

CAA CAP 1616 Options Appraisal Assessment (Phase I Initial)

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| Title of Airspace Change Proposal: | Glasgow Airport FASI (ScTMA Cluster) | | |
| Change Sponsor: | Glasgow Airport Ltd | | |
| ACP Project Ref Number: | ACP-2019-46 | | |
| Case study commencement date: | 29/07/2022 | Case study report as at: | 01/09/2022 |

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| Account Manager: [Redacted] | [Grey] | Airspace Regulator (Engagement & Consultation): [Redacted] | [Yellow] | IFP: [Redacted] | [Yellow] | 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 shortlist of options (including Do Nothing (DN) / Do Minimum (DM)) | | Status |
|--|---|---|
| 1.1 | Are the outcomes of the options' scenarios 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 produced an Options Appraisal (Phase I - Initial) which sets out how they have moved from the Statement of Need to the airspace change design options? [E12] | Yes, the sponsor has developed an Initial Options Appraisal, setting out how options meet the Statement of Need and how the airspace might change. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| 1.1.2 | Does the list of options include a description of the change proposal? | Yes, the sponsor provides a clear description of the proposed change designs, as follows: <ul style="list-style-type: none"> • Runway 05 Departure • Runway 05 Arrivals • Runway 23 Departure • Runway 23 Arrivals Each option design is then assessed against the baseline, that has been provided for each procedure and for each runway for comparative purposes only. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| 1.1.3 | Has the sponsor stated on what criteria the longlist of options has been assessed? | At Step 2A, the sponsor has assessed each option against the DPs and in Step 2B the assessment is done following Table E2 of CAP1616 - Appendix E. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| 1.1.4 | Where options have been discounted, does the change sponsor clearly set out why? | Yes, the sponsor provides a rational for discounting options both at Step 2A within the DPE and at the end of the IOA as reported in the summary table below. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| 1.1.5 | Has the change sponsor indicated their preferred option in the Options Appraisal (Phase I - Initial)? [E8] | Yes, at the end of the IOA the sponsor identified the options to take forward to Stage 3, including the preferred ones for each runway and procedures. The sponsor highlights that these options will be fully reviewed at Stage 3. The preferred options are the following: <ul style="list-style-type: none"> • Runway 23 Departure Option E; • Runway 05 Departure Option I; <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |

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| | | <ul style="list-style-type: none"> Runway 23 Arrival Hybrid Vectors and PBN; and Runway 05 Arrival Hybrid Vectors and PBN. <p>It is stated that <i>“the options being taken forward into Stage 3 are those believed to best balance the range of competing environmental and operational requirements for Glasgow and its stakeholders”</i>.</p> | |
| 1.1.6 | Does the Initial Options Appraisal (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)? | Yes, the sponsor has highlighted in different parts of the document what intends to assess in more details at Stage 3 and provides an indication of the data set, or any updated data that will be used. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| 1.1.7 | Does the plan for evidence gathering cover all reasonable impacts of the change? [E12] | Yes, the plan provided is reasonable at this stage. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |

| 2. Direct impact on air traffic control | | Status | | | |
|---|--|-------------------------------------|--------------------------|--------------------------|--------------------------|
| 2.1 | Are there direct cost impacts on air traffic control / management systems? If so, please provide below details of the factors considered and the level in which this has been analysed. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2.1.1 | The Sponsor qualitatively estimates if costs will be incurred (infra, operationally and deployment). The Sponsor chooses to consider ATCO training costs under 'deployment'. <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> RWY 23 Arrival Options C, D, E all require a redesign of the ILS (DPE Annex A), but the cost of this is not mentioned. Options C and E are discounted. Recommend that the Sponsor considers the cost of the ILS redesign of Arrival Option D, which is taken forward with the Hybrid option. | | | | |
| | | Not applicable | Qualitative | Quantified | Monetised |
| 2.1.2 | Infrastructure changes | | x | N/A | N/A |
| 2.1.3 | Deployment | | x | N/A | N/A |
| 2.1.4 | Training | | x | N/A | N/A |
| 2.1.5 | Day-to-day operational costs / workload / risks | | | | |
| 2.1.6 | Other (provide details) | | | | |

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| 2.1.7 | <p>Comments: The sponsor states that the proposed changes will not lead to any additional training costs for commercial airlines, apart from the updates introduced with the AIRAC, while it is expected to require air traffic controller training for the controllers and assistants located at NATS Prestwick Centre and Glasgow Airport. However, the magnitude of these costs will be estimated at Stage 3. The ANSP might incur into initial deployment costs as the proposed airspace change may require some ATC system engineering amendments, but apart from these costs there shouldn't be any other additional operational costs. The sponsor highlights that Glasgow airport operates a homeowner relocation scheme for residential properties affected by noise and provides a noise insulation scheme for sensitive buildings, i.e., schools and hospitals, however this is not an infrastructure cost for the airport itself but an additional cost that needs to be considered and fully assessed when developing the Cost Benefit Analysis at Stage 3. It is suggested to use a different label for these costs.</p> | | | | |
| 2.2 | <p>Are there direct beneficial impacts on air traffic control / management systems? If so, please provide details and how they have been addressed:</p> | | | | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| 2.2.1 | <i>Examples of benefits considered</i> | Not applicable | Qualitative | Quantified | Monetised |
| 2.2.2 | Reduced work-load | | x | N/A | N/A |
| 2.2.3 | Reduced complexity / risk | | x | N/A | N/A |
| 2.2.4 | Other (provide details) | | | | |
| 2.2.5 | <p>Comments: The sponsor provides a qualitative assessment of how if keeping the current situation, the estimated increased traffic might lead to higher workload and complexity for ATC: <i>"In future, increased forecast movements across the Scottish TMA are anticipated to result in capacity and resilience disbenefits. As traffic increases, flow restrictions are likely to be put in place in order for ATC and pilots to manage the additional complexity and workload. Flow regulations stabilise the number of movements until the peak in traffic subsides, however in doing so they generate ground delay for Glasgow"</i>. However, the proposed options will be able to allow departures at an interval of 1 minute, allowing more resilience and an increased capacity at the airport. (This is caveated by the statement, <i>subject to safety case and NERL ability to accept 1-minute separations, where applicable.</i>)</p> | | | | |
| 2.3 | <p>Where monetised, what is the net monetised impact on air traffic control (in net present value) over the project period? N/A</p> | | | | |
| 2.4 | <p>Are the direct impacts on air traffic management analysed accurately and proportionately? Yes, the sponsor provides an appropriate and proportional assessment of the impacts on the ATC/ATM at this stage.</p> | | | | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |

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| 3. Changes in air traffic movements / projections | | | | Status | | | |
|---|---|----------------|-------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|
| 3.1 | What is the impact of the ACP on the following and has it been addressed in the ACP 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 | x | N/A | |
| 3.1.2 | Type of aircraft movement | | | x | x | N/A | |
| 3.1.3 | Distance travelled | | x | | | | |
| 3.1.4 | Area flown over / affected | | | x | N/A | N/A | |
| 3.1.5 | Other impacts | | | | | | |
| 3.1.6 | <p>Comments:</p> <p>The sponsor states that in 2019 the total number of operations was of 25,275 (see table in Q 3.2) and provides a limited qualitative assessment of the fleet mix, highlighting that “in 2019 Turbo prop aircraft made up around 25% of traffic arriving and departing from Glasgow Airport. Due to factors such as the change in aircraft operators and passenger habits, Glasgow Airport expect to see a shift towards more jet aircraft going forward than was the norm in 2019 and preceding years”. A more detailed quantitative assessment will be provided at Stage 3.</p> | | | | | | |
| 3.2 | <p>Has the forecasting of traffic done reasonably using best available guidance (e.g. DfT WebTAG, the Green Book, Academic sources...etc?)</p> | | | | | | |
| | <p>The table below reports the traffic movements at Glasgow airport during the 92-day summer period (between 16 June to 15 September 2019).</p> | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Runway | Number of operations | Percentage |
|--------------------------|----------------------|------------|
| 23 (Westerly Operations) | 20,658 | 81.7 |
| 05 (Easterly Operations) | 4,617 | 18.3 |
| Total | 25,275 | |

Despite this table shows the movements at Glasgow, there is no indication of how the traffic volume might change over the 10-year forecast period. The sponsor outlines in the SoN that the proposed airspace change aims to increase traffic at the airport, but this has not been corroborated within the description of the traffic forecast at this Stage. The sponsor postpones to Stage 3 a detailed assessment of the traffic forecast.

3.3 What is the impact of the above changes (3.1) on the following factors below?
The sponsor provides a detailed qualitative assessment of the impacts that the proposed airspace change might have, with a particular focus on the environmental ones. When assessing the environmental impacts, the sponsor makes sure that the assessment is compared to the baseline, to show the potential deviation that the proposed options are going to have compared to what stakeholders experience today. The level of details provided at this stage is in line with CAP1616 requirements.

| | | Not applicable | Qualitative | Quantified | Monetised |
|-------|--|----------------|-------------|------------|-----------|
| 3.3.1 | Noise | | x | x | N/A |
| 3.3.2 | Fuel Burn | | x | x | N/A |
| 3.3.3 | CO2 Emissions | | x | x | N/A |
| 3.3.4 | Operational complexities for users of airspace | x | | | |
| 3.3.5 | Number of air passengers / cargo | x | | | |
| 3.3.6 | Flight time savings / Delays | x | | | |
| 3.3.7 | Air Quality | | x | x | N/A |
| 3.3.8 | Tranquillity and Biodiversity | | x | x | N/A |

3.4 Are the traffic forecast and the associated impacts analysed proportionately and accurately according to available guidelines (e.g. WebTAG or the Green Book?)
The sponsor states that will use the 2019 traffic to inform the assessment and will provide a more detailed traffic forecast at Stage 3. For this stage, it is reported only the total traffic movement as per 2019 and the modal split

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| | between the two runways (see Q3.2). | |
| 3.5 | What is the total monetised impact of 3.3? (Provide comments) N/A | |

| 4. Benefits of ACP | | Status | | | |
|--------------------|---|--|-------------|------------|-----------|
| 4.1 | Does the ACP impact refer to the following groups and how they are impacted by the ACP? | | | | |
| | | Not applicable | Qualitative | Quantified | Monetised |
| 4.1.1 | Air Passengers | x | | | |
| 4.1.2 | Air Cargo Users | x | | | |
| 4.1.3 | General aviation users | | x | N/A | N/A |
| 4.1.4 | Airlines | | x | N/A | N/A |
| 4.1.5 | Airports | | x | N/A | N/A |
| 4.1.6 | Local communities | | x | N/A | N/A |
| 4.1.7 | Wider Public / Economy | x | | | |
| 4.1.8 | Comments: The sponsor states that some proposed options are likely to promote a reduction in bottlenecks for GA access outside CAS, because these options can be contained within existing CAS whilst offering opportunity to reduce the total volume of CAS. | | | | |
| 4.2 | How are the above groups impacted by the ACP, especially (but not exclusively) looking at the following factors below: | | | | |
| 4.2.1 | Improved journey time for customers of air travel | N/A | | | |
| 4.2.2 | Increase choice of frequency and destinations from airport | N/A | | | |
| 4.2.3 | Reduced price due to additional competition because of new capacity | N/A | | | |
| 4.2.4 | Wider economic benefits | Increased effective capacity that will result in a positive economic impact on commercial air traffic. | | | |

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| 4.2.5 | Other impacts | |
| 4.2.6 | Comments: Nil | |
| 4.3 | What is the overall monetised impacts associated with 4.1 and 4.2 the above? N/A | |
| 4.4 | What are the non-monetised but quantified impacts of the above? N/A | |
| 4.5 | What are the qualitative / strategic impacts described above? | |
| 4.6 | What is the overall monetised benefits-costs ratio (BCR) of the policy? Is it more than 1? N/A | |
| 4.7 | Have the sponsors provided reasonable justification for the proportionality of analysis above? | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| 4.8 | If the BCR is less than 1, are the quantitative and qualitative strategic impacts proportional to the costs of the ACP? N/A | |

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| 5. Other aspects | |
| 5.1 | Nil |

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| 6. Summary of Assessment of Economic Impacts & Conclusions | |
| 6.1 | <p>The sponsor has developed an initial options appraisal (IOA) assessing all the options that have survived the design principle evaluation at Step 2A. Each option has been compared against the baseline and once identified the one that provide an improvement compared the current situation, the sponsor provides an explanation for discounting some options and for taking forward other ones. Among the options that perform better than the baseline, the sponsor identifies the preferred departure and arrival procedures for each runway:</p> <ul style="list-style-type: none"> • Runway 23 Departure Option E; • Runway 05 Departure Option I; |

- Runway 23 Arrival Hybrid Vectors and PBN; and
- Runway 05 Arrival Hybrid Vectors and PBN.

These options together with other viable ones will be taken forward and fully assessed in the next iteration of the options appraisal.

The sponsor provides a qualitative assessment for each option following the requirements outlined in Table E2 of CAP1616, and for the environmental impacts the level of details provided at this stage is sufficient. However, the requirements outlined in CAP2091 have not been fully addressed.

The sponsor is advised to address the actions below and to run a consistency check of the information provided in the document, including in the tables, before submitting the documents to the CAA.

Outstanding issues

| Serial | Issue | Action required |
|--------|---|--|
| 1 | Incorrect labels for the tables - Runway 23 Westerly Departure Option A | <p>Requirement The change sponsor should run a consistency check and update the errors before re-submitting the Initial Options Appraisal (IOA) document to the CAA. The information provided in the text does not always reflect how the same information is labelled and sometimes it refers to other options (see RWY23 Westerly Departure Option A labelled as Baseline, page 27 of the IOA) and this can be misleading.</p> <p>Sponsor corrective action: Within the Initial Options Appraisal (v1.4), RWY23 Westerly Deps Option A is now correctly labelled as Option A.</p> <p>01/09/2022: The CAA considers this satisfactory and is content that this addresses the action given.</p> |
| 2 | Justification for discounting Runway 05 Arrivals - Option C | <p>Requirement The change sponsor should check that it is referring to the correct option. It appears that this paragraph (on page 136) has been copied and pasted from Option A (05 Arrivals but not updated to reflect Option C, page 136 of the IOA).</p> <p>Sponsor corrective action: Within the Initial Options Appraisal (v1.4), RWY05 Arrival Option C now states, "<i>Option C would require additional CAS and this is expected</i></p> |

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| | | <p><i>to be a greater volume than options B and D. It is on the basis of CAS that Option C is discontinued at this stage.”</i></p> <p>01/09/2022: The CAA considers this satisfactory and is content that this addresses the action given.</p> |
| 3 | References to other documents | <p>Recommendation - In the IOA the sponsor often refers to the Technical Appendix A that is not part of the IOA but being this a separate document, it is recommended that the sponsor includes a link to this file.</p> |
| 4 | Noise Abatement Procedures (NAPs) | <p>The sponsor mentions the existing NAP but does not explain what these involve nor links this to the document for the reader. In the IOA when assessing the options, it is stated that these procedures would need to change to accommodate the offset departures and turns but doesn't explain what the change in terms of noise will be on the affected population.</p> <p>Recommendation – The sponsor must ensure that stakeholders understand what the NAPs are for and how they could change as part of the ACP going forward.</p> |
| 5 | Use of appropriate label for costs. | <p>The sponsor acknowledges that among the other costs included in Table E2, Glasgow airport is responsible of the homeowner relocation scheme for residential properties affected by noise and guarantees noise insulation schemes for sensitive buildings, i.e., schools and hospitals. However, these are not infrastructure costs directly related to the ANSP infrastructure but are indirect costs due to the airport activities</p> <p>As per para E36, the guidance provided in Table E2 is <i>“by no means exhaustive and sponsor should endeavour to understand all of the potential costs and benefits that may be relevant for the specific change proposal”</i>. This paragraph allows the sponsor flexibility to explore and expand the costs and benefits captured and presented.</p> <p>Recommendation – To avoid confusion among stakeholders, it is recommended that the sponsor re-labels these costs with a more appropriate wording and fully assesses them in the next stage, so that stakeholders can understand where financial impacts occur.</p> |
| 6 | Potential change to ILS | <p>Recommendation – The sponsor should consider any costs incurred as a result of changes to the ILS procedures, if required, at Stage 3.</p> |
| 7 | Justification for Runway 23 Arrival Option E | <p>Page 134 - In the last paragraph the sponsor compares Option D to Option E but the comparison can be made clearer, as it is difficult for the reader to determine why Option d is better than E. This is the same for Runway 05 Arrival Option D.</p> <p>Recommendation – The sponsor must ensure that when discounting options, the language used in the summary allows the reader to understand why, without recourse to other areas of the document.</p> |

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| 8 | Label as preferred option | Recommendation – Page 136 - Runway 05 Arrival Hybrid Vectors and PBN should report that it is their preferred option in the table for consistency purposes. |
| 9 | CAP2091 Recommendation | Recommendation – The sponsor has not used forecast to data to inform the CAP2091 category and states that they will reconfirm the CAP2091 category at stage 3; we recommend that the category is confirmed at the earliest opportunity to mitigate any risks of an incorrect category being used. |
| 10 | Options Appraisal colour coding | Recommendation - There is inconsistency in the way colour coding has been applied in the summary tables in Section 5 of Step 2B. For example, “no impact” is coloured grey for some options and green for others. In addition, some options are green compared to the baseline but then coloured red in the summary tables. The sponsor should run a consistency check before submitting the document to the CAA. |
| 11 | Rewording incorrect sentences | Sponsor guidance states that “ <i>CAP1616 describes the purpose of the Design Principle Evaluation as setting out how a sponsor’s ‘design options have responded to the design principles’ and, although shortlisting of options often occurs at this stage, CAP1616 does not specifically set any expectation that any options will be discounted through the DPE.</i> ” Observation – The sponsor must note that the CAP1616 process encourages sponsors to narrow down the options through the DPE exercise if options are not in line with the discounting mechanism that the sponsor has identified at this stage (i.e., Step 2A). This prevents that “unviable options” are assessed in more details at Step 2B and allows the sponsor to focus only on those options that have the potential to bring the change outlined in the SoN. |
| 12 | DPE and Not Applicable text | In the DPE the sponsor explains and colour-codes how options meet, partially meet or do not meet DPs, however there are some grey boxes in the main document that are not labelled consistently. Observation - For transparency a N/A (Not Applicable) box should be used consistently throughout the documentation. (Pages 98-99). |
| 13 | Arrival track CO2 methodology | Observation - CO2/fuel burn has been used to inform the arrival track that is taken forward. However, it is not entirely clear how this has been calculated. We look forward to greater detail at Stage 3. In accordance with CAP1616 B11 the sponsor must explain the methodology it adopted in order to reach its input and analysis results. |

| CAA Initial Options Appraisal Completed by | Name | Signature | Date |
|--|------------|------------|------------|
| Airspace Regulator (Economist) | [REDACTED] | [REDACTED] | 01/09/2022 |