



***AIRSPACE MODERNISATION AIRSPACE CHANGE  
PROPOSAL***

***STEP 2B  
INITIAL OPTIONS APPRAISAL***

***APPENDIX C***

***VECTORED ARRIVALS  
PART 5***



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All airspace design options in this document are subject to change throughout the airspace change process, as options are matured in detail and refined in accordance with safety requirements, design principles, appraisals and stakeholder engagement and consultation.

# Initial Options Appraisal

## Vectored Arrivals

### Runway 27R



All airspace design options in this document are subject to change throughout the airspace change process, as options are matured in detail and refined in accordance with safety requirements, design principles, appraisals and stakeholder engagement and consultation.

Version 1.0 (July 2023)

# Vectored Arrivals – RWY 27R Option D



## Option Description

This option has a vectoring area with Runway 27R Final Approach joining points between 11 and 15nm.

## Communities – Noise impact on health & quality of life

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA <sub>eq</sub> , 16h)	601,400	+31,200
Population above Partial LOAEL (night-time, LA <sub>eq</sub> , 8h)	820,900	+9,200
Population experiencing at least one event of N65 (daytime)	2,661,400	-530,200
Population experiencing at least one event of N60 (night-time)	3,298,600	+193,900

## Communities - Air Quality

As there is no change to track distribution below 1000ft, there is no effect on Air Quality from this option.

## Wider Society – Greenhouse Gas Impact

Metric	Option Value
Overall Track Miles of the option (nm)	Not possible to assess at this time, owing to uncertainty in new stack locations.

## Wider Society – Tranquillity & Biodiversity

Metric	Option Value	Difference to Baseline
Total Area of AONBs/National Parks (NPs) overflown between 0-7000ft once a day on average (daytime)	91km <sup>2</sup>	+67km <sup>2</sup>
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	0km <sup>2</sup>	No change
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km <sup>2</sup>	0km <sup>2</sup>
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-1640ft which observe a potential change in location overflown	0	No change
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-3000ft which observe a potential change in location overflown	0	No change

## Wider Society – Capacity/Resilience

The ability to constrain the vectoring area to joining final approach to within just a 4nm window is untested at Heathrow. There is a chance that the loss of flexibility could result in a degradation in landing rate, as an over delivery of arrivals will result in needing to extend arrival beyond the 4nm swathe.

Assuming that can be managed or occasional excursions from the small vectoring area is allowed, there is no other evidence to suggest an optimal landing rate cannot be achieved with this length final.

Heathrow's capacity for this ACP is limited by the existing 480,000 movement cap.

## General Aviation – Access

No additional CAS envisaged.

Option would not facilitate the release of CAS.

Option not expected to impact existing helicopter routes.



## General Aviation / Commercial Airlines – Economic impact from increased effective capacity

No economic effect expected on GA operations.

Assuming a smaller vectoring area has no negative effect on capacity, vectoring to final approach is expected to deliver the required landing rate.

## General Aviation / Commercial Airlines – Fuel Burn

Change in Fuel Burn (compared to the Baseline - annual - tonnes)

Not able to quantify at this time, owing to uncertainty in new stack locations.

## Commercial Airlines – Other costs

None identified.

## Commercial Airlines – Training costs

Option does not require any re-equipage or upgrade costs for airlines. No training costs required for airlines.

## Airport/ANSP – Operational costs

This option is not anticipated to change airport or ANSP operational costs.

Option may lead to a change in the number of properties eligible for the noise insulation scheme which could lead to a change in operational costs for the airport.

## Airport/ANSP – Infrastructure costs

No changes to infrastructure costs envisaged.

## Airport/ANSP – Deployment costs

There will be considerable costs associated with deployment in terms of operational training and system upgrades which will be quantified in Stage 3. However, there is not expected to be any differences in these costs between the different options.

## Safety

No IFP Design issues identified.

Although new or revised safety assurances may be needed, an acceptable safety argument is envisaged to be achievable.

## Adherence to AMS

Supports the AMS by enabling an efficient flow of traffic, accommodating demand and providing system resilience to the benefit of airspace users, where a sole reliance on PBN Arrivals is not expected to achieve this.

## Interdependencies, Conflicts & Trade-Offs

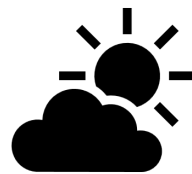
Option may restrict CCO/CDO to/from 7000ft for London City, Biggin Hill, Gatwick and Farnborough.

## Outcome of Vectored Arrival RWY27R Option D

All vectored arrival options have been retained into Stage 3 to allow us to determine if it would be beneficial and/or feasible to use different vectoring areas during different periods to provide respite or relief from noise. This will be informed by our Concept work during Stage 3 system assembly.

## OPTION CARRIED FORWARD TO STAGE 3

### VECTOR Arrivals – RWY 27R Option D (Day)



07:00 - 23:00

#### Overflight

Rate	Population Overflow		Overflight (0-7000 ft) contour map
	Baseline	Option D	
≥ 1	7,318,500	4,542,900	
≥ 5	5,318,700	4,163,500	
≥ 10	4,371,500	3,684,900	
≥ 20	3,320,800	3,266,600	
≥ 50	1,498,900	1,893,200	
≥ 100	360,600	571,800	
≥ 200	209,400	264,400	

#### Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day		N65 events contour map
	Baseline	Option D	
≥ 1	3,191,600	2,661,400	
≥ 5	1,235,700	1,432,500	
≥ 10	726,400	808,400	
≥ 20	339,500	418,000	
≥ 50	170,200	172,000	
≥ 100	83,900	83,300	
≥ 200	70,000	70,100	

#### Noise Exposures

Population count	Baseline	Option D	Partial LOAEL contour map
Estimated total population above WHO Threshold (>45 dB L <sub>den</sub> )	3,163,500	3,119,000	
Total population within Partial LOAEL (>51 dB L <sub>Aeq,16h</sub> )	570,200	601,400	

#### Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL	Change in noise exposure map
Partial LOAEL	4,300 (of which 4,300 brought out of Partial LOAEL by Option)	565,900	35,600 (of which 35,600 brought into Partial LOAEL by Option)	



VECTOR Arrivals – RWY 27R Option D (Night)



23:00 - 07:00

Overflight

Rate	Population Overflow		Overflight (0-7000 ft) contour map
	Baseline	Option D	
≥ 1	4,354,100	3,560,700	
≥ 5	1,603,900	1,704,800	
≥ 10	542,400	815,900	
≥ 20	214,900	247,300	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

Aircraft Noise Events

Rate	Population experiencing noise events above N60 each day		N60 events contour map
	Baseline	Option D	
≥ 1	3,104,600	3,298,600	
≥ 5	1,210,300	1,639,000	
≥ 10	889,700	927,800	
≥ 20	330,500	360,100	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

Noise Exposures

Population count	Baseline	Option D	Partial LOAEL contour map
Estimated total population above WHO Threshold (>40 dB L <sub>night</sub> )	2,208,300	2,380,100	
Total population within Partial LOAEL (>45 dB L <sub>Aeq,8h</sub> )	811,700	820,900	

Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL	Change in noise exposure map
Partial LOAEL	31,300 (of which 31,300 brought out of Partial LOAEL by Option)	778,500	42,300 (of which 40,400 brought into Partial LOAEL by Option)	



# Vectored Arrivals – RWY 27R Option E



## Option Description

This option has a vectoring area with Runway 27R Final Approach joining points between 12 and 16nm.

## Communities – Noise impact on health & quality of life

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA <sub>eq</sub> , 16h)	649,200	+79,000
Population above Partial LOAEL (night-time, LA <sub>eq</sub> , 8h)	861,400	+49,700
Population experiencing at least one event of N65 (daytime)	2,300,500	-891,100
Population experiencing at least one event of N60 (night-time)	3,113,400	+8,700

## Communities - Air Quality

As there is no change to track distribution below 1000ft, there is no effect on Air Quality from this option.

## Wider Society – Greenhouse Gas Impact

Metric	Option Value
Overall Track Miles of the option (nm)	Not possible to assess at this time, owing to uncertainty in new stack locations.

## Wider Society – Tranquillity & Biodiversity

Metric	Option Value	Difference to Baseline
Total Area of AONBs/National Parks (NPs) overflown between 0-7000ft once a day on average (daytime)	103km <sup>2</sup>	+79km <sup>2</sup>
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	0km <sup>2</sup>	No change
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km <sup>2</sup>	0km <sup>2</sup>
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-1640ft which observe a potential change in location overflown	0	No change
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-3000ft which observe a potential change in location overflown	0	No change

## Wider Society – Capacity/Resilience

The ability to constrain the vectoring area to joining final approach to within just a 4nm window is untested at Heathrow. There is a chance that the loss of flexibility could result in a degradation in landing rate, as an over delivery of arrivals will result in needing to extend arrival beyond the 4nm swathe.

Assuming that can be managed or occasional excursions from the small vectoring area is allowed, there is no other evidence to suggest an optimal landing rate cannot be achieved with this length final.

Heathrow's capacity for this ACP is limited by the existing 480,000 movement cap.

## General Aviation – Access

No additional CAS envisaged.

Option would not facilitate the release of CAS.

Option not expected to impact existing helicopter routes.



## General Aviation / Commercial Airlines – Economic impact from increased effective capacity

No economic effect expected on GA operations.

Assuming a smaller vectoring area has no negative effect on capacity, vectoring to final approach is expected to deliver the required landing rate.

## General Aviation / Commercial Airlines – Fuel Burn

Change in Fuel Burn (compared to the Baseline - annual - tonnes)

Not able to quantify at this time, owing to uncertainty in new stack locations.

## Commercial Airlines – Training costs

Option does not require any re-equipage or upgrade costs for airlines. No training costs required for airlines.

## Commercial Airlines – Other costs

None identified.

## Airport/ANSP – Infrastructure costs

No changes to infrastructure costs envisaged.

## Airport/ANSP – Operational costs

This option is not anticipated to change airport or ANSP operational costs.

Option may lead to a change in the number of properties eligible for the noise insulation scheme which could lead to a change in operational costs for the airport.

## Airport/ANSP – Deployment costs

There will be considerable costs associated with deployment in terms of operational training and system upgrades which will be quantified in Stage 3. However, there is not expected to be any differences in these costs between the different options.

## Safety

No IFP Design issues identified.

Although new or revised safety assurances may be needed, an acceptable safety argument is envisaged to be achievable.

## Adherence to AMS

Supports the AMS by enabling an efficient flow of traffic, accommodating demand and providing system resilience to the benefit of airspace users, where a sole reliance on PBN Arrivals is not expected to achieve this.

## Interdependencies, Conflicts & Trade-Offs

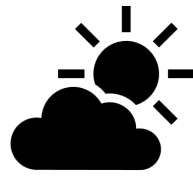
Option may restrict CCO/CDO to/from 7000ft for London City, Biggin Hill, Gatwick and Farnborough.

## Outcome of Vectored Arrival RWY27R Option E

All vectored arrival options have been retained into Stage 3 to allow us to determine if it would be beneficial and/or feasible to use different vectoring areas during different periods to provide respite or relief from noise. This will be informed by our Concept work during Stage 3 system assembly.

## OPTION CARRIED FORWARD TO STAGE 3

# CAP1616 - INITIAL OPTIONS APPRAISAL – SUPPLEMENTARY METRICS



07:00 - 23:00

## VECTOR Arrivals – RWY 27R Option E (Day)

### Overflight

Rate	Population Overflown		Overflight (0-7000 ft) contour map
	Baseline	Option E	
≥ 1	7,318,500	4,302,900	
≥ 5	5,318,700	3,984,300	
≥ 10	4,371,500	3,499,300	
≥ 20	3,320,800	3,108,400	
≥ 50	1,498,900	1,867,300	
≥ 100	360,600	622,000	
≥ 200	209,400	317,100	

### Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day		N65 events contour map
	Baseline	Option E	
≥ 1	3,191,600	2,300,500	
≥ 5	1,235,700	1,295,300	
≥ 10	726,400	801,000	
≥ 20	339,500	463,900	
≥ 50	170,200	172,000	
≥ 100	83,900	83,300	
≥ 200	70,000	70,100	

### Noise Exposures

Population count	Baseline	Option E	Partial LOAEL contour map
Estimated total population above WHO Threshold (>45 dB L <sub>den</sub> )	3,163,500	2,911,900	
Total population within Partial LOAEL (>51 dB L <sub>Aeq,16h</sub> )	570,200	649,200	

### Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL	Change in noise exposure map
Partial LOAEL	3,900 (of which 3,900 brought out of Partial LOAEL by Option)	532,200	117,000 (of which 82,900 brought into Partial LOAEL by Option)	



# CAP1616 - INITIAL OPTIONS APPRAISAL – SUPPLEMENTARY METRICS

## VECTOR Arrivals – RWY 27R Option E (Night)



23:00 - 07:00

### Overflight

Rate	Population Overflow		Overflight (0-7000 ft) contour map
	Baseline	Option E	
≥ 1	4,354,100	3,333,900	
≥ 5	1,603,900	1,736,500	
≥ 10	542,400	846,500	
≥ 20	214,900	299,800	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

### Aircraft Noise Events

Rate	Population experiencing noise events above N60 each day		N60 events contour map
	Baseline	Option E	
≥ 1	3,104,600	3,113,400	
≥ 5	1,210,300	1,586,400	
≥ 10	889,700	963,000	
≥ 20	330,500	386,300	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

### Noise Exposures

Population count	Baseline	Option E	Partial LOAEL contour map
Estimated total population above WHO Threshold (>40 dB L <sub>night</sub> )	2,208,300	2,248,600	
Total population within Partial LOAEL (>45 dB L <sub>Aeq,8h</sub> )	811,700	861,400	

### Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL	Change in noise exposure map
Partial LOAEL	4,000 (of which 4,000 brought out of Partial LOAEL by Option)	807,400	54,000 (of which 53,700 brought into Partial LOAEL by Option)	



# Vectored Arrivals – RWY 27R Option F



## Option Description

This option has a vectoring area with Runway 27R Final Approach joining points between 13 and 17nm.

## Communities – Noise impact on health & quality of life

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA <sub>eq</sub> , 16h)	690,700	+120,500
Population above Partial LOAEL (night-time, LA <sub>eq</sub> , 8h)	890,200	+78,500
Population experiencing at least one event of N65 (daytime)	2,027,800	-1,163,800
Population experiencing at least one event of N60 (night-time)	2,923,600	-181,100

## Communities - Air Quality

As there is no change to track distribution below 1000ft, there is no effect on Air Quality from this option.

## Wider Society – Greenhouse Gas Impact

Metric	Option Value
Overall Track Miles of the option (nm)	Not possible to assess at this time, owing to uncertainty in new stack locations.

## Wider Society – Tranquillity & Biodiversity

Metric	Option Value	Difference to Baseline
Total Area of AONBs/National Parks (NPs) overflown between 0-7000ft once a day on average (daytime)	106km <sup>2</sup>	+82km <sup>2</sup>
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	0km <sup>2</sup>	No change
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km <sup>2</sup>	0km <sup>2</sup>
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-1640ft which observe a potential change in location overflown	0	No change
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-3000ft which observe a potential change in location overflown	0	No change

## Wider Society – Capacity/Resilience

The ability to constrain the vectoring area to joining final approach to within just a 4nm window is untested at Heathrow. There is a chance that the loss of flexibility could result in a degradation in landing rate, as an over delivery of arrivals will result in needing to extend arrival beyond the 4nm swathe.

Assuming that can be managed or occasional excursions from the small vectoring area is allowed, there is no other evidence to suggest an optimal landing rate cannot be achieved with this length final.

Heathrow's capacity for this ACP is limited by the existing 480,000 movement cap.

## General Aviation – Access

No additional CAS envisaged.

Option would not facilitate the release of CAS.

Option not expected to impact existing helicopter routes.

## General Aviation / Commercial Airlines – Economic impact from increased effective capacity

No economic effect expected on GA operations.

Assuming a smaller vectoring area has no negative effect on capacity, vectoring to final approach is expected to deliver the required landing rate.

## General Aviation / Commercial Airlines – Fuel Burn

Change in Fuel Burn (compared to the Baseline - annual - tonnes)

Not able to quantify at this time, owing to uncertainty in new stack locations.

## Commercial Airlines – Other costs

None identified.

## Commercial Airlines – Training costs

Option does not require any re-equipage or upgrade costs for airlines. No training costs required for airlines.

## Airport/ANSP – Operational costs

This option is not anticipated to change airport or ANSP operational costs.

Option may lead to a change in the number of properties eligible for the noise insulation scheme which could lead to a change in operational costs for the airport.

## Airport/ANSP – Infrastructure costs

No changes to infrastructure costs envisaged.

## Airport/ANSP – Deployment costs

There will be considerable costs associated with deployment in terms of operational training and system upgrades which will be quantified in Stage 3. However, there is not expected to be any differences in these costs between the different options.

## Safety

No IFP Design issues identified.

Although new or revised safety assurances may be needed, an acceptable safety argument is envisaged to be achievable.

## Adherence to AMS

Supports the AMS by enabling an efficient flow of traffic, accommodating demand and providing system resilience to the benefit of airspace users, where a sole reliance on PBN Arrivals is not expected to achieve this.

## Interdependencies, Conflicts & Trade-Offs

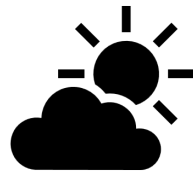
Option may restrict CCO/CDO to/from 7000ft for London City, Biggin Hill, Gatwick and Farnborough.

## Outcome of Vectored Arrival RWY27R Option F

All vectored arrival options have been retained into Stage 3 to allow us to determine if it would be beneficial and/or feasible to use different vectoring areas during different periods to provide respite or relief from noise. This will be informed by our Concept work during Stage 3 system assembly.

## OPTION CARRIED FORWARD TO STAGE 3

# CAP1616 - INITIAL OPTIONS APPRAISAL – SUPPLEMENTARY METRICS



07:00 - 23:00

## VECTOR Arrivals – RWY 27R Option F (Day)

### Overflight

Rate	Population Overflow		Overflight (0-7000 ft) contour map
	Baseline	Option F	
≥ 1	7,318,500	4,034,000	
≥ 5	5,318,700	3,746,000	
≥ 10	4,371,500	3,329,700	
≥ 20	3,320,800	2,863,600	
≥ 50	1,498,900	1,669,800	
≥ 100	360,600	602,700	
≥ 200	209,400	364,300	

### Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day		N65 events contour map
	Baseline	Option F	
≥ 1	3,191,600	2,027,800	
≥ 5	1,235,700	1,086,400	
≥ 10	726,400	782,500	
≥ 20	339,500	506,900	
≥ 50	170,200	172,000	
≥ 100	83,900	83,300	
≥ 200	70,000	70,100	

### Noise Exposures

Population count	Baseline	Option F	Partial LOAEL contour map
Estimated total population above WHO Threshold (>45 dB L <sub>den</sub> )	3,163,500	2,648,600	
Total population within Partial LOAEL (>51 dB L <sub>Aeq,16h</sub> )	570,200	690,700	

### Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL	Change in noise exposure map
Partial LOAEL	3,800 (of which 3,800 brought out of Partial LOAEL by Option)	531,500	159,200 (of which 124,300 brought into Partial LOAEL by Option)	



VECTOR Arrivals – RWY 27R Option F (Night)



23:00 - 07:00

Overflight

Rate	Population Overflow		Overflight (0-7000 ft) contour map
	Baseline	Option F	
≥ 1	4,354,100	3,155,400	
≥ 5	1,603,900	1,641,000	
≥ 10	542,400	770,100	
≥ 20	214,900	348,600	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

Aircraft Noise Events

Rate	Population experiencing noise events above N60 each day		N60 events contour map
	Baseline	Option F	
≥ 1	3,104,600	2,923,600	
≥ 5	1,210,300	1,460,100	
≥ 10	889,700	989,600	
≥ 20	330,500	423,300	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

Noise Exposures

Population count	Baseline	Option F	Partial LOAEL contour map
Estimated total population above WHO Threshold (>40 dB L <sub>night</sub> )	2,208,300	2,078,000	
Total population within Partial LOAEL (>45 dB L <sub>Aeq,8h</sub> )	811,700	890,200	

Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL	Change in noise exposure map
Partial LOAEL	7,500 (of which 7,500 brought out of Partial LOAEL by Option)	734,800	155,400 (of which 86,100 brought into Partial LOAEL by Option)	



# Vectored Arrivals – RWY 27R Option G



## Option Description

This option has a vectoring area with Runway 27R Final Approach joining points between 14 and 18nm.

## Communities – Noise impact on health & quality of life

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA <sub>eq</sub> , 16h)	704,700	+134,500
Population above Partial LOAEL (night-time, LA <sub>eq</sub> , 8h)	900,200	+88,500
Population experiencing at least one event of N65 (daytime)	1,749,300	-1,442,300
Population experiencing at least one event of N60 (night-time)	2,646,900	-457,800

## Communities - Air Quality

As there is no change to track distribution below 1000ft, there is no effect on Air Quality from this option.

## Wider Society – Greenhouse Gas Impact

Metric	Option Value
Overall Track Miles of the option (nm)	Not possible to assess at this time, owing to uncertainty in new stack locations.

## Wider Society – Tranquillity & Biodiversity

Metric	Option Value	Difference to Baseline
Total Area of AONBs/National Parks (NPs) overflown between 0-7000ft once a day on average (daytime)	114km <sup>2</sup>	+90km <sup>2</sup>
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	0km <sup>2</sup>	No change
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km <sup>2</sup>	0km <sup>2</sup>
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-1640ft which observe a potential change in location overflown	0	No change
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-3000ft which observe a potential change in location overflown	0	No change

## Wider Society – Capacity/Resilience

The ability to constrain the vectoring area to joining final approach to within just a 4nm window is untested at Heathrow. There is a chance that the loss of flexibility could result in a degradation in landing rate, as an over delivery of arrivals will result in needing to extend arrival beyond the 4nm swathe. Assuming that can be managed or occasional excursions from the small vectoring area is allowed, running a longer final approach could start to degrade the ability to consistently provide optimal spacing. This is due to the requirement to maintain more active/restrictive speed control on final approach, than on base-leg.

Heathrow's capacity for this ACP is limited by the existing 480,000 movement cap.

## General Aviation – Access

No additional CAS envisaged.

Option would not facilitate the release of CAS.

Option not expected to impact existing helicopter routes.





## General Aviation / Commercial Airlines – Economic impact from increased effective capacity

No economic effect expected on GA operations.

Running a longer final approach could start to degrade the ability to consistently provide optimal spacing. This is due to the requirement to maintain more active/restrictive speed control on final approach, than on base-leg.

This will be verified and quantified in Stage 3, should this option be favourable from an environmental and/or design perspective.

## General Aviation / Commercial Airlines – Fuel Burn

Change in Fuel Burn (compared to the Baseline - annual - tonnes)

Not able to quantify at this time, owing to uncertainty in new stack locations.

## Commercial Airlines – Other costs

None identified.

## Commercial Airlines – Training costs

Option does not require any re-equipage or upgrade costs for airlines. No training costs required for airlines.

## Airport/ANSP – Infrastructure costs

No changes to infrastructure costs envisaged.

## Airport/ANSP – Deployment costs

There will be considerable costs associated with deployment in terms of operational training and system upgrades which will be quantified in Stage 3. However, there is not expected to be any differences in these costs between the different options.

## Airport/ANSP – Operational costs

This option is not anticipated to change airport or ANSP operational costs.

Option may lead to a change in the number of properties eligible for the noise insulation scheme which could lead to a change in operational costs for the airport.

## Safety

No IFP Design issues identified.

Although new or revised safety assurances may be needed, an acceptable safety argument is envisaged to be achievable.

## Adherence to AMS

Supports the AMS by enabling an efficient flow of traffic, accommodating demand & providing system resilience, where a sole reliance on PBN Arrivals is not expected to achieve this. A consistently longer final approach could impact landing rates. This will be assessed further in Stage 3 should this option be favourable from an environmental &/or design perspective.

## Interdependencies, Conflicts & Trade-Offs

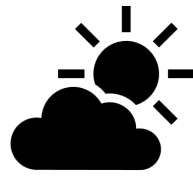
Option may restrict CCO/CDO to/from 7000ft for London City, Biggin Hill, Gatwick and Farnborough. However, a consistently longer final approach could enable improved vertical profiles for London City departures to above 3000/4000ft.

## Outcome of Vectored Arrival RWY27R Option G

All vectored arrival options have been retained into Stage 3 to allow us to determine if it would be beneficial and/or feasible to use different vectoring areas during different periods to provide respite or relief from noise. This will be informed by our Concept work during Stage 3 system assembly.

**OPTION CARRIED FORWARD TO STAGE 3**

# CAP1616 - INITIAL OPTIONS APPRAISAL – SUPPLEMENTARY METRICS



07:00 - 23:00

## VECTOR Arrivals – RWY 27R Option G (Day)

### Overflight

Rate	Population Overflow		Overflight (0-7000 ft) contour map
	Baseline	Option G	
≥ 1	7,318,500	3,849,000	
≥ 5	5,318,700	3,555,200	
≥ 10	4,371,500	3,207,100	
≥ 20	3,320,800	2,611,900	
≥ 50	1,498,900	1,386,400	
≥ 100	360,600	552,900	
≥ 200	209,400	400,000	

### Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day		N65 events contour map
	Baseline	Option G	
≥ 1	3,191,600	1,749,300	
≥ 5	1,235,700	962,700	
≥ 10	726,400	794,300	
≥ 20	339,500	530,200	
≥ 50	170,200	172,000	
≥ 100	83,900	83,300	
≥ 200	70,000	70,100	

### Noise Exposures

Population count	Baseline	Option G	Partial LOAEL contour map
Estimated total population above WHO Threshold (>45 dB L <sub>den</sub> )	3,163,500	2,427,000	
Total population within Partial LOAEL (>51 dB L <sub>Aeq,16h</sub> )	570,200	704,700	

### Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL	Change in noise exposure map
<b>Partial LOAEL</b>	<b>3,700</b> (of which 3,700 brought out of Partial LOAEL by Option)	<b>531,000</b>	<b>173,700</b> (of which 138,100 brought into Partial LOAEL by Option)	



### VECTOR Arrivals – RWY 27R Option G (Night)



23:00 - 07:00

#### Overflight

Rate	Population Overflown		Overflight (0-7000 ft) contour map
	Baseline	Option G	
≥ 1	4,354,100	3,071,800	
≥ 5	1,603,900	1,502,200	
≥ 10	542,400	705,300	
≥ 20	214,900	391,200	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

#### Aircraft Noise Events

Rate	Population experiencing noise events above N60 each day		N60 events contour map
	Baseline	Option G	
≥ 1	3,104,600	2,646,900	
≥ 5	1,210,300	1,344,500	
≥ 10	889,700	1,014,800	
≥ 20	330,500	451,700	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

#### Noise Exposures

Population count	Baseline	Option G	Partial LOAEL contour map
Estimated total population above WHO Threshold (>40 dB L <sub>night</sub> )	2,208,300	1,972,300	
Total population within Partial LOAEL (>45 dB L <sub>Aeq,8h</sub> )	811,700	900,200	

#### Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL	Change in noise exposure map
Partial LOAEL	9,600 (of which 9,600 brought out of Partial LOAEL by Option)	734,800	165,400 (of which 98,100 brought into Partial LOAEL by Option)	

