option has potential to reduce the overflight of AONBs or National Parks	9
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	This option is expected to adequately cater for forecast demand. Not the RNP-AR route would not be expected to enhance Luton's capacity but would be for noise sharing purposes and CO2 reductions.	Is expected to maintain Luton's operational performance in the future	4	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	This option does assume CDA from 7000ft for the vectored traffic and for the RNP-AR traffic owing to the redesign of adjacent airport's routes as part of FASI.	Option will most likely enable CDO or CDO to/from 7000ft on some or all routes (but not guaranteed at this time)	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	Whilst vectoring does not use specific routes, it does provide a distribution of traffic, not concentration. For this reason we have evaluated this option as using multiple routes (via the provision of randomised vectoring). Note also the consultation on AD6 provided feedback that vectoring of arrivals is preferable to concentration. The RNP-AR route enables sharing of the noise more equitably	Option does see the use of multiple routes	6
		New route structures	The vectored swathe and the RNP-AR route provides new route structures that share noise more equitably.	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	The RNP-AR route could be used only 2100-0700 and in theory could be mandatory between certain hours. However the operator equipment requirement combined with only being used during periods of low traffic levels, means it is likely to mean this can't be offered in practise	Option doesn't contain mechanism for respite	0
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	On one hand moving the vectored arrival swathe further north would reduce the likelihood of communities being overflown by multiple routes from both Luton and from other airports. This swathe would be deconflicted from RWY07 departures and the westerly SID options would largely be deconflicted with the exception of the night time CPT/OLY options in W SID Group 6 and 7. However, the RNP-AR arrival route could overfly the same communities as the night time RWY25 MATCH/OLY SIDs in West SID Group 7.	Option could increase overflying of the same communities with multiple routes	0	
7	Should minimise tactical intervention by ATC below 7000ft	The RNP-AR route would minimise tactical intervention below 7000ft for those arrivals.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	An RNP-AR arrival to RWY07 that joins final approach closer than today would most likely require a lowering of part of CTA5 and possibly CTA6	Option could be expected to require more CAS	0
		Simple airspace boundaries	The additional CAS requirement for the RNP-AR route could result in more fragmentation of existing boundaries	Option offers potential to increase complexity of airspace boundaries	0
		Allowing flexible use of airspace, where possible	This option would be dependent on a small change to the sharing agreement with Dunstable gliding club. Instead of Dusk to Dawn, Luton would need a more rigid agreement, such as the 0700-2100 assumption within this option. In addition the RNP-AR arrival would require more CAS so that would require a wider FUA arrangement with all aviation to provide CAS containment during 2011-0700.	Option would require altering the timings of the existing airspace sharing arrangement	1.5
				60.5	

Description of Option	<p>This option would see the use of 2 x PBN Approach Transitions used in rotation instead of a reliance on just vectoring. The Approach transitions have been positioned further north than the existing arrival swathe to facilitate E SID Groups 5 and 6. There could also be a PBN (RNP-AR) route that could be used when the gliding area is not active to reduce CO2 and help to reduce the frequency of overflight for those under final approach outside c.6nm. This route could only be used when the gliding airspace isn't being used by the gliders (2100-0700) as per Easterly Arrival Options 2 and 3.</p>
	<p>The 2 x PBN transitions have been positioned slightly and to the north of Leighton Buzzard although on a CDO profile, aircraft would be 6-7000ft in these areas.</p>
	<p>As we assume CDA from 7000ft on all three PBN approaches which introduces a dependency on other airports. The 2 x PBN Approach Transitions would be used in rotation that would alternate at a set time of day or day of the week. We estimate at this stage that the split of traffic is 45% on each of the PBN approach Transitions and c.10% on the RNP-AR route to the shorter final.</p> <p>Aircraft would be largely concentrated on the PBN Transitions however, we couldn't guarantee this as in peak arrival flows there would be a reliance on vectoring to deliver the required spacing between pairs of arrivals to the runway. Approach control would continue to need to be able to react to variable spacing requirements from the airport. However, those aircraft on the RNP-AR route would be concentrated on the route with no vectoring. A lowering of CTA 5 and 6 would still be required for an RNP-AR arrival.</p>



DESIGN PRINCIPLE EVALUATION: E Arrival 4

PRIORITY	DESIGN PRINCIPLE	SUMMARY OF QUALITATIVE ASSESSMENT	OUTCOME	POINTS	
1	Must be safe	New safety assurances would be required for the RNP-AR arrivals which have not yet been implemented in the UK and that other routes within LTMA enable CDA from 7000ft for the vectored arrivals. The risk of an aircraft incorrectly selecting the RNP-AR arrival during times of Gliding Activity needs to be investigated further.	Additional work required to generate acceptable safety argument but that is envisaged to be achievable	5	
2	Must meet the 3 aims of the NPS, Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof.	Noise	We wouldn't expect a significant change to the day or night LOAEL with this option as those LOAELs do not currently extend far enough west for the RNP-AR route or PBN transitions to make a difference.	Option is expected to maintain the population number within the day or night LOAEL	4.5
		CO2	The RNP-AR route would reduce miles but the main arrival transitions, as currently illustrated, join final approach towards the western end of the existing base leg. This is because the option was designed to overfly Leighton Buzzard (at c.5-6000ft) to address some stakeholder feedback. We'd expect this to result in an increase in track miles and therefore CO2 emissions. However, some of these inefficiencies could be designed out however use of PBN transitions for arrivals is likely to result in a slight increase in miles for the typical arrival	Option has potential to contribute to an increase in CO2 emissions	0
		Air Quality	No change to flightpaths below 1000ft. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.	Option is expected to maintain the same level of local air quality emissions	4.5
		AONB/Nat Parks	Moving the Vectored swathe north would result in much less overflight of the NW section of the Chilterns AONB. The RNP-AR route would also avoid the NW section of the Chiltern AONB albeit during the night. Final approach would still overfly the other sections of the AONB.	Option has potential to reduce the overflight of AONBs or National Parks	9
3	Should not constrain the airport's capacity, providing the environmental objectives/requirements have been met	So long as ATC retain the ability to vector arrivals to ensure accurate and safe final approach spacing, capacity is not expected to be constrained with this option. None of the PBN arrival routes would be expected to enhance Luton's capacity but would be for noise sharing purposes and CO2 reductions.	Is expected to maintain Luton's operational performance in the future	4	
4	Should enable continuous climb/descent to/from at least 7000ft & facilitate continuous climb/descent above that	This option does assume CDA from 7000ft for all the arrivals traffic owing to the redesign of adjacent airport's routes as part of FASL.	Option will most likely enable CDO or CDO to/from 7000ft on some or all routes (but not	7	
5	Should provide an equitable distribution of traffic where possible, through e.g.;	Use of multiple routes	This option sees multiple routes to share noise	Option does see the use of multiple routes	6
		New route structures	All the route structures would be new to share noise more equitably	Option does contain new route structures to share noise more equitably	6
		Options (mechanisms) for respite	The two transition routes would be used in rotation to provide respite however it would be expected that the RNP-AR route would be available all the time in periods of low traffic (exact usage to be determined through stakeholder engagement)	Option does contain mechanism for respite	6
6	Should avoid overflying the same communities with multiple routes, & take into account routes of other airports, below 7000ft	This option would reduce the overflying of communities with Luton arrivals and other routes from Luton and routes from other airports. The exception would be that the RNP-AR arrival route could overfly the same communities as the night time RWY25 MATCH/OLY SIDs in West SID Group 7. Overall though we would expect a reduction in the number of people overflown by multiple routes below 7000ft	Option is expected to reduce the overflying of some communities with multiple routes	5	
7	Should minimise tactical intervention by ATC below 7000ft	Use of PBN would reduce the amount of tactical intervention compared to today however there would be a requirement for ATC to still vector to ensure safe and accurate final approach spacing.	Option is expected to reduce the amount of tactical intervention compared to today	4	
8	Should minimise the impact on other airspace users through;	Keeping CAS requirements to a minimum	An RNP-AR arrival to RWY07 that joins final approach closer than today would most likely require a lowering of part of CTAs and possibly CTA6	Option could be expected to require more CAS	0
		Simple airspace boundaries	The additional CAS requirement for the RNP-AR route could result in more fragmentation of existing boundaries	Option offers potential to increase complexity of airspace boundaries	
		Allowing flexible use of airspace, where possible	This option would be dependent on a small change to the sharing agreement with Dunstable gliding club. Instead of Dusk to Dawn, Luton would need a more rigid agreement, such as the 0700-2100 assumption within this option. In addition the RNP-AR arrival would require more CAS so that would require a wider FUA arrangement with all aviation to provide CAS containment during 2011-0700.	Option would require altering the timings of the existing airspace sharing arrangement	1.5
				62.5	