

CAA CAP 1616 Options Appraisal Assessment (Phase I Initial)

Title of Airspace Change Proposal:	RAF Northolt FASI 'LTMA' Cluster		
Change Sponsor:	Ministry of Defence		
ACP Project Ref Number:	ACP-2018-66		
Case study commencement date:	31/10/2022	Case study report as at:	25/11/2022

Account Manager: [Redacted]	[Grey]	Airspace Regulator (Engagement & Consultation): [Redacted]	[Yellow]	IFP: [Redacted]	[Orange]	OGC: [Redacted]	[Dark Blue]
Airspace Regulator (Technical): [Redacted]	[Green]	Airspace Regulator (Environmental): [Redacted]	[Purple]	Airspace Regulator (Economist): [Redacted]	[Light Blue]	ATM (Inspector ATS Ops): [Redacted]	[Red]

Instructions

To aid the SARG project leader's efficient project management, please highlight the "status" cell for each question using one of the four colours to illustrate if it is:

Resolved - GREEN
 Not Resolved – AMBER
 Not Compliant – RED
 Not Applicable - GREY

Guidance

The broad principle of economic impact analysis is **proportionality**; is the level of analysis involved proportionate to the likely impact from that ACP. There are three broad levels of economic analysis; qualitative discussion, quantified through metrics, and monetised in £ terms. The more significant the impact, the greater should be the effort by sponsors to quantify and monetise the impact.

1. Background – Identifying the impact of the options (including Do Nothing (DN) / Do Minimum (DM))		Status	
1.1	Are the outcomes of the Initial Options Appraisal (IOA) (Phase I) clearly outlined in the proposal?	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
1.1.1	Has the change sponsor completed an Initial Options Appraisal? [E12]	Yes, the change sponsor has completed the Initial Options Appraisal and in addition to that they produced Technical Appendix to support IOA that comprises the illustrative tracks and flight paths within each option that have been placed into groups. The Technical Appendix provides quantitative information in terms of the total population overflown and all the tracks that affect population within a 70dB SEL.	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
1.1.2	Does the Initial Options Appraisal include: - a comprehensive list of viable options; - a clear description of the baseline scenario; - an indication of the environmental impacts; - a high-level assessment of costs and benefits involved	Yes, the change sponsor carried forward all viable options from its comprehensive list to the IOA. The change sponsor defined the Baseline (Do Nothing) scenario which is not only based on the current-day scenario but also takes into consideration of known or anticipated factors that might affect the current scenario such as planned housing developments close to an airport. In order to clarify that the change sponsor provided the evidence of planned developments in the next 20 years which is attached as an Appendix to the IOA. RAF Northolt's IOA uses CAP 1616 Table E2 for the impacts that need to be assessed for a typical airspace change. However, the sponsor also added an additional category called 'interdependencies with other FASI-S ACPs and a category named 'Airspace Modernisation Strategy' including the 7 confirmed indicators that the CAA will be used to assess whether the Stage 2 submission accords with the AMS, including iteration 2 of the Masterplan.	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
1.1.3	Has the sponsor stated on what criteria the comprehensive list of viable options has been assessed?	RAF Northolt's IOA assessment criteria was shown in IOA Table 2 which was categorised based on the	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

		example in CAP 1616 Appendix E and two additional categories were also added as explained above in Question 1.1.2.	
1.1.4	Where options have been discounted as part of the IOA exercise, does the change sponsor clearly set out why?	The IOA has not resulted in the discontinuation of any of the design options progressed from Step 2A DPE. The rationale of carrying forward all viable options into Stage 3 is explained in the IOA Conclusion section; as the IOA does not consider combinations of design options to form easterly and westerly arrivals and departures the sponsor concluded it'd be better to quantitatively assess the individual procedures at Stage 2. In addition to this, the sponsor emphasised compromises and trade-offs may be necessary between sponsors as RAF Northolt shares many dependencies with Heathrow Airport as well as Luton, London City, Stansted and NERL.	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
1.1.5	Has the change sponsor indicated their preferred option(s) as a result of the IOA (Phase I - Initial)? [E12]	The IOA indicates that due to the dependencies with other sponsors and unknown combinations of full systems, RAF Northolt is not able to make a statement towards a referred option at this Stage.	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
1.1.6	Does the IOA (Phase I - Initial) detail what evidence the change sponsor will collect, and how, to fill in any evidence gaps and how this will be used to develop the Options Appraisal (Phase II - Full)?	<p>The information is provided under IOA pg.67 Section 'Information to collect as part of the FOA.</p> <p>The change sponsor listed the data that will be collected as part of the FOA:</p> <ul style="list-style-type: none"> - Quantified baseline year (pre-implementation and 10 years post implementation) - Quantitative LAeq contours, population counts and size (km^2) - TAG assessment - Quantitative overflight contours that detail frequency of overflight and cumulative impacts from arrivals/departures and other airports - Detailed track length comparison - Detailed fuel burn and equivalent CO_2 emissions 	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

		data - Further information around interdependencies with the NERL network and neighbouring airports - ATC deployment / training costs - Quantitative capacity information - Quantified CAS requirements	
1.1.7	Does the plan for evidence gathering cover all reasonable impacts of the change? [E12]	Yes, the plan for Stage 3 is concluded to be proportionate, reasonable and achievable and in line with CAP 1616 process.	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

2. Impacts of the proposed airspace change		Status			
2.1	Are there direct impacts on the following:	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
2.1.1	<i>Examples of costs considered (please add costs that have been discussed, and any reasonable costs that the Airspace Regulator (Technical) feels have NOT been addressed)</i>				
2.1.2	Airport/ANSPs	Not applicable	Qualitative	Quantified	Monetised
	- Infrastructure	X			
	- Operation	X			
	- Deployment		X	N/A	N/A
	- Other(s)		X	N/A	N/A
2.1.3	Commercial Airlines/General Aviation	Not applicable	Qualitative	Quantified	Monetised
	- Training	X			
	- Economic impact from increased effective capacity		X	N/A	N/A
	- Fuel burn		X	X	N/A
	- Other(s)		X	N/A	N/A
2.1.4	General Aviation	Not applicable	Qualitative	Quantified	Monetised

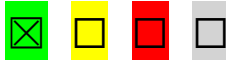
	- Access		X	X	N/A
2.1.5	Military	Not applicable	Qualitative	Quantified	Monetised
			X	N/A	N/A
2.1.6	Wider society, i.e., wider economic benefits, capacity resilience	Not applicable	Qualitative	Quantified	Monetised
			X	N/A	N/A
2.1.7	Other (provide details)	Not applicable	Qualitative	Quantified	Monetised
			X	N/A	N/A
2.2	Are there direct beneficial impacts on air traffic control / management systems? Provide details.			<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
2.3	Where impacts have been monetised, what is the overall value (expressed in net present value (NPV)) of the project? N/A				
2.4	Has the sponsor provided an accurate and proportionate assessment of the proposed airspace change impacts? Yes, the sponsor has qualitatively discussed the impact of easterly and westerly arrival and departure design options against the baseline scenario. The probable costs and benefits for all affected groups individually were explained in detail along with the anticipated common impacts on all.			<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

3. Changes in air traffic movements and projections				Status
3.1	If the proposed airspace change has an impact on the following factors, have they been addressed in the proposal?			<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		Not applicable	Qualitative	Quantified/ Monetised
3.1.1	Number of aircraft movements	X		
3.1.2	Number of air passengers / cargo	X		
3.1.3	Type of aircraft movements (i.e., fleet mix)		X	N/A

3.1.4	Distance travelled		X	X
3.1.5	Operational complexities for users of airspace		X	N/A
3.1.6	Flight time savings / Delays		X	N/A
3.1.7	Other impacts		X	N/A
	<p>Comments: The change sponsor explained the fleet mix operating into RAF Northolt in the IOA methodology section. For the purposes of the IOA, the sponsor has chosen to use profile of an Envoy (Flacon) aircraft as this is permanently based at RAF Northolt and is also representative of the civilian commercial aircraft types accepted in order to generate noise metrics through AEDT. However, the sponsor has confirmed in the IOA that a full fleet mix will be provided and the quantitative noise assessments will be based on the full fleet mix at Stage 3.</p> <p>The sponsor managed to provide their expectation with track miles difference for the proposed groups defined under each easterly and westerly arrival and departure options. However, the sponsor stated it is not possible to understand if there could be reductions in track miles without the network and Heathrow designs. So, the sponsor confirmed that detailed track length comparison will be provided as part of Stage 3.</p> <p>Flight time savings and delays are also not yet possible to being determined due to the unknown system-wide design.</p> <p>The IOA indicates that all of RAF Northolt's options will have interdependencies, conflicts, and trade-offs with adjacent airports and therefore this is being qualitatively discussed for each design option in comparison with the baseline option and further detailed analysis is said to be provided at Stage 3.</p> <p>The IOA also consists one additional impact category which is AMS related and the sponsor qualitatively discussed each option against the baseline in terms of the anticipated performance against the vision and parameters/strategic objectives of the AMS.</p>			
3.2	<ul style="list-style-type: none"> Has the sponsor used the most up-to-date, credible and clearly referenced source of data to develop the 10 years traffic forecast and considered the available guidelines (i.e., the Green Book and TAG models) in a proportionate and accurate manner? [B11 and E11] <p>The sponsor selected the busiest year (2016) for movement data as this is the most representative year for typical RAF Northolt movements. The IOA argued that its proportionate to adopt this approach for this stage due to the uncertain nature of aviation sector because of the pandemic. However, the sponsor confirmed pre-implementation baseline and options for the year of implementation and following next 10 years will be quantitatively appraised at Stage 3.</p>			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>

Table 1 2016 Movements and Modal Split																	
<table border="1"> <thead> <tr> <th>Year</th> <th>RWY25</th> <th>RWY07</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>2016 Movements and assumed 2027 forecast</td> <td>11,373</td> <td>5089</td> <td>16,462</td> </tr> <tr> <td>2016 Modal Split</td> <td>69%</td> <td>31%</td> <td></td> </tr> </tbody> </table>		Year	RWY25	RWY07	Total	2016 Movements and assumed 2027 forecast	11,373	5089	16,462	2016 Modal Split	69%	31%					
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2016 Movements and assumed 2027 forecast	11,373	5089	16,462														
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<ul style="list-style-type: none"> Has the sponsor explained the methodology adopted to reach its input and analysis results? [B11 and E11] 		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>												
3.3	Has the sponsor developed an assessment of the following environmental aspects?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>												
		Not applicable	Qualitative	Quantified	Monetised												
3.3.1	Noise		X														
3.3.2	Operational diagrams		X														
3.3.3	Overflight		X														
3.3.4	CO2 emissions		X														
3.3.5	Local air quality		X														
3.3.6	Tranquillity		X														
3.3.7	Biodiversity		X														
3.4	What is the monetised impact (i.e., Net Present Value (NPV)) of 3.3? (Provide comments) N/A																

4. Economic Indicators of the ACP		Status
4.1	What are the qualitative / strategic impacts described in the ACP? The sponsor aims to align with the AMS and maximise benefits from NERL'S re-design of the LTMA and the redesign of adjacent airports by enabling environmental benefits and potential reduction in the volumes of CAS that currently contain RAF Northolt's IFPs.	
4.2	What is the overall monetised and non-monetised (quantified) impact of the proposed airspace change? The impacts have not been monetised and not fully quantified for Stage 2. However, the sponsor endeavoured to quantify total population overflown with each option within a 70dB SEL. In addition to this, the sponsor also quantified rough estimations in track miles for each option in	

	comparison with the typical miles from the existing four arrival stacks to each runway and from each runway to three points within the upper airspace network.	
4.3	<p>What is the Net Present Value of the proposed options? Has the sponsor used this information to progress/discount options? Has the sponsor provided the benefits-costs ratio (BCR) of the proposed options and used it to support the choice of the preferred options? [E44]</p> <p>N/A. The sponsor has chosen to qualitatively assess all options at the first phase of options appraisal due to the unknown system-wide design options and potential changes to interdependencies, conflicts and trade-offs with adjacent airports.</p>	
4.3.1	<p>If the preferred option does not have the highest NPV or BCR, then has the sponsor justified the reasons to progress this option? [B50 and E23]</p> <p>The sponsor hasn't stated their preference towards an option or options amongst the shortlist of viable options. Please see the answer to Question 1.1.5 for further details.</p>	
4.4	<p>Have the sponsors provided reasonable justification for the proportionality of analysis above?</p> <p>The sponsor explained the rationale to conduct high-level qualitative analysis of the design options for Stage 2 in detail with robust statements. The sponsor produced numeric analysis to quantify the total population subjected to noise in excess 70dB SEL and additional track mileage. The approach for Stage 2 is concluded to be proportionate and reasonable as system-wide design options are not yet known likewise the potential compensation and trade-offs with adjacent airports.</p>	

5. Other aspects	
5.1	N/A

6. Summary of the Initial Options Appraisal & Conclusions	
6.1	<p>The sponsor provided the minimum criteria defined for Stage 2 – first phase of options appraisal which is the qualitative analysis of all viable options considered at Step 2A. The rationale of not conducting further quantified or monetised analysis has been explained in the IOA with reasonable arguments. Also, the sponsor managed to use numeric analysis to assess the anticipated noise and fuel burn impact. The sponsor succeeded to address all required issues that are listed under CAP 1616 Appendix E12 and provided a robust, comprehensive, and proportionate analysis in the IOA for all the viable design options.</p> <p>The following observations require the change sponsors immediate consideration and response:</p> <ul style="list-style-type: none"> In accordance with CAP 1616 para E12, the Initial Options Appraisal (IOA) must as a minimum contain what evidence the change sponsor will collect, and how, to fill in its evidence gaps. The change sponsor has provided an overview of what evidence they will

collect but not how they will fill in its evidence gaps. The evidence gaps are associated with their forecast and assessment of air quality.

- For Stage 2 the change sponsor has only provided a forecast of total aircraft movements for the opening year 2027, which, is based on the movement number from 2016 and reasoned that this “this approach to forecasting is considered proportionate at this stage of the CAP 1616 process”. The CAA accept this is a reasonable approach at this stage, particularly given the methodology used for options appraisal. However, the CAA requires the change sponsor to ensure that consideration is given to how this uncertainty can be mitigated so that robust forecasts are available and used to inform relevant assessments.
- The change sponsor has qualitatively identified an air quality impact. As per CAP 1616a para 1.97 change sponsors must produce information on local air quality impacts where there is the possibility of pollutants breaching legal (or worsening an existing breach of legal limits). A breach of legal limits is determined where there is a change in emissions (by volume or location) below 1,000 feet, and the location is within or adjacent to an AQMA. If a breach of legal limits is concluded a full air quality assessment will be required. As per CAP 1616a para 1.98 this assessment should include pollutant concentrations from all sources whether related to aviation and the airport or not. The change sponsor is therefore required to determine if a breach (or worsening) of legal limits is likely and therefore whether a full air quality assessment is required and if so, what evidence they will need to collect to enable such an assessment.
- The change sponsor has stated they ‘expect to sit within CAP 2091 Category’ but that the category will be ‘confirmed at Stage 3’. However, noise modelling has been used to inform the Initial Options Appraisal (IOA) (i.e. SEL footprints). Therefore, the change sponsor is required to confirm and evidence that the noise modelling used to inform the Initial Options Appraisal was undertaken in accordance with the required Category C standards (CAP 2091 Para 5.10). If the Stage 2 noise modelling has not been undertaken in accordance with the required minimum standard then the change sponsor should ensure that its stakeholders are aware that its noise modelling is likely to be of a lower sophistication to that required.
- If the IOA noise modelling was not undertaken to the standards of the required minimum category (i.e. CAP 2091 Category C), the CAA requires that the change sponsor confirm they have the relevant infrastructure to model to Category C standards and if not then to consider whether they may need to request and justify a transition period may be required (see CAP 2091 Para 5.26 to 5.29).

The following observations and recommendations for Stage 3 were provided as part of the Gateway Assessment (although not dependent on the Gateway decision):

- At stage 2 the change sponsor has supplemented qualitative assessments with numerical assessments and modelling. For Stage 3 onwards, the change sponsor must ensure they use the most up-to-date and credible, clearly referenced sources of data, with modelling carried out in line with relevant best practice and explain the methodology it adopted in order to reach its input and analysis result, including referenced sources of data that support its analysis outcome. The change sponsor must also be prepared to provide the CAA with all of its supporting data in a machine readable format to enable the CAA to validate its analysis if requested to do so.

- The change sponsor has identified a number of new and/or confirmed residential developments and it is not apparent whether these have informed the population counts presented within the Initial Options Appraisal. As per CAP 1616 E22, where appropriate these new developments should be factored into assessments at Stage 3.
- The change sponsor has used SEL noise footprints at Stage 2 as a proxy for the required noise assessment metrics. However, the presentation of these results is lacking clarity for example the use of average population counts and the data under the SEL_70 column. As per CAP 1616 B55, change sponsors are able to use additional metrics if they feel it is useful for explaining noise impacts. However, the change sponsor is reminded that, for all noise metrics used, there must also be a clear explanation of the metrics and what they mean in the context of the airspace change proposal.
- The change sponsor has not provided a full forecast at this stage and instead provided a forecast of total aircraft movements for the opening year 2027, which, is based on the movement number from 2016. The change sponsor has also identified that they have an annual movement limit of 12,000 commercial movements. However, the presented movements show 16,642 movements. The change sponsor should ensure Stage 3 assessments provide clarity on the forecasts, including whether commercial or military movements.
- The CAA also observes that the change sponsor identifies no commercial flying occurs at night (2300 to 0700) and therefore the CAA recommends the change sponsor considers whether assessments of night-time impacts are required (for example LAeq,8h contours) or whether assessments can be scoped out in accordance with CAP 1616 B26.

Outstanding issues

Serial	Issue	Action required
1	-	-
2		

CAA Initial Options Appraisal Completed by	Name	Signature	Date
Airspace Regulator (Economist)	[REDACTED]	[REDACTED]	25/11/2022
Airspace Regulator (Environmental)	[REDACTED]	[REDACTED]	25/11/2022