



# ***AIRSPACE MODERNISATION AIRSPACE CHANGE PROPOSAL***

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

### ***APPENDIX C***

#### ***VECTORED ARRIVALS Runway 09L - Part 7***



## Table of Contents

1.	<i>Initial Options Appraisal - Runway 09L - Baseline</i> .....	4
2.	<i>Initial Options Appraisal - Runway 09L - Option A</i> .....	8
3.	<i>Initial Options Appraisal - Runway 09L - Option B</i> .....	12
4.	<i>Initial Options Appraisal - Runway 09L - Option C</i> .....	16

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 09L



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 – Runway (RWY) 09L Baseline  
‘Do Nothing’**

**Option Description**

This represents the baseline for Doing Nothing with 09L arrivals. The image represents the areas overflowed at least once per day on average by arrivals in 2019.



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

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA <sub>eq</sub> , 16h)	31,100	N/A
Population above Partial LOAEL (night-time, LA <sub>eq</sub> , 8h)	31,500	N/A
Population experiencing at least one event of N65 (daytime)	237,300	N/A
Population experiencing at least one event of N60 (night-time)	131,400	N/A

**Communities - Air Quality**

As this is the Baseline ‘Do Nothing’, there is no change to Air Quality.

**Wider Society – Greenhouse Gas Impact**

Metric	Option Value
Overall Track miles (nm)	Not possible to assess.

**Wider Society – Tranquillity & Biodiversity**

Metric	Option Value	Difference to Baseline
Total Area of AONBs/National Parks (NPs) overflowed between 0-7000ft once a day on average (daytime)	197km <sup>2</sup>	N/A
Total Area of AONBs/NPs overflowed experiencing at least one event of N65 on average (daytime)	44km <sup>2</sup>	N/A
Total Area of Richmond Park overflowed between 0-7000ft at least once a day on average (daytime)	0km <sup>2</sup>	N/A
Number of sites (RAMSAR, SAC, SPA, SSSI) overflowed between 0-1640ft which observe a potential change in location overflow	N/A	N/A
Number of sites (RAMSAR, SAC, SPA, SSSI) overflowed between 0-3000ft which observe a potential change in location overflow	N/A	N/A

**Wider Society – Capacity/Resilience**

Doing nothing would maintain existing performance.

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

**General Aviation (GA) – Access**

No additional Controlled Airspace (CAS) required.

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

As this is the Baseline ‘Do Nothing’ there is no economic effect expected on GA or commercial airline operations.

## Commercial Airlines – Training costs

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

## Airport/Air Navigation Service Provider (ANSP) – Infrastructure costs

Doing nothing will mean no changes to infrastructure costs.

## Airport/ANSP – Deployment costs

Doing nothing will mean no deployment costs.

## Safety

Doing nothing will mean no Instrument Flight Procedures (IFP) design considerations.

At current traffic levels, there are no safety concerns with the current arrangements at Heathrow. Future traffic growth within the London Terminal Manoeuvring Area (LTMA) could however result in increased complexity and workload for ATC and pilots, which may lead to traffic levels within the London TMA being capped, or increased aircraft holding on the ground, in order to maintain safety.

## Interdependencies, Conflicts & Trade-Offs

Heathrow's arrivals generally 'block' Heathrow's departures from climbing above 6000ft. As a result, other airports' routes are also held down below 6000ft.

Doing nothing with Heathrow's arrivals will continue to constrain those routes as well as the ability for those airports to make more beneficial changes to their departures in the future. Doing nothing will therefore continue to inhibit future design options for RAF Northolt, Luton, Stansted, Gatwick, London City, Biggin Hill and Farnborough.

## General Aviation / Commercial Airlines – Fuel Burn

Change in Fuel Burn (annual - tonnes)	No change
--	-----------

## Commercial Airlines – Other costs

None identified.

## Airport/ANSP – Operational costs

Doing nothing will mean no change to operational costs.

## Adherence to Airspace Modernisation Strategy (AMS)

Doing nothing with Easterly arrivals will not align with the AMS. It will not enable environmental benefits, increase airspace capacity, reduce noise impacts or maximise benefits from NERL's re-design of the LTMA. No change and therefore no ACP submission will not enable enhancements to safety, enhanced integration or reductions in the volume of CAS.

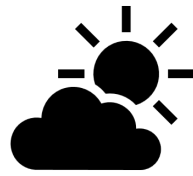
## Outcome of Vectored Arrival RWY09L Baseline ‘Do Nothing’

The Baseline (Do Nothing) Option was discontinued during the Design Principles Evaluation (DPE) phase of Stage 2, owing to the option not meeting the objectives set by the Airspace Modernisation Strategy (AMS).

**OPTION DISCONTINUED (During DPE)**



# CAP1616 - INITIAL OPTIONS APPRAISAL – SUPPLEMENTARY METRICS



07:00 - 23:00

## VECTOR Arrivals – RWY 09L Do Nothing (Day)

### Overflight

Rate	Population Overflown		Overflight (0-7000 ft) contour map
	Baseline	Do Nothing	
≥ 1	2,227,400	2,227,400	
≥ 5	1,207,700	1,207,700	
≥ 10	644,100	644,100	
≥ 20	263,900	263,900	
≥ 50	33,600	33,600	
≥ 100	19,600	19,600	
≥ 200	0	0	

### Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day		N65 events contour map
	Baseline	Do Nothing	
≥ 1	237,300	237,300	
≥ 5	57,800	57,800	
≥ 10	45,400	45,400	
≥ 20	41,600	41,600	
≥ 50	31,400	31,400	
≥ 100	27,100	27,100	
≥ 200	0	0	

### Noise Exposures

Population count	Baseline	Do Nothing	Partial LOAEL contour map
Estimated total population above WHO Threshold (>45 dB L <sub>den</sub> )	62,000	62,000	
Total population within Partial LOAEL (>51 dB L <sub>Aeq,16h</sub> )	31,100	31,100	

### 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	0 (0 brought out of Partial LOAEL by Option)	0	0 (0 brought into Partial LOAEL by Option)	





### VECTOR Arrivals – RWY 09L Do Nothing (Night)



23:00 - 07:00

#### Overflight

Rate	Population Overflown		Overflight (0-7000 ft) contour map
	Baseline	Do Nothing	
≥ 1	200,400	200,400	
≥ 5	20,600	20,600	
≥ 10	0	0	
≥ 20	0	0	
≥ 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	Do Nothing	
≥ 1	131,400	131,400	
≥ 5	46,500	46,500	
≥ 10	0	0	
≥ 20	0	0	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

#### Noise Exposures

Population count	Baseline	Do Nothing	Partial LOAEL contour map
Estimated total population above WHO Threshold (>40 dB L <sub>night</sub> )	46,600	46,600	
Total population within Partial LOAEL (>45 dB L <sub>Aeq,8h</sub> )	31,500	31,500	

#### 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	0 (0 brought out of Partial LOAEL by Option)	0	0 (0 brought into Partial LOAEL by Option)	





# Vectored Arrivals – RWY 09L Option A



## Option Description

This option has a vectoring area with Runway 09L Final Approach joining points between 8 and 12nm.

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

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA <sub>eq</sub> , 16h)	31,300	+200
Population above Partial LOAEL (night-time, LA <sub>eq</sub> , 8h)	31,500	No change
Population experiencing at least one event of N65 (daytime)	214,400	-22,900
Population experiencing at least one event of N60 (night-time)	205,200	+73,800

## 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)	223km <sup>2</sup>	+26km <sup>2</sup>
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	18km <sup>2</sup>	-26km <sup>2</sup>
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km <sup>2</sup>	No change
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 RAF Northolt, Gatwick and Farnborough, subject to the preferred options taken forward by those airports.

## Outcome of Vectored Arrival RWY09L Option A

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 09L Option A (Day)



07:00 - 23:00

#### Overflight

Rate	Population Overflow		Overflight (0-7000 ft) contour map
	Baseline	Option A	
≥ 1	2,227,400	798,700	
≥ 5	1,207,700	519,700	
≥ 10	644,100	377,500	
≥ 20	263,900	202,400	
≥ 50	33,600	50,800	
≥ 100	19,600	21,500	
≥ 200	0	0	

#### Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day		N65 events contour map
	Baseline	Option A	
≥ 1	237,300	214,400	
≥ 5	57,800	56,300	
≥ 10	45,400	45,300	
≥ 20	41,600	41,500	
≥ 50	31,400	30,900	
≥ 100	27,100	27,000	
≥ 200	0	0	

#### Noise Exposures

Population count	Baseline	Option A	Partial LOAEL contour map
Estimated total population above WHO Threshold (>45 dB L <sub>den</sub> )	62,000	55,100	
Total population within Partial LOAEL (>51 dB L <sub>Aeq,16h</sub> )	31,100	31,300	

#### 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	0 (of which 0 brought out of Partial LOAEL by Option)	31,100	200 (of which 200 brought into Partial LOAEL by Option)	





### VECTOR Arrivals – RWY 09L Option A (Night)



23:00 - 07:00

#### Overflight

Rate	Population Overflow		Overflight (0-7000 ft) contour map
	Baseline	Option A	
≥ 1	200,400	248,100	
≥ 5	20,600	22,600	
≥ 10	0	0	
≥ 20	0	0	
≥ 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 A	
≥ 1	131,400	205,200	
≥ 5	46,500	46,200	
≥ 10	0	0	
≥ 20	0	0	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

#### Noise Exposures

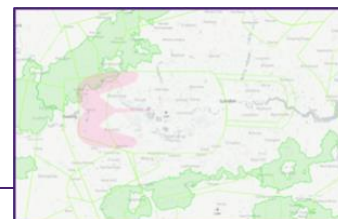
Population count	Baseline	Option A	Partial LOAEL contour map
Estimated total population above WHO Threshold (>40 dB L <sub>night</sub> )	46,600	46,100	
Total population within Partial LOAEL (>45 dB L <sub>Aeq,8h</sub> )	31,500	31,500	

#### 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	0 (of which 0 brought out of Partial LOAEL by Option)	31,500	100 (of which 100 brought into Partial LOAEL by Option)	



# Vectored Arrivals – RWY 09L Option B



## Option Description

This option has a vectoring area with Runway 09L Final Approach joining points between 9 and 13nm.

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

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA <sub>eq</sub> , 16h)	31,300	+200
Population above Partial LOAEL (night-time, LA <sub>eq</sub> , 8h)	31,500	No change
Population experiencing at least one event of N65 (daytime)	231,800	-5,500
Population experiencing at least one event of N60 (night-time)	198,200	+66,800

## 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)	224km <sup>2</sup>	+27km <sup>2</sup>
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	31km <sup>2</sup>	-13km <sup>2</sup>
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km <sup>2</sup>	No change
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 RAF Northolt, Gatwick and Farnborough, subject to the preferred options taken forward by those airports.

## Outcome of Vectored Arrival RWY09L Option B

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 09L Option B (Day)



07:00 - 23:00

Overflight

Rate	Population Overflown		Overflight (0-7000 ft) contour map
	Baseline	Option B	
≥ 1	2,227,400	838,600	
≥ 5	1,207,700	515,600	
≥ 10	644,100	379,900	
≥ 20	263,900	181,000	
≥ 50	33,600	55,000	
≥ 100	19,600	21,700	
≥ 200	0	0	

Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day		N65 events contour map
	Baseline	Option B	
≥ 1	237,300	231,800	
≥ 5	57,800	54,900	
≥ 10	45,400	45,300	
≥ 20	41,600	41,600	
≥ 50	31,400	30,900	
≥ 100	27,100	27,300	
≥ 200	0	0	

Noise Exposures

Population count	Baseline	Option B	Partial LOAEL contour map
Estimated total population above WHO Threshold (>45 dB L <sub>den</sub> )	62,000	55,700	
Total population within Partial LOAEL (>51 dB L <sub>Aeq,16h</sub> )	31,100	31,300	

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	0 (of which 0 brought out of Partial LOAEL by Option)	31,100	200 (of which 200 brought into Partial LOAEL by Option)	



VECTOR Arrivals – RWY 09L Option B (Night)



23:00 - 07:00

Overflight

Rate	Population Overflow		Overflight (0-7000 ft) contour map
	Baseline	Option B	
≥ 1	200,400	232,000	
≥ 5	20,600	22,800	
≥ 10	0	0	
≥ 20	0	0	
≥ 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 B	
≥ 1	131,400	198,200	
≥ 5	46,500	46,600	
≥ 10	0	0	
≥ 20	0	0	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

Noise Exposures

Population count	Baseline	Option B	Partial LOAEL contour map
Estimated total population above WHO Threshold (>40 dB L <sub>night</sub> )	46,600	46,200	
Total population within Partial LOAEL (>45 dB L <sub>Aeq,8h</sub> )	31,500	31,500	

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	0 (of which 0 brought out of Partial LOAEL by Option)	31,500	0 (of which 0 brought into Partial LOAEL by Option)	





# Vectored Arrivals – RWY 09L Option C



## Option Description

This option has a vectoring area with Runway 09L Final Approach joining points between 10 and 14nm.

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

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA <sub>eq</sub> , 16h)	31,300	+200
Population above Partial LOAEL (night-time, LA <sub>eq</sub> , 8h)	31,500	No change
Population experiencing at least one event of N65 (daytime)	227,500	-9,800
Population experiencing at least one event of N60 (night-time)	200,900	+69,500

## 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)	231km <sup>2</sup>	+34km <sup>2</sup>
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	46km <sup>2</sup>	+2km <sup>2</sup>
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km <sup>2</sup>	No change
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 RAF Northolt, Gatwick and Farnborough, subject to the preferred options taken forward by those airports.

## Outcome of Vectored Arrival RWY09L Option C

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 09L Option C (Day)



07:00 - 23:00

Overflight

Rate	Population Overflown		Overflight (0-7000 ft) contour map
	Baseline	Option C	
≥ 1	2,227,400	862,100	
≥ 5	1,207,700	565,100	
≥ 10	644,100	359,500	
≥ 20	263,900	197,000	
≥ 50	33,600	57,100	
≥ 100	19,600	22,000	
≥ 200	0	0	

Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day		N65 events contour map
	Baseline	Option C	
≥ 1	237,300	227,500	
≥ 5	57,800	66,900	
≥ 10	45,400	45,500	
≥ 20	41,600	41,600	
≥ 50	31,400	30,900	
≥ 100	27,100	27,300	
≥ 200	0	0	

Noise Exposures

Population count	Baseline	Option C	Partial LOAEL contour map
Estimated total population above WHO Threshold (>45 dB L <sub>den</sub> )	62,000	63,600	
Total population within Partial LOAEL (>51 dB L <sub>Aeq,16h</sub> )	31,100	31,300	

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	0 (of which 0 brought out of Partial LOAEL by Option)	31,100	200 (of which 200 brought into Partial LOAEL by Option)	



### VECTOR Arrivals – RWY 09L Option C (Night)



23:00 - 07:00

#### Overflight

Rate	Population Overflow		Overflight (0-7000 ft) contour map
	Baseline	Option C	
≥ 1	200,400	223,200	
≥ 5	20,600	23,200	
≥ 10	0	0	
≥ 20	0	0	
≥ 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 C	
≥ 1	131,400	200,900	
≥ 5	46,500	46,900	
≥ 10	0	0	
≥ 20	0	0	
≥ 50	0	0	
≥ 100	0	0	
≥ 200	0	0	

#### Noise Exposures

Population count	Baseline	Option C	Partial LOAEL contour map
Estimated total population above WHO Threshold (>40 dB L <sub>night</sub> )	46,600	46,600	
Total population within Partial LOAEL (>45 dB L <sub>Aeq,8h</sub> )	31,500	31,500	

#### 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	0 (of which 0 brought out of Partial LOAEL by Option)	31,500	0 (of which 0 brought into Partial LOAEL by Option)	

