

# Annex E Environmental Assessment and Statement

Title of airspace change proposal	Swanwick Airspace Improvement Programme - Airspace Deployment 6 (SAIP AD6)
Change Sponsor	NATS En Route Limited (NERL) / London Luton Airport (LLA)
Project no.	ACP-2018-65
Account Manager	[REDACTED]
<p><b>Instructions</b></p> <p>In providing a response for each question, please ensure that the 'status' column is completed using the following options:</p> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• Pending</li> <li>• N/A</li> </ul> <p>Please highlight the 'status' cell for each question using one of the three colours to illustrate if it is:</p> <p>resolved <b>Yes</b> not resolved <b>Partial</b> not compliant <b>No</b> not applicable <b>N/A</b></p>	
<p><b>1. Introduction</b></p> <p>This airspace change proposal (ACP) is co-sponsored by NATS En Route Limited (NERL) and London Luton Airport (LLA) (the 'Sponsors'). Due to the complexity of airspace around Luton, arriving aircraft, share a holding area with London Stansted Airport (STN). This complexity has been identified by the Sponsors as increasing air traffic controller workload and presenting a safety risk to aircraft. This proposal therefore aimed at addressing this complexity and would separate Stansted and Luton flows further out and higher up than currently.</p> <p>The separation of Luton and Stansted flows is achieved by developing new Standard Arrival Routes (STARS) for Luton arrivals and a new holding area north of the airfield. The new STARS are designed to start at similar locations as the existing STARS, to ensure connectivity with the main upper airway network. Once Luton arrivals are separated, they would then be vectored to the final approach. The proposed new hold, known as ZAGZO, would be used only when required and is to be located over Grafham Water Reservoir near to the junction of the A1 and A14, west of Huntingdon in Cambridgeshire. Aircraft arriving at Stansted would continue to use the extant STARS and holds, but due to the separation from Luton aircraft, there is anticipated to be less holding for these arriving aircraft.</p> <p>As Luton Airport aircraft exit the STARS, most aircraft would be vectored or given shortcuts to the runway with the remainder entering the hold. The Sponsors articulate that, due to the optimised network, the hold would be used when Stansted and Luton arrivals require separating and the need to hold aircraft is likely to occur daily during 'peak' hours. The fast-time simulations, which informed the fuel burn and emissions modelling, assumed the airspace was optimised and therefore would operate with the hold 'rarely' needing to be used. The process of aircraft using vectors and shortcuts is similar to the current process for arriving aircraft</p>	

today. However, given the new location of the STARs and the hold, there will be a change in overflight below 7,000 ft<sup>1</sup> because of aircraft exiting the STARs between 8,000 ft and 5,000 ft. Once at 5,000 ft aircraft are expected to continue to operate as they do today.

It should be noted that the proposal commenced in December 2019 before the COVID-19 pandemic resulted in a downturn in aviation traffic. At the time the ACP was commenced, both Luton and Stansted were forecasting continued growth which was expected to increase the complexity in the airspace environment. The Sponsors have stated that air traffic is expected to return to pre-pandemic forecast levels, however, there is forecast to be a 1-year delay in the original forecast growth. The Sponsors initially based their environmental assessments on the 10-year period between 2021 and 2031 and these assessments were updated to reflect the 1-year delay and became 2022 to 2032.

2. Nature of the Proposed Change		Status
2.1	<b>Is it clear how the proposed change will operate, and therefore what the likely environmental impacts will be?</b>	<b>Yes</b>
	<p>London Luton Airport (LLA) and London Stansted Airport (STN) arrival flows share the same holding stacks at LOREL (near Royston, Hertfordshire) and ABBOT (near Sudbury, Suffolk and Great Yeldham, Essex), with the shared arrivals then separated as aircraft descend through c.8,000 ft by air traffic controllers. This separation can result in inefficiencies at both airports due to need to apply flow restriction measures if the risk of the workload becomes too great for Air Traffic Controllers (ATCOs). This ACP therefore aims to remove Luton Airport’s interaction with Stansted Airport’s arrival flows.</p> <p>No airspace changes were originally proposed to any departures<sup>2</sup> and the ACP is not related to the separate London Luton Airport Limited (LLAL)<sup>3</sup> Development Consent Order (DCO) application for works that will allow the airport to grow from the current permitted capacity of 18 million passengers per annum (mppa) to 32 million mppa. Although this ACP is not related to the ‘Expansion of London Luton Airport’ DCO, the Sponsors have undertaken an environmental assessment for ‘with-DCO’ and ‘without-DCO’ scenarios to ensure both potential outcomes are considered. It should be noted the forecasts for the without-DCO scenario assume the airport is operating at its permitted capacity in the opening year (2022) and therefore there is no increase in aircraft movements over the forecast period.</p> <p>This ACP has the potential to alter traffic patterns below 7,000 ft over an inhabited area; therefore, this is scaled as a Level 1 ACP in accordance with CAP 1616. The Sponsors identify that as a result of the proposal there will be<sup>4</sup>:</p> <ul style="list-style-type: none"> <li>• No changes to Stansted STARs but some changes to Stansted standard instrument departures (SIDs)<sup>5</sup>;</li> </ul>	

<sup>1</sup> CAP1498: Definition of Overflight defines overflight as "An aircraft in flight passing an observer at an elevation angle (approximately the angle between the horizon and the aircraft) that is greater than an agreed threshold, and at an altitude below 7,000 ft".

<sup>2</sup> There has been an amendment to Stansted Airport departures due to an issue identified at Stage 5 of the ACP process – see Question 16 for further detail

<sup>3</sup> London Luton Airport Ltd (LLAL) is the company that owns Luton Airport and London Luton Airport Operations Limited (LLAOL) is the operator of Luton Airport and the joint sponsor for this ACP.

<sup>4</sup> See CAA Operational Assessment for more detail

<sup>5</sup> See Question 16

- Reduced need for Stansted arrivals to use the extant LOREL and ABBOT holds;
- Revision and implementation of 10 STARs into Luton Airport, removing the interdependency of the current STARs and therefore resulting in a change in traffic patterns for Luton traffic at upper altitudes;
- A new hold for Luton arrivals over Graham Water Reservoir which would be ‘rarely’ used;
- A change to traffic patterns between 5,000 ft and 8,000 ft as aircraft exit the Standard Terminal Arrival Routes (STAR) to the final approach, resulting in a change in areas overflown below 7,000 ft; and
- Minimal changes for Luton arrivals below 5,000 ft with aircraft being vectored in on arrival like that occurring today.

In summary it is considered that the ACP is unlikely to lead to additional adverse impacts on noise, local air quality, tranquillity, or biodiversity. However, the change is likely to lead to an increase in fuel burn and therefore consequential greenhouse gas emissions (expressed as CO<sub>2</sub>e). A further detailed review of the Sponsors’ environmental assessment, and adherence to relevant policy and guidance, is provided in the proceeding sections of this report.

#### **Local Air Quality**

Consistent with the government’s environmental objective with respect to air navigation, to minimise local air quality emissions and ensure that the UK complies with its international obligations on air quality, an assessment of local air quality is required where there is the possibility of pollutants breaching legal limits following the implementation of an airspace change (or worsening an existing breach of legal limits). The Sponsors have qualitatively determined that there is no impact on local air quality as there are unlikely to be any changes in aircraft operations below 1,000 ft. The CAA agrees that this is a reasonable conclusion to make, as based on the effects of mixing and dispersion it is considered that emissions from aircraft above 1,000 ft are unlikely to have a significant impact on local air quality.

#### **Noise**

The Sponsors have monetised the health and amenity impact of the proposed change using the Department for Transport’s (DfT) Transport Appraisal Guidance (TAG) Noise Impacts Worksheet. This assessment concluded that the with-DCO scenario is likely to have a net improvement in adverse impacts of aircraft noise, reducing the number of people affected by noise levels in excess of the Lowest Observed Adverse Effect Level (LOAEL)<sup>6</sup> and resulting in a Net Present Value (NPV) of £402,581<sup>7</sup>. The Sponsors have therefore assessed that the change reduces the total adverse effects on people as per Altitude-Based Priority A<sup>8</sup>. However, it is of the CAA’s opinion that some of this benefit is a result of the modelling assumptions applied by the Sponsor; therefore, as there are minimal changes below 4,000 ft the benefit is likely to be lower than that presented within the ACP and likely to be closer to the no change in impacts. Additionally, the TAG appraisal for the without-DCO scenario shows that change is likely to lead to a minor increase

<sup>6</sup> There is no one threshold at which all individuals are considered to be significantly adversely affected by noise. However, it is possible to set a Lowest Observed Adverse Effect Level (LOAEL) that is regarded as the point at which adverse effects begin to be seen on a community basis. For the purposes of assessing and comparing the noise impacts of airspace changes, the government has set a LOAEL of 51dB L<sub>Aeq16h</sub> for daytime noise and 45dB L<sub>Aeq8h</sub> for night-time noise.

<sup>7</sup> Excluding daytime impacts below 51 dB L<sub>Aeq16h</sub>

<sup>8</sup> Altitude-Based Priority A: “in the airspace from the ground to below 4,000 feet the government’s environmental priority is to limit and, where possible, reduce the total adverse effects on people” (Air Navigation Guidance 2017, p. 17).



in total adverse impacts as measured by TAG and therefore a negative NPV of -£30,221<sup>9</sup>. However as stated earlier, the CAA's opinion is that there is likely to be no change in impacts.

Regarding noise under the hold, the CAA concludes that noise exposure levels will be less than the LOAELs and therefore, there are no anticipated adverse impacts on health and quality of life, based on expected hold use and because it has been designed at a level above 8,000 ft. The aircraft in the hold will likely be audible but not to the extent that they will impact health and quality of life as measured by TAG.

#### **CO<sub>2</sub> and Fuel Burn**

The Sponsors have concluded that the change is likely to result in an overall increase in fuel burn and therefore greenhouse gas emissions as in general Luton Airport aircraft will fly further before they land at upper levels. There is also expected to be a reduction in fuel burn for aircraft arriving at Stansted Airport due to the reduced need to aircraft, however, the reduction in Stansted Airport emissions is not enough to offset the increase at Luton Airport. In summary the CO<sub>2</sub> impacts are predicted:

- The Sponsors have assessed that in the opening year (2022) for both with and without-DCO scenarios, 70,740 Luton arrivals would be impacted resulting in a total increase of 7,699 tonnes of CO<sub>2</sub>e (tCO<sub>2</sub>e). Additionally, the Sponsors have concluded that 101,719 Stansted arrivals would be impacted by the change, resulting in a benefit of 1,555 tCO<sub>2</sub>e in 2022;
- In 2032, without Luton's DCO, the ACP would result in an increase of 7,699 tCO<sub>2</sub>e for the 70,740 Luton arrivals and a decrease of 3,533 tCO<sub>2</sub>e for the 102,410 Stansted arrivals;
- In 2032, if Luton's DCO is approved, the changes would result in an increase of 7,762 tCO<sub>2</sub>e for the 91,500 Luton arrivals and a decrease of 3,533 tCO<sub>2</sub>e for Stansted arrivals.
- Over the 10-year forecast period the without-DCO scenario is appraised by the Sponsors as leading to an increase of 56,703 tCO<sub>2</sub>e;
- Over the 10-year forecast period the with-DCO scenario is appraised by the Sponsors as leading to an increase of 57,052 tCO<sub>2</sub>e;
- According to the output of TAG workbooks, for the without-DCO scenario, the Sponsors assessed the GHG NPV as -£432,274 (non-traded) and -£1,253,159 (traded)<sup>10</sup>; and
- For the with-DCO scenarios the design would yield a negative GHG NPV of £434,606 for the non-traded sector, and a negative NPV of £1,262,843 for the traded sector which reflects a disbenefit in greenhouse gases and fuel burn.

Due to the way the Sponsors modelled the fuel burn and CO<sub>2</sub> emissions, the emissions for the baseline do-nothing scenario were not provided and only the relative change in emission were provided. For context, in the publicly available 2019 sustainability report<sup>11</sup> the airport's 2019 carbon footprint was reported as 12,151 tCO<sub>2</sub>e. It should be noted that this footprint only includes Scope 1<sup>12</sup> and Scope 2<sup>13</sup> emissions and therefore does not include aircraft

<sup>9</sup> Excluding daytime impacts below 51 dB L<sub>Aeq16h</sub>

<sup>10</sup> NPV of the traded sector is not summarised as part of the Sponsor's assessment score as the traded sector is assumed to be internalised through marked prices

<sup>11</sup> <https://www.london-luton.co.uk/LondonLuton/files/2e/2ee042ae-0b64-4d4f-8c92-1f73ac3059be.pdf>

<sup>12</sup> Scope 1 emissions are direct emissions from owned or controlled sources (e.g., combustion in airport boilers and airport owned vehicles)

<sup>13</sup> Scope 2 emissions are indirect emissions from purchased energy (e.g., electricity)



	<p>emissions which are classed as being Scope 3<sup>14</sup>.</p> <p><b>Tranquillity</b></p> <p>The consideration of impacts upon tranquillity is with specific reference to National Parks and Areas of Outstanding Natural Beauty (AONB), and any local ‘tranquil’ areas identified through community engagement, which are subsequently reflected within an ACP’s design principles. In line with the DfT’s altitude-based priorities, airspace change sponsors are encouraged, where it is practical, to avoid overflight of National Parks or AONBs (Areas of Outstanding Natural Beauty) below 7,000 feet. The Chilterns AONB is the only such receptor identified by the Sponsors as being potentially impacted by this change. With respect to the Chilterns AONB, the Sponsors have concluded that there is no change in tranquillity as result of this airspace change.</p> <p><b>Biodiversity</b></p> <p>The Sponsors provided high-level statements with regards to biodiversity, concluding that the airspace change “<i>would not have an impact on biodiversity because they do not involve ground infrastructure changes</i>”. The CAA agrees that this is a reasonable conclusion to make as CAP1616 states that ACPs that do not involve ground-based infrastructure are “<i>unlikely to have an impact on biodiversity</i>” and as such are “<i>are unlikely to have a direct impact that would engage the Birds or Habitats legislation</i>”.</p>	
<p><b>3. Secretary of State Call-in Noise Criterion</b></p>		<p><b>Status</b></p>
<p>3.1</p>	<p><b>Is the proposal likely to meet the Secretary of State’s criterion for call-in on noise impacts? If yes, has the additional assessment on that criterion been undertaken and what are the results? If no, what is the rationale for that conclusion?</b></p> <p><i>The criterion, as set out in the DfT’s Air Navigation Guidance (2017)<sup>15</sup> is that the proposed airspace change could lead to a change in noise distribution resulting in a 10,000 net increase in the number of people subjected to a noise level of at least 54 dB<sup>16</sup> as well as having an identified adverse impact on health and quality of life.<sup>17</sup></i></p>	<p><b>No</b></p>
	<p>Direction 6(5)(c) states that an ACP shall meet call-in Criterion C if it could lead to a change in noise distribution resulting in a net increase of 10,000 people subjected to a noise level of at least 54 dB L<sub>Aeq,16hr</sub> and have an identified adverse impact on health and quality of life. In CAP 2092; “CAA Policy on Secretary of State Call in for Airspace Change Proposals”, the CAA indicated how it would interpret “an identified adverse impact on health and quality of life”.</p> <p>Guidance states that to enable this criterion to be assessed, the CAA must ensure that a change sponsor submitting any ACP for a decision includes either (a) an assessment of whether the 54 dB L<sub>Aeq,16h</sub> test set out in Criterion C is met, based on satisfactory noise modelling, or (b) where agreed</p>	

<sup>14</sup> Scope 3 emissions are a consequence of the activities of the airport but occur from sources not owned or controlled by the airport.

<sup>15</sup> The DfT’s call-in criteria are set out in The Civil Aviation Authority (Air Navigation) Directions 2017, Section 6, paragraph (5). These Directions are replicated in Annex D of the DfT’s Air Navigation Guidance 2017.

<sup>16</sup> L<sub>Aeq,16h</sub> noise exposure.

	with the CAA, other satisfactory evidence demonstrating that the anticipated change in noise impacts will not meet this criterion. When assessing against the first sub-clause of Direction 6(5)(c), the CAA concludes that the proposed change would not lead to a 10,000 net increase in the number of people subjected to a noise level of at least 54 dB L <sub>Aeq 16hr</sub> , and there is no requirement to assess whether the ACP has an identified adverse impact on health and quality of life. Therefore, the CAA's assessment is that this criterion is not met.	
<b>4. Statement of Need</b>		<b>Status</b>
4.1	<b>Does the Statement of Need include any environmental factors?</b>	<b>No</b>
	The Statement of Need does not include any specific environmental factors. The need for the change, as stated within the Revised Statement of Need (ref.2401) is to address 'a latent [safety] risk within the sector' which was identified following an internal safety report (TC [Terminal Control] Essex Safety Survey) by NERL and caused by arriving traffic to Luton Airport and Stansted Airport sharing aircraft holds at LOREL and ABBOT. The intended outcomes for the change were stated as being 'a reduction in complexity, workload and delays in relation to arriving traffic at Luton and, as a consequence, Stansted.'	
<b>5. Design Principles</b>		<b>Status</b>
5.1	<b>Does the final set of Design Principles include any environmental objectives?</b>	<b>Yes</b>
	The Sponsors developed a final set of 15 design principles (DPs) and allocated these DPs a priority ranking of 1 to 8. Of the 15 DPS, five were assigned as being environmental and two were assigned as being economic DPs, despite also containing environmental objectives. <ul style="list-style-type: none"> <li>• DP2 - Must meet the 3 aims of the NPSE [Noise Policy Statement for England 2010], Air Navigation Guidance 2017 and all appropriate Government aviation policies, and updates thereof (Priority 2);</li> <li>• DP7 - Should enable continuous descent from at least 7,000ft &amp; facilitate continuous descent above that (Priority 3);</li> <li>• DP8 - Minimise the requirement to change future low altitude arrival flows within the next ten years (Priority 4);</li> <li>• DP10 - Should provide an equitable distribution of traffic where possible, through e.g., use of multiple routes, new route structures, options/mechanisms for respite (Priority 5);</li> <li>• DP11 (economic) – Reduce fuel burn (Priority 5);</li> <li>• DP12 (economic) – Minimise potential increases in fuel burn (Priority 5); and</li> <li>• DP13 - Should avoid overflying the same communities with multiple routes, &amp; take into account routes of other airports, below 7,000ft (Priority 6).</li> </ul>	



5.2	<b>Does the proposal explain how and to what extent the final airspace design achieves any environmental Design Principles?</b>	<b>Partial</b>
<p>In the final proposal at Step 4b <i>‘Proposed changes to London Luton Airport Arrivals CAP1616 Stage 4 Step 4B Airspace Change Proposal’</i> the Sponsors do not explain how and to what extent the final design meets the seven design principles with environmental objectives referred to in Question 5.1. The Sponsors do however state that at Step 2a (Options Development) they “evaluated each Design Option and rejected those that did not best meet the Design Principles”. It should be noted that the final proposed option (Option 1a) was introduced at Stage 3 and therefore was not subject to an evaluation as part of the Step 2a Design Principle Evaluation.</p> <p>However, at Step 4a the Sponsors also produced a consultation response document <i>‘Proposed changes to London Luton Airport Arrivals CAP1616 Stage 4 Step 4A(i) Consultation Response Document’</i>. This document sets out if and then how Option 1a meets the design principles:</p> <ul style="list-style-type: none"> <li>• DP2 – The Sponsors consider that this DP meets the three aims of the NPSE “as far as possible”. However, it should be noted that the DP was assigned the second highest priority and said the option “must meet” the design principle. The three aims of the NPSE are to avoid significant adverse impacts on health and quality of life; mitigate and minimise adverse impacts on health and quality of life and where possible, contribute to the improvement of health and quality of life. The Sponsors conclude that it meets the first aim as the option introduces no new significant impacts, it meets the second aim as the options were designed to mitigate and minimise adverse impacts, and it meets the third aim as the option provides some positive impacts. The CAA agrees that the proposal is unlikely to introduce significant adverse impacts as defined by the NPSE, however, to determine where significant adverse impacts begin the Sponsors would first need to define a threshold for the Significant Adverse Observed Effect Level (SOAEL). The NPSE does not define a SOAEL for air navigation purposes or indeed other sources of noise to allow “...policy flexibility until further evidence and suitable guidance is available”;</li> <li>• DP7 – The Sponsors conclude that the final design does not meet this DP because extant “Heathrow, London City and Stansted departures require LLA arrival flows to fly level at 5,000 ft”. Although, whilst the design does not allow Continuous Descent Approaches (CDA) the Sponsors identify the distance of level flight would be reduced;</li> <li>• DP8 – The Sponsors conclude that the DP is not met. It is stated that the “design is as consistent as possible with the AMS (Airspace Modernisation Strategy) Government strategy [Airspace Modernisation Strategy], however the design decisions were driven by consultation feedback which has been contrary to the full intent of the AMS.” In addition, the Sponsors state that the ACP does not “prejudice any potential future airspace design associated with NATS and LLA’s compliance with the Government’s AMS”;</li> <li>• DP10 – The Sponsors conclude that the DP is partially met as the final design “provides a distribution of traffic via vectoring but does not provide route structures or mechanisms for respite”. However, the decision to progress with vectored arrivals rather than Precision Based Navigation (PBN) was influenced by stakeholder feedback and seen as being “less unfair than PBN routes”;</li> <li>• DP11 – The Sponsors conclude that this DP is not met as the there is an increase in fuel burn “due to the requirement to separate LLA arrival flows from Stansted, which necessarily means making routes slightly longer”;</li> <li>• DP12 – Although the Sponsors conclude that DP11, related to reducing fuel burn, is not met the Sponsors do conclude that DP12, related to minimising fuel burn, is met as “design recommendation 3.01, led to the routes being shortened”. It is the CAA’s view that although design</li> </ul>		



	<p>recommendation 3.01<sup>18</sup> does reduce the fuel burn impact as initially assessed for Option 1, there is no evidence that the fuel burn for Option 1a has been minimised as far as practicable; and</p> <ul style="list-style-type: none"> <li>• DP13 – The Sponsors do not conclude whether this DP is met but do state that the final design “uses tactical vectoring from the hold to the runway, which negates the need to publish specific routes (which could require traffic to accurately overfly the same communities)” and that “routes of other airports would be considered by controllers on a tactical (case by case) basis”.</li> </ul>	
5.3	<b>Were there any proposed environmental Design Principles that were rejected from the final set? If so, is the rationale for rejecting those Principles reasonable?</b>	No
	The Sponsors initially produced a longlist of 23 design principles (DPs), which were narrowed down to the final set of 15 DPs through a series of iterations, which, combined several environmental design principles. Therefore, although the final set of design principles was reduced, it is considered the intentions of the initial design principles were preserved in the final set and the rationale for joining design principles is reasonable.	
5.4	<b>Were there any design options during the airspace change process that might have better met the environmental Design Principles than the final proposal as submitted to the CAA? If so, is the rationale for rejecting those options set out?</b>	No
	<p>At Stage 3 (Consultation) the Sponsors consulted on two options:</p> <ul style="list-style-type: none"> <li>• <b>Option 1 Vectoring</b> – to establish a new hold or stack for LLA arrivals, with associated airspace and routes at c. 8,000 ft and above, with air traffic controllers vectoring and/or using shortcuts to descend arrivals down from 8,000 ft to the runway. It is estimated that during the year of implementation and based on an assumed peak of 24 movements per hour, 17 aircraft would be given vectors and 7 aircraft would be given shortcuts; and</li> <li>• <b>Option 2 PBN Routes with Vectoring</b> - to establish a new hold or stack for LLA arrivals, with associated airspace and routes at c. 8,000 ft and above but introducing Performance Based Navigation (PBN) transitions [between the hold and the joining point<sup>19</sup>], which, would be used alongside air traffic controller vectoring. The Sponsors estimate that during the year of implementation and based on an assumed peak of 24 movements per hour, 5 aircraft would be given vectors, 7 aircraft given shortcuts and 12 aircraft given a PBN arrival route.</li> </ul> <p>Both Option 1 and Option 2, are similar in design but the main difference is the method aircraft would take to descend from the hold to the runway. Option 2 proposed to establish predetermined arrival flightpaths in the form of PBN routes to be used alongside the vectors and shortcuts that formed Option 1.</p> <p>The Sponsor’s preferred option at Stage 3 (Consultation) was Option 2, as the Sponsors evaluated this option as being more aligned</p>	

<sup>18</sup> Design recommendation 3.01 was identified in the Step 4A(i) Consultation Response Document as shortening the routes consulted on at Stage 3, particularly reducing the upper arrival routes ending at the hold.

<sup>19</sup> The joining point is a point on the extended runway centreline, where aircraft intercept the Instrument Landing System (ILS).



	<p>with central government’s Airspace Modernisation Strategy (AMS) as it would result in a greater increase in resilience (defined by the Sponsors as a reduction in controller/pilot interactions) due to the availability of predetermined flightpaths (RNAV1 transitions).</p> <p>Following consultation feedback, at Stage 4 the Sponsors chose to progress with Option 1 as this option reduced the amount of concentration along flight paths. The Sponsors also refined the design of Option 1, and this became Option 1a. The refinement involved moving and reorientating the hold and amending its availability so that aircraft would be 1,000 ft higher under normal operating conditions. The Sponsors also assessed that the refinement reduced some of the fuel burn and CO<sub>2</sub> disbenefit by shortening some of the arrival routes and keeping some aircraft higher for longer.</p> <p>It is considered that both options have different merits against the environmental design principles, however, the rationale for selecting the Sponsors’ initial preferred option (Option 2) and subsequently the final submitted option (Option 1a) is clearly set out. The Sponsors’ final submitted proposal was primarily based on consultation feedback where there was an overriding preference for reducing the likelihood of flightpath concentration.</p>	
<b>6. Options Appraisal</b>		<b>Status</b>
6.1	<b>Have environmental impacts been adequately reflected and assessed in the Options Appraisal?</b>	<b>Yes</b>
	<p>The CAA expects that environmental assessments are used within a Sponsor’s consultation material. Where any trade-offs are being made between environmental impacts, these should also be illustrated by the change sponsor. The environmental trade-offs are the subject of over-arching government policy, such as the altitude-based priorities, which determine how competing environmental priorities should be handled. The CAA takes these altitude-based priorities into account when considering the potential environmental impact of airspace changes. The CAA categorise proposals for a permanent change to airspace design into ‘Levels’ depending on the characteristics of the change. This change has the potential to alter traffic patterns below 7,000 ft over an inhabited area; therefore, it is scaled as a Level 1 change. For Level 1 changes, the change sponsor is required to consider the environmental impacts on local air quality, noise, CO<sub>2</sub>, tranquillity and where relevant, biodiversity.</p> <p>The Sponsors have assessed all environmental aspects required for a Level 1 ACP. The Sponsors conducted three phases of options appraisal, Initial (Phase 1), Full (Phase 2) and Final (Phase 3). Each phase of options appraisal builds on the previous options appraisal. The CAA’s assessment of the options appraisal is contained within:</p> <ul style="list-style-type: none"> <li>• CAA Initial Options Appraisal Assessment;</li> <li>• CAA Full Options Appraisal Assessment; and</li> <li>• CAA Final Options Appraisal Assessment.</li> </ul> <p>In summary the Initial Options Appraisal was qualitative and the Full and Final Options Appraisal quantitatively assessed and monetised relevant impacts, namely noise and CO<sub>2</sub>. The Sponsors qualitatively assessed local air quality, tranquillity, and biodiversity in all phases of the options appraisal.</p> <p>The Sponsors initially produced environmental assessments for 2021<sup>20</sup> and 2031 and the Sponsors undertook much of their assessment work for the</p>	

<sup>20</sup> Question 6.6 of The Full Options Appraisal identifies that the original timescale to implement was May 2021, however, due to delays as result of Covid-19 the implementation date has been revised to February 2022.

Full Options Appraisal prior to the Covid-19 pandemic. However, as stated earlier, due to delays because of Covid-19 a further year was added to these assessment periods therefore, the assessments were updated to cover the period from 2022 to 2032.

The Sponsors assumed two scenarios within its environmental assessment, one which assumed a Development Consent Order (DCO) is granted and one which assumed the DCO is not granted. The Sponsors have articulated that they are forecasting the same movements in the revised implementation year of 2022 as was originally forecast in 2021. However, for the revised +10-year forecast with-DCO scenario, the Sponsors predict an increase in movements of 1.1% (or 2.8 arrivals per day) and there is no change in the movements predicted for the 2032 no-DCO scenario as previously assumed in 2031.

Due to the 1.1% increase in aircraft movements forecast between 2031 and 2032 for the with-DCO scenario, the Sponsors have argued in the Full Options Appraisal, that it would not be proportionate to update the original 2031 noise assessments and therefore concluded the previous noise assessments remain valid. The CAA agrees with this rationale for not updating the noise assessment for the increase in movements of 1.1%.

A summary of the environmental assessments detailed within the Final Options Appraisal is presented below:

#### **Local Air Quality**

Assessment of local air quality are required where there is the possibility of pollutants breaching legal limits following the implementation of an airspace change (or worsening an existing breach of legal limits). This is determined where there is likely to be a change in aviation emissions (by volume or location) below 1,000 feet, and the location of the emissions is within or adjacent to an identified air quality management area (AQMA). The Sponsors have qualitatively determined that there is no impact on local air quality as there are no changes below 1,000ft.

#### **Noise**

The Sponsors produced noise outputs in the form of monetised health impacts using the DfT TAG noise impact tool, Leq contours, N-above contours (N60 and N65) and overflight contours. For the purposes of assessing airspace changes, the 51 dB  $L_{Aeq,16h}$  contour is considered the Lowest Observed Adverse Effect Level (LOAEL) for daytime noise, which, is regarded as the point at which adverse effects begin to be seen on a community basis. For night-time noise, the LOAEL is set to 45 dB  $L_{Aeq,8h}$ . It is considered that noise from aircraft flying at or above 4,000 feet is less likely to affect the key noise metrics used for determining adverse effects (i.e., the LOAEL). The average summer day  $L_{Aeq,16hr}$  contour shows a 0.1% decrease in the area encompassed by the 51 dB  $L_{Aeq,16h}$  Contour for the opening year (2022) and a 0.3% reduction in the number of people encompassed by the contour from 35,222 to 35,118. Similarly, the night-time  $L_{Aeq,8h}$  contours show changes in all presented contour bands from 45 dB  $L_{Aeq,8h}$  of between 0 and -0.2%. These findings remain the same for the 2032 assessment year.

As most changes occur outside of the 51  $L_{Aeq,16h}$  contour and are above 5,000ft, including under the hold, the consultation material provides indicative noise levels for aircraft expressed as maximum sound level ( $L_{Amax}$ ). Using the data presented and conservatively assuming that aircraft above 5,000ft produce a noise level of 60 dB  $L_{Amax}$ , and an aircraft overflight sound exposure level (SEL) is equivalent to  $L_{Amax} +10dB$ , there would need to be approximately a daily average of 700 flights within the 16h daytime period for the noise level at 5,000 ft to be above the 51 dB  $L_{Aeq,16h}$  daytime LOAEL. The Sponsors forecasts the highest number of movements occur in 2032 for the 'with-DCO' scenario where the airport is forecast to handle 91,500 arrivals per year (an average of 250 movements per day). Therefore, it is considered unlikely that noise exposure levels above the LOAEL would occur at a height above 5,000ft and under the new hold, which has a designed base level of 8,000 ft.

Further clarification questions were sent to the sponsors regarding their noise modelling (ref, Clarifications Q&A additional October 2021 ref. Clarifications Q&A September 2021). The Sponsors' clarification response described that the noise modelling for the with-ACP scenarios was theoretical and that the lateral dispersion around the centreline was based on engagement with controllers on how they would vector aircraft on



arrival. This approach is considered good practice for noise modelling but is inconsistent with the approach used for the do-nothing baseline scenario which assumed the current lateral dispersion for vectored arrivals based on actual aircraft track data, consistent with the Category A methodology specified in CAP2091. As a result of this modelling approach, the Sponsors demonstrated a net present value (NPV) monetised TAG noise impact benefit of up to £454,597. However, it is considered that because there are minimal changes below 5,000 ft, and because aircraft operations above 4,000 ft are considered less likely to affect the key noise metrics used for determining adverse effects, the monetised TAG NPV benefit is likely to be reduced and lie somewhere between £0 and the stated NPV value.

Within the clarification response the Sponsors highlighted that the lateral dispersion methodology for the with-ACP scenarios was developed to allow for a more transparent assessment of overflight and ensure consistency between overflight and noise calculations. The ANG 2017 states that for “airspace changes where noise levels are expected to lead to fewer measurable impacts on health and the quality of life, greater consideration should be given to how the number of overflights is distributed”. The CAA therefore welcomes the Sponsors’ assessment of overflight as a means of informing communities further away from the airport about the likely impact of proposed changes. The overflight contours, which portray the pattern and dispersion of aircraft below 7,000 ft, show a reduction in the number of people overflown by less than 20 flights per day, an increase in the number of people overflown by 50 - 100 flights per day and a reduction in the number of people overflown by over 100 flights per day.

In addition, as most of the airspace changes occur above the point at which adverse impacts typically occur, the Sponsors modelled daytime noise contours down to 45 dB  $L_{Aeq,16h}$ . It should be noted the CAA recommends in CAP1616a para 1.21 that daytime noise contours should be portrayed from 51 dB  $L_{Aeq,16h}$ , based on government airspace policy. Noise levels below 51 dB  $L_{Aeq,16h}$  are below the level at which government policy identifies that adverse effects start to be realised on a community basis.

In addition, the N65 contours have also been presented and these show increases of between 0.6% to 1.6% in area for N65 ten events or less per average summer day. It is the CAA’s view that changes in the N65 contour area for 50 and 100 events per average summer day are likely due to the modelling process and not related to the proposal. Average summer night N60 contour areas change by +2% (N60 one event) to -0.6% (N60 ten events).

It should be noted that the Sponsors have not taken account of local plans within the assessment. CAP1616 para 139 requires that the change sponsor “Must also have regard to local plans, such as what is anticipated under Local Development Frameworks, which will require the change sponsor to engage as needed with local authorities and local communities” and CAP1616 para B47 requires that “when producing noise contours or footprints, change sponsors must take account of planned property developments when determining impacts and those affected”. The CAA sought clarification<sup>21</sup> on this requirement with the Sponsors. The Sponsors confirmed that although they had not taken account of local plans the population data underpinning the noise and overflight assessment did include population growth that is expected to happen naturally over time. Additionally, the Sponsors confirmed that below 5,000ft the design is like that already taking place today and therefore if there were any confirmed developments these would be overflown anyway and that between 7,000ft and 5,000ft where changes in aircraft behaviour are proposed, the airspace is constrained and therefore it would not be practicable to avoid any developments if indeed there are any.

#### **CO<sub>2</sub> and Fuel Burn**

The Sponsors have provided an analysis of fuel and CO<sub>2</sub> emissions for both Luton and Stansted Airports. The Sponsors have assessed that in the opening year and 2032 there will be an average increase in fuel burn of 89kg per flight (285 kgCO<sub>2</sub>e) for the without-DCO scenario. This disbenefit is slightly reduced to 80kg of fuel (254 kg CO<sub>2</sub>e) for the 2032 with-DCO scenario. Some of this increase is partially offset by a reduction in fuel burn for

<sup>21</sup> See Ref27, Ref28, Ref29 and Ref41 of the Clarification Responses

	<p>Stansted arrivals by 5kg of fuel (15 kgCO<sub>2</sub>e) per flight in 2022 and 11kg of fuel (35 kgCO<sub>2</sub>e) per flight in 2032.</p> <p>In the Final Options Appraisal, the Sponsors have reported the overall increase in CO<sub>2</sub> emissions as 6,144 tCO<sub>2</sub>e (2022 both with and without-DCO), 4,166 tCO<sub>2</sub>e (2032 without-DCO) and 4,229 tCO<sub>2</sub>e (2032 with-DCO).</p> <p><b>Tranquillity</b></p> <p>The consideration of impacts upon tranquillity is with specific reference to National Parks and Areas of Outstanding Natural Beauty (AONB), plus any local ‘tranquil’ areas identified through community engagement, which are subsequently reflected within an ACP’s design principles. In line with the Department for Transport’s altitude-based priorities, airspace change sponsors are encouraged, where it is practical, to avoid overflight of National Parks or AONBs below 7,000 feet. The Chilterns AONB is within the Potentially Affected Area as identified on the CAA’s Airspace Change Portal. With respect to the Chilterns AONB, the Sponsors have concluded that there is no change in tranquillity as there are no proposed changes below 5,000ft.</p> <p><b>Biodiversity</b></p> <p>The Sponsors provided a high-level rationale to the scope out the assessment of biodiversity, concluding that the airspace change “<i>would not have an impact on biodiversity because [...] [it does] not involve ground infrastructure changes.</i>” CAP1616 requires explicit consideration and assessment of biodiversity only when necessary and the requirement to assess biodiversity will typically be captured and considered as a specific factor in the design principles for each proposal when taking account of local circumstances. Given the evidence presented, the CAA considers that the high-level rationale used to scope out the assessment of biodiversity is reasonable. As stated within CAP1616, explicit consideration and assessment of biodiversity is only required where necessary and ‘<i>inclusion within the design principles is expected to be the full extent of any consideration in most instances</i>’.</p>	
6.2	<p><b>Is the final proposal as submitted to the CAA the airspace design option that also produced the best environmental impacts as assessed by the Options Appraisal? If not, does the rationale for selecting the preferred option adequately explain this choice?</b></p>	<b>Yes</b>
	<p>The Sponsors made it clear why Option 2 is preferred over Option 1 and calculated the relevant NPV of each option over the 10 years appraisal period. In the submission, the Sponsors argued that only Option 2 aligns with AMS Initiative 8 (Satellite Navigation Route Redesign) because it would introduce PBN routes to connect the hold to the final approach for the landing runway; whereas Option 1 does not provide any such structure. The Sponsors also compared the NPV for each scenario concluding that Option 2 is likely to result in a greater disbenefit than Option 1, however, because Option 2 was the only option to align with AMS initiative 8, it was identified as the Sponsor’s preferred option.</p> <p>Following the consultation undertaken at Stage 3, the Sponsors articulated that its proposed design from consultation was not their preferred design and was progressed following stakeholder feedback. Following consultation, Option 1 was modified, moving the position of the hold, and increasing the minimum holding altitude by 1,000 ft to produce Option 1a. This final proposed option uses vectors and shortcuts and does not use RNAV1 transitions <sup>22</sup>. As a consequence of the modifications, fuel burn disbenefit is estimated to be reduced compared with Options 1 and 2, whilst the noise benefit is unchanged. Thus, the final proposed Option 1a results in the best environmental impacts of the options considered. It should be noted that where options for route design from the ground to below 4,000 ft are similar in terms of the number of people affected by total adverse</p>	

<sup>22</sup> The design has RNAV1 transitions which are only to be used in the event of radio communications failure



	noise effects, preference should be given to the option which is most consistent with existing published airspace arrangements. It is considered that Option 1a is the option which is most consistent with existing published airspace arrangements below 4,000ft and the Sponsors' monetised WebTAG outputs also conclude that this option results in the least number of people affected by total adverse noise effects.	
<b>7. Noise [for Level 1 and Level M1 airspace change proposals]</b>		<b>Status</b>
<b>7.1</b>	<b>Has the noise impact been adequately assessed and presented in both the consultation material and the final submission to the CAA, taking account of scalability and proportionality?</b>	<b>Yes</b>
	<p>The SAIP AD6 Proposal and the Airspace Consultation Document include a description of the environmental impacts of the proposed airspace change. Following CAP1616 and CAP1616a requirements, the noise contours (<math>L_{Aeq,16h}</math> and <math>L_{Aeq,8h}</math>) are based on Luton traffic data for a typical summer day (16 June – 15 September) over a 10-year appraisal period from 2022 to 2032. The noise modelling has been undertaken against the highest category of modelling (Category A) as described in CAP2091; “CAA Policy on Minimum Standards for Noise Modelling”.</p> <p>The Sponsors appraised the noise impact between 2021 and 2031 using the Federal Aviation Administration’s (FAA’s) Aviation Environmental Design Tool (AEDT) version 3.0b. A.1.4. Due to delays brought about as a result of the COVID-19 pandemic the Sponsors assumed that air traffic would return to pre-pandemic levels and therefore concluded that the traffic forecasts and related noise assessments remain valid, albeit with the assessment years rolled forward 1-year. Thus, the 10-year appraisal period became 2022 to 2032 for the purpose of the Final Options Appraisal. Within the forecasts, the Sponsors also assumed an aircraft fleet replacement programme and therefore assumed the introduction of newer and quieter aircraft over the 10-year appraisal period. It should be noted that the Sponsors used Noise Consultants Limited to provide their noise contours. Noise Consultants Limited have not previously undertaken noise contouring for the airport and therefore the contours appear different to those normally produced by the airport.</p> <p>When considering noise impacts, the CAA weigh the outcomes from ‘primary’ metrics over ‘secondary’ metrics. Primary metrics are those that are used to quantify significant noise impacts (for example monetised TAG outputs). Secondary or supplementary metrics are those that are not being used to determine significant impacts, but which are still able to convey noise effects (for example N65 contours and <math>L_{max}</math> levels). In addition, whilst not a noise metric, overflight contours are considered a secondary metric for the purposes of decision-making. For stakeholder engagement purposes <math>L_{Aeq}</math> noise exposure contours should be portrayed, showing noise levels from 51 dB <math>L_{Aeq,16h}</math> (daytime) and 45 dB <math>L_{Aeq,8h}</math> (night-time). For communities further away from airports that will not be affected by noise above the LOAELs, the ANG 2017 states that supplementary [secondary] metrics must also be used to inform communities about the likely impact of proposed changes. Metrics that must be considered for these purposes include the overall number of overflights and number above metrics: N65 for daytime noise and N60 for night-time noise.</p> <p>Within the consultation material and final submission, the Sponsors reported the following indicators of noise:</p> <ul style="list-style-type: none"> <li>• Monetised noise impacts on amenity (annoyance), sleep disturbance, acute myocardial infarction (AMI, commonly referred to as a heart attack), stroke and dementia;</li> <li>• <math>L_{Aeq}</math> contours portrayed down to 45 dB <math>L_{Aeq,16h}</math> and 45 dB <math>L_{Aeq,8h}</math>. Including the number of households, population, area counts, and noise-sensitive buildings within noise contours. As the government has set a LOAEL of 51dB <math>L_{Aeq,16h}</math> for daytime noise the CAA has not taken account of reported noise impacts below this level;</li> </ul>	



	<ul style="list-style-type: none"> <li>• N65 (daytime) and N60 (Night-time) noise contours; and</li> <li>• Overflight contours<sup>23</sup>.</li> </ul> <p>It is considered that the Sponsors have adequately assessed and presented the noise impacts, however, there are several issues within the submission, but it is the CAA's view that these issues do not change the conclusions.</p> <ul style="list-style-type: none"> <li>• As referred to in Question 6.1, the Sponsors assumptions regarding lateral dispersion around the mean track centreline has resulted in them assessing a positive noise impact. However, it is the CAA's view that it is more likely that there will be no change in TAG monetised noise impacts;</li> <li>• Also referred to in Question 6.1, the Sponsors have reported noise impacts below the LOAEL, and this has led to them overstating the positive noise impact;</li> <li>• The Sponsors published incorrect contours as part of the SAIP AD6 Consultation Document on page 102 (Annex F-3) as the night-time <math>L_{Aeq,8h}</math> contour only show noise impacts from arriving aircraft. The CAA clarified this point with the Sponsors (see clarification 10) and the Sponsors highlighted that although these contours were incorrect, the contours used for the purpose of Virtual Exhibition events were correct and the presented outputs, including TAG Noise Impacts used correct contour data; and</li> <li>• The Sponsors have not taken account of local plans and confirmed planning developments within their noise assessments. The CAA sought clarification on this point and the Sponsors highlighted that while these have not been taken account of the constrained airspace would mean it is difficult to avoid such developments and below 5,000ft the airspace is similar today; therefore, any developments would be overflown today.</li> </ul>	
7.2	<p><b>If a noise assessment has not been undertaken by the Sponsor, has this decision been adequately explained and evidenced in both the consultation material and the final submission to the CAA, and is the rationale reasonable?</b></p>	<b>N/A</b>
	The Sponsors have undertaken a noise assessment that is proportionate for a change of this nature and monetised the impact using the DfT TAG Noise Impact workbook.	
7.3	<b>Summary of anticipated noise impacts for the final proposed airspace change.</b>	
	<p>There is no one threshold at which all individuals are considered to be significantly adversely affected by noise, however, the Government has set a LOAEL that is regarded as the point at which adverse effects begin to be seen on a community basis. The noise modelling outputs concluded that the SAIP AD6 Proposal would result in decreases in the population encompassed by noise levels in excess of the daytime LOAEL of 51 dB <math>L_{Aeq,16h}</math> (-0.3% to -0.9%) and increases in the population encompassed by noise levels in excess of 45 dB <math>L_{Aeq,8h}</math> (+0.3% to +0.6%).</p> <p>A summary of the monetised noise impacts is shown in the table below. It should be noted that the DfT TAG Noise Impact Worksheet was updated</p>	

<sup>23</sup> Overflight is a means of defining and portraying the pattern and dispersion of aircraft below 7,000 feet, and the frequency that they occur. They are based upon a perception of overflight and do not illustrate noise impacts.

as the Sponsors moved from Stage 3 to Stage 4 of the process. The Sponsors therefore updated the TAG noise assessment using the latest workbook and as a result presented a reduced monetised noise benefit. This reduction in noise benefit can be seen in the Option 1A noise impacts shown in the table below. The Sponsors did not update the noise modelling as a result of the amended design for Option 1A, which, is considered appropriate as there was no change in design below 5,000ft. Therefore, any changes in the reported impacts are linked to the updated TAG workbooks and not as a result of changes to the amended design of Option 1.

In addition, the Sponsors reported the NPV for daytime noise levels from 45 dB LAeq,16h within their Cost Benefit Analysis (CBA). However, change sponsors are advised not to model noise impacts below the 51 dB LAeq,16h LOAEL, therefore the CAA has summarised the 10-year NPV for impacts greater than the 51 dB LAeq,16hr LOAEL.

Option	Stage Impact Assessed	TAG Monetised Noise Impact (60-year appraisal period)	Households experiencing Changes in noise		Households experiencing Changes in noise		Appraised NPV CBA (over 10-year Period) [in brackets the sensitivity test results are reported which excludes impacts below 51 dB]
			Day (increase)	Day (decrease)	Night (increase)	Night (decrease)	
Option 1 (without DCO)	Stage 3	-£34,125	2,252	2,959	872	1,156	£50,290 (£16,906)
Option 1 (with DCO)	Stage 3	£454,597	2,798	3,858	979	934	£66,096 (£50,898)
Option 1A (without DCO)	Stage 4	-£30,221	2,252	2,959	872	1,156	£44,536 (-£14,972)
Option 1A (with DCO)	Stage 4	£402,581	2,798	3,858	979	934	£58,533 (£45,074)

8. CO <sub>2</sub> Emissions		Status
8.1	<b>Has the impact on CO<sub>2</sub> emissions been adequately assessed and presented in both the consultation material and the final submission to the CAA, taking account of scalability and proportionality?</b>	<b>Yes</b>
	<p>The Sponsors have adequately assessed and presented the impact on CO<sub>2</sub> in both the consultation material and final submission. As the ACP is scaled as a Level 1 change, the change sponsor is required to provide an assessment of fuel and CO<sub>2</sub> impacts of the proposed change on a per flight basis and as an annual total expressed in tonnes (tCO<sub>2</sub>e) and the monetised impact using the DfT TAG Greenhouses Gases workbook. Longer term CO<sub>2</sub> impacts over the 10-year forecast period are also required.</p> <p>The Sponsors provided an assessment of CO<sub>2</sub> impacts for the proposed change based on the increase in emissions at Luton Airport and the decrease in emission at Stansted Airport. The final assessments covered the 10-year forecast period from 2022 to 2032, however, initially these</p>	



	<p>were based on the period 2021 to 2031 but due to Covid-19 delays the assessments were ‘adapted’ to account for the new period. It should be noted that the final assessments of CO<sub>2</sub> emissions, which, were presented at Stage 4 within the Final Options Appraisal for Option 2a, were updated from the one presented for Option 2 at Stage 3 and these changes were not consulted on as the Sponsors argued the initially assessed impacts were ‘reduced’. Additionally, it should also be noted that as referred to in Question 16, the Sponsors articulated that the amendments to the airspace following the Step 2B submission do not change the conclusions previously presented.</p> <p>Fast-time simulations informed how the airspace is likely to be used for the with and without ACP scenarios and these were undertaken using the AirTOP (v2.3.28B159) software with the fuel burn and CO<sub>2</sub> impact modelled using KERMIT. As the airspace change is not facilitating growth the assessments assumed the same forecasts for with and without ACP scenarios and assumed that the westerly runway direction is used 70% of the time and the easterly direction 30% of the time. For the purposes of TAG, the proportion of traded and non-traded flights were informed using 2019 data and assumed not to change throughout the 10-year forecast period. The Sponsors modelled the CO<sub>2</sub> impact based on a relative change between with and without ACP scenarios and therefore did not show the ‘baseline’ emissions and therefore it is considered that the baseline was not fully presented. Not showing the baseline emissions does not change the presented conclusions, however, it does result in the conclusions not having context.</p> <p>Within the Options Appraisal, the Sponsors have also incorrectly stated the CO<sub>2</sub> impacts are over a 60-year appraisal period when in fact the Sponsors have only included emission over the 10-year forecast period from 2022 to 2032. Additionally, per flight emissions as required by CAP1616 were not provided within the Final Options Appraisal or within the Final Submission.</p>											
8.2	<p><b>If an assessment of the impact on CO<sub>2</sub> emissions has not been undertaken by the Sponsor, has this decision been adequately explained and evidenced in both the consultation material and the final submission to the CAA, and is the rationale reasonable?</b></p>	N/A										
	<p>The Sponsors have undertaken an assessment of CO<sub>2</sub> emissions that is proportionate for a change of this nature.</p>											
8.3	<p><b>Summary of anticipated impact on CO<sub>2</sub> emissions for the final proposed airspace change.</b></p>											
	<p>The Sponsors have assessed that this change is likely to have a negative CO<sub>2</sub> impact (i.e., an increase in emissions). This impact is as a result of increased track mileage required for the new, longer STARS; however, some of this impact is partially offset by a positive impact at Stansted Airport. Additionally, the amendment of Option 1 to form Option 1a has resulted in a further reduction in the initially assessed CO<sub>2</sub> impact. A summary of the CO<sub>2</sub> impact is presented in the table below. It can be seen from the table that the airspace change has been assessed to increase CO<sub>2</sub> emissions by between 56,703 tCO<sub>2</sub>e and 57,052 tCO<sub>2</sub>e over the 10-year appraisal period. For context, and as discussed in Question 2, Luton Airport’s 2019 carbon footprint was reported as 12,151 tCO<sub>2</sub>e.</p>											
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Option</th> <th style="width: 25%;">Overall tCO<sub>2</sub>e (10-year appraisal period)</th> <th style="width: 25%;">Overall tCO<sub>2</sub>e 2022 (Opening Year)</th> <th style="width: 20%;">Overall tCO<sub>2</sub>e 2032</th> <th style="width: 15%;">Appraised TAG Monetised Impact for the non-traded</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Option	Overall tCO <sub>2</sub> e (10-year appraisal period)	Overall tCO <sub>2</sub> e 2022 (Opening Year)	Overall tCO <sub>2</sub> e 2032	Appraised TAG Monetised Impact for the non-traded					
Option	Overall tCO <sub>2</sub> e (10-year appraisal period)	Overall tCO <sub>2</sub> e 2022 (Opening Year)	Overall tCO <sub>2</sub> e 2032	Appraised TAG Monetised Impact for the non-traded								



					sector (10-year appraisal Period) <sup>24</sup>
	<b>Option 1A (without DCO)</b>	56,703	6,144	4,166	£432,274
	<b>Option 1A (with DCO)</b>	57,052	6,144	4,229	£434,606
<b>9. Local Air Quality [for Level 1 and Level M1 airspace change proposals]</b>					<b>Status</b>
<b>9.1</b>	<b>Has the impact on Local Air Quality been adequately assessed and presented in both the consultation material and the final submission to the CAA, taking account of scalability and proportionality?</b>				<b>Yes</b>
	<p>The CAA considers that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 ft are unlikely to have a significant impact on local air quality. Therefore, the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic, and local transport infrastructures feeding the airport. However, airspace change sponsors must include consideration of whether local air quality could be impacted when assessing airspace change proposals. Change sponsors must produce information on local air quality impacts only where there is the possibility of pollutants breaching legal limits following the implementation of an airspace change (or worsening an existing breach of legal limits). The CAA deems that this is only likely to become a possibility where:</p> <ul style="list-style-type: none"> <li>• There is likely to be a change in aviation emissions (by volume or location) below 1,000 ft, and</li> <li>• The location of the emissions is within or adjacent to an identified Air Quality Management Area (AQMA).</li> </ul> <p>The Sponsors provided a high-level qualitative statement regarding air quality impacts and conclude that there are “no changes below 1,000ft, no change in impacts” which is considered to be a reasonable conclusion to make.</p>				
<b>9.2</b>	<b>If an assessment of the impact on Local Air Quality has not been undertaken by the Sponsor, has this decision been adequately explained and evidenced in both the consultation material and the final submission to the CAA, and is the rationale reasonable?</b>				<b>N/A</b>
	The Sponsors have undertaken an air quality assessment that is proportionate for a change of this nature; concluding no change in impacts on the basis of there being no change below 1,000ft.				

<sup>24</sup> Non-Traded flights account for 17.9% of all flights at Luton Airport and 13.9% at Stansted Airport. These flights are those that are not already traded within the EU Emissions Trading Scheme (EU ETS). The monetised impact of traded flights is therefore not reported within as these are internalised. Traded flights are those that are intra-EU.

9.3	<b>Summary of anticipated impact on Local Air Quality for the final proposed airspace change.</b>	
	It is considered unlikely that this ACP will have an adverse impact on air quality as there are unlikely to be changes to the behaviour of aircraft below 1,000ft.	
<b>10. Tranquillity [for Level 1 and Level M1 airspace change proposals]</b>		<b>Status</b>
10.1	<b>With specific reference to Areas of Outstanding Natural Beauty and National Parks - Has the impact on tranquillity been adequately considered and presented in both the consultation material and the final submission to the CAA, taking account of scalability and proportionality?</b>	<b>Yes</b>
	<p>National Parks and Areas of Outstanding Natural Beauty (AONB) are designated areas with specific statutory purposes to ensure their continued protection in relation to landscape and scenic beauty. The statutory purpose of National Parks is to conserve and enhance their natural beauty, wildlife, and cultural heritage and to promote opportunities for the understanding and enjoyment of their special qualities by the public. The statutory purpose of AONBs is to conserve and enhance the natural beauty of their area. In exercising or performing any air navigation functions in relation to, or so as to affect, land in National Parks and AONBs, the CAA is required to have regard to these statutory purposes when considering proposals for airspace changes. Given the finite amount of airspace available, it will not always be possible to avoid overflying National Parks or AONBs, and there are no legislative requirements to do so as this would be impractical. However, where practicable, it is desirable that airspace routes below 7,000 ft should seek to avoid flying over AONBs and National Parks.</p> <p>The only relevant such receptor is the Chilterns AONB, and the Sponsors undertook a detailed assessment of this location within its consultation material portraying overflight diagrams for the 'current' situation in 2019 (i.e., the 'baseline do-nothing option' as described by the Sponsors). The Sponsors also provided a summary of the number of times the AONB was overflowed in June 2019 by Runway 07 and Runway 25 arrivals landing at Luton Airport. The Sponsors concluded that Option 1 "would be broadly similar" to the baseline which is considered a reasonable statement to make given the nature of the change. For Option 2, the Sponsors provided indicative overflight contours for both Runway 07 and Runway 25 over the northern and southern parts of the Chilterns AONB and stated that of the 51% of routes predicted to still be vectored by this option, "aircraft are likely to behave in the same way they do under Option 0 [baseline do-nothing option]".</p> <p>Within the Full and Final Options Appraisal, the Sponsors cross-referenced the Consultation Document and provided a high-level qualitative statement with regards to the impact, concluding:</p> <ul style="list-style-type: none"> <li>• Option 0 (Baseline do-nothing scenario) – the Sponsors provided quantified analysis of overflights base on a 7-day sample of traffic from June 2019.</li> <li>• Option 1 – "would not change the likelihood of overflight of the Chilterns AONB, compared with the quantitative estimates provided in the baseline Option 0"</li> <li>• Option 2 –</li> </ul>	



	<ul style="list-style-type: none"> <li>○ Runway 07 RNAV1 Routes to final approach (northern) – “Aircraft using this route are likely to narrowly avoid overflying the northern section of the Chilterns AONB at 5,000 ft but will continue to overfly the southern section on approach below 4,000 ft”.</li> <li>○ Runway 07 RNAV1 Routes to final approach (southern) – “Aircraft using this route are likely to overfly the north-western tip of the northern section of the Chilterns AONB at 5,000 ft and will continue to overfly the southern section on approach below 4,000 ft”.</li> <li>○ Runway 25 RNAV1 Route to final approach – “Aircraft using this route are likely to avoid the Chilterns AONB”.</li> <li>○ Controller intervention – the 51% of affected aircraft are likely to behave in the same way they do under Option 0.</li> </ul>	
10.2	<b>If consideration of the impact on tranquillity has not been undertaken by the Sponsor, has this decision been adequately explained and evidenced in both the consultation material and the final submission to the CAA, and is the rationale reasonable?</b>	N/A
	The Sponsors have undertaken an assessment of tranquillity with specific reference to Areas of Outstanding Natural Beauty and National Parks that is proportionate for a change of this nature.	
10.3	<b>Summary of anticipated impact on tranquillity for the final proposed airspace change.</b>	
	The ACP is considered unlikely to have an impact on tranquillity with regards to changes to routes and/or traffic patterns that may affect either an Area of Outstanding Natural Beauty (AONB) or a National Park. The Sponsors concluded that there will be no impact as “Flightpaths and altitudes of aircraft using the Option 1-concept of vectoring would be comparable to current (pre-pandemic) flightpaths and altitudes”.	
<b>11. Biodiversity [for Level 1 and Level M1 airspace change proposals]</b>		<b>Status</b>
11.1	<b>Has the impact on biodiversity been adequately assessed and presented in both the consultation material and the final submission to the CAA, taking account of scalability and proportionality?</b>	<b>Yes</b>
	<p>Within CAP1616 the CAA considers that in general, airspace change proposals are unlikely to have an impact upon biodiversity because they do not involve ground-based infrastructure. As such they are unlikely to have a direct impact that would engage the Birds or Habitats legislation. However, given that all changes below 7,000 ft should take into account local circumstances in the development of airspace structures, the change sponsor should include in its consultations and engagement potential biodiversity implications associated with design options under consideration, and should be mindful of such potential impacts as are identified by stakeholders. In addition, as per CAP1616, explicit consideration and assessment of biodiversity is only required where necessary and <i>‘inclusion within the design principles is expected to be the full extent of any consideration in most instances’</i>.</p> <p>The design principles for this ACP did not consider biodiversity nor did they identify any locations that the proposal should seek to avoid overflying. Therefore, the Sponsors provided high-level statements regarding biodiversity, concluding that the airspace changes “would not have an impact to</p>	



	biodiversity because they do not involve ground infrastructure changes.” In addition, the Sponsors argue that “changes in greenhouse gas emissions which may have potential indirect impact on biodiversity” are also described in the Full and Final Options Appraisal. It should be noted that although greenhouse gases are assessed, the assessment does not consider impacts in relation to biodiversity.	
11.2	<b>If assessment of the impact on biodiversity has not been undertaken by the Sponsor, has this decision been adequately explained and evidenced in both the consultation material and the final submission to the CAA, and is the rationale reasonable?</b>	N/A
	The Sponsors have undertaken an assessment of biodiversity that is proportionate for a change of this nature.	
11.3	<b>Summary of anticipated impact on biodiversity for the final proposed airspace change.</b>	
	It is considered unlikely that this ACP would have an impact on biodiversity as there are no changes to ground based infrastructure and there are minimal changes below 5,000ft. Below, 5,000ft Aircraft are expected to be arrive at the airport in a comparable manner to that which occurs today.	
<b>12. Traffic Forecasts</b>		<b>Status</b>
12.1	<b>Have traffic forecasts been provided, are they reasonable, and have these been used to reflect the anticipated environmental impacts of the proposal?</b>	Yes
	<p>The CAA requires traffic forecasts for a period of at least 10 years from the intended year of implementation, including all intermediate years, to be provided for a permanent ACP. The Sponsors initially assumed the year of implementation was 2021, however, due to the Covid-19 pandemic the Sponsors updated this assumption to 2022. Therefore, the assessments covered the period 2022 to 2032. Due to the DCO that is being progressed by Luton, the Sponsors developed forecasts for with-DCO and no-DCO scenarios. The no-DCO scenario assumes the airport operates at capacity in 2022 and therefore assumes the same number of aircraft movements through to 2032. The with-DCO scenario assumes that the DCO is approved in 2025 and from that point the traffic growth is consistent with the forecasts underpinning the DCO application. It should be noted that the growth in aircraft movements within this ACP are predicted regardless of the ACP occurring and therefore the assumed movements were the same for the with and without ACP scenarios. The Stansted forecast is developed from the ‘NATS Stansted NERL Base Case’ forecast.</p> <p>The Sponsors have provided high-level traffic forecasts for the scenarios. These forecasts show the total number of aircraft movements but do not break this down into the types of aircraft that are forecast to operate. In addition to forecasts for operations at Luton Airport, the Sponsors also provided estimates of fuel and CO<sub>2</sub> savings at Stansted Airport due the reduced need to hold Stansted Airport traffic. The Sponsors therefore provided high-level traffic forecasts for Stansted Airport. Although the full traffic forecasts have not been provided, it is understood that these were developed and applied to the environmental assessments. In addition, the Sponsors identify in the Full Options Appraisal that ‘fleet analysis assumptions’<sup>25</sup> have been applied. It is therefore considered that the forecasts have been used to reflect the anticipated environmental impacts of the proposal.</p>	

<sup>25</sup> The Sponsors identify ‘fleet analysis assumptions’ as being ‘retire older/noisier aircraft and replace with newer/quieter aircraft’



	A summary of the traffic forecasts is presented in the table below:											
		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
	Luton No-DCO	70,740	70,740	70,740	70,740	70,740	70,740	70,740	70,740	70,740	70,740	70,740
	Luton DCO	70,740	70,740	70,740	79,000	79,000	80,500	83,500	86,500	89,500	90,500	91,500
	Stansted	101,719	101,788	101,857	101,926	101,995	102,064	102,133	10,2202	10,2271	10,2341	10,2410
<b>13. Consultation</b>											<b>Status</b>	
13.1	<b>Has the change sponsor taken account of any relevant environmental factors (noise, CO2 emissions, Local Air Quality, tranquillity, or biodiversity) raised by consultees or has evidence been provided to indicate why this has not been possible?</b>											<b>Yes</b>
	The CAA has produced a separate assessment of the Sponsors' consultation and engagement activities. Question B.5.4 of the Consultation and Engagement Assessment summarise the key themes identified through consultation and considers if the themes are accurately captured in the Sponsors' consultation response document. Question B.5.5 concludes whether the Sponsors have taken account of issues raised by consultees and whether the responses to the issues raised are appropriate. The Consultation and Engagement Assessment concludes that overall, the Sponsors have 'partially' taken account of issues raised, however, this conclusion is due to non-environmental factors and therefore it is considered that the Sponsors have adequately taken account of relevant environmental factors raised by consultees.											
13.2	<b>Has the change sponsor taken account of any consultation response submitted by ICCAN (Independent Commission on Civil Aircraft Noise)? If so, what are the outcomes?</b>											<b>N/A</b>
	ICCAN did not submit any consultation response for this ACP.											
<b>14. Public Evidence Session (if held)</b>											<b>Status</b>	
14.1	<b>If a Public Evidence Session has been held, was any new evidence on potential environmental impacts presented?</b>											<b>Yes</b>
	A public evidence session was held on Thursday 23 September 2021. Several representations were concerned with the environmental impact of the process. A summary of the public evidence session, including a transcript from the session, is available on the CAA Airspace Change Portal - <a href="https://airspacechange.caa.co.uk/">https://airspacechange.caa.co.uk/</a> and the following new and relevant environmental evidence was presented: <ul style="list-style-type: none"> <li>• The change is adjacent to the proposed Great Ouse Valley AONB; and</li> <li>• The change could have potential impact the Portholme Meadow Special Area of Conservation (SAC) site and therefore afforded protection under the Conservation of Habitats and Species Regulations 2017.</li> </ul>											

14.2	<b>If so, was the new evidence relevant and material to the CAA’s consideration of the environmental impacts of the submitted airspace change proposal?</b>	<b>No</b>
<p>The CAA has considered the new and relevant evidence referred to in Question 14.1 and a summary of our response is provided below:</p> <p><b>Great Ouse Valley</b></p> <p>Where practicable, it is desirable that airspace routes below 7,000 feet should seek to avoid flying over AONBs and National Parks. However, it is considered that it will not always be possible to avoid overflying National Parks or AONBs, and there are no legislative requirements to do so as this would be impractical. The airspace in which this change is being proposed is constrained and therefore it is not considered practicable to avoid overflying National Parks or AONBs. In addition, the changes adjacent to the Great Ouse Valley are above 7,000ft.</p> <p><b>Portholme Meadow Special Area of Conservation (SAC)</b></p> <p>Within the submission the Sponsors provided rationale to scope out biodiversity impacts; therefore, in concluding there are no biodiversity impacts it is considered unlikely that there will be an impact on any habitats. The Sponsors scoped out biodiversity impacts on the basis that there is no physical infrastructure. Within CAP1616, the CAA considers that “in general, airspace change proposals are unlikely to have an impact upon biodiversity because they do not involve ground-based infrastructure. As such they are unlikely to have a direct impact that would engage the Birds or Habitats legislation.”</p>		
<b>15. Compliance with policy and guidance from Government, ICCAN or the CAA</b>		<b>Status</b>
15.1	<b>Has the change sponsor satisfied all relevant policy and/or guidance from either the Government, ICCAN or the CAA, with regards to environmental impacts of the proposed airspace change?</b>	<b>Yes</b>
<p>The Sponsors have satisfied all relevant policy and guidance for an ACP of this nature. Including:</p> <ul style="list-style-type: none"> <li>• Air Navigation Guidance 2017: Guidance to the CAA on its environmental objectives when carrying out its air navigation functions, and to the CAA and wider industry on airspace and noise management;</li> <li>• CAP1616: Airspace change: Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information;</li> <li>• CAP1616a: CAP 1616a Airspace Change: Environmental requirements technical annex;</li> <li>• CAP1498: Definition of overflight;</li> <li>• CAP2091: CAA Policy on Minimum Standards for Noise Modelling;</li> <li>• Noise Policy Statement for England 2010 concerning the Government’s long-term vision for noise policy and the overall objectives for the management of noise within the context of Government policy on sustainable development;</li> <li>• National Parks and Access to Countryside Act 1949, as read with section 19 and schedule 2 of the Civil Aviation Act 1982 concerning the designation of National Parks and AONBs; and</li> <li>• Conservation of Habitats and Species Regulations 2010 concerning the protection of biodiversity through the conservation of natural</li> </ul>		



	habitats and species of wild fauna and flora.	
15.2	<b>Has the change sponsor adequately considered the DfT's Altitude-Based Priorities<sup>26</sup>?</b>	<b>Yes</b>
	<p>The Sponsors have adequately considered the DfT's Altitude-Based Priorities as set within the Air Navigation Guidance 2017 and the CAA has applied these altitude-based priorities in considering whether the submission has proportionately assessed and presented all relevant environmental factors for a Level 1 ACP:</p> <p>A) in the airspace from the ground to below 4,000 feet the government's environmental priority is to limit and, where possible, reduce the total adverse effects on people;</p> <ul style="list-style-type: none"> <li>• The Sponsors have monetised the health and amenity impact of the proposed change using the DfT's Transport Appraisal Guidance (TAG) Noise Impacts worksheet. This assessment concluded that the change is likely to have a net improvement in adverse impacts of aircraft noise and reduced the number of people affected by noise levels in excess of the LOAEL set by Government for the purposes of assessing and comparing the noise impacts of airspace changes. Therefore, the Sponsors have assessed that change reduces the total adverse effects on people as per the altitude-based priority. However, it is the CAA's opinion that some of this benefit is because of the modelling assumptions applied by the Sponsors and as there are minimal changes below 4,000ft the benefit is likely to be lower than that presented by the Sponsors and more likely to be neutral.</li> </ul> <p>B) where options for route design from the ground to below 4,000 feet are similar in terms of the number of people affected by total adverse noise effects, preference should be given to that option which is most consistent with existing published airspace arrangements;</p> <ul style="list-style-type: none"> <li>• At Stage 3 the Sponsors carried forward two primary Options. Both were similar in design, having the same upper design; however, the first option (Option 1) did not have published RNAV (aRea NAVigation) 1 transitions for everyday usage and proposed aircraft would be vectored in on arrival like today's current practice. The second option (Option 2) proposed that most aircraft would be vectored in on arrival but also had published RNAV1 transitions for everyday usage. At stage 3, the Sponsors' preferred option was Option 2 which involved published airspace routes and was different to the operation today. However, following consultation feedback the Sponsors proposed to carry forward an amended Option 1 (Option1a) to Stage 4 and this option is considered most consistent with existing published airspace arrangements.</li> </ul> <p>C) in the airspace at or above 4,000 feet to below 7,000 feet, the environmental priority should continue to be minimising the impact of aviation noise in a manner consistent with the government's overall policy on aviation noise, unless the CAA is satisfied that the evidence presented by the Sponsors demonstrates this would disproportionately increase CO2 emissions;</p>	

<sup>26</sup> Paragraph 3.3, DfT's Air Navigation Guidance 2017

	<ul style="list-style-type: none"> <li>In the airspace between 7,000ft and 4,000ft it is concluded that this change does not affect the key metrics for determining adverse noise impacts. Below 4,000ft the airspace is similar to the current airspace design however, there is a change between 5,000ft and 7,000ft as aircraft leave the end of the STARs. Additionally, the change has an overall negative impact on CO<sub>2</sub> emissions, however, this increase in emissions is primarily related to changes above 7,000ft.</li> </ul> <p>D) in the airspace at or above 7,000 feet, the CAA should prioritise the reduction of aircraft CO<sub>2</sub> emissions and the minimising of noise is no longer the priority;</p> <ul style="list-style-type: none"> <li>At and above 7,000ft the airspace change has a negative impact (i.e., an increase) in CO<sub>2</sub> emissions. However, the sponsors have argued that the ACP is required to address a latent a safety risk.</li> </ul> <p>E) where practicable, it is desirable that airspace routes below 7,000 feet should seek to avoid flying over Areas of Outstanding Natural Beauty (AONB) and National Parks; and</p> <ul style="list-style-type: none"> <li>The Chilterns AONB is the only such receptor impacted by this change below 7,000ft. The airspace design over the Chilterns AONB is similar to that occurring today and therefore as assessed in Question 10, the ACP is considered unlikely to have an impact on tranquillity with regards to changes to routes and/or traffic patterns that may affect either an Area of Outstanding Natural Beauty (AONB) or a National Park.</li> </ul> <p>F) all changes below 7,000 feet should take into account local circumstances in the development of the airspace design, including the actual height of the ground level being overflown, and should not be agreed to by the CAA before appropriate community engagement has been conducted by the Sponsor.</p> <ul style="list-style-type: none"> <li>It is considered the Sponsors have partially taken account of local circumstances for changes below 7,000ft. The Sponsors undertook a consultation and engagement exercise and amended the proposed design following stakeholder feedback. Additionally, assessments of overflight and noise have taken account of height over the ground by using terrain data within the modelling. However, it should be noted and as referred to in Question 5, the Sponsors have not taken account of Local Plans and confirmed planning developments within their assessments of noise.</li> </ul>	
<b>16. Other aspects</b>		<b>Status</b>
16.1	<b>Are there any other aspects of the airspace change proposal that have not already been addressed in this report but that may have a bearing on the environmental impact?</b>	<b>Yes</b>
	<p>In undertaking our Stage 5 Environmental Assessment and Statement, it became apparent that there were two additional aspects to the airspace change proposal that may have a bearing on the environmental impact. These are:</p> <ul style="list-style-type: none"> <li>Impact on Stansted SIDs due to the need for additional controlled airspace (CAS); and</li> <li>Amendment to the proposed STARs</li> </ul>	



**Impact on Stansted Standard Instrument Departure Routes (SIDs)<sup>27</sup>**

As part of this ACP there was a need for additional CAS and therefore it was proposed to reduce the volume of low-altitude CAS to the southeast of Stansted Airport. These amendments involved the following:

- Raise CAS base of Stansted CTA3 by 500ft to 2,500ft and to the same altitude as the southern adjacent CAS volume known as LTMA1;
- Delete the triangular volume known as LTMA2 southeast of Stansted; and
- Expand LTMA3 to infill the ‘gap’ left by the removal of LTMA2, making a single CAS base of 3,500ft with no unnecessary lines on aeronautical charts.

The Sponsors submitted evidence to the CAA to explain that the majority of departing Stansted aircraft already outclimb the existing altitude restrictions and therefore the change is unlikely to have a material impact on aircraft operations. This analysis showed that over 94% of impacted operations per ‘gate’ outclimb the current SID restrictions and therefore are not affected by the proposed changes. It is therefore the Sponsors view that the environmental impact of the additional thrust required to achieve the additional height of up to 500ft for the under-performing aircraft “would be neither discernible nor measurable”.

It is the CAA’s view that overall; the proposed change is unlikely to lead to additional adverse environmental impacts over what already occur. On an individual aircraft basis, the impacts could be “discernible” and “measurable” however on balance and when considering the proportion of aircraft affected by the change, it is unlikely to lead to additional adverse environmental impacts.

**Amendments to proposed STARs<sup>28</sup>**

Following simulator testing by the Sponsors and a review by the CAA’s Instrument Flight Procedure (IFP) Regulator it became apparent the proposed STARs from the east required modifying to route via JUMZI. This modification means that the STARs would now route COCCU-JUMZI-ZAGZO rather than COCCU-ZAGZO. All these changes are proposed to occur above 7,000ft and therefore the environmental scope of any impact is fuel burn and CO<sub>2</sub> and the Sponsors concluded that impacts would be “de minimis”.

To support the conclusion of de minimis, the Sponsors provided robust rationale to the CAA to explain how their fast-time simulations analysed how the STARs perform and therefore the track mileage, fuel burn and CO<sub>2</sub> emissions. This rationale demonstrated that the change in STAR definition from COCCU-ZAGZO to COCCU-JUMZI-ZAGZO would not change how the simulations decide whether to turn an aircraft off the STAR or to enter the hold and as the proposal is for an optimised network, the simulations rarely required aircraft to enter the hold. The Sponsors explained that the simulations had behaviours built into them and these behaviours provided short-cuts for aircraft to exit the STARs and onto the final approach, with the fast-time model deciding which behaviour would need to be taken. The decision to turn off the STAR is taken once separated from other aircraft and the aircraft would continue along the STAR until separation was predicted to occur and would then turn towards the runway.

The CAA agrees that based on the way the Sponsors developed the fuel burn modelling and fast-time simulations, the minor amendments to the proposed STARs from the east would not change the conclusions with regards to fuel burn and CO<sub>2</sub> emissions.

<sup>27</sup> See Section 6 Supplement V1.4

<sup>28</sup> See SAIP AD6 Supplement

17. Recommendations/Conditions/PIR Data Requirements		Status
17.1	<b>Are there any environmental recommendations which the change sponsor should address either before or after implementation?</b>	No
	<p>There are no recommendations which the Sponsors should fulfil either before or after implementation for this ACP. However, there are several recommendations that the joint Sponsors should consider for any future ACPs, these are as follows:</p> <ul style="list-style-type: none"> <li>• To ensure that operational diagrams are clear and understood by impacted stakeholders;</li> <li>• To ensure the assumptions applied to environmental modelling are consistent for factors that are unchanged, for example the use of vectoring used within the noise modelling;</li> <li>• To fully take account of local circumstances, including Local Authority local plans and confirmed future developments; and</li> <li>• To transparently present and explain the methodologies and assumptions used within the quantitative assessment of environmental impacts.</li> </ul>	
17.2	<b>Are there any environmental conditions which the change sponsor must fulfil either before or after implementation?</b>	No
	There are no environmental conditions which the change sponsors must fulfil either before or after implementation.	
17.3	<b>Are there any environmental requirements in terms of the data to be collected by the change sponsor for the Post Implementation Review?</b>	Yes
	<p>For this ACP it is recommended that the Sponsors start to collect the following information from the date of implementation for the Post Implementation Review:</p> <ul style="list-style-type: none"> <li>• Aircraft movement logs to confirm the robustness of forecasts used within environmental assessments;</li> <li>• Aircraft track data to confirm the statements regarding minimal changes below 5,000ft and changes to traffic patterns below 7,000ft over the Chilterns AONB;</li> <li>• Track density plots to confirm the assumptions regarding lateral dispersion around the mean track centreline;</li> <li>• Data to support the assumptions regarding the number of aircraft that use the hold and the numbers which are vectored and/or given shortcuts;</li> <li>• Data to support the usage of the hold;</li> <li>• Data to confirm the assumptions used within the assessment of fuel usage and aircraft greenhouse gas emissions; and</li> <li>• Data to support the conclusion that there are no 'discernible' changes in the performance of aircraft departing from Stansted Airport.</li> </ul>	



## 18. Summary of Assessment of Environmental Impacts & Conclusions

In summary it is considered that this ACP is unlikely to result in additional adverse noise impact over which would be expected to occur without the change occurring. It should be noted that the Sponsors conclude that there will be a reduction in adverse impacts as a result of this change, however, it is the CAA's view that the noise benefit is unlikely to be as high as that stated by the Sponsors.

With regard to noise under the hold, it is considered that aircraft will be audible but not to the extent that it introduces an adverse impact on health or quality of life. If an aircraft were to fly the hold and exit descending from 8,000ft, there will be a change in areas overflown until approximately 5,000 ft where aircraft will behave in a comparable way to that observed today. It should be noted that the CAA definition of overflight, as stated within CAP1498, defines overflight as occurring at an altitude below 7,000ft and therefore as per this definition, the change in overflight is between 7,000ft and 5,000ft. Although there is a change in areas overflown between 7,000ft and 5,000ft, this change in overflight is unavoidable given the location of the hold and the constrained airspace.

It is considered unlikely that there will be an adverse air quality, tranquillity, or biodiversity impact. However, the airspace change is likely to result in an increase in greenhouse gas emissions. The Sponsors have assessed that this increase will be as high as 57,052 tCO<sub>2</sub>e over the 10-year forecast period.

Within the Air Navigation Guidance, the government has set key environmental objectives with respect to air navigation, which are designed to minimise the environmental impact of aviation within the context of supporting a strong and sustainable aviation sector. These objectives, in support of sustainable development, are to:

- limit and, where possible, reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise;
- ensure that the aviation sector makes a significant and cost-effective contribution towards reducing global emissions; and
- minimise local air quality emissions and in particular ensure that the UK complies with its international obligations on air quality.

It is concluded that this airspace change proposal meets the first aim as it does not result in an increase in the number of people significantly affected by adverse impacts from aircraft noise. Adverse impacts are considered to be those related to health and quality of life. The Sponsors used the Department for Transport's WebTAG TAG noise impacts module for valuing these impacts of noise and concluded that the proposal results in a net benefit in the number of people significantly affected by adverse impacts from aircraft noise. Additionally, it is concluded that this Airspace Change Proposal meets the third aim as there is unlikely to be any change in local air quality and therefore the change is unlikely to lead to a breach of legal obligations for air quality limits. However, it is considered that the proposal does not meet the second aim. This airspace change proposal is likely to lead to an increase in greenhouse gas emissions and therefore it does not make a significant and cost-effective contribution towards reducing global emissions.

Within CAP1616, the CAA has a methodology to appraise the expected impact of a proposal. This methodology requires the Sponsors to proportionately appraise the expected impacts of the proposed options. This methodology follows the DfT's WebTAG and requires environmental impacts to be monetised using the relevant modules. This methodology therefore applies a consistent unit to environmental impacts and allows them to be compared with other costs and benefits of the proposed change. The CAA's assessment of the Sponsors' Final Options Appraisal is within the CAA's Final Options Appraisal Assessment. This assessment identifies that the benefits-cost ratio (BCR) of the proposed airspace change is negative, which means that the proposed airspace change is anticipated to have higher costs than benefits.

**Environmental assessment and statement sign-off and approval**

	<b>Name</b>	<b>Signature</b>	<b>Date</b>
Environmental assessment and statement completed by:	[REDACTED]	[REDACTED]	22/11/2021
Environmental assessment and statement reviewed by:	[REDACTED]	[REDACTED]	22/11/2021