



***AIRSPACE MODERNISATION AIRSPACE CHANGE
PROPOSAL***

***STAGE 2A APPENDIX D - CLOO WORKSHOP NOTES
(COMMUNITY & INDUSTRY)
November 2022***





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1. Heathrow Step 2A Engagement

Report of community engagement workshops between Heathrow and stakeholder representatives on the Comprehensive List of Options for Airspace Modernisation taking place between 1st-9th November.

This report was prepared by Headland Consultancy, which had been engaged by Heathrow to independently chair and minute the session.

Background

This report provides a minute of the engagement sessions between representatives of Heathrow and stakeholder representatives. Six sessions were held across 1 and 9 November (in person) and 8 November (virtually). These were part of Step 2A of Heathrow's airspace modernisation proposal (ACP). The report does not provide a full summary of the content as presented by Heathrow, which is best reflected in Heathrow's documentation; instead, it captures the comments and questions from the attendees, and Heathrow's responses.

Attendees

Organisations represented across the workshops were:

Bracknell Forest Council	Heathrow Association for the Control of Aircraft Noise (HACAN)
Buckinghamshire Council (Bucks Council)	Heathrow Strategic Planning Group (HSPG)
Communities Against Gatwick Noise Emissions (CAGNE)	Hertfordshire County Council
Central Bedfordshire Council	Iver Village Residents Association
Chilterns Conservation Board	Kingston upon Thames Council
The Chiltern Society	Local Authorities Aircraft Noise Council (LAANC)
Clean Air Bayswater	Local Community Forum, Independent Chair
Colnbrook Residents Association (CRA)	Local Resident Walton-on-Thames, Surrey
The Campaign to Protect Rural England Oxfordshire (CPRE Oxfordshire)	London Borough of Ealing
Elmbridge Borough Council	Milton Keynes City Council
Englefield Green Action Group (EGAG)	Molesey Residents Association (MRA)
Forest Hill Society (FHS)	Mole Valley District Council (MVDC)
Friends of Richmond Park (FRP)	Noise and Airspace Community Forum (NACF), Independent Chair
Greenwich London Borough Council	National Trust
Harmondsworth & Sipson Residents Association (HASRA)	NATS Heathrow
Haringey Council	Paddington Residents Active Concern on Transport (PRACT)
Heathrow Community Engagement Board / Council for the Independent Scrutiny of Heathrow Airport (HCEB / CISHA)	Pavilion Association
	Plane Hell Action

Reigate and Banstead Borough Council
 Richings Park Residents Association (RPRA)
 Richmond Heathrow Campaign (RHC)
 Royal Borough of Windsor & Maidenhead Council (RBWM)
 The Royal Parks
 Southwark Council
 Spelthorne Borough Council

Surrey County Council
 Surrey Heath Borough Council
 Teddington Action Group (TAG)
 Watford Borough Council
 Westbourne Park Road East Resident's Association (WPRERA)
 The Windlesham Society (TWS)

Throughout this report, contributions are attributed to an organisation rather than an individual. Contributions from all six workshops have been combined into this single report. The ordering of the report reflects the structure of the discussion, not necessarily the order in which comments were made. A slide pack, also submitted alongside this report, was presented by Heathrow to guide and inform the discussion.

Representatives from Heathrow, and support from Headland in running the workshops, were:

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Approach to developing Comprehensive List of Options

1.Design principles

1.1	MRA	Asked how Heathrow scores options in evaluation and what makes a good route option for each design principle.
1.2	EGAG	Asked whether there was a weighting applied per design principle.
1.3	Bracknell Forest Council & FRP	Asked if the comprehensive list of options involves consideration of all the design principles.
1.4	HASRA	Asked whether some design principles had been disregarded or changed following previous engagements.
1.5	Heathrow	Stated that each airport sets out their own approach to assessing whether a principle is “fully met”, “partially met” or “not met at all” at the Design Principle Evaluation (DPE) in Step 2A, and what the CAA are looking for is a methodology that is transparent and consistently applied. Heathrow will

		<p>develop a methodology to evaluate each flight path option against the Design Principles.</p> <p>Confirmed that no design principles would be disregarded at any stage and that the Initial Options Appraisal will provide a more informed analysis of the flight path options.</p> <p>Stated that there was no weighting applied to principles, other than the distinction between “must” and “should” principles. Explained that the approach and inputs used in the DPE will be shared. The DPE will include a ‘do nothing’ option, using a 2019 baseline. The baseline data will be updated as we progress throughout the ACP.</p>
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1.6	RPRA	Asked how similar other airports’ design principles are, and why airports cannot use a consistent approach.
1.7	Heathrow	Noted that the design principles used by other airports are largely similar, with some different nuances. Stated that Heathrow had previously raised the question of consistent design principles with the CAA, but that currently each sponsor was required to develop their own in collaboration with local stakeholders. Stated that the CAA are considering consulting on creating a shortlist of design principles for sponsors to select from. Noted that sponsors who were starting their ACP more recently, e.g., Heathrow, tended to put greater emphasis on reducing CO ₂ emissions than had been included in earlier design principle submissions.

1.8	FHS	Asked how Heathrow ‘reserved’ the airspace allocated to Northolt and London City in these design principles.
1.9	Heathrow	<p>Stated that ‘reserved’ is not the correct language. Rather, they took both airports’ existing operations, their immediate departures and arrivals routes, and imposed a 3-mile buffer for this area of airspace to allow them to continue to operate at least as efficiently as today. The 3-mile buffer is closer than the routes interact at present.</p> <p>Clarified that Heathrow have not considered Northolt and London City’s new flight path options at this stage when developing the Comprehensive List of Options (CLOO’s).</p>
1.10	CPRE Oxfordshire	Stated that the northern departure routes for the blended option seem likely to conflict with Stansted and Luton.
1.11	Heathrow	Noted that future flight paths will almost certainly interact with other airports to a degree, but that the intention is to minimise any conflicts for the benefit of all. Other surrounding airports will be accounted for in Heathrow’s developing airspace design.

1.12	CAGNE	Asked how Heathrow was engaging in the trade-off between noise and CO ₂ impacts.
1.13	Heathrow	Noted that it was one of the main trade-offs that Heathrow will expect to see through the Initial Options Appraisal and the altitude-based priorities in the government’s Air Navigation Guidance will need to be applied.

2. Metrics generated for each notional track

2.1	RBWM	Asked whether the distance between Heathrow's four runway ends and a point in the NATS network referred to point-to-point distance, or track miles.
2.2	Heathrow	Stated that distance referred to track miles (nautical miles), and that they would make that clear in future documents.

2.3	HSPG	Asked whether these tracks have assumed multiple gradients.
2.4	Bracknell Forest Council	Asked whether the overflight cones covered the full journey between 0-7,000ft.
2.5	NACF	Asked whether Heathrow would get a different answer if they used a more "realistic" climb rate. Pointed out that, today, a 4% minimum climb rate is assumed between 1-4,000ft and asked why this figure was not used in the analysis.
2.6	TAG	Asked what assumption Heathrow used for climb gradient.
2.7	Heathrow	Stated that the overflight metric used a somewhat pessimistic assumption for this early analysis based on a climb of 5.5%, whereas some aircraft would climb quicker in reality. Noted that at Initial Options Appraisal, analysis across different aircraft types and their actual climb rates would be used.

2.8	RHC	Asked whether Heathrow will consider those who are already overflown but may be more overflown in future.
2.9	Heathrow	Responded that yes this can be assessed quantitatively at a later stage of appraisal once system options have been designed in Stage 3.

2.10	FRP	<p>Acknowledged the enormous amount of work by Heathrow necessary to make this airspace change.</p> <p>Specifically queried two metrics used in the generation of data for notional tracks, noting that omitting certain considerations created a bias in the development of options at this early stage.</p> <ol style="list-style-type: none"> 1) Total population overflown between the runway and 7,000ft. Stated that measures of people overflown should measure "people", as stated in design principles 9 and 10, and not (resident) population, as implied by the metric. Noted that millions of people spend time in Richmond Park and are affected by aircraft noise but would be ignored by a "population" metric. Stated that Heathrow should be careful about use of "people" vs "population" language. 2) Stated that they disagreed with only measuring overflight of National Parks (of which there are none affected) and AONBs. They suggested that Heathrow should also include SSSIs, areas of conservation, bird sanctuaries and other open spaces.
2.11	RHC	Asked whether royal parks such as Kew Gardens and Richmond Park were considered in the definition of natural areas.
2.12	Heathrow	Stated that they have used those two characteristics of land use (AONBs and National Parks) at this stage, because those are the areas mentioned in ANG17. A wider set of areas will be assessed at Initial Options Appraisal in

		<p>Step 2B, using land use types such as RAMSAR sites, SSSI's, SACs etc.</p> <p>Stated that, at this early stage, it was important to generate some data to guide us in developing a comprehensive list of route options using the design principles, however more detailed analysis of the options will come later at Step 2B. This involves the categories in Appendix E of CAP1616 such as tranquillity and air quality to assess the options.</p> <p>Noted the point about precise use of language.</p>
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2.13	EGAG	Asked why 20 flights per day was selected as a measure for "overflown", rather than 30 or 40 flights per day. Noted that they would like to see a higher figure such as 30 flights per day used, to encourage greater sharing of overflight across different communities.
2.14	RPRA	Stated that 20 seemed a lot of times to be overflown each day. Noted that this implied a definition of "newly and <u>regularly</u> overflown".
2.15	Resident of Walton-on-Thames	Asked what the definition is for "overflown".
2.16	FRP	Suggested that standard metrics would rule out every existing flight path as it would define the whole of London as 'overflown'.
2.17	NACF	Asked if the assumption is that more than 20 flights per day corresponds to being "overflown". Asked why 10 times a day was not selected.
2.18	Heathrow	<p>Noted that the CAA does not describe overflight in terms of average rate per day. Stated that Heathrow had done modelling recently, reviewing the rates included in CAP1498. It was noted that using a higher value may be misleading as it could indicate people are not overflown under certain routes. Whereas a lower threshold would indicate almost all locations are overflown and that 20 times a day relates to at least 1 flight per hour on average.</p> <p>Heathrow explained that this metric was used to provide a starting point for understanding locations routinely overflown and to help create the CLOO. Heathrow explained that as part of Step 2B, several overflight rates will be considered (e.g. 10, 20, 50, 100 times per day).</p>

2.19	MRA	Asked what balance between easterly and westerly operations was assumed.
2.20	Heathrow	Responded that data was purely based on the frequency of overflight as it occurred in 2019.

2.21	EGAG	Asked why the 70dB SEL metric was used in addition to overflight.
2.22	MRA	Asked how the 70dB SEL metric was selected.
2.23	HACAN	Asked if there is a point in the process where stakeholders can see details of different aircrafts and levels of flights to understand the potential noise impact of the flight path options. Asked why 51dB LOAEL was not selected as this is the LOAEL used in policy.
2.24	RHC	Asked why overflight cones were used and not noise contours. Asked to see a set of options for different decibels, such as 65dB, and different aircraft types to understand noise sensitivity, but recognised this is a lot of work.
2.25	Bucks	Asked how Heathrow are defining noise, especially for those not technically

	Council	overflowed but experiencing noise. Asked how the metric is used to measure exposure. Also asked if the 70dB SEL metric was a boundary.
2.26	NACF	Asked if the choice of the 70dB SEL metric was based on aircraft noise. Asked whether Heathrow had examined SEL at a lower level than 70dB and requested to see examples of such sensitivity analysis. Requested Heathrow share their rationale for the selection of the 70dB SEL noise metric.
2.27	Resident of Walton-on-Thames	Suggested it would have been beneficial to see sensitivity analysis around health impacts of noise. Asked if lower noise levels will be considered when analysing the options.
2.28	Pavilion Association	Asked whether Heathrow would consider the amount of noise experienced for those significantly overflowed.
2.29	TAG	Stated that the CAA metrics for noise and air quality are not fit for purpose. Requested a meeting with the CAA and DfT to make this point. Noted that they had written to Heathrow asking them to take a position on this point. Asked how much of a reduction in noise is likely to be achieved.
2.30	Plane Hell Action	Stated that SoNA 14 is flawed.
2.31	Heathrow	<p>Stated that the overflight cone bears no direct relation to noise, and therefore Heathrow needs a direct measure of noise impact, so used both overflight cones and the 70dB SEL noise contour.</p> <p>Stated that it is only after Stage 3 where the granular detail of different levels/aircrafts can be assessed. Noted that the full LOAEL is an average noise exposure measure, so can only be calculated once a full system has been designed, and the schedule and proportion of easterly and westerly use applied. This would be partially possible at Initial Options Appraisal and fully available at Stage 3.</p> <p>Confirmed that they had looked at other SEL levels but that 70dB was most appropriate and corresponded to other metrics required by the CAA. Explained that 70dB relative to 60dB L_{Amax} so this was covered off. Stated that they do have data for 80dB SEL and 90dB SEL but found that when we look at the area this covered for the 4,000ft point, 70dB SEL fits well and covers off a lot of considerations at this stage. 70dB SEL is a single noise event contour, taking account of those who are not overflowed directly but do experience noise events. As the overflight cones narrow closer to the airport, the 70dB SEL metric provides more intelligence in comparison. Confirmed that the 70dB SEL does not form any boundary, rather it gives an indication of how many people experience noise events at this threshold. Noted that a lower SEL level takes you to a contour that is so wide that it may not allow much differentiation. Likewise, the higher the SEL value, the lower the altitude of aircraft events it represents.</p> <p>Noted that at Step 2B, Initial Options Appraisal, Heathrow will be putting the 2019 Summer schedule through the flight path options and analysing noise against a range of metrics e.g. L_{Aeq}, N_x. Noted that the SEL is a component of the L_{Aeq} metrics so provides an early understanding of performance.</p> <p>Noted the request from TAG regarding noise metrics, and that they would respond in writing. Asked for proposed alternative on policy to be included in TAG's written feedback.</p>

2.32	TAG	Asked whether the 0 - 7,000ft area of responsibility for Heathrow's airspace design was fixed, or if there was a chance of it increasing to 9,000ft, as per the recent ACOG paper.
2.33	Heathrow	Acknowledged that the subject had been raised by ACOG, but confirmed that Heathrow's responsibility remained up to 7,000ft.

2.34	MRA	Asked whether noise data from a given aircraft is based on real-world data or data published by the manufacturers; noted the VW emissions scandal.
2.35	Heathrow	Stated that it was real world data, not taken from the aircraft handbook.

2.36	RPR	Asked about the two different engine types on the A320 and which one was reflected in the metrics.
2.37	TAG	Asked what stage (i.e., weight) of A320 was assumed.
2.38	Heathrow	Explained that the model aggregates both main types of engines, based on the proportion of use. Stated a Stage 4, i.e. heavily loaded, A320 was assumed.

2.39	NACF	Regarding the use of the A320 for data purposes, asked how many aircraft are noisier than the A320.
2.40	TAG	Questioned the use of A320s for 7,000ft, as 40% of the fleet at Heathrow are 'heavies' that don't reach 7,000ft for a long time. This ignores the real impact.
2.41	EGAG	Asked how Heathrow expect an A320 aircraft to climb.
2.42	Heathrow	<p>Stated that 50-55% of aircraft using Heathrow are A320s. The SEL modelled at this point is based on the first generation. Other aircraft currently operating will be noisier, however in the future it is reasonable to expect noise from future types to be equivalent to that from an early A320. It was also noted that the overflight cones prepared to generate the CLOO were based on a slow 5.5% climb gradient to 7,000ft.</p> <p>Stated that there needs to be a balance of climb rates, but accepted there is no perfect way of assessing a noise metric at this stage. Noted that more detailed analysis, reflecting the operational profile of the full fleet mix, would follow at the Step 2B Initial Options Appraisal.</p>

2.43	RHC	<p>Asked whether Heathrow had data on whether the options improved punctuality, reliance, reducing CO₂ etc. Noted that it would be ideal for Heathrow to share positive information when possible.</p> <p>Asked Heathrow to provide a map of its entry and exit points to the national NATS network, and to include other airports.</p>
2.44	Heathrow	<p>Responded that early indications were that the options do improve these factors, but with trade-offs, and reiterated that the current large number of options meant that there is a low fidelity of analysis, that will increase as the process continues. As the analysis becomes more detailed, Heathrow are committed to sharing this with stakeholders to help them understand the likely changes.</p> <p>Stated that a map for Heathrow's entry and exit points was possible but noted that they might change as other ACP's progress.</p>

2.45	FRP	Asked how Heathrow reduced the 650,000 notional tracks to the Comprehensive List of Options. Asked whether a track being removed at this stage meant it was no longer available in the rest of the process.
2.46	TAG	Asked how the 650,000 notional tracks had been generated, using what parameters.
2.47	Heathrow	Stated that the purpose of the analysis was to understand which tracks performed best and use that information to design options. Noted a distinction between “notional tracks” and “options”. Stated that they used judgement and technical expertise to create viable options, not simply the data from the tracks. Noted that options would continue to be adjusted throughout the process as Heathrow’s understanding of their impact becomes more detailed, and mitigations are applied.

2.48	Clean Air Bayswater	Noted the lack of any metrics for impact on air quality.
2.49	EGAG	Suggested that the CAA guidance stating that air quality is not affected above 1,000ft is false, and the community group has challenged them. Asked whether air quality is assessed at this stage.
2.50	WPRERA	Asked if Heathrow were taking into account variables beyond their control with air quality, such as how aircraft take off.
2.51	Heathrow	Stated that air quality analysis would occur at Stage 3, including looking at tailpipe emissions vs ground emissions where applicable. Stated that there are emissions experts working with the team on this and taking into account the latest research. However, the CAA and Department for Transport recognise 1,000ft, therefore Heathrow has to work within this for CAP1616.

PBN Departures

3. Design Principle 2

3.1	RBWM	Stated that minimising track miles does reduce CO2, but that there are many other factors – gradient, speed – so just miles might not be the best way to assess this.
3.2	Heathrow	Responded that this is correct, but that track miles do have a huge impact on CO2. Stated that only when a full system of options is designed at Stage 3 can some of the impacts mentioned be assessed in greater detail to produce a shorter list of higher fidelity options. The timeline for this is dependent upon input received from other airports’ ACPs and NERL’s arrival mechanisms.

3.3	MRA	Stated that by prioritising minimising the number of people overflown, the design principle is predicated on disproportionately affecting smaller numbers of people, whose lives will become unbearable because of concentration of noise.
3.4	Resident of Walton-on-Thames	Questioned the notion of impacting the smallest number of people, as it is very unpleasant if it is your community.
3.5	Heathrow	Stated that they understand the issue of concentration and are listening to

		feedback. Stated that this metric is a starting point for the analysis, and that there are concepts being explored for how best to deliver respite for communities affected by noise.
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4. Design principle 4

4.1	EGAG	Asked whether aircraft banking hard and increasing power to make tight turns had been accounted for within these options.
4.2	Heathrow	Stated that this had not been accounted for at this point, that it was simply about minimising track miles.

5. Design principle 9

5.1	MRA	Asked whether the southern bias is because there are more destinations to the south.
5.2	Heathrow	Answered that more flights head in a southerly direction due to more scheduled flight destinations being located towards the south of the UK.

6. Design principle 10

6.1	HSPG	Asked whether data on higher dB SELs could be included in the analysis to see the most affected areas.
6.2	Heathrow	Explained that they could not generate L_{Aeq} during options development but can generate event data for each of the routes within the options to see how many people could be affected. Future data will be use more noise metrics for different locations.

7. Options blending across design principles

7.1	EGAG	Asked how Heathrow could create blended options without applying a weighting scheme to different principles.
7.2	TWS	Asked if Heathrow could share the method for creating the blended route options (combining DPs 2, 4, 9, 10) as this differs from the other options.
7.3	FRP	Asked what weighting had been applied to the principles in the blended option.
7.4	Heathrow	<p>Stated that the approach they used considered all possible weighting schemes in increments of 5%. The analysis of the notional tracks was repeated tens of thousands of times with all possible weighting combinations considered. The blended score for each track reflected the average score across all the weights.</p> <p>Explained that this will lead to different options as it is a blend of multiple DPs with no one metric being given priority, whereas in all other departure options the focus was on one DP only.</p>

PBN Arrivals

8. PBN Arrivals Options

8.1	RHC	Asked how Heathrow planned to build in vectored arrivals, that might be used
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		for 80-90% of arriving aircraft. Also asked how this will work with PBN usage.
8.2	Heathrow	Noted the forthcoming slides on this point. Indicated that PBN transitions between arriving aircraft and vectored approaches was something Heathrow were looking at as part of Stage 3 design.

8.3	RBWM	Asked what percentage of aircraft have PBN equipage. Asked what proportion of aircraft will be able to use arrival routes that join final approach very late. Asked whether they could expect aircraft to use these late-joining final approach routes less frequently.
8.4	EGAG	Asked what percentage of arrivals will use PBN. Pointed out that some PBN options join final approach as close as 3nm from the runway.
8.5	TAG	Commented that the arrivals options differ significantly to today's flight paths, and queried whether this was in attempt to avoid concentration over central London.
8.6	Heathrow	<p>Stated that most aircraft will have PBN capabilities, but that just having standard PBN does not mean they will necessarily be able to join final approach as late as 3 miles from the runway.</p> <p>Stated that some aircraft could use PBN to join final approach 3nm from the runway, but they are limited by technical approvals and pilot certification. Indicated that they expected around 20% of arriving aircraft to be capable of using these routes if they existed today. Stated that viability of each route would be considered when full system options were being designed.</p>

8.7	TAG	Asked whether Heathrow was looking at options to eliminate holding stacks, as per the design being explored by Gatwick.
8.8	CAGNE	Stated that it would benefit operations at Gatwick and London City if Heathrow's holding stacks were eliminated. Asked if timed arrivals holding stacks were being considered by NATS.
8.9	WPRERA	Asked what was meant by "arrivals mechanism".
8.10	Pavilion Association	Asked if Heathrow could show how aircraft exit from the holding stacks today.
8.11	Heathrow	<p>Confirmed that arrivals mechanism is a term to describe the stacks and the routes from the stacks, whether that be PBN or vectors.</p> <p>Stated that holding stacks are not expected to be removed, however changes to the location and height of them are expected. NATS is responsible for the design of these since they are above 7000ft.</p>

8.12	TAG	Suggested that if flights took a closer turn on arrivals they would make significantly more noise, and questioned if the modelling used was correct as it does not take into account banking.
8.13	Heathrow	Confirmed that angle was a consideration Heathrow will investigate but they are currently working with the best information available. Heathrow is committed to making sure the model used is the best it can be.

Development of concepts

9. Respite

9.1	RBWM	<p>Asked whether dispersion is possible for aircraft departing using PBN. Noted that PBN sees aircraft flying as if “on rails” and has the potential to concentrate noise.</p> <p>Asked whether Heathrow have considered limiting the number of departures for some routes at certain time periods. Asked what definition Heathrow was using for respite.</p>
9.2	HACAN	Asked what definition of respite was used to create the concepts.
9.3	HSPG	Noted their previous submissions on the definition of respite.
9.4	Bucks Council	Asked for definition of respite and sought clarification on respite for whom.
9.5	TAG	Stated concern that concentration isn’t considered in the initial analysis metrics.
9.6	Pavilion Association	Stated that for the first time this year, aircraft flying over Compton were now following very precise tracks, which is having a very negative impact. Called for more respite.
9.7	Plane Hell Action	Asked if mitigations will be considered beyond eight miles from landing, giving the example of southeast London which is 20 miles away from Heathrow. Stated that currently respite is considered as a form of mitigation, however there is none experienced in SE London where planes overfly for 19 hours a day, as there is no split in flight paths until closer to Heathrow.
9.8	Heathrow	<p>Acknowledged the concern around concentration of noise and stated that Heathrow are looking into operational concepts to mitigate the effects of concentration as a result of PBN. Noted that the analysis needed to assess cumulative impact and was only possible once full systems had been designed.</p> <p>Noted the three potential concepts for delivering respite in the presentation.</p> <p>Noted that there is separate work ongoing looking at the definition of respite. However, the definition Heathrow is starting from is a predictable, meaningful mitigation of the effects of concentration of noise.</p> <p>Noted that dispersion techniques within PBN are being explored to mitigate the noise impacts of routes as part of the operational concepts work.</p> <p>Stated that restricting departure numbers on certain routes had not been considered as part of this airspace change proposal, as route limits are an operational matter and not related to airspace design.</p> <p>Stated that the Initial Options Appraisal process will use the 2019 flight schedule to compare all the options.</p> <p>Noted the need to explore how respite could be offered to communities fairly and to start by focusing on those most impacted within the LOAEL. Noted ANG17 guidance to mitigate the impacts of noise within the 51dB LOAEL.</p>
9.9	MRA	Asked whether PBN can facilitate 3 or 4 routes within a flight path option. Also asked in practice how far apart the routes need to be to provide meaningful

		respite.
9.10	Heathrow	Responded that the distance between similar routes and the technical viability needs to be further explored through the operational concept work. Heathrow are committed to updating stakeholders on the progress of this work throughout the ACP.
9.11	EGAG	Noted that implementing respite from noise can be conflicting amongst communities. Some want dispersion of noise, but others do not want to be newly overflowed. Stated that this where the weighting of design principles should come in.
9.12	MRA	Stated that noise and pollution have huge impacts on people's everyday lives. Called for a reasonable and fair balance and stated that community stakeholders are trying to work collaboratively with Heathrow.
9.13	RHC	Asked whether Heathrow could look at options seeking to maximise the number of people overflowed, to share impacts as much as possible.
9.14	Heathrow	Responded by saying that the Heathrow team are doing their best to be transparent and work with the local communities. Noted that an option maximising the number of people overflowed had not been developed as this would not be in line with policy. Dispersion is being explored within these concepts, which could distribute noise more fairly but affect more people.

10. Noise efficient operational practices

10.1	RBWM	Asked about the analysis that has taken place on different operating procedures such as NADP 1 + 2 and associated climb rates.
10.2	Heathrow	Stated that they are looking into the impact of the different approaches on noise through an ongoing piece of modelling work in collaboration with the Local Community Forum, the CAA and British Airways. The study is relatively small, and they do not have the results yet.

10.3	Plane Hell Action	Noted that CDO assumption is 3 degrees, but some aircraft achieve 3.2 degrees already. Asked whether arrivals to Heathrow are to have great lengths of level flight. Suggested Heathrow could enforce CDO for future options as other airports are doing CDO.
10.4	Heathrow	Stated that 3.2 degree approaches are available under certain conditions but are not mandatory. Heathrow had to use an assumption to create options. Noted that all airports have assumed continuous climb and continuous descent to 7,000ft.

10.5	EGAG	Asked who is going to be responsible for the speed at which noise efficient operational procedures would be implemented.
10.6	Heathrow	Noted their intention to make substantial progress on these issues prior to Stage 3 consultation.
10.7	EGAG	Responded to say they have been raising these issues for 10 years, but thanked Heathrow for the comments and looked forward to the update at the next stage. Noted that movement on NADP2 and on dispersion would be significant progress.

10.8	MRA	Advocated that there needs to be monitoring and enforcement in place for noise efficient operational practices post implementation.
10.9	Heathrow	Confirmed that there will be a post implementation review and ongoing operational reporting.

11. Airports overflying same areas

11.1	EGAG	Asked whether design principle 7 has been assessed at this point and noted the impact of communities being affected by both easterly and westerly operations.
11.2	MRA	Asked about the extent of route conflict today, for example with Gatwick. Asked about the risk of ACOG ignoring the best options as derived through this process, due to the need to make all the airports' plans fit together. Asked whether Heathrow has more "clout" than other airports when the plans are considered together.
11.3	FHS	Asked whether respite concepts would be coordinated across all airports, so that if Heathrow provides respite on one day, London City will also adhere to this.
11.4	TWS	Noted their desire to avoid seeing communities overflowed by multiple paths and stated that the problem of overflight by both arrivals and departures was getting worse.
11.5	Heathrow	Stated that Heathrow are aware of where there are likely to be interdependencies with other airports. Heathrow will be able to assess and explore mitigation of the cumulative impacts of arrival and departure routes once the full systems have been designed, and once they are able to fully integrate with other airports' plans. ACOG will oversee this process. Stated that it's not a question of Heathrow having more "clout". But that Heathrow has a huge impact because of the number of flights and the population affected, so changes to Heathrow's airport have disproportionately more impact than other airports. Explained that future consultations will need to be aligned across multiple airports.

11.6	TAG	Asked at what stage Heathrow will consider both arrival and departure routes affecting the same communities. Suggested that work to develop system options should come as early as possible in the process, prior to the Design Principle Evaluation. Requested that Heathrow clarify the proposed methods and metrics to be used for the Design Principle Evaluation and Initial Options Appraisal.
11.7	NACF	Asked why Heathrow wasn't considering the impact of arrivals and departures together at this stage.
11.8	HASRA	Stated it was unsatisfactory that Heathrow were unable to answer many of the questions posed, because the design had not yet reached sufficient complexity.
11.9	Heathrow	Stated that creating system options at this stage of the process is not feasible as it would restrict the number of options that could be generated. Heathrow's approach to developing routes in isolation is more rigorous as a

		<p>comprehensive list of options will then be evaluated against all design principles during Design Principle Evaluation and Initial Options Appraisal. This includes comparing the CLOO to a 2019 baseline to understand how the arrival and departure routes perform individually and the options will inevitably evolve to inform how a system option will operate.</p> <p>Acknowledged the likely overlapping of flight path routes but cannot assemble system options until input is received from other airports, which will come at Stage 3, prior to public consultation.</p>
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12. “Future proofing” operations

12.1	FRP	Asked how much control Heathrow will have over the use of new technologies such as drones in the future.
12.2	EGAG	Asked for clarity around the use of AAM.
12.3	EMRA	Asked whether new technology such as drones will be considered in the ACP.
12.4	WPRERA	Asked whether Heathrow will work with operators to develop “flying taxi” routes.
12.5	Heathrow	<p>Stated that Heathrow will probably have some influence on activities in the vicinity of Heathrow, but with innovative technologies nothing has been established yet and it is difficult to forecast the likely impacts. Stated that a drone/flying taxi operator seeking to establish a permanent route would likely have to go through an ACP, and that Heathrow would be a major stakeholder in that process.</p> <p>Noted that there is conceptual work published on the CAA website that considered ‘flying taxi’ routes and that Heathrow was part of a consortium considering this. Stated that this conceptual work is not a direct consideration in this ACP.</p>

13. Night flights

13.1	Local Community Forum	Asked if Heathrow’s ACP will reduce the number of early morning / late night flights. Asked whether Heathrow is likely to be expanded and how the community would be informed.
13.2	HSPG	Asked whether Heathrow could have multiple routes for arrivals/departures at night used in combination, to create maximum opportunity for alternation and respite.
13.3	PRACT	Asked why Heathrow are not considering using both runways for early morning/late night arrivals with alternation.
13.4	CAGNE	Asked whether Heathrow planned to increase or decrease the number of night flights.
13.5	Heathrow	<p>Stated that this ACP would not reduce the number of night flights permitted, but instead seek to mitigate the impacts of early morning/late night flights as much as possible, and in alignment with the future Noise Action Plan (2028) and other initiatives.</p> <p>Explained an increase in efficiency as a result of this airspace change should mean a quicker recovery from disruption and therefore fewer late-running flights into the night. Clarified that operational practices and restrictions around night flights lie outside the control of this ACP.</p>

		Clarified that between 6-7am both runways are used for arrivals, but the rest of the time only one runway is used for early morning/late night flights.
13.6	NACF	Asked whether Heathrow had considered the impact of night flights in its initial analysis.
13.7	Heathrow	Noted that options had been developed based on single events and not related to a time of day. The impacts of the options at night will be initially appraised at Step 2B, Initial Options Appraisal.

Engagement and process

14. About the engagement and process

14.1	Local Community Forum	Asked how this engagement session is different to other stages. Asked whether Heathrow had conducted public consultations with people in the wider community.
14.2	Heathrow	Explained that this session forms part of the engagement required by CAP1616 where Heathrow engages with representatives from a wide range of community, environmental and industry groups on the approach to developing the comprehensive list of options, in line with the design principles. Explained that at Stage 3 Heathrow will conduct a full public consultation sharing information with all members of the public who could be impacted by the proposed airspace changes.
14.3	The Royal Parks	Asked whether there would be further engagement at Step 2B.
14.4	HACAN	Asked when Step 2B would begin. Asked whether Heathrow would publish data comparing all design options to the baseline. Stated that a summary of the initial options output would be helpful to see before it is uploaded to the CAA portal. Asked whether stakeholders would be asked to choose between options at consultation.
14.5	RHC	Asked if Heathrow were still following the timetable presented at the last NACF meeting on 13 July 2022.
14.6	HASRA	Asked when the next engagement activity will take place, and whether any information will be distributed in between engagement activities. Asked if Heathrow will provide an airspace update at the next NACF meeting.
14.7	FRP	Asked whether this engagement is the statutory engagement for Stage 2. Asked whether there will be more opportunities to provide feedback prior to the Stage 2 Gateway submission. Asked when the submission documents will be uploaded to the portal. Suggested that other airports which have completed Stage 2 have shared geographical routes, and that by not examining these in detail now it was a breach of CAP1616. Stated that other airports have provided geographical maps at this stage. Suggested that communities currently don't know how many options they are

		going to be presented with at the next stage, and it is opaque how Heathrow has reached that comprehensive list of options.
14.8	Resident of Walton-on-Thames	Asked whether negative feedback on the options was possible at Stage 3 (public consultation). Asked whether all those engaged at this stage would be invited to future engagement.
14.9	TAG	Asked what documents Heathrow would submit to the CAA, and when.
14.10	MRA	Asked whether the Stage 2 Gateway date is likely to move.
14.11	NACF	Asked what happens next in the process and when stakeholders can next expect to be engaged.
14.12	Heathrow	<p>Stated that Step 2B would begin in Q1 of 2023 and confirmed that Heathrow are still on track for a Stage 2 Gateway in September 2023, but that this is a huge change and therefore the chance remains that the programme could slip.</p> <p>Heathrow committed to re-issue an updated stakeholder engagement timeline and to provide an update at the next NACF meeting at the end of November, noting that future airspace design questions should be directed to the Airspace email address.</p> <p>Confirmed that the six CLOO workshops held with community groups during Step 2A in November 2022 are in line with CAP1616 requirements. Explained that there is more engagement planned to update stakeholders on the Design Principle Evaluation and the Initial Optional Appraisal, prior to the Stage 2 Gateway. Stated the potential to host a follow up Methods and Metrics workshop. Noted that these engagements are additional to the CAP1616 requirement, and that Heathrow are committed to bringing stakeholders along on the journey through this process. Confirmed that Heathrow will engage the same stakeholders in future engagement.</p> <p>Stated that Heathrow's Stage 2 submission will include data developed and appraised in the technical work and all evidence of engagement. This will be available to view on the CAA portal following submission. Submission is expected to take place 4 weeks prior to the Gateway in Summer 2023.</p> <p>Noted that at public consultation, there is a statutory process Heathrow must follow with regard to seeking feedback on the options. All feedback on the ACP will be recorded publicly on Citizen Space. Stated that the public will be able to feedback on design options, but there is no current plan to ask stakeholders to choose between them.</p>

14.13	Bucks Council	Noted the "private" classification on the presentation shared and asked what restrictions that placed on their ability to share within their organisation.
14.14	CRA	Asked whether the document could be shared with their members.
14.15	Heathrow	Stated that the purpose of the "private" classification was so that documents would not be shared with the wider public, without the context or background provided by Heathrow. Clarified that stakeholder representatives were welcome to share the document with members of their organisations for the purpose of gathering their feedback.

14.16	Plane Hell Action	Asked that slides be sent in advance in future, so stakeholders could engage earlier and come with questions prepared. Asked that slides be shared with high enough resolution to see the local impact of options.
14.17	HASRA & Clean Air Bayswater	Asked that slides be sent in advance in future, as is common practice for board meetings at other large organisations.
14.18	Heathrow	Responded that they prefer to give groups the opportunity to hear the context of the slides first, and then share with stakeholders after the sessions to allow them time to provide feedback. Noted that the decision to share pre-reading material is specific to each round of engagement and is appropriate to the nature of the material. Noted that not all stakeholders have the same level of background knowledge and would prefer to be talked through the material. Stated that there is a balance in finding the right approach and that the feedback loop remains open.

14.19	MRA	Asked what stage other airports are at in this process.
14.20	RBWM	Asked at what point Heathrow will work with other airports' preferred options and what happens when these conflict with each other. Noted the inherent difficulties given the complexity of the design. Asked what level of stakeholder engagement would happen at that point; would the outcome simply be whatever the airports decided?
14.21	EGAG	Asked whether all other airports are putting forward their options to the CAA as well and how many options Heathrow are going to put forward themselves.
14.22	MVDC	Asked if the pending Gatwick DCO and the FASI South changes had been considered in Heathrow's airspace design.
14.23	HASRA	<p>Asked what Heathrow had learned from other London or European airports, given the enormous potential impact of these changes on the population in and around London, including climate change. Suggested community groups should be part of this engagement.</p> <p>Stated that communities in southeast London had no respite because of aircraft noise from Gatwick, London City and Heathrow and suggested they host a joint stakeholder engagement session.</p>
14.24	Plane Hell Action	Asked how long Heathrow community groups will have to wait for NATS and London City (LCY) to provide their inputs to Heathrow's airspace design. Stated that LCY have their routes mapped and are looking at higher arrivals. Asked why Heathrow are not considering a similar approach at this stage or using the LCY flight path options as a starting point.
14.25	CAGNE	Stated that NATS had provided letter box routes for Heathrow to join onto.
14.26	TAG	Suggested that as LCY take off more quickly due to the number of people around the airport, Heathrow should work around their routes.
14.27	Heathrow	<p>Stated that other London airports are further ahead than Heathrow in the CAP1616 process, with some having completed Stage 2. Those airports will have to wait for others to complete Stage 2, but that Heathrow does not yet have all 14 other airports' data to be able to consider.</p> <p>Stated that Heathrow are already collaborating with other airports through technical working groups, and that there will be more engagement at Stage 3.</p> <p>Explained that it is a statutory requirement for Heathrow to consult with all those who are likely to be affected by the options following the Full Options</p>

		<p>Appraisal process at Stage 3. Stated that consideration will be given to feedback received across all London airports via consultation, where there are proposed interdependencies between routes.</p> <p>Noted that Heathrow, at present, do not have a figure for the number of departure and arrival options that will be taken through to the Stage 2 Gateway Submission as this work has not yet been completed.</p> <p>Noted the role of ACOG and the forthcoming public engagement in Spring 2023 on the third iteration of their masterplan. Noted the role of the CAA in signing off the design and the likelihood of important decisions being called in by the Secretary of State for Transport.</p> <p>Noted that the Gatwick DCO was a separate process, and that FASI South would be part of the consideration, coordinated by ACOG.</p> <p>Noted that the letter box concept developed by NATS had fallen away during the pandemic period. Stated that assumptions are now based on the current network exit points.</p>
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14.28	MRA	Asked whether Heathrow are engaging with airlines as stakeholders and how it differed if they are.
14.29	Heathrow	Stated that Heathrow does engage with airlines as part of its stakeholder engagement strategy and that the same engagement material is used.

14.30	MRA	<p>Asked whether the route modelling activities are being conducted in-house or by consultants and how much quality control Heathrow has over the analysis. Asked if airports are using different modelling techniques.</p> <p>Asked how ACOG interpreted submissions from different airports if they were prepared by different consultants to different standards.</p>
14.31	RHC	Asked whether Heathrow was using the AEDT model, and if not, whether the model being used could be shared with stakeholders. Asked whether the model could be independently validated. Noted that they are placing a lot of trust in Heathrow on a hugely complex matter and that it would be helpful for them to seek verification from an independent body.
14.32	TAG	Called for independent verification of the noise modelling approach.
14.33	Heathrow	<p>Stated that the Heathrow airspace team is made up of both in-house staff and contracted consultants, and that the team was growing again following staff cuts at the start of the pandemic. Stated that Heathrow assures quality of work through its robust internal governance process for all outputs of the project. Noted the internal procurement regime in place and also that the work of one consultant is validated by another separate consultant.</p> <p>Noted that the CAA have advised on guidelines to form a minimum standard that is uniform across all airports. Noted that each individual airport sponsor will have their own team – smaller airports = smaller team, bigger airports = bigger teams - and will decide on a suitable methodology to follow. ACOG are the coordinating group working on similar guidance to allow them to integrate all the airport sponsors' submissions, which will be subject to scrutiny from the</p>

		<p>CAA.</p> <p>Stated that Heathrow were using a proprietary software that they had developed with validation of elements such as noise metrics. Noted that there has been validation of the model from a third party, and that the model would not be accessible to most stakeholders, given its complexity. Noted that noise metrics are validated against AEDT. Assured those present that the model has been internally challenged and validated against ANCON, and the CAA will also scrutinise all models at each Gateway.</p>
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14.34	RHC	Asked when WebTAG comes into the process.
14.35	Heathrow	Noted that partial WebTAG can be considered at the Step 2B Initial Options Appraisal.

14.36	Resident of Walton-on-Thames	Suggested that Heathrow should do leaflet drops to advertise to communities.
14.37	Heathrow	A leaflet programme for communities to advertise this process is a consideration for public consultation at Stage 3.

14.38	EGAG	Stated that they had been coming to meetings for 8 years, and that a change has occurred from the previous hostility towards a more communicative and open environment and, as long as its genuine, that progressive steps are taking place through these productive discussions.
14.39	Heathrow	Thanked EGAG, noted that they hoped that there was respect between all parties.

14.40	FRP	Requested that Heathrow circulate the engagement material presented as soon as possible.
14.41	Heathrow	Stated that they will issue the engagement material following the conclusion of the Step 2A workshop series by COP on Friday 11 November.

14.42	The Chiltern Society	Thanked Heathrow very much for an excellent presentation
14.43	FRP	Complimentary about Heathrow's approach and transparency in presenting the comprehensive list of options, and commended the hard work that has occurred to date.
14.44	NACF	Thanked Heathrow for their hard work and noted that the wider community representatives will appreciate this too.

Wider considerations

15. Wider considerations

15.1	RBWM	Asked whether the IPA (Independent Parallel Approach) airspace change was
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		being considered.
15.2	Heathrow	Confirmed that the previous ACP on IPA was not being taken forward, and that it had been removed from the CAA portal.

15.3	Local Community Forum & EGAG	Asked how the possibility of a third runway might change this airspace change proposal.
15.4	NACF	Asked whether Heathrow was “future proofing” this design and modelling future scenarios with respect to a possible third runway.
15.5	MRA	Asked whether this design accounts for a possible future increase in traffic, above the 480,000 ATMs cap.
15.6	RPRA	Asked if Heathrow is considering altering the cap on airport operations.
15.7	Resident of Walton-on-Thames	Asked if this work is based on the current numbers of departures from Heathrow, and what plans are in place for if that number changes.
15.8	TAG	Stated Heathrow should consider an option for reducing the number of ATMs by 20%.
15.9	HASRA	Called for Heathrow to continue with the “demand management” it had imposed during the summer, given the impact on the environment and businesses’ decisions to reduce their air travel.
15.10	Heathrow	Stated that this airspace change proposal was being developed for a two-runway airport using the current runway alternation practices. Stated that a third runway would require re-design of the airspace and a new airspace change proposal. Stated that this design assumes 480,000 ATMs per year and that any increase would be subject to a separate consenting process.

15.11	MRA	Asked whether PBN-based systems were resilient to faults or deliberate attacks to the satellite technology that the aircraft use, and what level this operates up to.
15.12	Heathrow	Stated that there is a ground-based resilience package that mitigates this risk, in case of faults developing while aircraft are flying; and that if there were wholesale problems with global satellites then aircraft would stop flying. Noted that some ground-based navigation aids and the instrument landing system will remain in place.

15.13	CRA	Noted the lack of respite in their area due to the Cranford Agreement. Noted that Heathrow had previously secured the planning permission to have easterly departures off the northern runway, but hadn’t implemented the changes, despite being it in discussion for two decades. Asked whether this can be addressed through this airspace change.
15.16	Heathrow	Noted that the airspace design assumed both runways would be used for departures and arrivals in both directions. Stated that a separate project was underway within Heathrow to re-apply for planning permission to commence ground works needed for easterly alternation. The planning application is not dependent on the ACP. Stated that environmental assessments were underway but that they were not able to provide a detailed timeline yet.

15.17	TAG	Asked whether changes to the rules regarding directional preference were under review as part of this process.
15.18	Heathrow	Stated that it was not part of this airspace change to decide operational matters for the airport. Stated that they would use assumptions on modal operations that matched today when conducting system analysis at Stage 3.

15.19	HSPG	Asked whether Heathrow have assumed displaced thresholds.
15.20	Heathrow	Stated that displaced thresholds are not part of this airspace change proposal.

Step 2A Comprehensive List of Options Engagement Industry Workshops

Report of industry engagement workshops between Heathrow and industry stakeholder group representatives on the Comprehensive List of Options (CLOO) for Airspace Modernisation taking place between 3 – 15 November 2022.

Attendees:

Stakeholder Group / Organisation:	Heathrow Representatives:
Airspace Change Organising Group (ACOG)	██████████
American Airlines	██████████████████
Biggin Hill Airport	██████████
Blackbushe Airport Ltd	
British Airways	
Cathay Pacific	
Delta	
Etihad	
Farnborough Airport	
Flybe	
Future Aviation Industry Working Group on Airspace Integration (FAIWG-AI)	
Gatwick Airport	
IATA	
KLM	
London City Airport	
Lufthansa Group (Swiss)	
Luton Airport	
Ministry of Defence – Defence Airspace and Air Traffic Management (MoD DAATM)	
National Air Traffic Services (NATS) EN-Route (NERL)	
RAF Northolt	
Southampton Airport	
Southend Airport	
Stansted Airport	
United	
Virgin Atlantic	
WestJet	

Seven workshops were held across 3 – 15 November 2022 virtually. These were part of Step 2A of Heathrow's airspace change proposal (ACP). Throughout this note comments and questions from the 53 attendees are attributed to the organisation they represent, rather than the individual. Contributions from all seven workshops have been combined into this single report.

A slide pack was presented during the discussion and shared with stakeholders afterwards, with a Technical Appendix including additional information. The structure of the report reflects the agenda and order in which the slides were presented, but key discussion points have been grouped into sub-sections where appropriate.

1. Approach to developing the CLOO
2. PBN Departures options
3. PBN Arrivals options
4. Development of concepts
5. AOB

Notes from the Discussion:

1. Approach to developing the CLOO

1.1	IATA & Stansted Airport	Asked whether Heathrow's ACP is designed to the government's current cap of 480,000 air traffic movements (ATMs) per year.
1.2	Heathrow	Confirmed that the ACP is for Heathrow's existing two runways with 480,000 ATMs a year, as per the government's cap.

1.3	WestJet	Asked if Heathrow has engaged with aircraft operators about average metrics.
1.4	Heathrow	Stated that they have spoken to six main airline operators at Heathrow, and always welcome feedback from others including WestJet. As the ACP progresses, Heathrow will engage more widely to seek input from more airlines that operate to/from Heathrow.

1.5	Blackbushe Airport	Asked if Heathrow has applied a weighting to the metrics. Commented that there is a trade-off between concentrating the noise impact over communities currently overflown or distributing the noise more widely and risk overflying new areas.
1.6	American Airlines	Commented that the USA are considering dispersion of routes to avoid overflying the same communities and sharing the noise impact.
1.7	British Airways	Commented that steeper climb gradients produce more thrust and carbon at lower levels whereas modern fleets are designed for an optimal noise and carbon gradient which could be less, especially for long-haul aircraft.
1.8	Heathrow	<p>Stated that there was no weighting applied to principles, other than the distinction between "must" and "should" principles. Agreed with Blackbushe Airport's point and explained that the conceptual work around provision of respite and multiple Performance Based Navigation (PBN) routes for dispersion is important as the options continue to develop. Stated that Heathrow values stakeholders' feedback on the concepts at this stage.</p> <p>Stated that the Design Principle Evaluation (DPE) and Initial Options Appraisal (IOA) in the later part of Stage 2 will show the high-level impact of the options and potential trade-offs between the metrics such as noise and carbon.</p>

1.9	British Airways	Queried Heathrow's use of the A320 and the 5.5% climb gradient inputs, asking how Heathrow is considering continuous climb.
1.10	Stansted Airport	Commented that an assumed 5.5% climb gradient is low.
1.11	Heathrow	Explained that the CLOO is based on the somewhat pessimistic assumption of a 5.5% continuous climb gradient to 7,000ft. Stated that this provides a starting point to enable the development of the CLOO and comparison against actual climb rates for the June – September 2019 summer schedule (the baseline). More detailed analysis, reflecting the operational profile of the full future fleet mix and comparison against the baseline is to follow at the Step 2B Initial Options Appraisal.

1.12	British Airways	Asked if the flight path routes are constrained by existing VOR navigation waypoints, and whether Heathrow is considering new network entry/exit points.
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1.13	Heathrow	Explained that the actual entry and exit points into/from the upper network are not known yet so assumptions for the arrival options were made based on the current positioning of the stacks and initial indications received from NERL. Heathrow has chosen six common network points to assign a common track length based on the direction of aircraft.
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2. PBN Departures options

2.1	Delta	Stated that the PBN Departures options maps appear to show the overflight cones overlapping, and asked how Heathrow is considering operational throughput to maintain maximum use of the two runways.
2.2	Heathrow	Confirmed that Heathrow will only use one runway at a time for PBN Departures. Explained that the maps in the engagement material (e.g. slide 24) show an overlay of all the PBN Departure options for each of the four runway ends.

2.3	IATA	Asked if the options developed for Design Principle 5 still considered avoiding the airspace surrounding London City airport and RAF Northolt.
2.4	Stansted Airport	Asked about the London City airport and RAF Northolt 3,000 – 4,000 ft 'exclusion zone' in Heathrow's PBN Departure options maps.
2.5	Heathrow	Confirmed that such limitations remain constant throughout the options. Explained that they took London City and RAF Northolt airport's existing operations, their immediate departure and arrival routes, and imposed a 3 nautical mile (NM) buffer for this area of airspace to allow them to continue to operate as least as efficient as today. The 3 NM figure is closer than the routes interact at present. Clarified that Heathrow has not considered Northolt and London City's proposed flight path changes at this stage when developing the CLOO.

2.6	IATA	Asked if the 'total population overflown below 7,000ft' input takes into consideration future forecast changes to population numbers.
2.7	British Airways	Asked if the population overflown input considers where people live or work.
2.8	Heathrow	Explained that Heathrow had contacted 77 local authorities requesting their local plans including information on proposed noise sensitive developments such as schools, houses, hospitals to understand any future changes to population. Stated that Design Principle 10 refers to "population" rather than "people" and that more detailed analysis of the options will come later at Step 2B.

2.9	American Airlines	Asked whether the PBN Departure options are using area navigation (RNAV). Commented that using PBN technology more frequently will result in less dispersal over the ground and concentrate noise exposure for those people living underneath the centreline.
2.10	Heathrow	Clarified that all departure flight path options are designed to a PBN Required Navigation Performance 1 (RNP1 +RF or A-RNP). Commented that Heathrow is exploring concepts to mitigate the impacts of aircraft noise by providing meaningful respite or relief.

3. PBN Arrivals options

3.1	Flybe	Commented that the use of PBN equipage varies across different operators for the same and different aircraft types, as well as differences in crew training. This risks some aircraft operators using different approaches for the same aircraft type.
3.2	Heathrow	Noted Flybe's point and asked that this is included in their feedback form.

3.3	KLM	Asked if Heathrow is planning to use RNP approaches for future arrivals operations, commenting that Denver airport currently has no capacity constraints on the RNP approach.
3.4	American Airlines	Commented that the USA are considering the introduction of advanced RNP across the full fleet mix.
3.5	Heathrow	Stated that to maintain runway throughput of 40 arrivals per hour, vectoring will be required during the busier daytime period when one runway is in use for arrivals. At quieter times of day, such as the early morning period, PBN-AR can be considered for arriving aircraft.

3.6	Delta	Asked if the PBN Arrivals options exit from the current holding stacks.
3.7	Heathrow	Confirmed that Heathrow's ACP is to design flight path options up to 7,000ft and NERL is responsible for designing airspace above 7,000ft, which is the base level of the holding stacks. Stated that the position of the stacks, including the entry and exit points into/from the upper network are being developed as part of NATS NERL's ACP. Heathrow will continue to work collaboratively with NATS NERL and other surrounding airports to incorporate any future changes into airspace design.

3.8	London City Airport	Commented that there does not appear to be any PBN Arrival options that overfly Lewisham, stating that they have received complaints from stakeholders in this area who are overflown by arriving aircraft at both London City airport and Heathrow airport. Asked if Vectored Arrivals would continue to overfly this area.
3.9	Heathrow	Stated that Heathrow is still exploring the geographical locations of its vectoring areas and that this is subject to change throughout the ACP process as the level of analysis becomes more detailed. Once the options are matured in detail and refined, Heathrow will collaborate with London City and other airports to consider potential cumulative impacts of the airspace design on specific areas.

3.10	KLM	Asked whether Heathrow is considering implementation using a GBAS Landing System (GLS) alternative to the Instrument Landing System (ILS).
3.11	British Airways	Asked how Heathrow selected the 3 degree descent gradient input.
3.12	Heathrow	Stated no current plans to implement GLS and Heathrow plans to use its current infrastructure of ILS with PBN to ILS or pure PBN. Explained that Heathrow discussed the descent gradient input with airlines and that 3 degrees was optimum.

4. Development of concepts

4.1	IATA	Asked how the concepts could be enhanced throughout the ACP.
4.2	Heathrow	Responded that the options are in their early phase of development and therefore not possible to know how the concepts could be applied until options are further refined and finalised.

4.3	WestJet	Asked whether Heathrow is considering other airspace users and future forms of aviation technology such as Advanced Air Mobility or drones.
4.4	United	Asked how Heathrow is considering future aircraft and aviation technology.
4.5	Heathrow	Stated that the ACP includes consideration of other airspace users and future forms of aviation technology, as per Design Principle 11. Heathrow is aware of investment in these technologies, but it is not something that can be specifically designed for at this Stage. However, Design Principle 12 is to <i>minimise the impact to all stakeholders from future changes to Heathrow's airspace</i> meaning that any changes will be considered in the ACP.

4.6	IATA	Commented that night flights are a key consideration for airlines and requested continued engagement on this topic.
4.7	Heathrow	Stated that unless the Government impose a ban on night flights then the risk of late running departures into the night period remains. Heathrow are working with stakeholders and investigating ways to mitigate the impact of aircraft noise to overflow areas.

5. AoB

5.1	IATA	Asked whether Step 3B in the CAP1616 process is the formal consultation, and how that differs to what is being presented today.
5.2	Heathrow	Stated that for Stage 2, Heathrow's approach is to develop a CLOO that is aligned to the Design Principles and Statement of Need which were approved by the CAA at the Stage 1 Gateway. Explained that at Stage 3, Heathrow will continue to collaborate with other airports and will continue to assess the CLOO to produce a smaller number of options that are likely to be operated in practice and this will be presented to stakeholders at the Public Consultation.

5.3	IATA	Asked if the timeline shown on slide 13 is for the Government's airspace modernisation programme.
5.4	Heathrow	Stated that the Government's AMS programme is planned up to 2040. The timeline shown on slide 13 is specific to Heathrow's ACP and will be influenced by other London airports and NAT NERL's ACPs.

5.5	Stansted Airport	Asked why Heathrow is planning additional engagement activities that are not part of the statutory CAP1616 requirements.
5.6	Heathrow	Explained that Stage 2 is a long and complicated process and felt that stakeholders would value more engagement than is required by CAP1616 to provide regular updates on the work undertaken.

5.7	WestJet	Asked if Heathrow are considering the risk of laser strikes and security for the population overflow.
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5.8	Heathrow	Responded to WestJet's point that laser strikes are not being assessed specifically but that resilience is a key consideration at Heathrow airport. Commented that the Civil Aviation Authority's (CAA) ACP Process CAP1616 allows for transparency with members of the public affected by the airspace change and for two-way engagement.
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