ACOG Airspace Change Organising Group

# Airspace Change Organising Group

## Scottish Terminal Control Area (ScTMA) Cluster - Cumulative Analysis Framework Part 2 (CAF2) Report

Issue 2.0 (June 2025)

# Contents

# 1 Executive Summary

1. This document provides information on the cumulative and collective performance of the Airspace Change Proposals (ACPs) in the Scottish Terminal Control Area (ScTMA) cluster (also referred to as the Scottish Airspace Modernisation). This cluster consists of separate ACPs for Glasgow Airport, Edinburgh Airport and NATS En-Route Limited (NERL); these three organisations are collectively referred to as the 'sponsors'). This document has been complied by the Airspace Change Organising Group (ACOG) in line with the Cumulative Analysis Framework method presented in the UK Airspace Change Masterplan (Iteration 3 ScTMA).

2. Each sponsor has undertaken a Full Options Appraisal in line with the CAA's CAP1616 requirements for airspace change. The sponsors' Full Options Appraisals provide detail at the local level, whereas this document provides an overview of cumulative and collective performance at a cluster-wide level.

3. Each of the three sponsors is presenting one option for consultation. This means there is one cluster-wide option for this document to consider comprising of the three component proposals.

4. The CAF2 data has been generated by combining information from each sponsor's Full Options Appraisal to show how the combined 'with airspace change' option for the cluster compares to the combined 'without airspace change' baseline. The comparison is undertaken for a 10 year period from 2027 (the implementation year) to 2036. The result is a suite of tables and diagrams to match those presented in the individual ACPs, but which show performance for the whole cluster, rather than for single ACP.

5. All the sponsors options are compatible with one another, so there are no interdependencies or trade-offs between the sponsors consultation options[1].

6. There are no cumulative impacts from noise or overflights in the cluster-wide option. Cumulative impacts in this case would relate to the situation where a location is overflown by new flight paths below 7000ft from both the Glasgow Airport and Edinburgh Airport proposed designs. The data shows there are no such cumulative impacts – this is demonstrated by the fact that there is no overlap between the noise and overflight contours for each airport's consultation options. Therefore, stakeholders with an interest in the noise or overflight effects from flights below 7000ft in specific areas should consult the relevant local ACP where local impacts are described in more detail.

7. The CAF2 collective results for the cluster are summarised below. For details, regarding each ACP please see the separate Full Options Appraisal submissions/consultations.

8. **Cost Benefit Analysis:** The cost benefit analysis figures summarised Table 1 show the cluster-wide option would provide an overall Net Present Value (NPV) benefit of c.£130m for the period 2027-2036.

[1] Interdependencies and trade offs identified during the design phase are captured in the CAF1 sections of the UK Airspace Modernisation Strategy Masterplan (Iteration 3 ScTMA).

*Table 1: Cost benefit Analysis Summary for 2027-2036*

| Total NPV benefit | Noise NPV Benefit | $CO_2e$ NPV Benefit | Fuel NPV Benefit | Delay NPV benefit | Infrastructure Costs | Operational Cost |
|---|---|---|---|---|---|---|
| £ 129,693,984 | £ 31,566,333 | £ 53,573,505 | £ 36,472,681 | £ 7,866,010 | £ 244,050 | -£ 28,594 |

9. Table 2 shows a summary of key collective statistics from the ScTMA cluster, which provide context for the monetised values in Table 1.

*Table 2: CAF2 Summary Results for 2027-2036*

| Net people experiencing reduced daytime noise (LAeq) | Net people experiencing reduced nighttime noise (LAeq) | Greenhouse Gas Benefit (CO2e kT) | Fuel Benefit (kT) |
|---|---|---|---|
| 39,973 | 53,358 | 219.8 | 69.1 |

10. **Noise**: the government identifies a level of noise above which there are potential adverse effects on health and quality of life. These levels are defined in the '$L_{Aeq}$' noise metric which is the primary decision-making metric for noise. The population data for the $L_{Aeq}$ metric showed that, in the cluster-wide 'with airspace change' option, some people would experience more noise above the levels defined by government, but in all cases these would be outnumbered by people experiencing less noise. Overall this results in a benefit from reduced noise which has been monetised at c. £32m over the 10 year analysis period (using the governments TAG workbook).

11. **Greenhouse Gases ($CO_2e$) and Fuel Burn**: these are both forecast to increase as a result of traffic growth in both the 'without airspace change' baseline and cluster-wide 'with airspace change' option. However, the $CO_2e$/fuel *per flight* is expected to fall, meaning that the rate of increase for overall $CO_2e$ would be less as a result of the change. Overall, this results in a benefit from reduced CO2e which is valued at c. £51m over the 10 year analysis period. There is also a benefit from reduced fuel costs of c.£36m over the same period.

12. It should be noted that the $CO_2e$ results represent what is referred to as 'enabled benefit' derived from computer modelling which rely on forecasts and assumptions. The modelling used is industry-leading, but the level of accuracy cannot be confirmed until it is assessed at the post implementation stage. Some results may be an overestimation, others may underestimate. However, under all scenarios it is anticipated that the proposed changes will enable a cluster-wide $CO_2e$ benefit on average per flight.

13. **Capacity:** Flight numbers in the region are expected to grow at an equal rate either with or without the cluster wide change. However, the cluster-wide 'with airspace change' option is forecast to result in fewer minutes of delay: 46,746 minutes fewer in 2027, rising to 60,818 minutes fewer in 2036.

14. **General Aviation (GA):** Overall, the cluster-wide 'with airspace change' option will require approximately 700 cubic nautical miles ($NM^3$) of additional controlled airspace. However, this is a net figure and relates to over 1300 $NM^3$ of new controlled airspace that is required by the changes above 7000ft. This is to provide more efficient en-route connectivity, and is predominantly at higher altitudes and over the sea. As such this airspace is not expected to have a significant impact on General Aviation operations. Below 7,000ft there is a reduction in CAS of over 600 $NM^3$. The sponsors believe that much of the released airspace is in areas that will be beneficial for General Aviation.

15. No cumulative effects are identified with respect to General Aviation access. That is to say that there are no negative changes described in the individual ACPs that would be considered worse than described, when considered alongside the proposals in neighbouring ACPs.

16. Additionally, over 5,000 $NM^3$ of airspace has had classification reduced from Class A, mostly to Class C or Class D. This reduces the requirements for aircraft to be granted clearance to enter the airspace. Access to temporary reserved areas for gliding has also been maintained.

17. In conclusion, the cluster-wide 'with airspace change' option represents a significant £130m overall benefit which comprises of net benefits across the key performance criteria of noise, $CO_2e$, fuel and capacity.

# 2 Introduction

18. The UK's Airspace Modernisation Strategy (AMS) explains that achieving the objectives of airspace modernisation will maintain and improve the UK's high levels of aviation safety, boost efficiency, strengthen environmental sustainability and facilitate access for the ever-expanding range of competing airspace users.

19. Where changes are proposed that share the same airspace, there is benefit in taking forward those proposals concurrently, so that the proposals can be coordinated, competing demands can be assessed, and decisions made that are optimised for all users in aggregate. This rationale has been adopted for the UK's Future Airspace Strategy Implementation (FASI) airspace change programme, encompassing more than 20 airport Airspace Change Proposals (ACPs) across the UK.

20. A region of airspace above central Scotland is shared by Glasgow Airport, Edinburgh Airport and NATS En-route Limited (NERL), each of whom is progressing their own ACP under CAA CAP1616. This is referred to as the Scottish Terminal Control Area (ScTMA) cluster. The ACPs in the ScTMA cluster must adhere to CAP1616 guidance and the UK Airspace Change Masterplan (Iteration 3 ScTMA). Note that the term ScTMA cluster, which is used in this document and the Masterplan, is interchangeable with the term Scottish Airspace Modernisation, which is a more generic term used in consultation).

21. The Masterplan presents a Cumulative Analysis Framework (CAF) to capture information on interdependencies and trade-offs between ACPs. This is to ensure that cumulative and collective performance has been considered by the sponsors in a cluster when progressing their individual, but linked ACPs through the CAP1616 process.

22. The CAF has 3 parts as shown in Table 1 overleaf.

23. CAF Part 1 (CAF1) provides a basis for sponsors to resolve design conflicts in advance of the Full Options Appraisal. As such CAF1 was completed earlier in the process and is reported in UK Airspace Change Masterplan (Iteration 3 ScTMA).

24. This report is for CAF Part 2 (CAF2) which provides information on how the consultation options in the three separate ACPs within the ScTMA cluster work together as a system. CAF2 is generated by combining information from each of the sponsors Full Options Appraisals. The result is a suite of tables and diagrams to match those presented in the Full Options Appraisals but which show 'cumulative' and 'collective' performance for the whole cluster, rather than performance for a single ACP. The CAF2 report has been collated from, and on behalf of, the individual ACPs by the Airspace Change organising Group (ACOG). For information about the role and function of ACOG see the ACOG website

25. CAF3 will be produced at stage 4 of the CAP1616 process. It will combine information from each of the sponsors Final Options Appraisal, which take into account any changes made by the sponsors to their designs following public consultation.

*Table 3: CAF Stages as Summarised in ScTMA Masterplan Iteration 3*

| CAF Phase | Key characteristics and use | Link to CAP1616 and Masterplan |
|---|---|---|
| CAF1: Review of Route Interdependencies, Design Conflicts and Trade-Offs | • Provides an assessment of design conflicts and trade-offs between route options in interdependent ACPs<br>• Provides a basis for sponsors to resolve design conflicts considering collective performance (including cumulative impacts)<br>• Trade-off information may be drawn from Initial Options Appraisals<br>• Qualitative, with additional quantitative assessment added where necessary | • Prior to sponsors starting CAP1616 Full Options Appraisal<br>• Outputs will be presented in the Stage 3 Consult Gateway submissions and Masterplan Iteration 3<br>• CAF1 information in Masterplan Iteration 3 demonstrates how cumulative impact, collective impact and trade-offs have been accounted for in the design pre-consultation |
| CAF2: Full CAF | • Identifies cumulative impact of consultation options<br>• Generation of information to describe collective cluster -wide performance and trade-offs for consultation options<br>• Comparison between cluster-wide consultation option(s) and the cluster-wide baseline<br>• Information drawn from Full Options Appraisals | • After each sponsor in the cluster has completed Full Options Appraisal<br>• Outputs are presented in the Stage 3 Consult Gateway submissions (and Masterplan Iteration 4 which will be produced after consultation) |
| CAF3: Final CAF | • Identifies cumulative impacts of final designs<br>• Generation of information to describe collective performance and trade-offs in the final cluster-wide design<br>• Comparison between final cluster-wide design and the cluster-wide baseline<br>• Information drawn from Final Options Appraisals | • After each sponsor in the cluster has completed Final Options Appraisal<br>• Outputs will be presented in Masterplan Iteration 4<br>• Comparison of CAF3 and CAF2 output in Masterplan Iteration 4 will demonstrate how cumulative impact, collective impact and trade-offs have been affected by the design updates in Stage 4 |

# 3 CAF2 Methodology

26. CAF2 provides information on how the consultation options in the three separate ACPs in the ScTMA cluster work together as a system. CAF2 is generated by combining information from each sponsors Full Options Appraisals. The result is a suite of tables and diagrams to match those presented in the Full Options Appraisals in the cluster's individual ACPs, but which show 'cumulative' and 'collective' performance for the whole cluster, rather than the performance for a single ACP.

27. **Cumulative data** helps individual stakeholders identify where and how they may be affected by more than one ACP, for example a community may be overflown by 10 aircraft a day from one ACP and 20 from another ACP – giving a cumulative overflight impact from both ACPs of 30 over flights per day for that community. (Note that for ScTMA the CAF shows there are no such cumulative impacts because of the distance between Glasgow and Edinburgh Airports – this is demonstrated through the data presented in this report and its annexes).

28. **Collective data** describes the overall performance of all the ACPs when considered as a cluster. This is of relevance to stakeholders with interests which are not location specific. For example those interested in climate change may have little interest in how much $CO_2e$ individual ACPs generate as it is the total effect of the cluster on global climate change that is most relevant to them.

29. In both cumulative and collective cases the methodology is, in the simplest terms, to add together the performance data from the individual CAP1616 Full Options Appraisals within the cluster, and present an equivalent for the cluster level performance. For full details of the methodology for CAF2 see the Masterplan Appendices 1 and 2.

30. Note that the focus of CAF2 is on the quantitative data. It does not seek to collate and repeat the local qualitative assessment unless they are deemed significant to the overall case for change. For full local detail see the individual ACPs.

### Analysis Period and Forecasting

31. Implementation is currently planned for 2027. Each of the contributing Full Option Appraisal annual analyses have therefore used the 2027 and 2036, respectively as the year of implementation (year 1), and year 10 following implementation. The rest of this document presents ScTMA cluster data for this analysis period.

32. 'Current-day' information is also required by CAP1616 and presented here on a collective basis. This data relates to 2023, apart from the Glasgow Airport noise data for which the latest year available at the time of analysis was 2022. The collective noise data for the 'current year' is therefore a composite of 2023 data for Edinburgh Airport and 2022 data for Glasgow Airport. It should therefore be considered as indicative of 'current day' impacts rather than a definite set of results for a specific year.

### Comparison

33. The following sections present information on the collective performance of the ScTMA cluster. Section 6 presents the baseline data and sections 7 and 8 show how the performance of the cluster-wide 'with airspace change' option differs from the 'without airspace change' baseline. The data behind the comparisons is presented in the annexes.

### Combined $CO_2e$/Fuel Methodology

34. The nature of $CO_2e$ benefits make it necessary for interdependent ACPs to collaborate to analyse $CO_2e$, rather than progressing entirely separate analyses. This shared methodology is presented in Annex A.

### Methodology for Other Impact Categories

35. There is no interdependency between the ScTMA sponsors assessment for the other appraisal impact categories including noise and overflight. Therefore, they have progressed them independently and details of their methodologies are included the individual ACPs.

### Other Shared Assumptions

36. There are a number of assumptions that underpin full options appraisal. Assumptions that have been shared between sponsors are listed in Annex C.

### Rounding

37. In their Full Options Appraisal sponsors have rounded the result they have presented. CAF2 has worked from the data provided by sponsors, which in some cases has been unrounded source data, and then applied the same rounding protocol. This means that the CAF2 results are an accurate collective representation of the data supplied, but in places may not exactly match the sum of the rounded data presented in the individual Full Options Appraisals.

### Safety

38. This document is focussed on the option appraisal impact categories rather than safety. Sponsors have captured safety assurance information relevant to their changes, and to how their changes interface with neighbouring ACPs, in their respective ACPs.

### Annexes

39. This document and its annexes present the Tables and Figures in the same way as the individual Full Options Appraisals they are built from. These appraisals sought to present data in the main report that is most relevant to each category, with the annexes presenting any remaining data sets/figures. The CAF2 report and annexes follows the same principles with the distribution of data between the main report and annexes matching the airport submissions as far as practical (given the difference in presentation between the Full Options Appraisals).

# 4 Consultation Options

40. The consultation options being presented by each sponsor are as listed in Table 4.

*Table 4: ACP Consultation Options*

| Sponsor | Sponsor Option |
|---|---|
| **NERL** | Option 1 – Modernised ATS Route Structure including providing connectivity to Standard Instrument Departure route end points, STARs and holding facilities. |
| **Glasgow Airport** | Option 5 - PBN Approach Transitions with vectors. PBN Standard Instrument Departure routes with no offsets |
| **Edinburgh Airport** | Option 1 – PBN Standard Instrument Departure routes and Approach Transitions with vectoring only for safety and weather |

# 5 Interdependencies and Trade Offs

41. In developing their Stage 2 options into viable options for the cluster, sponsors have considered interdependencies between the ACPs. Interdependencies encountered in the generation of a viable cluster-wide design are reported in the ScTMA Masterplan Iteration 3.

42. Following the development of viable cluster-wide designs, sponsors have performed Full Options Appraisals on their ACP options to determine which will be presented in their consultation material (their 'consultation options').

43. In the case of the ScTMA cluster, there were no interdependencies between the sponsors options for the Full Options Appraisal. This means that none of the options in one ACP's Full Options Appraisal were dependent on another sponsor choosing a specific option for their ACP.

44. By extension, this also means that there were no interdependencies or trade-offs to consider with respect to the consultation option assessed in CAF2 (i.e. all combinations of consultation options are compatible)[2].

45. While there may be no interdependencies or trade-offs between consultation options, there remains a requirement for CAF2 to describe cumulative performance (or lack of in this case) and collective performance. This information is provided in this CAF2 report (and annexes) so that stakeholders can assess how the ScTMA cluster as a whole may affect them.

[2] Note that while there were no trade-offs between the *consultation options* assessed in CAF2, there were two design conflicts and associated trade-offs between the NERL and Glasgow Airport ACPs that were identified in the design phase. These occurred in the design process prior to Full Options Appraisl and were documented through th CAF1 process. For further details of the design conflicts see Appendix C of the Masterplan..

# 6 Cluster-Wide Baseline "Without Airspace Change"

46. All sponsors have analysed a Baseline performance for their part of the cluster-wide design. This section collates that data to provide information on the cluster-wide baseline performance for a 'current year' (this is based on last full year of data available when the sponsors undertook the analysis, which was either 2023 or 2022 depending on the analysis in question), together with projected performance for the years 2027 (year of implementation) and 2036 (10 years following implementation).

47. Figure 1 shows the existing, published, departure and arrival route structure for Edinburgh and Glasgow Airports for reference (note that there are no published arrival routes below 7000ft that are regularly flown and so none are shown). Above and beyond these routes lies the network of routes that provide onward connections for Glasgow and Edinburgh Airports, and which are used by other flights crossing the region (these include routes above 7000ft used by Prestwick Airport flights). These are not shown on Figure 1 because the diagram would become too crowded and difficult to interpret. The existing "without airspace change" airspace structure for the ScTMA is fully described in the UK AIP. Details of the specific structures that are proposed to change can be found in the individual ACP submissions/consultations.

48. Figure 2 show the pattern of overflights seen today on these routes below 7000ft. This shows flight paths from a 2 week period covering both Easterly and Westerly operations at each airport. This figure is provided for information only. For detailed descriptions of the scope of the changes below and above 7,000ft please see the individual ACP submissions/consultations.

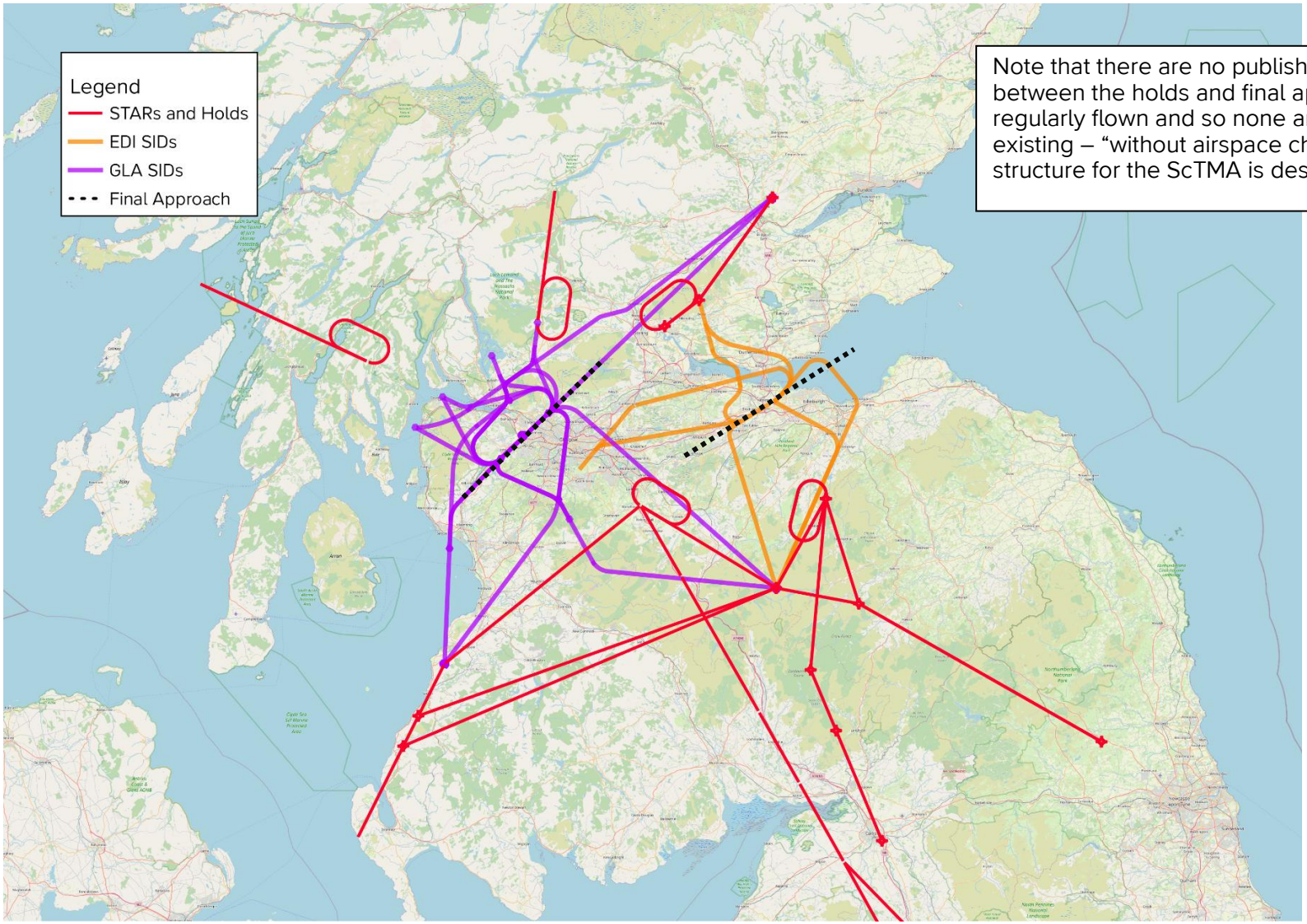



*Figure 1: 'Without Airspace Change' Standard Instrument Departures, Holds and Standard Arrivals Routes for Edinburgh and Glasgow Airports*

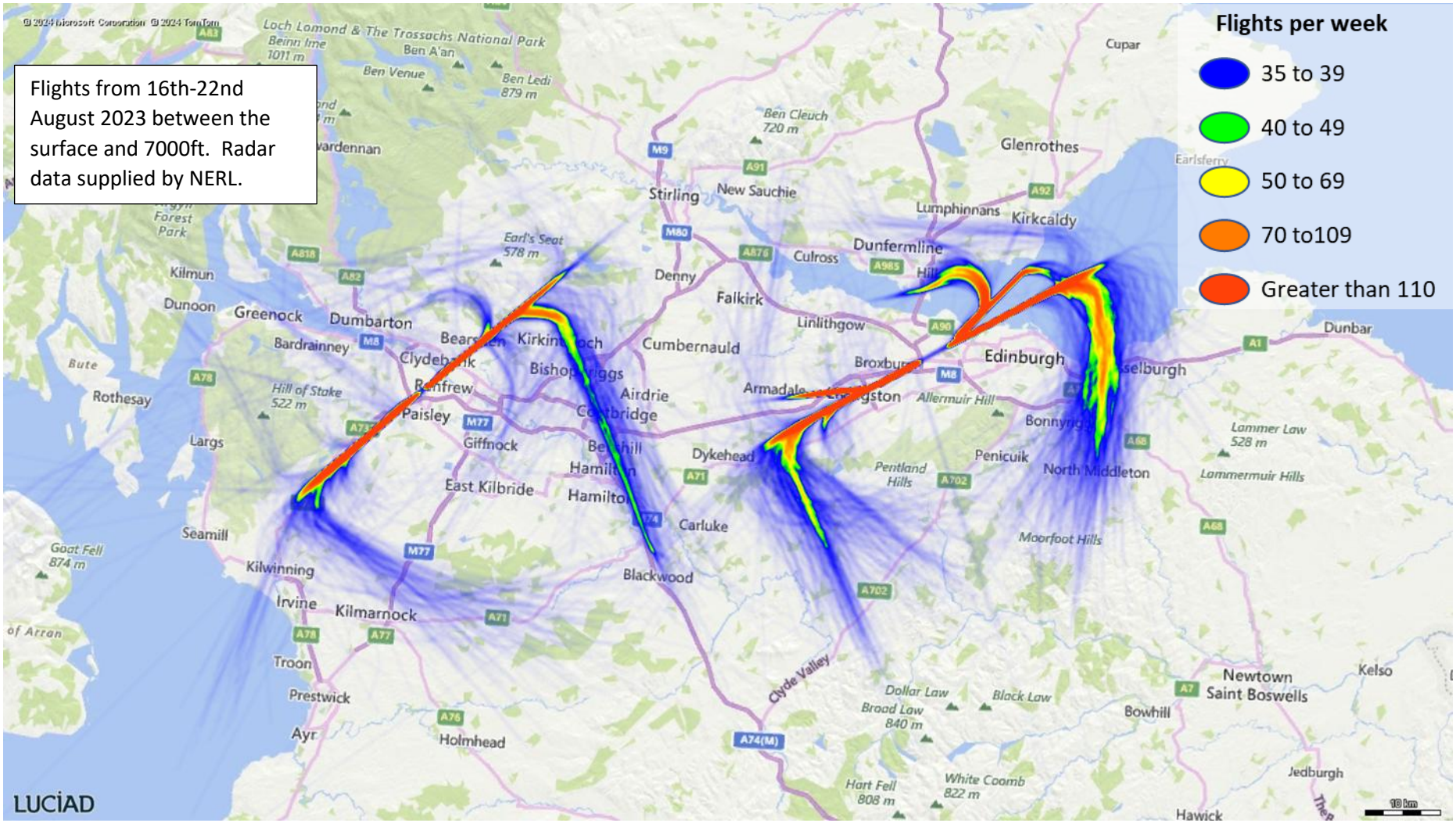



*Figure 2: Current Day Glasgow and Edinburgh Airport Flight Paths Below 7000ft for Easterly and Westerly Operations*

### $L_{Aeq}$ for "Without Airspace Change" Baseline - Communities

49. The following tables show collective $L_{Aeq}$ noise contour data for the 'without airspace change' current day scenario (2022/2023[3]), 2027 (year of implementation) and 2036 (10 years following implementation).For each contour band, the area of the contour is presented along with the total population, total households and number of potentially noise sensitive buildings within each band.

50. The contour figures are provided in Annex D. In all case these show there is considerable distance between the contours at the different airports and so there is no cumulative impact to consider. For more detailed views of contours or each airport, please see the individual ACP submissions/consultation material relevant to the area of interest.

[3] The current year is the latest full year sample available at the time the sponsor commenced its analysis. For Glasgow Airport the year used was 2022, for Edinburgh Airport the year used was 2023)

*Table 5: $L_{Aeq,\ 16\ Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day*

| Year | Scenario | Metric | Contour (dB) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2022 (GLA) 2023 (EDI) | Without Airspace Change | $L_{Aeq16hr}$ | 51 | 86.98 | 47,100 | 101,500 | 34 | 1 | 18 | 28 | 226 |
| | | | 54 | 47.87 | 15,400 | 32,600 | 9 | 0 | 5 | 10 | 132 |
| | | | 57 | 25.26 | 4,200 | 8,700 | 1 | 0 | 1 | 2 | 66 |
| | | | 60 | 12.98 | 1,300 | 2,600 | 1 | 0 | 1 | 1 | 23 |
| | | | 63 | 6.76 | 200 | 400 | 0 | 0 | 0 | 0 | 3 |
| | | | 66 | 2.13 | 100 | 100 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 1.14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0.68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 6: $L_{Aeq,\ 16\ Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027*

| Year | Scenario | Metric | Contour (dB) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2027 | Without Airspace Change | $L_{Aeq16hr}$ | 51 | 108.06 | 58,700 | 126,800 | 50 | 1 | 20 | 33 | 257 |
| | | | 54 | 59.93 | 22,100 | 47,000 | 16 | 0 | 10 | 18 | 162 |
| | | | 57 | 32.52 | 6,500 | 13,800 | 4 | 0 | 1 | 4 | 81 |
| | | | 60 | 16.83 | 2,100 | 4,300 | 1 | 0 | 1 | 2 | 44 |
| | | | 63 | 8.64 | 200 | 500 | 0 | 0 | 0 | 0 | 10 |
| | | | 66 | 2.9 | 100 | 200 | 0 | 0 | 0 | 0 | 1 |
| | | | 69 | 1.52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0.86 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 7: $L_{Aeq,\ 16\ Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036*

| Year | Scenario | Metric | Contour (dB) | Area ($km^2$) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2036 | Without Airspace Change | $L_{Aeq16hr}$ | 51 | 121.53 | 64,700 | 139,800 | 54 | 1 | 22 | 39 | 284 |
| | | | 54 | 68.14 | 27,200 | 58,400 | 21 | 1 | 11 | 21 | 177 |
| | | | 57 | 37.37 | 8,100 | 17,300 | 6 | 0 | 1 | 5 | 101 |
| | | | 60 | 19.59 | 2,400 | 4,900 | 1 | 0 | 1 | 2 | 49 |
| | | | 63 | 10.11 | 500 | 900 | 0 | 0 | 0 | 0 | 15 |
| | | | 66 | 3.48 | 200 | 300 | 0 | 0 | 0 | 0 | 1 |
| | | | 69 | 1.81 | <100 | <100 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 8: $L_{Aeq,\ 8\ Hr}$, Night-Time Cluster-Wide "Without Airspace Change" Baseline, Current Day*

| Year | Scenario | Metric | Contour (dB) | Area ($km^2$) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2022 (GLA) 2023 (EDI) | Without Airspace Change | $L_{Aeq8hr}$ | 45 | 134.62 | 69,800 | 150,600 | 63 | 1 | 25 | 50 | 291 |
| | | | 48 | 76.42 | 34,400 | 73,100 | 31 | 0 | 17 | 26 | 191 |
| | | | 51 | 40.52 | 12,400 | 25,400 | 10 | 0 | 5 | 12 | 112 |
| | | | 54 | 20.44 | 2,600 | 5,100 | 1 | 0 | 1 | 2 | 58 |
| | | | 57 | 10.5 | 900 | 1,800 | 1 | 0 | 1 | 0 | 17 |
| | | | 60 | 3 | 100 | 200 | 0 | 0 | 0 | 0 | 2 |
| | | | 63 | 1.51 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 66 | 0.81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0.31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 9: $L_{Aeq,\ 8\ Hr}$, Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2027*

| Year | Scenario | Metric | Contour (dB) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2027 | Without Airspace Change | $L_{Aeq8hr}$ | 45 | 151.19 | 75,500 | 163,300 | 66 | 1 | 27 | 55 | 336 |
| | | | 48 | 85.87 | 45,500 | 97,700 | 35 | 1 | 19 | 28 | 209 |
| | | | 51 | 46.44 | 15,000 | 31,200 | 13 | 0 | 6 | 14 | 122 |
| | | | 54 | 23.72 | 2,900 | 6,000 | 1 | 0 | 1 | 2 | 64 |
| | | | 57 | 12.17 | 1,100 | 2,300 | 1 | 0 | 1 | 1 | 24 |
| | | | 60 | 3.59 | 200 | 300 | 0 | 0 | 0 | 0 | 3 |
| | | | 63 | 1.85 | <100 | <100 | 0 | 0 | 0 | 0 | 0 |
| | | | 66 | 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0.56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0.36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 10: $L_{Aeq,\ 8\ Hr}$, Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2036*

| Year | Scenario | Metric | Contour (dB) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2036 | Without Airspace Change | $L_{Aeq8hr}$ | 45 | 167.66 | 80,100 | 173,200 | 68 | 1 | 28 | 58 | 360 |
| | | | 48 | 95.89 | 50,100 | 107,700 | 38 | 1 | 19 | 28 | 232 |
| | | | 51 | 52.48 | 18,200 | 38,100 | 15 | 0 | 8 | 17 | 138 |
| | | | 54 | 27.26 | 3,800 | 7,800 | 1 | 0 | 1 | 2 | 70 |
| | | | 57 | 14.01 | 1,400 | 2,700 | 1 | 0 | 1 | 1 | 36 |
| | | | 60 | 4.39 | 200 | 500 | 0 | 0 | 0 | 0 | 7 |
| | | | 63 | 2.25 | 100 | 100 | 0 | 0 | 0 | 0 | 0 |
| | | | 66 | 1.13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0.64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0.41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

### N60 and N65 contours "Without Airspace Change" Baseline - Communities

51. The following tables show collective N65 and N60 noise contour data for the 'without airspace change' current day scenario (2022/2023 [4]), the year of proposed implementation (2027) and 10 years following proposed implementation (2036). For each contour band, the area within the contour is presented along with the population and number of potentially noise sensitive buildings within each band.

52. The contour figures are provided in Annex D. In all case these show there is sufficient distance between the contours at the different airports to assume there is no cumulative impact to consider. For more detailed views of contours or each airport, please see the individual ACP submissions/consultation material relevant to the area of interest.

[4] The current year is the latest full year sample available at the time the sponsor commenced its analysis. For Glasgow Airport the year used was 2022, for Edinburgh Airport the year used was 2023)

*Table 11: N65 Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2022 (GLA) 2023 (EDI) | Without Airspace Change | N65 (Day) | 5 | 229.53 | 102,900 | 220,500 | 80 | 1 | 36 | 78 | 583 |
| | | | 10 | 182.45 | 85,400 | 184,600 | 73 | 1 | 31 | 65 | 374 |
| | | | 20 | 138.44 | 70,800 | 153,300 | 64 | 1 | 25 | 50 | 298 |
| | | | 50 | 78.89 | 35,900 | 77,700 | 26 | 1 | 17 | 26 | 211 |
| | | | 100 | 30.61 | 6,000 | 13,000 | 4 | 0 | 3 | 1 | 106 |
| | | | 200 | 2.28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 12: N65 Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2027 | Without Airspace Change | N65 (Day) | 5 | 256.16 | 112,300 | 240,200 | 82 | 1 | 39 | 83 | 692 |
| | | | 10 | 203.44 | 90,100 | 194,200 | 74 | 1 | 33 | 66 | 427 |
| | | | 20 | 157.17 | 76,500 | 165,800 | 68 | 1 | 27 | 53 | 323 |
| | | | 50 | 99.17 | 49,700 | 107,600 | 34 | 1 | 18 | 34 | 241 |
| | | | 100 | 48.01 | 14,300 | 31,100 | 8 | 1 | 5 | 7 | 144 |
| | | | 200 | 3.99 | <100 | 100 | 0 | 0 | 0 | 0 | 0 |

*Table 13: N65 Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2036 | Without Airspace Change | N65 (Day) | 5 | 268.28 | 116,500 | 249,300 | 83 | 1 | 39 | 85 | 744 |
| | | | 10 | 212.19 | 94,300 | 202,800 | 74 | 1 | 35 | 67 | 441 |
| | | | 20 | 166.05 | 79,100 | 171,200 | 72 | 1 | 28 | 56 | 353 |
| | | | 50 | 107.9 | 53,800 | 116,900 | 41 | 1 | 19 | 36 | 253 |
| | | | 100 | 54.32 | 19,600 | 43,100 | 11 | 1 | 7 | 9 | 152 |
| | | | 200 | 20.03 | 3,900 | 8,300 | 3 | 0 | 2 | 1 | 77 |

*Table 14: N60 Night-Time Cluster-Wide "Without Airspace Change" Baseline, Current Day*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2022 (GLA) 2023 (EDI) | Without Airspace Change | N60 (Night) | 5 | 258.09 | 117,600 | 251,000 | 85 | 1 | 41 | 88 | 669 |
| | | | 10 | 157.74 | 75,800 | 163,500 | 67 | 1 | 27 | 51 | 348 |
| | | | 20 | 58.24 | 14,700 | 32,100 | 8 | 1 | 6 | 2 | 130 |
| | | | 50 | 1.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 15: N60 Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2027*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2027 | Without Airspace Change | N60 (Night) | 5 | 281.63 | 125,300 | 267,600 | 89 | 1 | 41 | 97 | 741 |
| | | | 10 | 170.54 | 82,600 | 177,500 | 69 | 1 | 27 | 57 | 370 |
| | | | 20 | 78.46 | 26,900 | 59,300 | 13 | 1 | 7 | 3 | 187 |
| | | | 50 | 2.76 | <100 | <100 | 0 | 0 | 0 | 0 | 1 |

*Table 16: N60 Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2036*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2036 | Without Airspace Change | N60 (Night) | 5 | 306.39 | 134,300 | 287,600 | 94 | 2 | 42 | 98 | 776 |
| | | | 10 | 190.89 | 92,700 | 199,900 | 74 | 1 | 32 | 61 | 405 |
| | | | 20 | 89.07 | 32,100 | 70,700 | 24 | 1 | 7 | 7 | 212 |
| | | | 50 | 3.31 | <100 | 100 | 0 | 0 | 0 | 0 | 6 |

### Overflight Contours "Without Airspace Change" Baseline - Communities

53. The following tables show collective overflight data for the 'without airspace change' current day scenario (2022/2023[5]), the year of proposed implementation (2027) and 10 years following proposed implementation (2036). For each contour band, the area within the contour is presented along with the population and number of potentially noise sensitive buildings within each band.

54. The contour figures are provided in Annex D. In all case these show there is sufficient distance between the contours at the different airports to assume there is no cumulative impact to consider. For more detailed views of contours or each airport, please see the individual ACP submissions/consultation material relevant to the area of interest.

[5] The current year is the latest full year sample available at the time the sponsor commenced its analysis. For Glasgow Airport the year used was 2022, for Edinburgh Airport the year used was 2023)

*Table 17: Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2022 (GLA) 2023 (EDI) | Without Airspace Change | Overflights Day | 5 | 1385.97 | 367,400 | 797,400 | 273 | 8 | 109 | 254 | 3,510 |
| | | | 10 | 743.34 | 250,100 | 549,400 | 187 | 6 | 81 | 165 | 2,130 |
| | | | 20 | 370.3 | 150,700 | 331,400 | 113 | 4 | 58 | 104 | 1,182 |
| | | | 50 | 76.36 | 33,600 | 74,000 | 27 | 1 | 8 | 18 | 77 |
| | | | 100 | 18.27 | 5,700 | 12,700 | 3 | 1 | 3 | 1 | 5 |

*Table 18: Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2027 | Without Airspace Change | Overflights Day | 5 | 1765.27 | 450,500 | 972,600 | 331 | 13 | 136 | 328 | 4,296 |
| | | | 10 | 941.45 | 278,200 | 611,000 | 210 | 7 | 89 | 186 | 2,338 |
| | | | 20 | 501.44 | 191,500 | 421,900 | 139 | 5 | 69 | 123 | 1,659 |
| | | | 50 | 107.57 | 43,400 | 94,600 | 32 | 1 | 11 | 27 | 123 |
| | | | 100 | 31.85 | 13,800 | 30,700 | 6 | 1 | 6 | 2 | 17 |

*Table 19: Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2036 | Without Airspace Change | Overflights Day | 5 | 1990.36 | 485,800 | 1,048,900 | 353 | 21 | 149 | 345 | 4,878 |
| | | | 10 | 1089.14 | 290,900 | 638,800 | 220 | 7 | 95 | 191 | 2,521 |
| | | | 20 | 581.44 | 212,800 | 468,700 | 152 | 5 | 74 | 129 | 1,871 |
| | | | 50 | 123.08 | 48,000 | 104,600 | 34 | 1 | 12 | 29 | 146 |
| | | | 100 | 47.85 | 20,700 | 46,300 | 18 | 1 | 7 | 9 | 33 |
| | | | 200 | 4.59 | 2,800 | 6,200 | 3 | 0 | 1 | 0 | 3 |

*Table 20: Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, Current Day*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2022 (GLA) 2023 (EDI) | Without Airspace Change | Overflights Night | 5 | 239.86 | 85,600 | 187,600 | 57 | 2 | 34 | 39 | 764 |
| | | | 10 | 64.5 | 24,800 | 54,300 | 20 | 1 | 10 | 13 | 61 |
| | | | 20 | 15.93 | 3,900 | 8,700 | 3 | 0 | 3 | 1 | 5 |

*Table 21: Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2027*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2027 | Without Airspace Change | Overflights Night | 5 | 292.23 | 104,100 | 228,900 | 68 | 3 | 38 | 49 | 1,136 |
| | | | 10 | 88.18 | 38,500 | 84,100 | 30 | 1 | 10 | 22 | 83 |
| | | | 20 | 25.17 | 9,300 | 20,700 | 4 | 1 | 6 | 2 | 10 |

*Table 22: Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2036*

| Year | Scenario | Metric | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2036 | Without Airspace Change | Overflights Night | 5 | 366.89 | 124,500 | 274,300 | 80 | 4 | 41 | 59 | 1,389 |
| | | | 10 | 105.86 | 43,900 | 95,900 | 32 | 1 | 12 | 24 | 119 |
| | | | 20 | 33.26 | 12,300 | 27,400 | 6 | 1 | 6 | 2 | 19 |

### Local Air Quality for "Without Airspace Change" Baseline - Communities

55. The individual ACPs include an assessment of potential Loal Air Quality impacts from each proposal. In each case they conclude that the nature of the change unlikely to have a significant impact on local air quality and the impact is considered negligible. Local air quality is not assessed further for any options and so is not considered further in this CAF2 assessment.

### Greenhouse Gas Emissions for "Without Airspace Change" Baseline – Wider society

56. Annual and per flight greenhouse gas emissions are presented in Table 23 for the 'without airspace change' scenario[6].

*Table 23: $CO_2e$ "Without Airspace Change" Baseline, Current Day (2023) and 2027-2036*

| Year | Annual total GHG emissions (KtCO2e) | Average GHG emissions per flight (kgCO2e) |
|---|---|---|
| 2023 | 1208.9 | 5,961.1 |
| 2027 | 1569.1 | 6,067.9 |
| 2028 | 1591.3 | 6,077.1 |
| 2029 | 1613.4 | 6,086.0 |
| 2030 | 1635.5 | 6,094.7 |
| 2031 | 1657.7 | 6,103.2 |
| 2032 | 1679.8 | 6,111.5 |
| 2033 | 1702.0 | 6,119.6 |
| 2034 | 1724.1 | 6,127.5 |
| 2035 | 1746.2 | 6,135.2 |
| 2036 | 1768.4 | 6,142.8 |

57. The impact of $CO_2e$ is not location specific and so there is no cumulative impact to consider.

[6] Please refer to the greenhouse gas emissions methodology section provided in Annex B for contextual information on how the use of planned flight data in the NERL modelling may affect this result

### Tranquillity for "Without Airspace Change" Baseline – Wider society

58. The following tables show the collective area and number of locations/spaces that are relevant to the consideration of tranquillity and sit within the $L_{Aeq}$, N65, N60 and overflight contours. These data cover the 'without airspace change' current day scenario (2022/2023[7]), the year of proposed implementation (2027) and 10 years following proposed implementation (2036). As can be seen in the tables there are a number of Candidate Quiet Areas (CQA), Country Park, Gardens and designated Landscapes and Scheduled Ancient Monuments (SAMs) that are overflown, but no National Scenic Areas (NSA) or National Parks that are overflown below 7,000ft more than five times a day/night in the baseline. For maps of the receptors see the individual ACP Full Options Appraisal submissions.

59. The tranquillity data is based on the noise and overflight contours, for which it has already been concluded there is no cumulative impact, there is likewise no cumulative impact to consider regarding locations/spaces relevant to the consideration of tranquillity. For a more detailed view of how noise and overflight contours affect particular locations, please see the individual ACP submissions/consultation material relevant to that area.

*Table 24: Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day*

| Year | Scenario | Metric | Contour (dB) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2022 (GLA) 2023 (EDI) | Without Airspace Change | $L_{Aeq16hr}$ | 51 | 1 | 0.07 | 5 | 3.69 | 4 | 5.28 | 0 | 0 | 0 | 0 | 14 | 0.35 |
| | | | 54 | 0 | 0 | 4 | 1 | 4 | 3.8 | 0 | 0 | 0 | 0 | 10 | 0.22 |
| | | | 57 | 0 | 0 | 2 | 0.24 | 3 | 1.91 | 0 | 0 | 0 | 0 | 8 | 0.15 |
| | | | 60 | 0 | 0 | 0 | 0 | 3 | 0.84 | 0 | 0 | 0 | 0 | 5 | 0.05 |
| | | | 63 | 0 | 0 | 0 | 0 | 2 | 0.36 | 0 | 0 | 0 | 0 | 4 | 0.04 |
| | | | 66 | 0 | 0 | 0 | 0 | 1 | 0.03 | 0 | 0 | 0 | 0 | 2 | 0.02 |
| | | | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | | | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

[7] The current year is the latest full year sample available at the time the sponsor commenced its analysis. For Glasgow Airport the year used was 2022, for Edinburgh Airport the year used was 2023)

*Table 25: Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027*

| Year | Scenario | Metric | Contour (dB) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2027 | Without Airspace Change | $L_{Aeq16hr}$ | 51 | 1 | 0.13 | 5 | 4.43 | 5 | 6 | 0 | 0 | 0 | 0 | 21 | 0.4 |
| | | | 54 | 1 | 0 | 5 | 2.17 | 4 | 4.53 | 0 | 0 | 0 | 0 | 13 | 0.26 |
| | | | 57 | 0 | 0 | 4 | 0.58 | 4 | 2.76 | 0 | 0 | 0 | 0 | 8 | 0.19 |
| | | | 60 | 0 | 0 | 0 | 0 | 3 | 1.25 | 0 | 0 | 0 | 0 | 8 | 0.09 |
| | | | 63 | 0 | 0 | 0 | 0 | 2 | 0.56 | 0 | 0 | 0 | 0 | 4 | 0.04 |
| | | | 66 | 0 | 0 | 0 | 0 | 1 | 0.16 | 0 | 0 | 0 | 0 | 3 | 0.02 |
| | | | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| | | | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 26: Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036*

| Year | Scenario | Metric | Contour (dB) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2036 | Without Airspace Change | $L_{Aeq16hr}$ | 51 | 1 | 0.2 | 5 | 4.74 | 5 | 6.48 | 0 | 0 | 0 | 0 | 22 | 0.41 |
| | | | 54 | 1 | 0.02 | 5 | 3.11 | 4 | 4.93 | 0 | 0 | 0 | 0 | 13 | 0.28 |
| | | | 57 | 0 | 0 | 4 | 0.76 | 4 | 3.34 | 0 | 0 | 0 | 0 | 9 | 0.2 |
| | | | 60 | 0 | 0 | 1 | 0.02 | 3 | 1.61 | 0 | 0 | 0 | 0 | 8 | 0.12 |
| | | | 63 | 0 | 0 | 0 | 0 | 3 | 0.71 | 0 | 0 | 0 | 0 | 4 | 0.04 |
| | | | 66 | 0 | 0 | 0 | 0 | 2 | 0.25 | 0 | 0 | 0 | 0 | 3 | 0.02 |
| | | | 69 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0.01 |
| | | | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

*Table 27: Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day*

| Year | Scenario | Metric | Contour (Flights per Day) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2022 (GLA) 2023 (EDI) | Without Airspace Change | Overflights Day | 5 | 10 | 14.8 | 10 | 7.17 | 31 | 37.99 | 0 | 0 | 0 | 0 | 230 | 6.02 |
| | | | 10 | 5 | 10.29 | 9 | 6.45 | 20 | 29.27 | 0 | 0 | 0 | 0 | 131 | 4.08 |
| | | | 20 | 3 | 4.23 | 7 | 4.93 | 11 | 14.93 | 0 | 0 | 0 | 0 | 76 | 2.72 |
| | | | 50 | 0 | 0 | 3 | 0.68 | 3 | 0.66 | 0 | 0 | 0 | 0 | 13 | 0.45 |
| | | | 100 | 0 | 0 | 1 | 0.38 | 2 | 0.24 | 0 | 0 | 0 | 0 | 3 | 0.09 |

*Table 28: Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027*

| Year | Scenario | Metric | Contour (Flights per Day) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2027 | Without Airspace Change | Overflights Day | 5 | 10 | 15.79 | 13 | 7.82 | 34 | 41.43 | 0 | 0 | 0 | 0 | 261 | 6.76 |
| | | | 10 | 6 | 10.91 | 10 | 6.8 | 25 | 30.75 | 0 | 0 | 0 | 0 | 166 | 4.71 |
| | | | 20 | 4 | 7.2 | 7 | 5.68 | 17 | 22.92 | 0 | 0 | 0 | 0 | 100 | 3.49 |
| | | | 50 | 0 | 0 | 4 | 2.38 | 3 | 2.41 | 0 | 0 | 0 | 0 | 16 | 0.55 |
| | | | 100 | 0 | 0 | 2 | 0.51 | 2 | 0.4 | 0 | 0 | 0 | 0 | 5 | 0.32 |

*Table 29: Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036*

| Year | Scenario | Metric | Contour (Flights per Day) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2036 | Without Airspace Change | Overflights Day | 5 | 10 | 16.28 | 13 | 8.07 | 38 | 44.65 | 0 | 0 | 0 | 0 | 306 | 7.58 |
| | | | 10 | 6 | 12.5 | 10 | 6.93 | 25 | 33.43 | 0 | 0 | 0 | 0 | 195 | 5.25 |
| | | | 20 | 4 | 7.77 | 8 | 5.94 | 18 | 24.6 | 0 | 0 | 0 | 0 | 107 | 3.7 |
| | | | 50 | 0 | 0 | 4 | 2.75 | 3 | 2.74 | 0 | 0 | 0 | 0 | 17 | 0.58 |
| | | | 100 | 0 | 0 | 2 | 0.57 | 2 | 0.5 | 0 | 0 | 0 | 0 | 9 | 0.38 |
| | | | 200 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0.03 |

## Biodiversity Data for "Without Airspace Change" Baseline – Wider Society

60. The ACPs identify that their changes would not result in likely significant effects on the conservation objectives of any European site. The flights in the baseline do not overlap below the HRA scoping level of 3,000ft and so there are no cumulative effects to consider.

61. However, the sponsors have provided the following tables to show the number and area of European Sites (RAMSAR, SAC, SPA) that are collectively overflown below 7,000ft for the 'without airspace change' current day scenario (2022/2023[8]), the year of proposed implementation (2027) and 10 years following proposed implementation (2036). For maps showing these areas see the individual ACP appraisals.

*Table 30: Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day*

| Year | Scenario | Metric | Contour (Flights per Day) | RAMSAR | | SAC | | SPA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2022 (GLA) 2023 (EDI) | Without Airspace Change | Overflights Day | 5 | 16 | 13.9 | 8 | 19.77 | 19 | 243.46 |
| | | | 10 | 13 | 8.01 | 2 | 0.38 | 15 | 186.8 |
| | | | 20 | 7 | 5.9 | 0 | 0 | 9 | 101.11 |
| | | | 50 | 1 | 0.62 | 0 | 0 | 3 | 17.08 |
| | | | 100 | 1 | 0.38 | 0 | 0 | 3 | 8.62 |

[8] The current year is the latest full year sample available at the time the sponsor commenced its analysis. For Glasgow Airport the year used was 2022, for Edinburgh Airport the year used was 2023)

*Table 31: Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027*

| Year | Scenario | Metric | Contour (Flights per Day) | RAMSAR | | SAC | | SPA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2027 | Without Airspace Change | Overflights Day | 5 | 17 | 16.51 | 9 | 30 | 21 | 277.21 |
| | | | 10 | 14 | 10.32 | 7 | 2.51 | 17 | 204.68 |
| | | | 20 | 11 | 6.89 | 0 | 0 | 13 | 121.24 |
| | | | 50 | 1 | 2.28 | 0 | 0 | 3 | 26.8 |
| | | | 100 | 1 | 0.51 | 0 | 0 | 3 | 12.22 |

*Table 32: Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036*

| Year | Scenario | Metric | Contour (Flights per Day) | RAMSAR | | SAC | | SPA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2036 | Without Airspace Change | Overflights Day | 5 | 17 | 17.73 | 9 | 32.09 | 22 | 294.9 |
| | | | 10 | 16 | 12 | 8 | 13.59 | 19 | 220.41 |
| | | | 20 | 11 | 7.23 | 0 | 0 | 13 | 143.6 |
| | | | 50 | 1 | 2.63 | 0 | 0 | 3 | 36.04 |
| | | | 100 | 1 | 0.57 | 0 | 0 | 3 | 14.36 |
| | | | 200 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 33: Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, Current Day*

| Year | Scenario | Metric | Contour (Flights per Day) | RAMSAR | | SAC | | SPA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2022 (GLA) 2023 (EDI) | Without Airspace Change | Overflights Night | 5 | 4 | 3.67 | 0 | 0 | 6 | 75.89 |
| | | | 10 | 1 | 0.64 | 0 | 0 | 3 | 18.55 |
| | | | 20 | 1 | 0.45 | 0 | 0 | 3 | 9.99 |

*Table 34: Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2027*

| Year | Scenario | Metric | Contour (Flights per Day) | RAMSAR | | SAC | | SPA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2027 | Without Airspace Change | Overflights Night | 5 | 4 | 4.41 | 0 | 0 | 6 | 87.22 |
| | | | 10 | 1 | 0.66 | 0 | 0 | 3 | 20.46 |
| | | | 20 | 1 | 0.49 | 0 | 0 | 3 | 11.4 |

*Table 35: Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2036*

| Year | Scenario | Metric | Contour (Flights per Day) | RAMSAR | | SAC | | SPA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2036 | Without Airspace Change | Overflights Night | 5 | 6 | 5.27 | 0 | 0 | 8 | 107.81 |
| | | | 10 | 1 | 0.69 | 0 | 0 | 3 | 27.07 |
| | | | 20 | 1 | 0.55 | 0 | 0 | 3 | 13.58 |

### Capacity/Resilience for "Without Airspace Change" Baseline - Wider society

62. Table 36 shows Glasgow Airport's modelled pre-departure ground delay for 2027 and 2036 whereas and NERLs has modelled network delay for the same periods. Edinburgh presented only qualitative information relating to delay so are not represented in this table.

*Table 36: Pre-departure Ground Dealy and Network Delay for "Without Airspace Change" Baseline, 2027 & 2036*

| Without Airspace Change | Delay Minutes | |
|---|---|---|
| | 2027 | 2036 |
| Pre Departure Ground Delay (Glasgow Only) | 46,989 | 62,320 |
| Network Delay | 114,971 | 176,051 |

### Access – General Aviation

63. Details of the existing controlled airspace structures can be found in Section ENR 6.6 and 6.7 in the UK AIP.

### Economic Impact from Increased Effective Capacity for "Without Airspace Change" Baseline – General Aviation/Commercial Airlines

64. The current cost of the delay figures from Table 36 have been monetised by the sponsors. See the individual ACPs for description of the values used to monetise the delay. This monetised value represents baseline from which the economic impact of increased effective capacity is calculated. This monetisation is captured in the Cost Benefit Section 8.

### Fuel burn for "Without Airspace Change" Baseline – General Aviation/Commercial Airlines

65. Fuel burn is proportional to $CO_2e$ and so is calculated by the same method/assumptions as described in Annex A.

*Table 37: Fuel Burn for "Without Airspace Change" Baseline, Current Day (2023) and 2027-2036 & Total*[9]

| Year | Annual total fuel burn (Kt) | Annual Fuel Burn Cost (£) 2024 prices | Average Fuel Burn per Flight (kg) |
|---|---|---|---|
| 2023 | 380.2 | £ 260,785,756 | 1,874.5 |
| 2027 | 493.4 | £ 338,489,871 | 1,908.2 |
| 2028 | 500.4 | £ 343,265,898 | 1,911.0 |
| 2029 | 507.4 | £ 348,041,924 | 1,913.8 |
| 2030 | 514.3 | £ 352,817,951 | 1,916.6 |
| 2031 | 521.3 | £ 357,593,977 | 1,919.2 |
| 2032 | 528.2 | £362,370,004 | 1,921.9 |
| 2033 | 535.2 | £ 367,146,030 | 1,924.4 |
| 2034 | 542.2 | £ 371,922,057 | 1,926.9 |
| 2035 | 549.1 | £ 376,698,083 | 1,929.3 |
| 2036 | 556.1 | £ 381,474,110 | 1,931.7 |

### Training Costs for "Without Airspace Change" Baseline – Commercial Airlines

66. This category relates to costs incurred through changing the airspace and so it is zero for the "without Airspace change" baseline.

### Other Costs for "Without Airspace Change" Baseline – Commercial Airlines

67. This category relates to costs incurred through changing the airspace and so it is zero for the "without Airspace change" baseline.

### Operational Costs for "Without Airspace Change" Baseline – Airport / ANSP

68. This category relates to costs incurred through changing the airspace and so it is zero for the "without Airspace change" baseline.

### Deployment Costs for "Without Airspace Change" Baseline – Airport / ANSP

69. This category relates to costs incurred through changing the airspace and so it is zero for the "without Airspace change" baseline.

[9] The costs shown are not discounted – see Section 8 for Net Present Value calculations

## Other Costs for “Without Airspace Change” Baseline – Airport / ANSP

70. This category relates to costs incurred through changing the airspace and so it is zero for the “without Airspace change” baseline.

# 7 Collective Performance – Cluster-Wide "With Airspace Change"

*This section presents data showing the difference between Cluster "With Airspace Change" Proposal and the Baseline data set. The absolute results are also presented for key primary metrics, with absolute values for secondary and other metrics presented in Annex E.*

71. Figure 3 shows the set of routes associated with the proposed cluster-wide "With Airspace Change" option. These include the PBN Standard Instrument Departures routes and PBN approach transitions from the Edinburgh and Glasgow Airport ACPs, and the holds and Standard Instrument Arrival routes for both airports that are included in the NERL ACP. These are provided for reference only, for details see the relevant ACP submission/consultation. Above and beyond these routes lies the network of routes for which NERL is also proposing change (these include routes above 7000ft used by Prestwick Airport flights). These are not shown on Figure 1 as the diagram would become too crowded; for this detail see the NERL ACP.

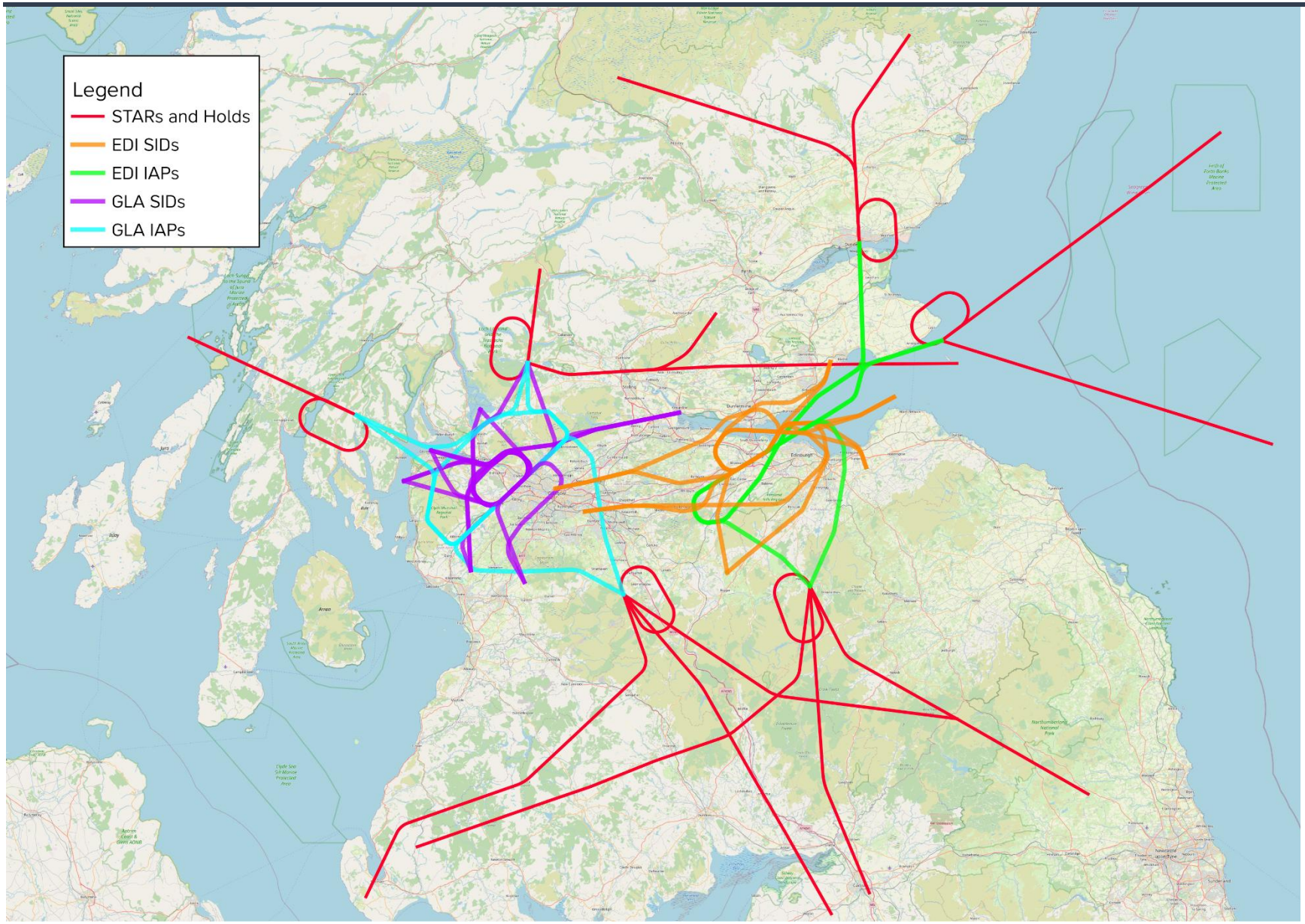



*Figure 3: Cluster-Wide "With Airspace Change" Proposal Standard Instrument Departures (SIDs), Approach Transitions (IAPs), Standard Arrival Routes (STARs)and Holds for Edinburgh and Glasgow Airports*

## Noise for Cluster-Wide "With Airspace Change" Proposal - Communities

72. The output from the 'TAG noise workbook – aviation' is a primary measure of the adverse effects to health and quality of life for the purpose of the CAA's decision-making on a proposal (CAP1616i, November 2023, Parar 5.17).

73. TAG has been used by each sponsor to assess total adverse noise effects over a 10-year appraisal period (2027 – 2036 ). The individual assessments have been aggregated for this report.

74. The collective full TAG assessment results are presented in Table 38. The monetised net present value (NPV) of $L_{Aeq}$ noise changes of this option is c.£32m (2024 prices). This positive value reflects a net benefit (i.e. a reduction in total adverse effects on health and quality of life from noise).

75. However, it should be noted that the population data also in Table 38 shows that this net benefit includes some people would experience more noise, albeit that all cases these would be outnumbered by people experiencing less noise. . The monetised difference is captured in the cost benefit analysis (see Section 88).

*Table 38: Cluster-Wide "With Airspace Change" Proposal TAG Noise Assessment Results*

| NPV Total Noise (2024 prices) | NPV Sleep (2024 prices) | NPV Amenity (2024 prices) | NPV AMI (2024 prices) | NPV Stroke (2024 prices) | NPV Dementia (2024 prices) | individuals experiencing increased daytime noise in forecast year | individuals experiencing reduced daytime noise in forecast year | individuals experiencing increased night time noise in forecast year | individuals experiencing reduced night time noise in forecast year |
|---|---|---|---|---|---|---|---|---|---|
| £31,566,333 | £19,576,635 | £8,467,515 | £35,742 | £1,389,597 | £2,096,844 | 8,756 | 48,729 | 21,472 | 74,830 |

## $L_{Aeq}$ for Cluster-Wide "With Airspace Change" Proposal - Communities

76. The TAG results are based on $L_{Aeq}$ contour analysis. The difference between Cluster-Wide "With Airspace Change" Proposal and the baseline in term of $L_{Aeq}$ contour statistics is presented below. All the associated contour diagrams are provided in the Annex E. In all case the contour diagrams show there is sufficient distance between the contours at the different airports to assume there is no cumulative impact to consider.

*Table 39: Comparison Table for $L_{Aeq,\ 16\ Hr}$, ,Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027*

| Scenario | Metric | Year | Contour (dB) | Area ($km^2$) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison $L_{Aeq16hr}$ | 2027 | 51 | -3.53 | -6,300 | -13,900 | -7 | 0 | 0 | -1 | -8 |
| | | | 54 | -1.57 | -2,500 | -5,600 | -2 | 0 | -1 | -1 | -2 |
| | | | 57 | -0.31 | -200 | -500 | 0 | 0 | 0 | -1 | -3 |
| | | | 60 | -0.01 | -100 | -200 | 0 | 0 | 0 | 0 | -3 |
| | | | 63 | -0.02 | 0 | -100 | 0 | 0 | 0 | 0 | 0 |
| | | | 66 | -0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 40: Comparison Table for $L_{Aeq,\ 16\ Hr}$, ,Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036*

| Scenario | Metric | Year | Contour (dB) | Area ($km^2$) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison $L_{Aeq16hr}$ | 2036 | 51 | -2.76 | -5,400 | -12,000 | -4 | 0 | 0 | -6 | 0 |
| | | | 54 | -1.88 | -3,700 | -8,000 | -4 | 0 | 1 | -2 | 3 |
| | | | 57 | -0.52 | -700 | -1,600 | -1 | 0 | 0 | 0 | -14 |
| | | | 60 | -0.02 | -100 | -100 | 0 | 0 | 0 | 0 | -1 |
| | | | 63 | -0.03 | -100 | -200 | 0 | 0 | 0 | 0 | -3 |
| | | | 66 | -0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | -0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 41: Comparison Table for $L_{Aeq,\ 8\ Hr}$, ,Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027*

| Scenario | Metric | Year | Contour (dB) | Area ($km^2$) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison $L_{Aeq8hr}$ | 2027 | 45 | -2.53 | -4,500 | -10,400 | -8 | 0 | 1 | -5 | -19 |
| | | | 48 | -5.73 | -11,100 | -24,700 | -6 | 0 | -2 | -3 | -11 |
| | | | 51 | -1.77 | -2,200 | -4,900 | -5 | 0 | 0 | -4 | -5 |
| | | | 54 | -0.12 | 0 | 100 | 0 | 0 | 0 | 0 | -3 |
| | | | 57 | 0 | 0 | -100 | 0 | 0 | 0 | 0 | -2 |
| | | | 60 | -0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | 63 | -0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 66 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 42: Comparison Table for $L_{Aeq,\ 8\ Hr}$, Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036*

| Scenario | Metric | Year | Contour (dB) | Area ($km^2$) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison $L_{Aeq8hr}$ | 2036 | 45 | 0.01 | -2,800 | -6,900 | -7 | 0 | 1 | -3 | 8 |
| | | | 48 | -5.46 | -4,700 | -10,100 | -3 | 0 | -1 | -2 | -22 |
| | | | 51 | -1.93 | -3,200 | -7,100 | -5 | 0 | -2 | -5 | -11 |
| | | | 54 | -0.2 | -300 | -700 | 0 | 0 | 0 | 0 | 1 |
| | | | 57 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 60 | -0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 63 | -0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 66 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

77. As $L_{Aeq}$ is the primary noise metric the absolute values are also provided for reference below.

*Table 43: $L_{Aeq,\ 16\ Hr}$, ,Daytime Cluster-Wide "With Airspace Change" Proposal, 2027*

| Year | Scenario | Metric | Contour (dB) | Area ($km^2$) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2027 | With Airspace Change | $L_{Aeq16hr}$ | 51 | 104.53 | 52,400 | 112,900 | 43 | 1 | 20 | 32 | 249 |
| | | | 54 | 58.36 | 19,500 | 41,500 | 14 | 0 | 9 | 17 | 160 |
| | | | 57 | 32.21 | 6,300 | 13,300 | 4 | 0 | 1 | 3 | 78 |
| | | | 60 | 16.82 | 2,000 | 4,100 | 1 | 0 | 1 | 2 | 41 |
| | | | 63 | 8.62 | 200 | 400 | 0 | 0 | 0 | 0 | 10 |
| | | | 66 | 2.88 | 100 | 200 | 0 | 0 | 0 | 0 | 1 |
| | | | 69 | 1.52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0.86 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 44: $L_{Aeq,\ 16\ Hr}$, ,Daytime Cluster-Wide "With Airspace Change" Proposal, 2036*

| Year | Scenario | Metric | Contour (dB) | Area ($km^2$) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2036 | With Airspace Change | $L_{Aeq16hr}$ | 51 | 118.77 | 59,300 | 127,800 | 50 | 1 | 22 | 33 | 284 |
| | | | 54 | 66.26 | 23,600 | 50,300 | 17 | 1 | 12 | 19 | 180 |
| | | | 57 | 36.85 | 7,400 | 15,700 | 5 | 0 | 1 | 5 | 87 |
| | | | 60 | 19.57 | 2,400 | 4,800 | 1 | 0 | 1 | 2 | 48 |
| | | | 63 | 10.08 | 400 | 700 | 0 | 0 | 0 | 0 | 12 |
| | | | 66 | 3.46 | 200 | 300 | 0 | 0 | 0 | 0 | 1 |
| | | | 69 | 1.82 | <100 | <100 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0.99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 45: $L_{Aeq,\ 8\ Hr}$, ,Night-Time Cluster-Wide "With Airspace Change" Proposal, 2027*

| Year | Scenario | Metric | Contour (dB) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2027 | With Airspace Change | $L_{Aeq8hr}$ | 45 | 148.66 | 71,000 | 152,800 | 58 | 1 | 28 | 50 | 317 |
| | | | 48 | 80.14 | 34,400 | 73,000 | 29 | 1 | 17 | 25 | 198 |
| | | | 51 | 44.67 | 12,800 | 26,300 | 8 | 0 | 6 | 10 | 117 |
| | | | 54 | 23.6 | 2,900 | 6,000 | 1 | 0 | 1 | 2 | 61 |
| | | | 57 | 12.17 | 1,100 | 2,300 | 1 | 0 | 1 | 1 | 22 |
| | | | 60 | 3.58 | 200 | 300 | 0 | 0 | 0 | 0 | 4 |
| | | | 63 | 1.83 | <100 | <100 | 0 | 0 | 0 | 0 | 0 |
| | | | 66 | 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0.56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0.36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 46: $L_{Aeq,\ 8\ Hr}$, ,Night-Time Cluster-Wide "With Airspace Change" Proposal 2036*

| Year | Scenario | Metric | Contour (dB) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2036 | With Airspace Change | $L_{Aeq8hr}$ | 45 | 167.67 | 77,200 | 166,300 | 61 | 1 | 29 | 55 | 368 |
| | | | 48 | 90.43 | 45,400 | 97,600 | 35 | 1 | 18 | 26 | 210 |
| | | | 51 | 50.55 | 15,000 | 31,000 | 10 | 0 | 6 | 12 | 127 |
| | | | 54 | 27.06 | 3,500 | 7,100 | 1 | 0 | 1 | 2 | 71 |
| | | | 57 | 14.05 | 1,400 | 2,700 | 1 | 0 | 1 | 1 | 36 |
| | | | 60 | 4.35 | 200 | 500 | 0 | 0 | 0 | 0 | 7 |
| | | | 63 | 2.24 | 100 | 100 | 0 | 0 | 0 | 0 | 0 |
| | | | 66 | 1.14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0.64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0.41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

### N60 and N65 contours for Cluster-Wide "With Airspace Change" Proposal - Communities

78. Number above contours show the locations where the number of events (i.e., flights) exceeds a pre-determined noise level, expressed in dB $L_{ASmax}$. For example, N65 contours show the number of events where the noise level from those flights exceeds 65 dB $L_{ASmax}$.

79. Number above contours are described in CAP1616i as secondary metrics and are not monetised or used to determine 'adverse noise effects'. Difference tables are presented below for information. The tables below show the difference in each contour band compared to the 'without airspace change' scenario. Absolute values and the contour diagrams are provided in Annex E. In all case the contour diagrams show there is sufficient distance between the contours at the different airports to assume there is no cumulative impact to consider.

*Table 47: Comparison Table for N65,Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027*

| Scenario | Metric | Year | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison N65 (Day) | 2027 | 5 | 50.92 | 900 | 1,900 | 1 | 0 | 5 | 6 | 31 |
| | | | 10 | 23.04 | 4,700 | 10,500 | 0 | 0 | 0 | 3 | 82 |
| | | | 20 | -0.1 | -2,000 | -4,800 | -3 | 0 | 1 | -4 | 41 |
| | | | 50 | -3.62 | -5,400 | -11,800 | -5 | 0 | 0 | -4 | -2 |
| | | | 100 | -1.51 | -1,100 | -2,400 | 0 | 0 | 0 | 0 | -2 |
| | | | 200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 48: Comparison Table for N65 ,Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036*

| Scenario | Metric | Year | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison N65 (Day) | 2036 | 5 | 54.73 | -1,000 | -2,500 | 0 | 0 | 6 | 5 | 31 |
| | | | 10 | 22.85 | 3,700 | 8,300 | 3 | 0 | -2 | 3 | 81 |
| | | | 20 | 1.65 | -1,800 | -4,100 | -6 | 0 | 0 | -4 | 41 |
| | | | 50 | -4.28 | -6,100 | -13,400 | -9 | 0 | 0 | -4 | -10 |
| | | | 100 | -2.01 | -2,400 | -5,400 | -3 | 0 | 0 | 0 | -4 |
| | | | 200 | -2.25 | -1,900 | -4,000 | -3 | 0 | -2 | -1 | -26 |

*Table 49: Comparison Table for N60 ,Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027*

| Scenario | Metric | Year | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison N60 (Night) | 2027 | 5 | 17.36 | -7,600 | -16,800 | -5 | 0 | -2 | -7 | -63 |
| | | | 10 | -11.52 | -2,000 | -4,400 | -4 | 0 | 2 | -4 | -21 |
| | | | 20 | -4.74 | -5,100 | -11,400 | -4 | 0 | -1 | -1 | -20 |
| | | | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 50: Comparison Table for N60 , Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036*

| Scenario | Metric | Year | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison N60 (Night) | 2036 | 5 | 30.67 | -11,900 | -26,400 | -8 | -1 | -3 | -7 | -52 |
| | | | 10 | -8.6 | -1,100 | -2,600 | -4 | 0 | 0 | -5 | -29 |
| | | | 20 | -2.19 | -4,800 | -10,800 | -8 | 0 | 0 | -3 | -3 |
| | | | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Overflight Contours for Cluster-Wide "With Airspace Change" Proposal - Communities

80. The measurement of 'overflight' is a secondary metric that can be useful for explaining the impacts of airspace change proposals.

81. Overflight contours are described in CAP1616i as secondary metrics and are not monetised or used to determine 'adverse noise effects'. The overflight metric is defined in CAP1498[10].

82. Difference tables are presented below for information. The tables below show the difference in each contour band compared to the 'without airspace change' scenario. Absolute values and the contour diagrams are provided in Annex E. In all case the contour diagrams show there is sufficient distance between the contours at the different airports to assume there is no cumulative impact to consider.

*Table 51: Comparison Table for Overflight, Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027*

| Scenario | Metric | Year | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison Overflights Day | 2027 | 5 | -418.19 | -114,800 | -251,700 | -76 | -6 | -27 | -61 | -1,426 |
| | | | 10 | -51.94 | -103,900 | -228,500 | -66 | -5 | -15 | -35 | -361 |
| | | | 20 | 40.49 | -93,500 | -206,100 | -72 | -4 | -25 | -57 | -1,048 |
| | | | 50 | 126.86 | 7,400 | 16,300 | -6 | 0 | 4 | -3 | 140 |
| | | | 100 | 45.04 | 2,500 | 5,300 | 0 | 0 | 0 | 0 | 48 |

*Table 52: Comparison Table for Overflight, Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036*

| Scenario | Metric | Year | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison Overflights Day | 2036 | 5 | -581.7 | -126,800 | -279,800 | -81 | -14 | -35 | -39 | -1,791 |
| | | | 10 | -97.34 | -98,700 | -217,000 | -63 | -5 | -16 | -30 | -387 |
| | | | 20 | 27.59 | -96,900 | -213,700 | -70 | -4 | -27 | -52 | -839 |
| | | | 50 | 198.1 | 11,400 | 25,500 | -3 | 0 | 6 | -2 | 184 |
| | | | 100 | 64.44 | 600 | 1,000 | -9 | 0 | 2 | -6 | 76 |
| | | | 200 | 2.38 | -2,300 | -5,200 | -3 | 0 | -1 | 0 | 3 |

[10] Note that the 48.5 degree cone definition of overflight has been used by all sponsors.

*Table 53: Comparison Table for Overflight, Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027*

| Scenario | Metric | Year | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison Overflights Night | 2027 | 5 | 170.43 | -28,600 | -63,800 | -25 | -2 | -10 | -16 | -417 |
| | | | 10 | 69.18 | -1,500 | -3,600 | -12 | 0 | 4 | -11 | 116 |
| | | | 20 | -1.65 | -4,800 | -10,700 | -1 | -1 | -3 | -1 | 0 |

*Table 54: Comparison Table for Overflight, Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036*

| Scenario | Metric | Year | Contour (Flights per Day) | Area (km²) | Total Households | Total Population | Number of Schools | Number of Hospitals | Number of Carehomes | Number of Places of Worship | Number of Listed Buildings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| With Airspace Change | Comparison Overflights Night | 2036 | 5 | 125.2 | -44,200 | -98,400 | -30 | -3 | -13 | -23 | -463 |
| | | | 10 | 96.43 | 1,400 | 3,000 | -8 | 0 | 3 | -7 | 117 |
| | | | 20 | 66.31 | 4,900 | 10,900 | 1 | 0 | 1 | -1 | 84 |

### Local Air Quality for Cluster-Wide "With Airspace Change" Proposal - Communities

83. Not considered further – see para 55.

### Greenhouse Gas Emissions for Cluster-Wide "With Airspace Change" Proposal – Wider society

84. TAG has been used to assess the greenhouse gas impact over a 10-year appraisal period. The change in $CO_2e$ emissions over the 10-year appraisal period is a reduction of 219.8kT of which 127.7kT is traded in the UK ETS and 92.0kT is not[11]. This results in a total monetised net present value (NPV) benefit of £54m (including monetisation of both traded and non traded).

85. Annual greenhouse gas emissions ($CO_2e$) are presented in Table 55 for "With Airspace Change" Proposal[12].

*Table 55: Comparison Table for $CO_2e$, Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027-2036 & Total*

| Year | Without Airspace Change | | With Aispace Change | | Difference | |
|---|---|---|---|---|---|---|
| | Annual total GHG emissions (KtCO2e) | Average GHG emissions per flight (kgCO2e) | Annual total GHG emissions (KtCO2e) | Average GHG emissions per flight (kgCO2e) | Annual total GHG emissions (KtCO2e) | Average GHG emissions per flight (kgCO2e) |
| 2027 | 1,569.1 | 6,067.9 | 1,550.3 | 5,995.1 | - 18.8 | - 72.9 |
| 2028 | 1,591.3 | 6,077.1 | 1,571.7 | 6,002.5 | - 19.5 | - 74.6 |
| 2029 | 1,613.4 | 6,086.0 | 1,593.2 | 6,009.7 | - 20.2 | - 76.3 |
| 2030 | 1,635.5 | 6,094.7 | 1,614.6 | 6,016.7 | - 20.9 | - 78.0 |
| 2031 | 1,657.7 | 6,103.2 | 1,636.0 | 6,023.6 | - 21.6 | - 79.6 |
| 2032 | 1,679.8 | 6,111.5 | 1,657.5 | 6,030.3 | - 22.3 | - 81.2 |
| 2033 | 1,702.0 | 6,119.6 | 1,678.9 | 6,036.8 | - 23.0 | - 82.8 |
| 2034 | 1,724.1 | 6,127.5 | 1,700.4 | 6,043.2 | - 23.7 | - 84.3 |
| 2035 | 1,746.2 | 6,135.2 | 1,721.8 | 6,049.5 | - 24.4 | - 85.8 |
| 2036 | 1,768.4 | 6,142.8 | 1,743.3 | 6,055.6 | - 25.1 | - 87.2 |

[11] These figures are rounded (see paragraph 37 in Section 3)

[12] Please refer to the greenhouse gas emissions methodology section provided in Annex B for contextual information on how the use of planned flight data in the NERL modelling may affect this result

## Tranquillity for Cluster-Wide "With Airspace Change" Proposal – Wider society

86. The difference to impact on designated tranquil sites of cluster-wide "With Airspace Change" proposal for daytime noise and overflight metrics, and for both 2027 and 2036 are shown below. Contour diagrams are provided in Annex E.

*Table 56: Comparison Table for Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime, Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027*

| Scenario | Metric | Year | Contour (dB) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| With Airspace Change | Comparison $L_{Aeq16hr}$ | 2027 | 51 | 0 | -0.01 | 0 | 0.98 | 0 | 0.36 | 0 | 0 | 0 | 0 | -2 | -0.01 |
| | | | 54 | 0 | 0 | 0 | -0.12 | 0 | 0.38 | 0 | 0 | 0 | 0 | -2 | -0.01 |
| | | | 57 | 0 | 0 | 0 | -0.05 | -1 | 0.03 | 0 | 0 | 0 | 0 | 0 | -0.01 |
| | | | 60 | 0 | 0 | 0 | 0 | 0 | -0.01 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 63 | 0 | 0 | 0 | 0 | 0 | -0.04 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 66 | 0 | 0 | 0 | 0 | 0 | -0.03 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 57: Comparison Table for Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime, Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036*

| Scenario | Metric | Year | Contour (dB) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| With Airspace Change | Comparison $L_{Aeq16hr}$ | 2036 | 51 | 0 | -0.02 | 0 | 1.02 | 0 | 0.36 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 54 | 0 | 0 | 0 | 0.13 | 0 | 0.37 | 0 | 0 | 0 | 0 | -1 | -0.02 |
| | | | 57 | 0 | 0 | 0 | -0.08 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | -0.01 |
| | | | 60 | 0 | 0 | 0 | -0.01 | 0 | -0.03 | 0 | 0 | 0 | 0 | 0 | -0.01 |
| | | | 63 | 0 | 0 | 0 | 0 | 0 | -0.03 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 66 | 0 | 0 | 0 | 0 | -1 | -0.03 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 58: Table for Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime, Cluster-Wide "With Airspace Change" Proposal, 2027*

| Year | Scenario | Metric | Contour (dB) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2027 | With Airspace Change | $L_{Aeq16hr}$ | 51 | 1 | 0.12 | 5 | 5.41 | 5 | 6.36 | 0 | 0 | 0 | 0 | 19 | 0.39 |
| | | | 54 | 1 | 0 | 5 | 2.05 | 4 | 4.91 | 0 | 0 | 0 | 0 | 11 | 0.25 |
| | | | 57 | 0 | 0 | 4 | 0.53 | 3 | 2.79 | 0 | 0 | 0 | 0 | 8 | 0.18 |
| | | | 60 | 0 | 0 | 0 | 0 | 3 | 1.24 | 0 | 0 | 0 | 0 | 8 | 0.09 |
| | | | 63 | 0 | 0 | 0 | 0 | 2 | 0.52 | 0 | 0 | 0 | 0 | 4 | 0.04 |
| | | | 66 | 0 | 0 | 0 | 0 | 1 | 0.13 | 0 | 0 | 0 | 0 | 3 | 0.02 |
| | | | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| | | | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table 59: Table for Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime, Cluster-Wide "With Airspace Change" Proposal, 2036*

| Year | Scenario | Metric | Contour (dB) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| 2036 | With Airspace Change | $L_{Aeq16hr}$ | 51 | 1 | 0.18 | 5 | 5.76 | 5 | 6.84 | 0 | 0 | 0 | 0 | 22 | 0.41 |
| | | | 54 | 1 | 0.02 | 5 | 3.24 | 4 | 5.3 | 0 | 0 | 0 | 0 | 12 | 0.26 |
| | | | 57 | 0 | 0 | 4 | 0.68 | 4 | 3.44 | 0 | 0 | 0 | 0 | 9 | 0.19 |
| | | | 60 | 0 | 0 | 1 | 0.01 | 3 | 1.58 | 0 | 0 | 0 | 0 | 8 | 0.11 |
| | | | 63 | 0 | 0 | 0 | 0 | 3 | 0.68 | 0 | 0 | 0 | 0 | 4 | 0.04 |
| | | | 66 | 0 | 0 | 0 | 0 | 1 | 0.22 | 0 | 0 | 0 | 0 | 3 | 0.02 |
| | | | 69 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0.01 |
| | | | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

*Table 60: Comparison Table for Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027*

| Scenario | Metric | Year | Contour (Flights per Day) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| With Airspace Change | Comparison Overflights Day | 2027 | 5 | 0 | 5.93 | 6 | -0.1 | -10 | -18.43 | 1 | 1.66 | 1 | 0.27 | -78 | -2.77 |
| | | | 10 | 2 | 7.33 | 1 | -0.56 | -11 | -20.31 | 1 | 0.32 | 0 | 0 | -51 | -2.3 |
| | | | 20 | 1 | -1.44 | -2 | -0.61 | -9 | -17.32 | 0 | 0 | 0 | 0 | -23 | -1.6 |
| | | | 50 | 2 | 1.55 | 1 | 0.49 | 2 | 0.88 | 0 | 0 | 0 | 0 | 22 | 0.62 |
| | | | 100 | 1 | 0 | 0 | 0.08 | 1 | 0.87 | 0 | 0 | 0 | 0 | 17 | 0.41 |

*Table 61: Comparison Table for Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036*

| Scenario | Metric | Year | Contour (Flights per Day) | Country Parks | | CQA | | Gardens and Designated Landscapes | | National Parks | | NSA | | SAMs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| With Airspace Change | Comparison Overflights Day | 2036 | 5 | 0 | 5.71 | 7 | -0.03 | -14 | -20.77 | 1 | 2.71 | 1 | 0.41 | -121 | -3.4 |
| | | | 10 | 2 | 6.32 | 2 | -0.41 | -8 | -17.89 | 1 | 0.51 | 0 | 0 | -65 | -2.51 |
| | | | 20 | 1 | -1.38 | -3 | -0.8 | -9 | -18.82 | 0 | 0 | 0 | 0 | -22 | -1.72 |
| | | | 50 | 3 | 1.99 | 1 | 1.76 | 3 | 1.72 | 0 | 0 | 0 | 0 | 32 | 0.83 |
| | | | 100 | 1 | 0.02 | 1 | 0.1 | 2 | 0.93 | 0 | 0 | 0 | 0 | 16 | 0.38 |
| | | | 200 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 1 | 0.24 |

## Biodiversity Data for Cluster-Wide "With Airspace Change" Proposal

87. The ACPs identify that their changes would not result in likely significant effects on the conservation objectives of any European site. The proposals do not overlap below the HRA scoping level of 3,000ft and so there are no cumulative effects to consider for the cluster -wide design..

88. However, the sponsors have provided the following tables to show the difference to impact on designated biodiversity sites of cluster-wide "With Airspace Change" proposal for daytime and nighttime overflight metrics, and for both 2027 and 2036 are shown below. Absolute values and the contour diagrams are provided in Annex E.

*Table 62: Comparison Table for Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027*

| Scenario | Metric | Year | Contour (Flights per Day) | RAMSAR | | SAC | | SPA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| With Airspace Change | Comparison Overflights Day | 2027 | 5 | -8 | -5.11 | -2 | -13.27 | -6 | -38.8 |
| | | | 10 | -9 | -4.01 | -1 | 12.64 | -7 | -1.93 |
| | | | 20 | -7 | -1.58 | 3 | 10.63 | -7 | 27.79 |
| | | | 50 | 2 | 0.54 | 2 | 6.93 | 2 | 33.02 |
| | | | 100 | 1 | 0.08 | 0 | 0 | 1 | 20.9 |

*Table 63: Comparison Table for Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036*

| Scenario | Metric | Year | Contour (Flights per Day) | RAMSAR | | SAC | | SPA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| With Airspace Change | Comparison Overflights Day | 2036 | 5 | -8 | -4.74 | -2 | -15.08 | -7 | -48.14 |
| | | | 10 | -9 | -5.3 | -2 | 1.91 | -7 | -2.7 |
| | | | 20 | -6 | -1.68 | 3 | 11.14 | -4 | 28.77 |
| | | | 50 | 3 | 2.33 | 3 | 8.92 | 3 | 57.54 |
| | | | 100 | 2 | 0.11 | 1 | 0.04 | 2 | 22.69 |
| | | | 200 | 0 | 0 | 0 | 0 | 1 | 3.94 |

*Table 64: Comparison Table for Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027*

| Scenario | Metric | Year | Contour (Flights per Day) | RAMSAR | | SAC | | SPA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| With Airspace Change | Comparison Overflights Night | 2027 | 5 | 1 | 0.9 | 3 | 1.02 | 3 | 77.26 |
| | | | 10 | 2 | 0.18 | 1 | 0.08 | 2 | 22.59 |
| | | | 20 | 0 | -0.04 | 0 | 0 | 0 | 2.52 |

*Table 65: Comparison Table for Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036*

| Scenario | Metric | Year | Contour (Flights per Day) | RAMSAR | | SAC | | SPA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Area ($km^2$) | Total | Area ($km^2$) | Total | Area ($km^2$) |
| With Airspace Change | Comparison Overflights Night | 2036 | 5 | -1 | 0.21 | 3 | 1.1 | 1 | 66.59 |
| | | | 10 | 2 | 0.2 | 1 | 0.12 | 2 | 18.3 |
| | | | 20 | 2 | 0.11 | 0 | 0 | 2 | 22.52 |

## Capacity/Resilience for Cluster-Wide "With Airspace Change" Proposal - Wider society

89. Table 66 shows the reduction in pre-departure ground delay and network delay. Edinburgh Airport's proposal presented only qualitative assessment relating to delay so are not represented in Table 36. This qualitative assessment identified potential benefits to their delay as a result of new routes that avoid some of the busiest downstream sectors over the North of England

*Table 66: Comparison Table for Delay, Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027-2036 & Total*

| With Airspace Change | Delay Minutes | |
|---|---|---|
| | 2027 | 2036 |
| Pre Departure Ground Delay (Glasgow Only) | 35,772 | 52,336 |
| Reduction in Pre Departure Ground Delay (Glasgow Only) | 11,217 | 9,983 |
| Network Delay | 150,500 | 226,886 |
| Reduction in Network Delay | 35,529 | 50,835 |
| Total Reduction | 46,746 | 60,818 |

90. Both Edinburgh and Glasgow Airport identify that the published procedures today rely on conventional ground-based navigation aids called Very High Frequency Omnidirectional Range (VOR). This equipment is due to be decommissioned as part of a NERL UK wide programme under the Airspace Modernisation Programme. PBN routes would enable Edinburgh to continue operating as the VORs are decommissioned.

## Access for Cluster-Wide "With Airspace Change" Proposal – General Aviation

91. **Controlled airspace (CAS)** is airspace of defined dimensions within which an air traffic control (ATC) service is provided in accordance with the airspace classification. Its purpose is to create a known air traffic environment to achieve the objectives of the ATC service to prevent collisions between aircraft and to expedite and maintain an orderly flow of air traffic.

92. Different types of airspace are classified by a lettering system specified by ICAO. Class A to E airspace is known as "controlled airspace"; Class G airspace is "uncontrolled airspace". The airspace classification type establishes the extent to which airspace users must comply with various regulations (embracing, for example, aircraft equipage, pilot qualification and applicable Rules of the Air) and the types of air traffic services that are provided in the airspace.

93. In the UK, controlled airspace is established primarily to protect commercial air transport passenger flights from other flights and is where Air Traffic Control (ATC) needs to have positive control over aircraft flying in the airspace in order to maintain safe separation between them. Uncontrolled airspace is airspace where aircraft are able to fly freely without being constrained by instructions from ATC, unless they request such a service.

94. Controlled airspace contains the network of corridors (known as Airways or the Route Network) which link the busy airspace surrounding the major airports. The controlled airspace around the major airports is designated variously as Control Zones (CTR), from the ground upwards to a specified upper limit; Control Areas (CTA), from a specified base level and Terminal Control Areas (TMA) which are larger CTAs normally encompassing a number of airports and extend from a specified base level above the ground to a specified upper limit. This can be seen in Figure 4.

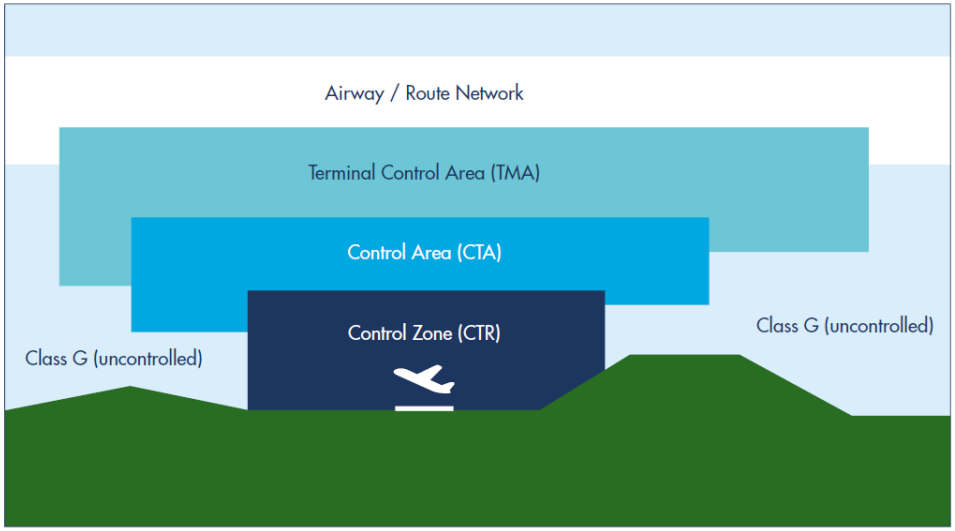



*Figure 4: Illustrative example of CAS structures*

95. Airspace change must account for the needs of all airspace users and ensure that the amount of proposed CAS is the minimum necessary to achieve safe and efficient operations. The remainder of the section presents information on the cluster-wide "With Airspace Change" proposal to describe the scale of proposed CAS and its potential impact on airspace accessibility for the General Aviation sector. Greater detail of the individual changes is available within each of the sponsors ACP submissions/consultation documents where the operations within CAS are described and proposed size of CAS is justified.

96. Table 67, Table 68 and Table 69 show breakdown of the volume of CAS changing classifications for eth whole cluster at all level, above 7000ft and below 7000ft respectively.

97. Table 67 shows that the overall proposal would result in an increased volume of CAS (and therefore decrease in Class G) of c.700 $NM^3$. However, this is a 'net' value. Table 69 shows that c.1300 $NM^3$ of new CAS is required by the changes above 7000ft to provide more efficient en-route connectivity. This airspace is predominantly at high level and much of it is over the sea (the Firth or Forth in particular). It is therefore not expected to have a major impact on non-commercial air traffic operations. Table 68 shows that below 7000ft there is a reduction of c.600 $NM^3$. The sponsors believe that it is airspace in areas that will be most beneficial for General Aviation, a conclusion that will be tested during the consultation.

*Table 67: Volume of each type and classification of CAS in the baseline and proposed, combined Glasgow Airport, Edinburgh Airport and NERL ACPs (All Levels).*

| Airspace Type | Baseline Volume | Option A Volume | Volume Change (nm3) |
|---|---|---|---|
| CTR | 773.2 | 737.6 | - 35.5 |
| CTA | 26,129.4 | 26,778.7 | 649.3 |
| TMA | 9,467.3 | 9,512.3 | 45.1 |
| Total | 36,369.8 | 37,028.7 | 658.8 |

| Airspace Classification | Baseline Volume | Option A Volume | Volume Change (nm3) |
|---|---|---|---|
| Class A | 6,714.0 | 1,417.8 | - 5,296.2 |
| Class C | 0.0 | 3,713.2 | 3,713.2 |
| Class D | 17,691.7 | 19,307.5 | 1,615.8 |
| Class E | 11,964.2 | 12,590.1 | 626.0 |
| Total | 36,369.8 | 37,028.7 | 658.8 |

*Table 68: Volume of each type and classification of CAS in the baseline and proposed, combined Glasgow Airport, Edinburgh Airport and NERL ACPs 7000ft and below only.*

| Airspace Type | Baseline Volume | Option A Volume | Volume Change ($NM^3$) |
|---|---|---|---|
| CTR | 773.2 | 737.6 | - 35.5 |
| CTA | 7,667.8 | 7,100.1 | - 567.7 |
| TMA | 9,467.3 | 9,468.8 | 1.5 |
| Total | 17,908.2 | 17,306.5 | - 601.7 |

| Airspace Classification | Baseline Volume | Option A Volume | Volume Change ($NM^3$) |
|---|---|---|---|
| Class A | 404.4 | 95.2 | - 309.2 |
| Class C | 0.0 | 0.0 | 0.0 |
| Class D | 13,389.0 | 13,566.8 | 177.8 |
| Class E | 4,114.9 | 3,644.6 | - 470.3 |
| Total | 17,908.2 | 17,306.5 | - 601.7 |

*Table 69: Volume of each type and classification of CAS in the baseline and proposed, combined Glasgow Airport, Edinburgh Airport and NERL ACPs above 7000ft.*

| Airspace Type | Baseline Volume | Option A Volume | Volume Change ($NM^3$) |
|---|---|---|---|
| CTR | 0.0 | 0.0 | 0.0 |
| CTA | 18,461.6 | 19,678.6 | 1,217.0 |
| TMA | 0.0 | 43.5 | 43.5 |
| Total | 18,461.6 | 19,722.1 | 1,260.5 |

| Airspace Classification | Baseline Volume | Option A Volume | Volume Change ($NM^3$) |
|---|---|---|---|
| Class A | 6,309.6 | 1,322.6 | - 4,987.0 |
| Class C | 0.0 | 3,713.2 | 3,713.2 |
| Class D | 4,302.7 | 5,740.7 | 1,438.0 |
| Class E | 7,849.3 | 8,945.5 | 1,096.2 |
| Total | 18,461.6 | 19,722.2 | 1,260.6 |

98. In terms of access to controlled airspace, all sponsors have confirmed appropriately equipped and operated General Aviation aircraft will be granted clearance into CAS where traffic density and capacity permits. Table 67 shows that a net reduction of over 5,000 $NM^3$ in Class A airspace, which a corresponding increase in Class C, Class D and E which improves opportunities for access.

99. Reclassifying Class A to Class D or E helps to support VFR access of general aviation operators as VFR are not able to enter Class A.

100. The net volume of airspace released is only part of the story. The useability of airspace that is released must also be considered, Figure 5 to Figure 27 show airspace 'cutaways' highlighting where the proposals would change the controlled airspace structure .

101. Airspace Cutaway Diagrams Cutaways are only provided at 5000ft intervals from 500ft upwards *where there is a change*. e.g. the airspace for 1000ft is the same as that at 500ft and so the next cutaway shown after 500ft is at 1500ft.

102. Figure 5 to Figure 27 are presented to show a simplified view, at a cluster wide level, of where airspace is changing from controlled (Class A, C , D or E) to uncontrolled (Class G). Note that it was found that showing both the classifications and the changes on the same cluster wide map made the maps overly complex and difficult to interpret. Further detailed information on the changes to classification are provided in the individual ACP submissions and consultation material. Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

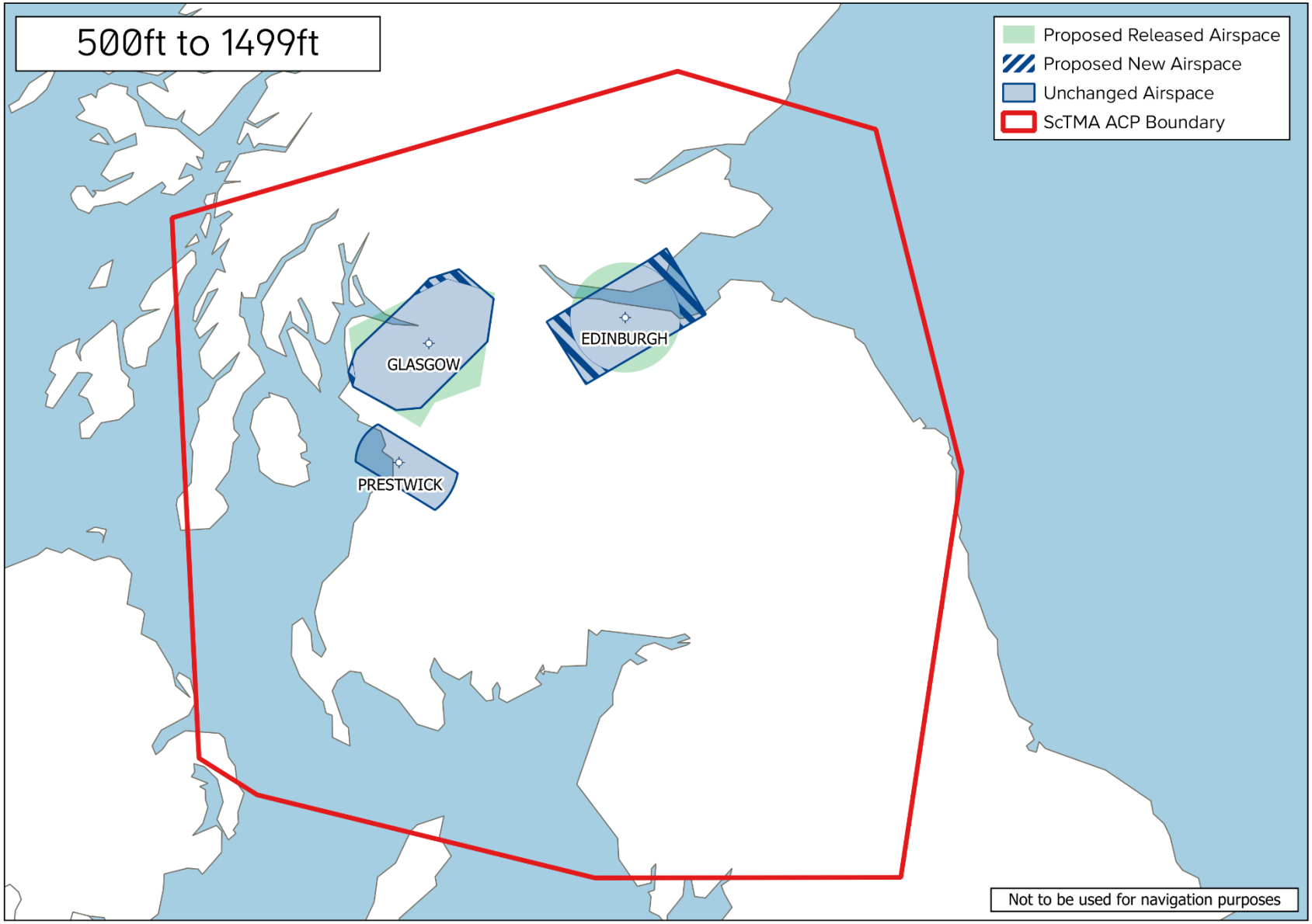
103. It is immediately apparent from these Figures that both airports have amended airspace to make it more appropriate for a single runway operation, changing the shape of the CTRs. Other changes at lower levels relate to airspace reverting to Class G as the systemised design and modern operations do not require it, resulting in significant increase in Class G airspace below 7,000ft.

104. One area of significant change and increase in CAS is to the Northeast of Edinburgh. This is to provide CAS to protect aircraft arriving and departing on Edinburgh Airport's proposed routes to and from the north, east and southeast, which have been developed to move commercial flights over the sea as much as is practical. The totality of this increase can only be seen when considering both the Edinburgh Airport and NERL changes together.

105. There is nothing else in the changes of the individual ACPs that is exacerbated when they are brought together (i.e. there are no cumulative negative effects where the impact of the proposal as a whole is worse than the sum of its parts). Indeed, the total reduction in airspace between Glasgow and Edinburgh at the lower levels is only possible because Glasgow and Edinburgh Airports have been working together to align proposals and ensure that the net effect is to improve GA access in the areas where it is most beneficial. The diagrams below, combined with the more detailed information in the relevant ACPs, aim to help other airspace users to assess any impact on the requirements of their own operations so that feedback may be provided through consultation.

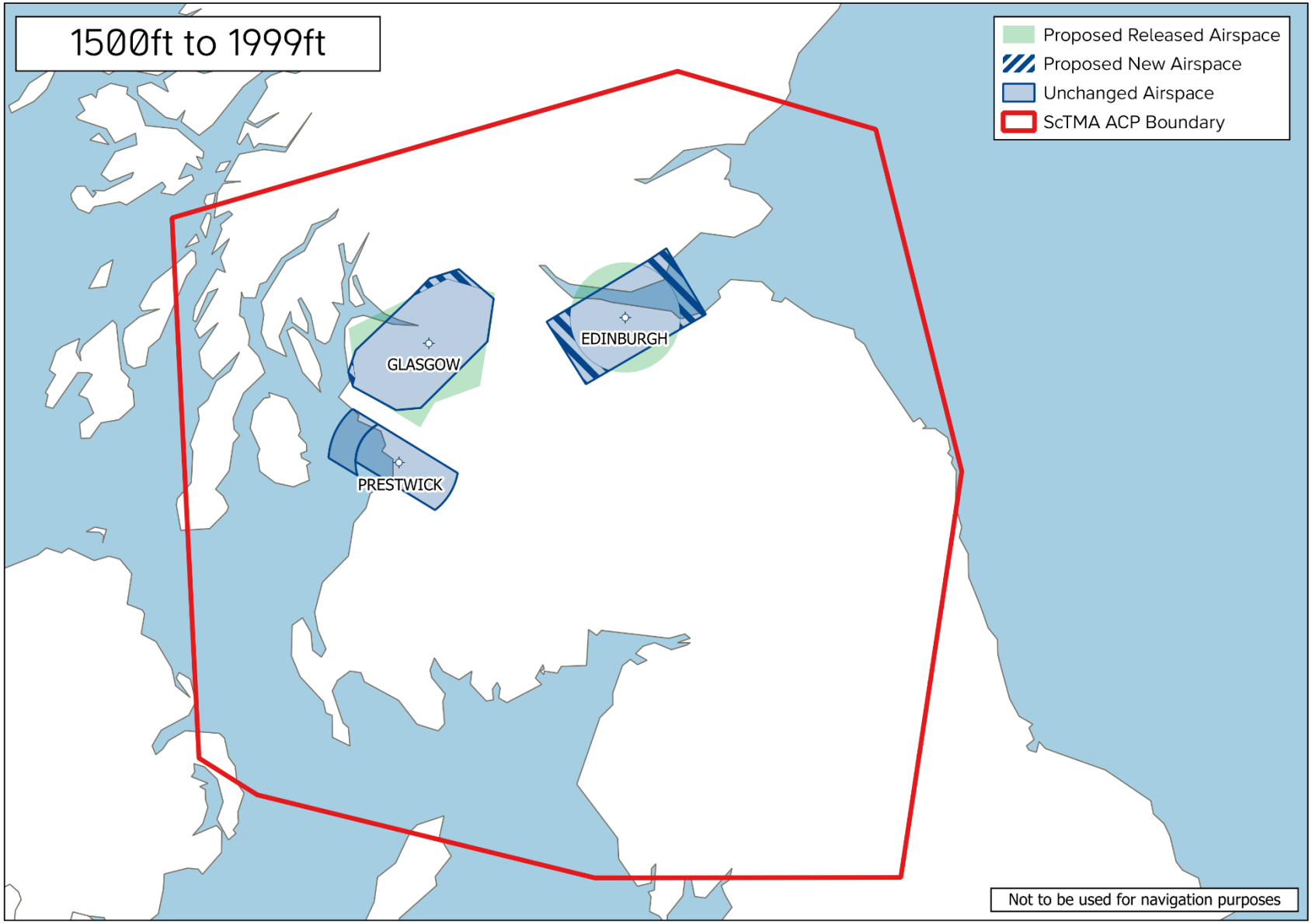
106. As part of this overall proposal NERL has also sought to revise and extend Temporary Reserved Areas (Gliding) (TRA(G) in the vicinity of the ScTMA. TRA(G)s are used for gliding between FL195 and FL245. As these changes are entirely covered in the NERL ACP, the details are not repeated in this CAF2 document. For full details see the NERL ACP submission/consultation.

*Figure 5: New and Released CAS 500ft-1499ft*



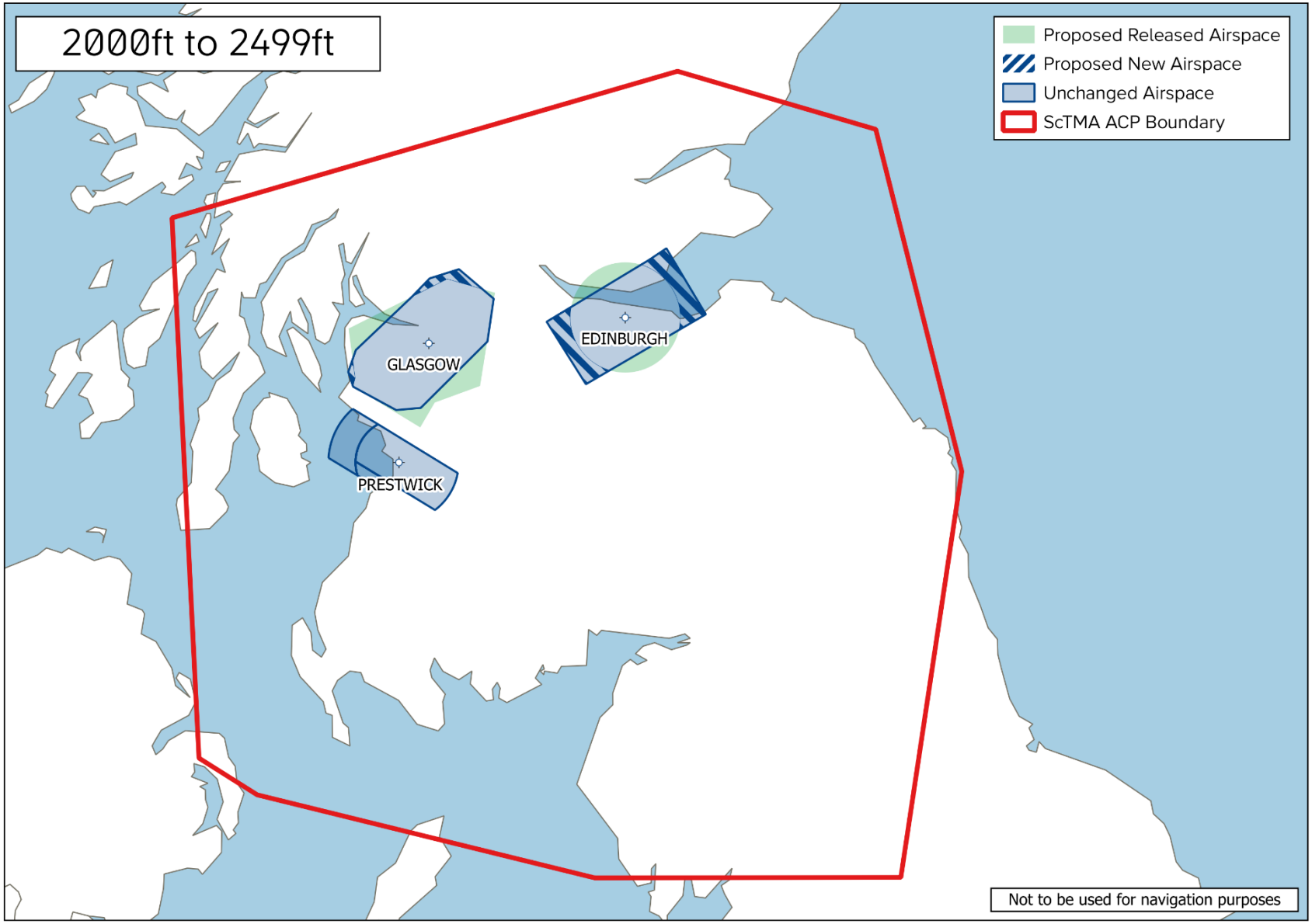

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 6: New and Released CAS 1500ft-1999ft*



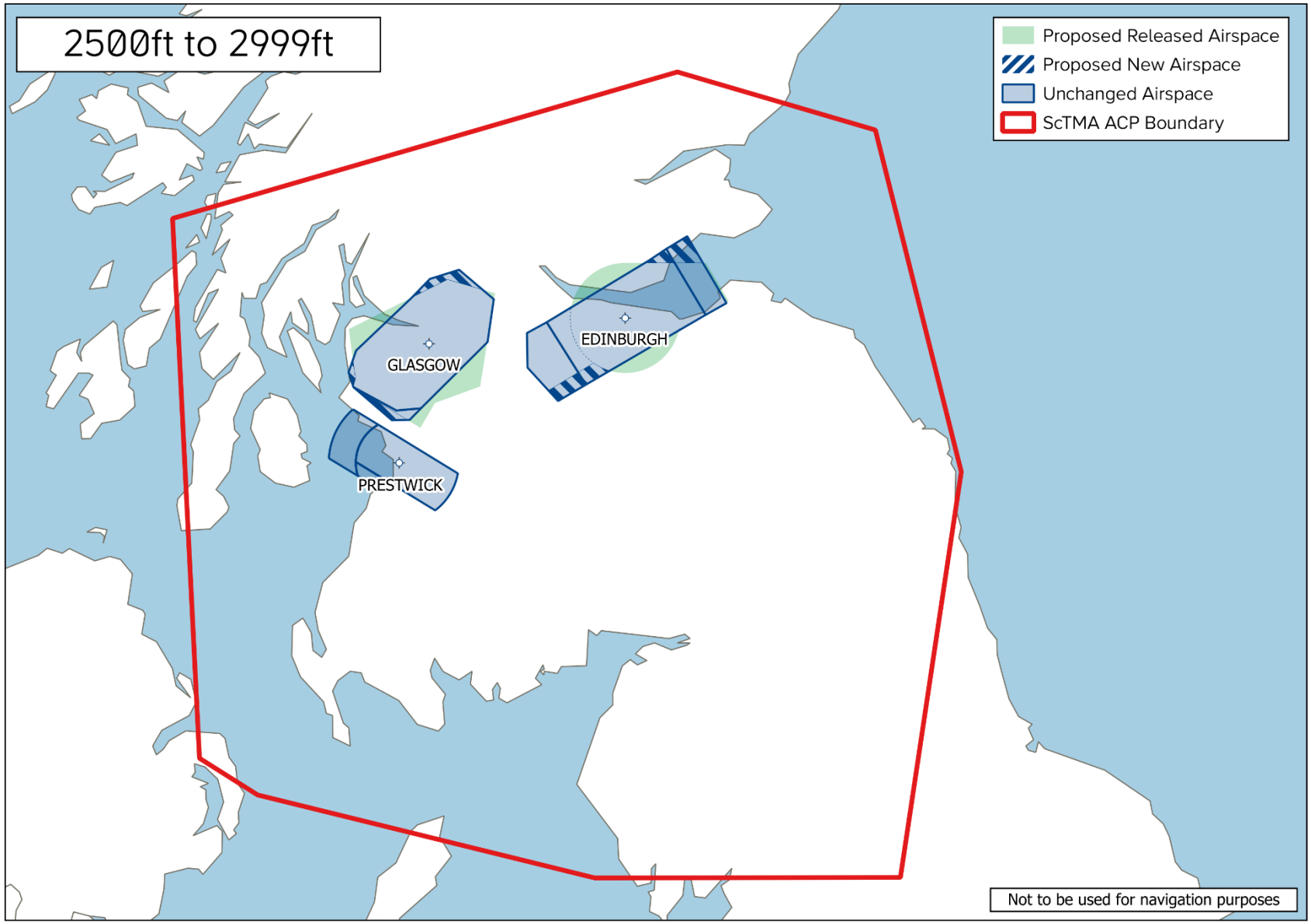

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 7: New and Released CAS 2000ft-2499ft*



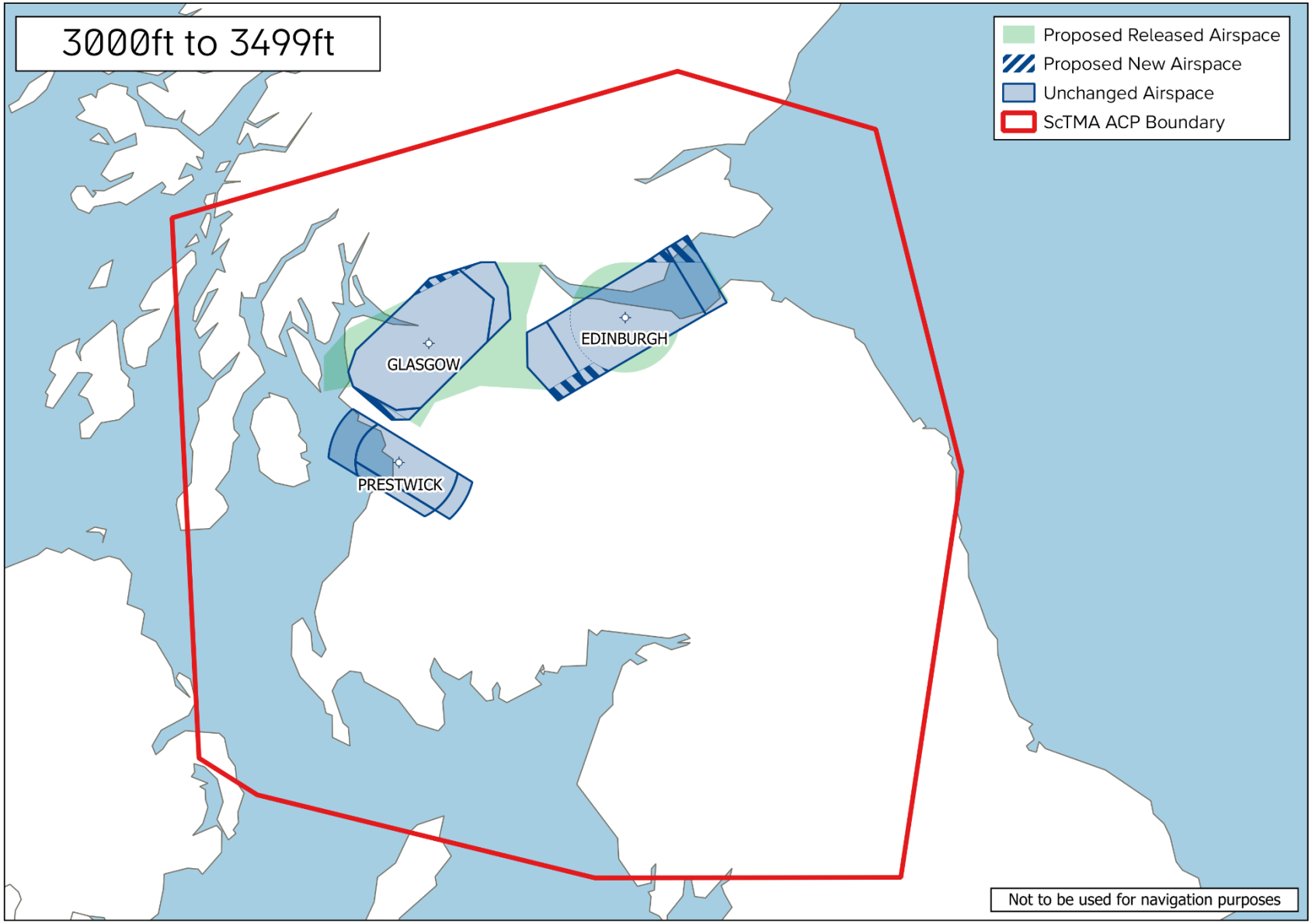

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 8: New and Released CAS 2500ft-2999ft*



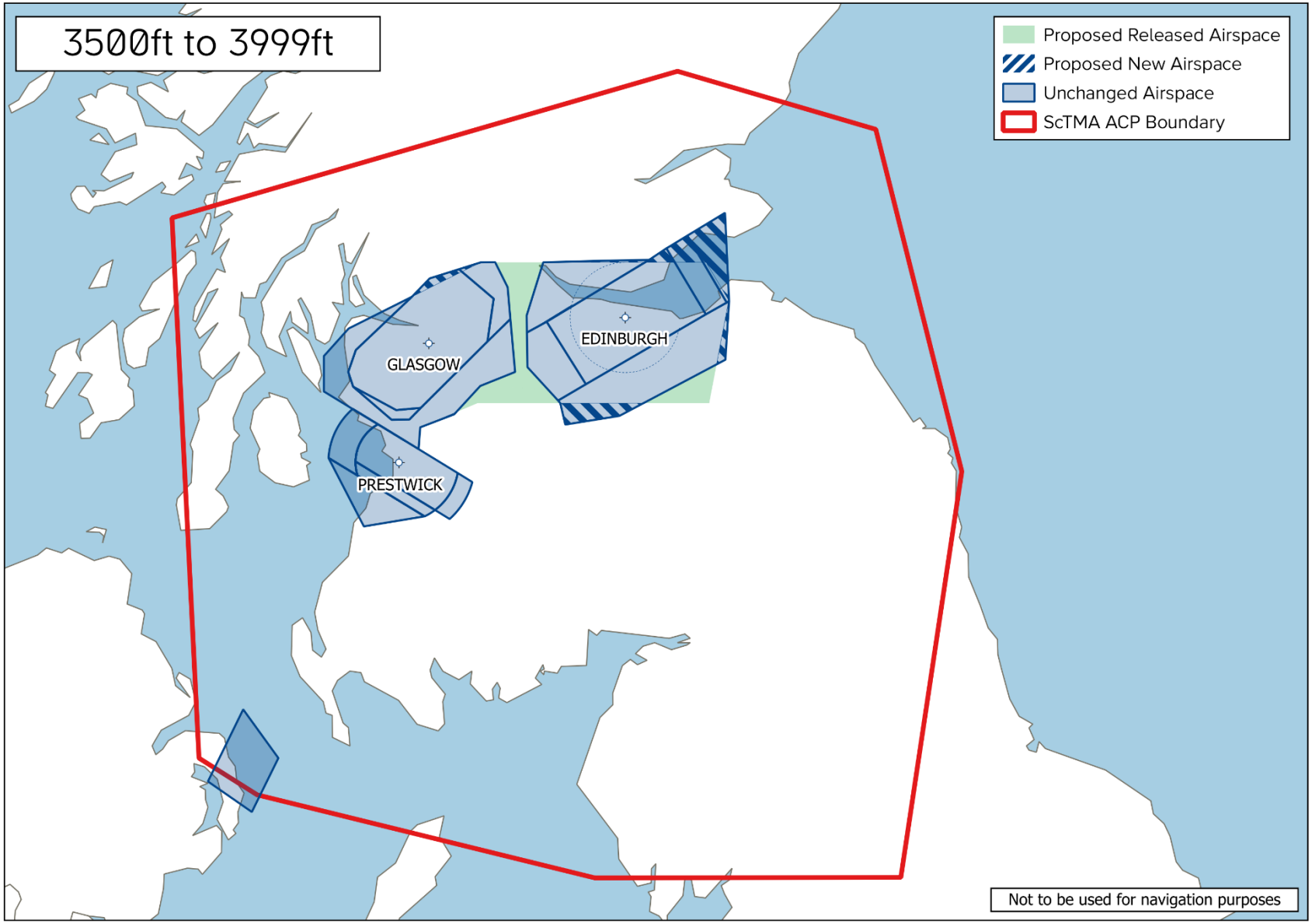

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 9: New and Released CAS 3000ft-3499ft*



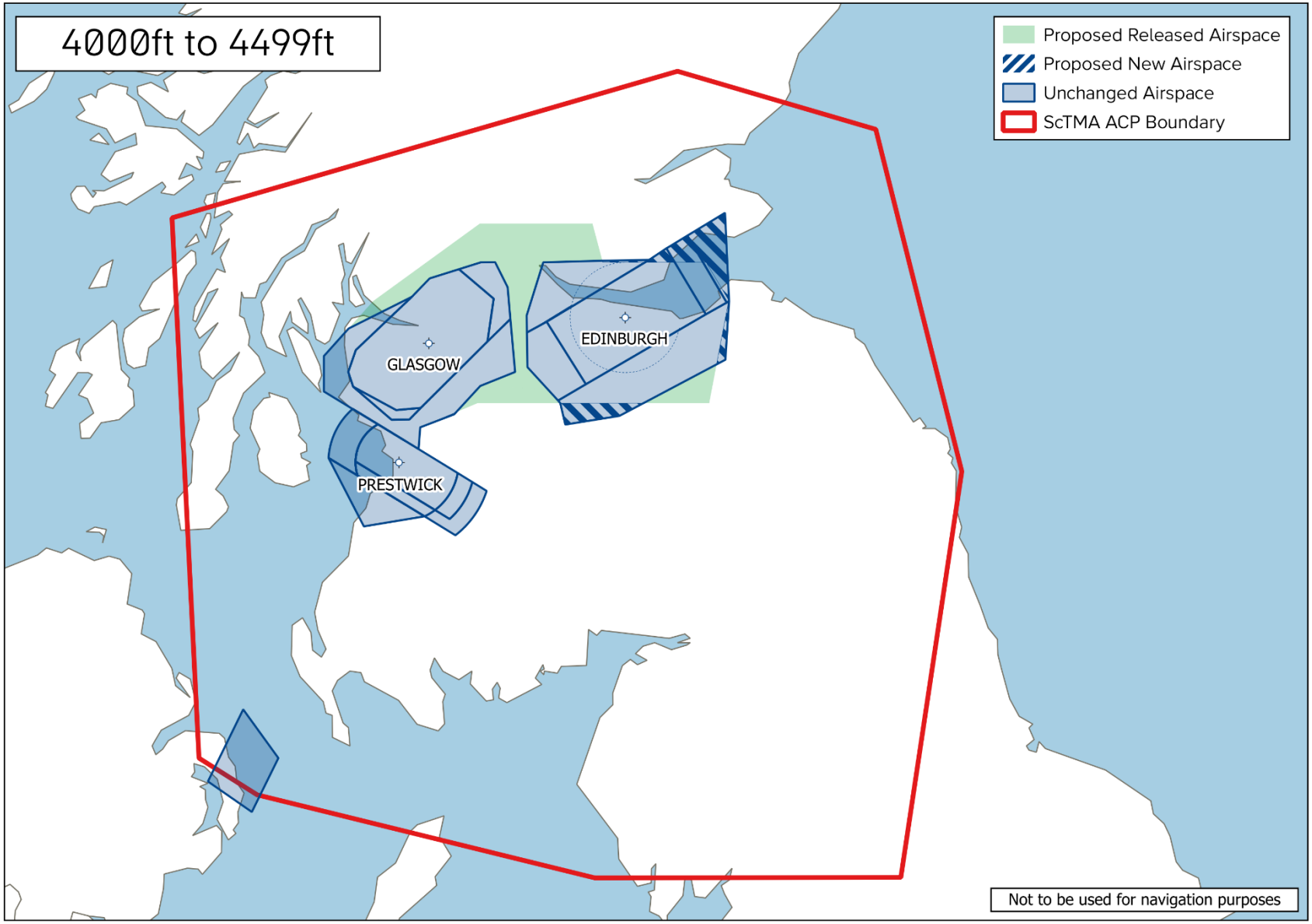

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 10: New and Released CAS 3500ft-3999ft*



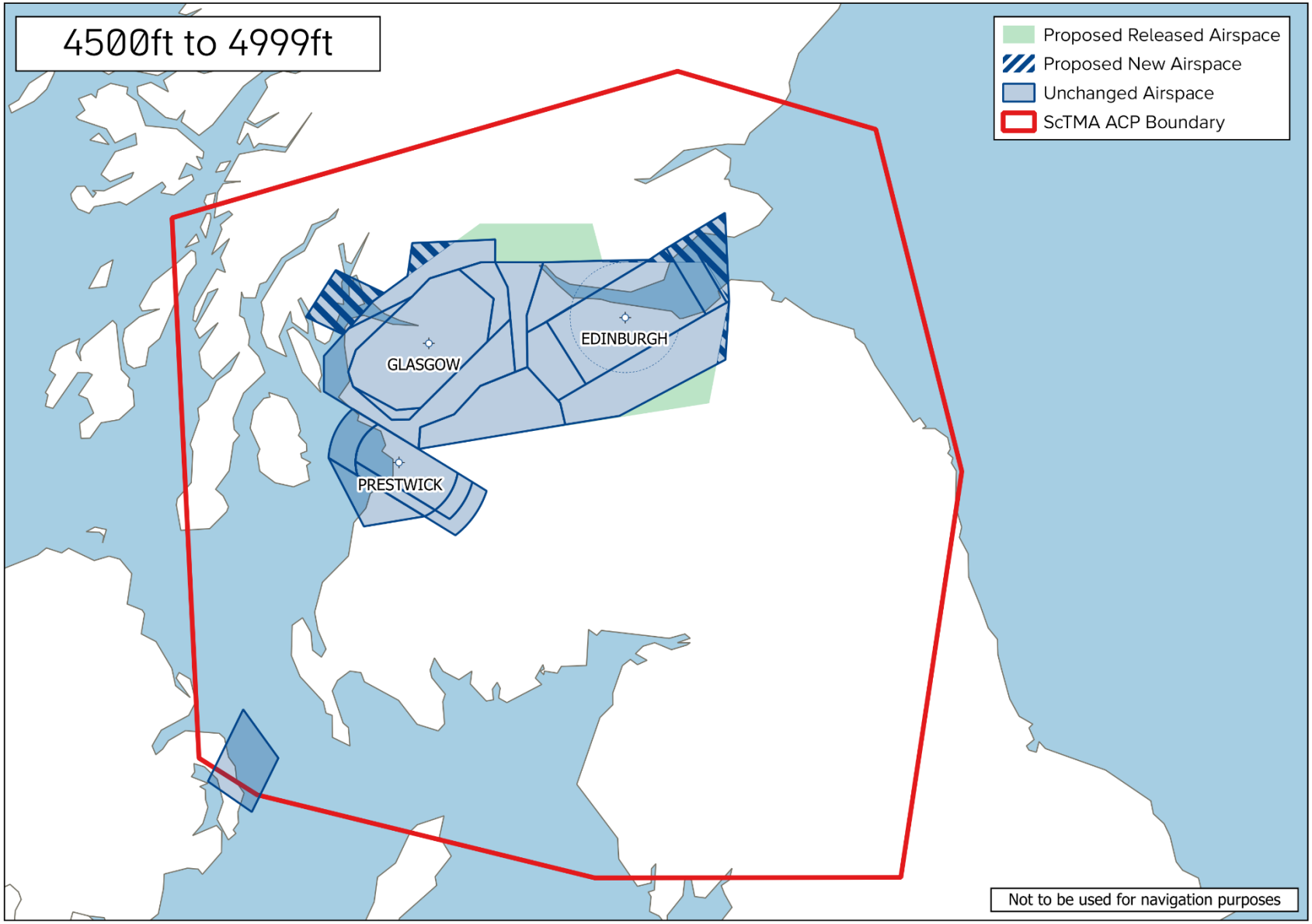

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 11: New and Released CAS 4000ft-4499ft*



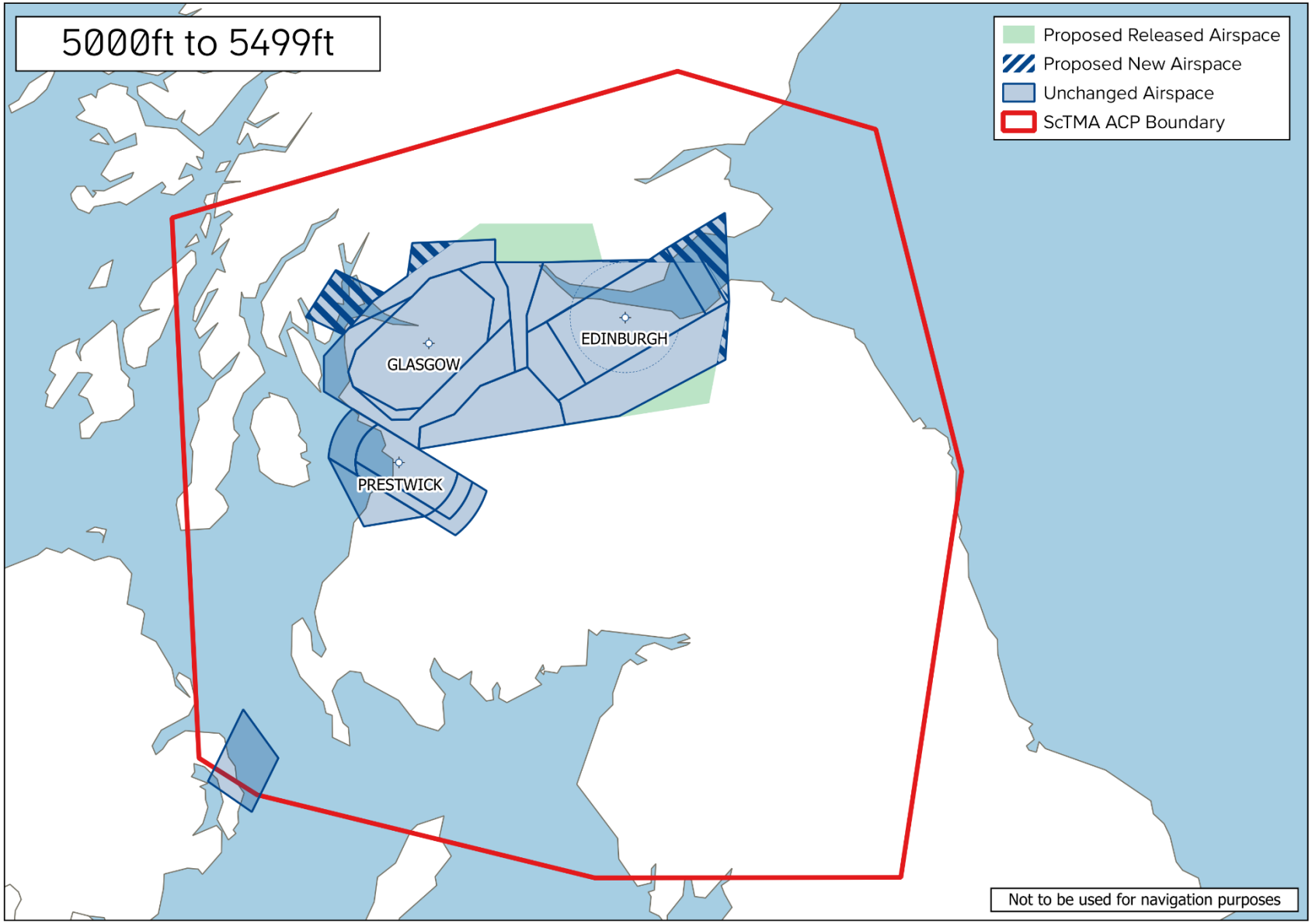

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 12: New and Released CAS 4500ft-4999ft*



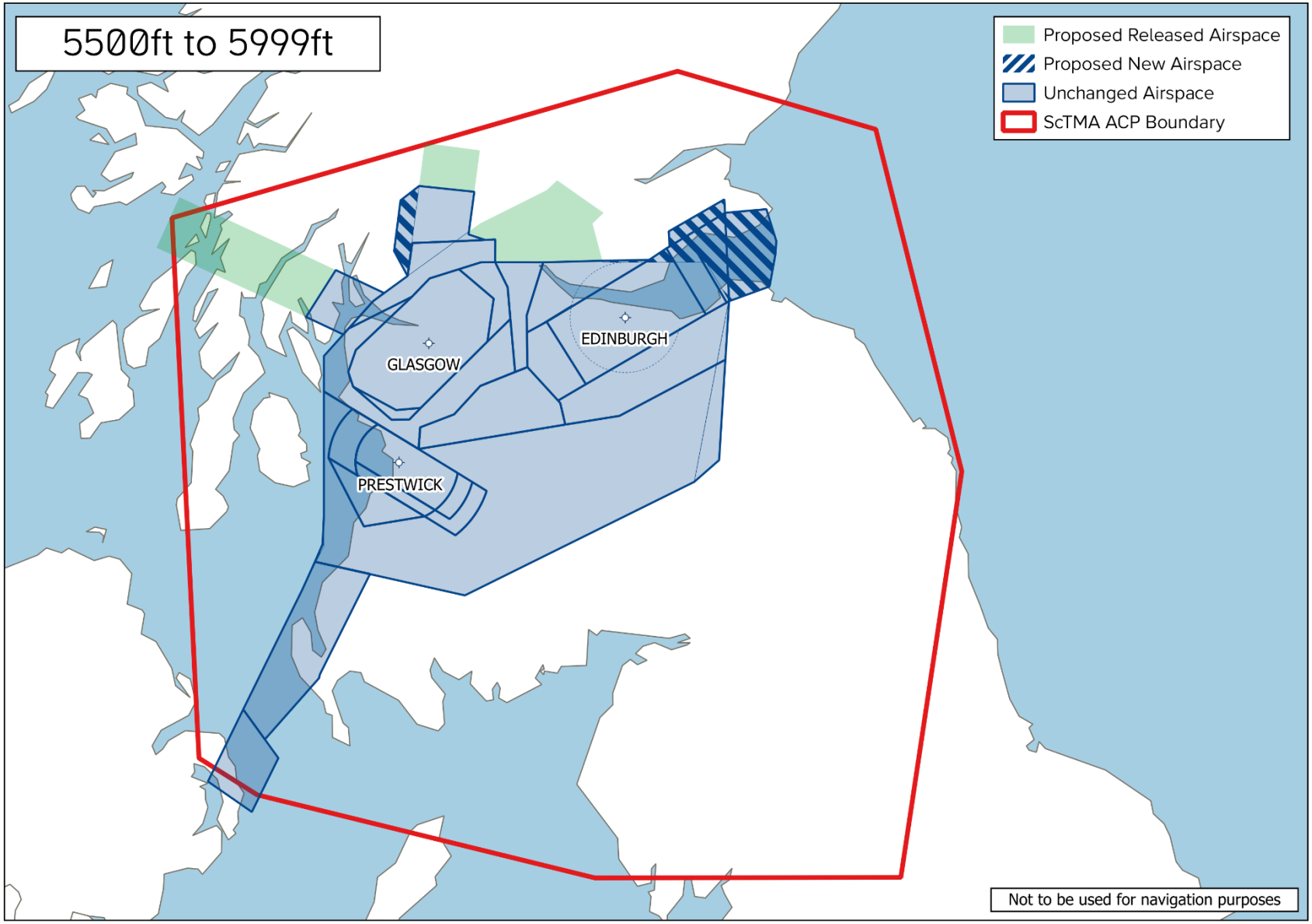

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 13: New and Released CAS 5000ft-5499ft*



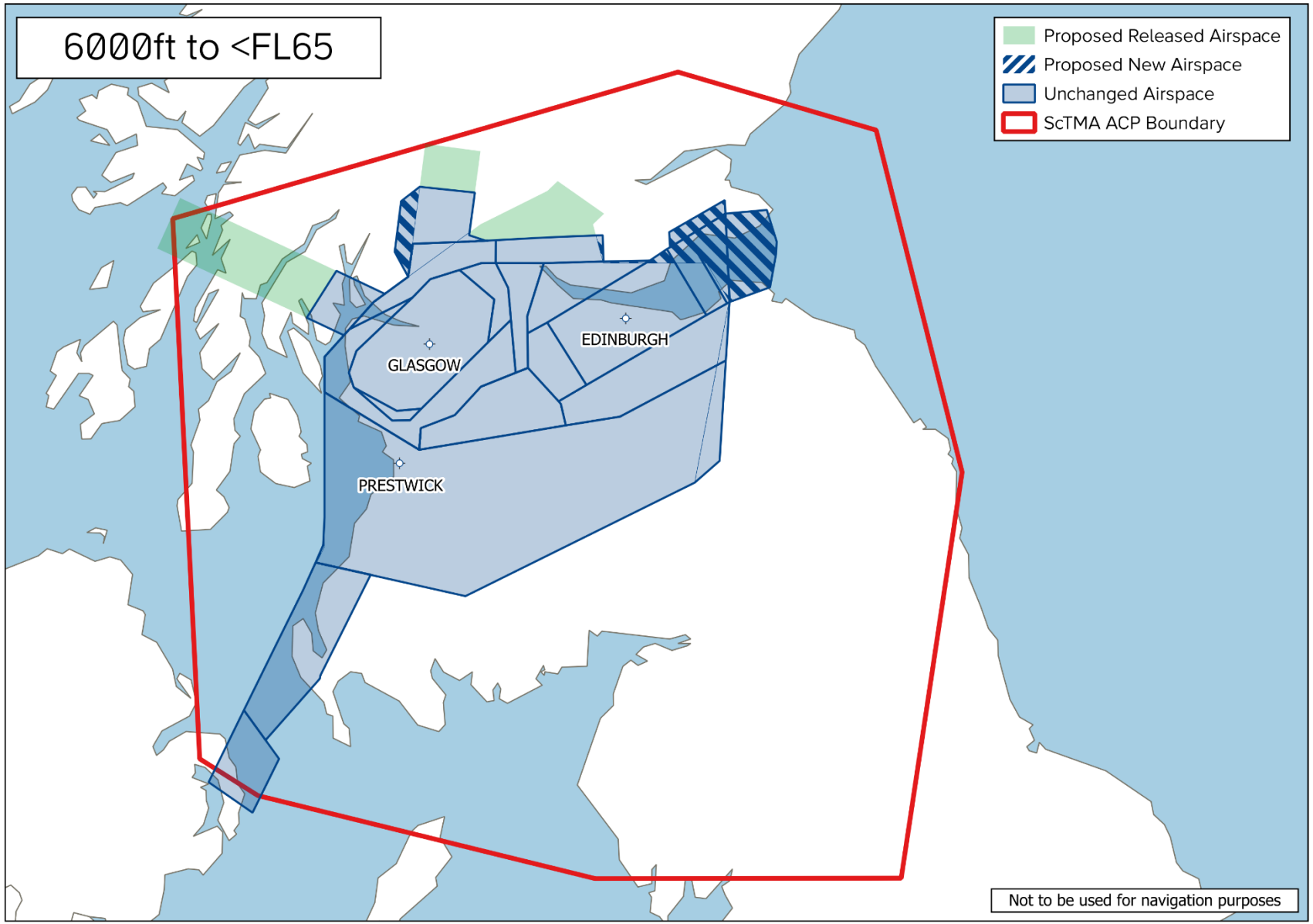

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 14: New and Released CAS 5500ft-5999ft*



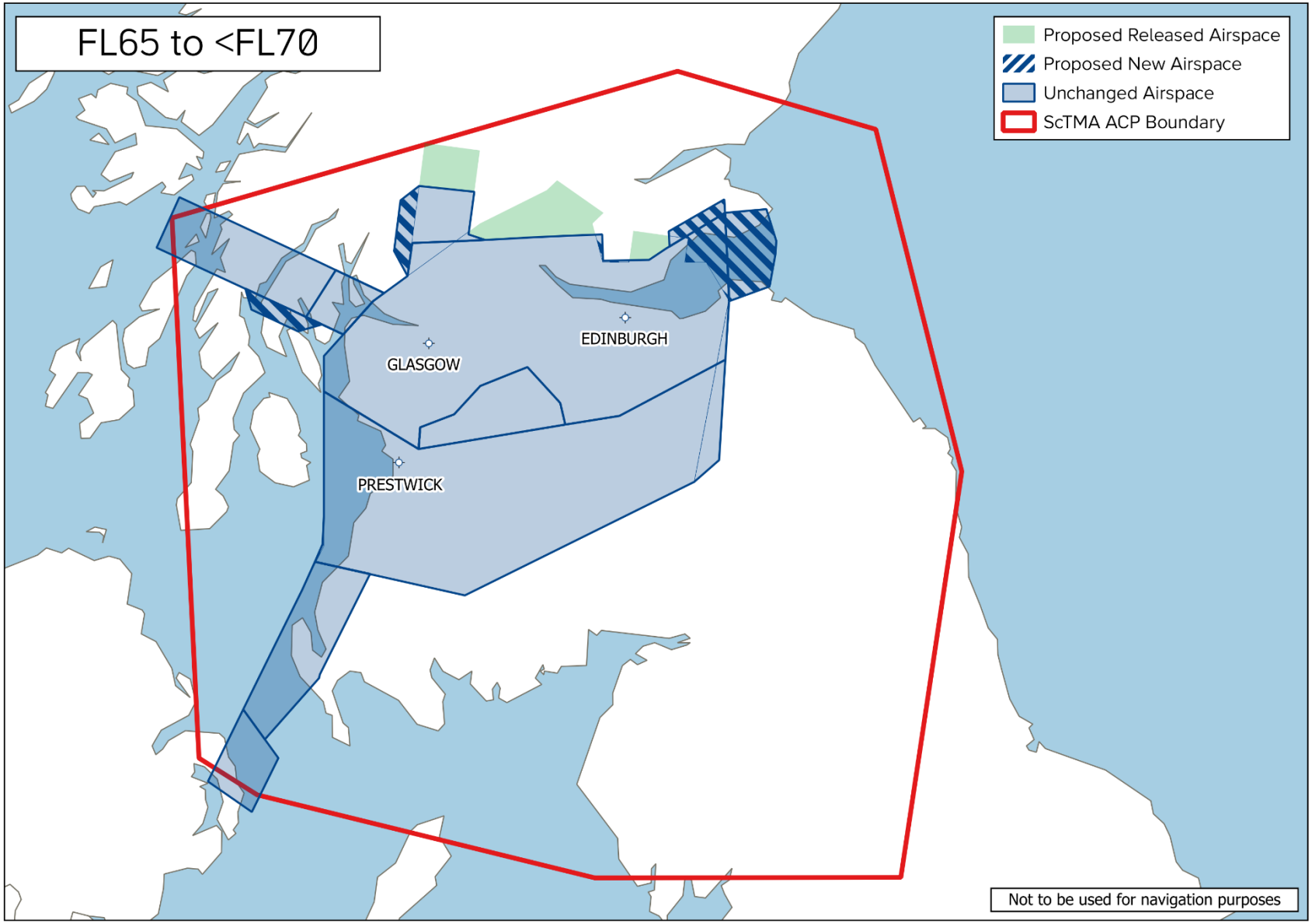

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 15: New and Released CAS 6000ft to <FL65*



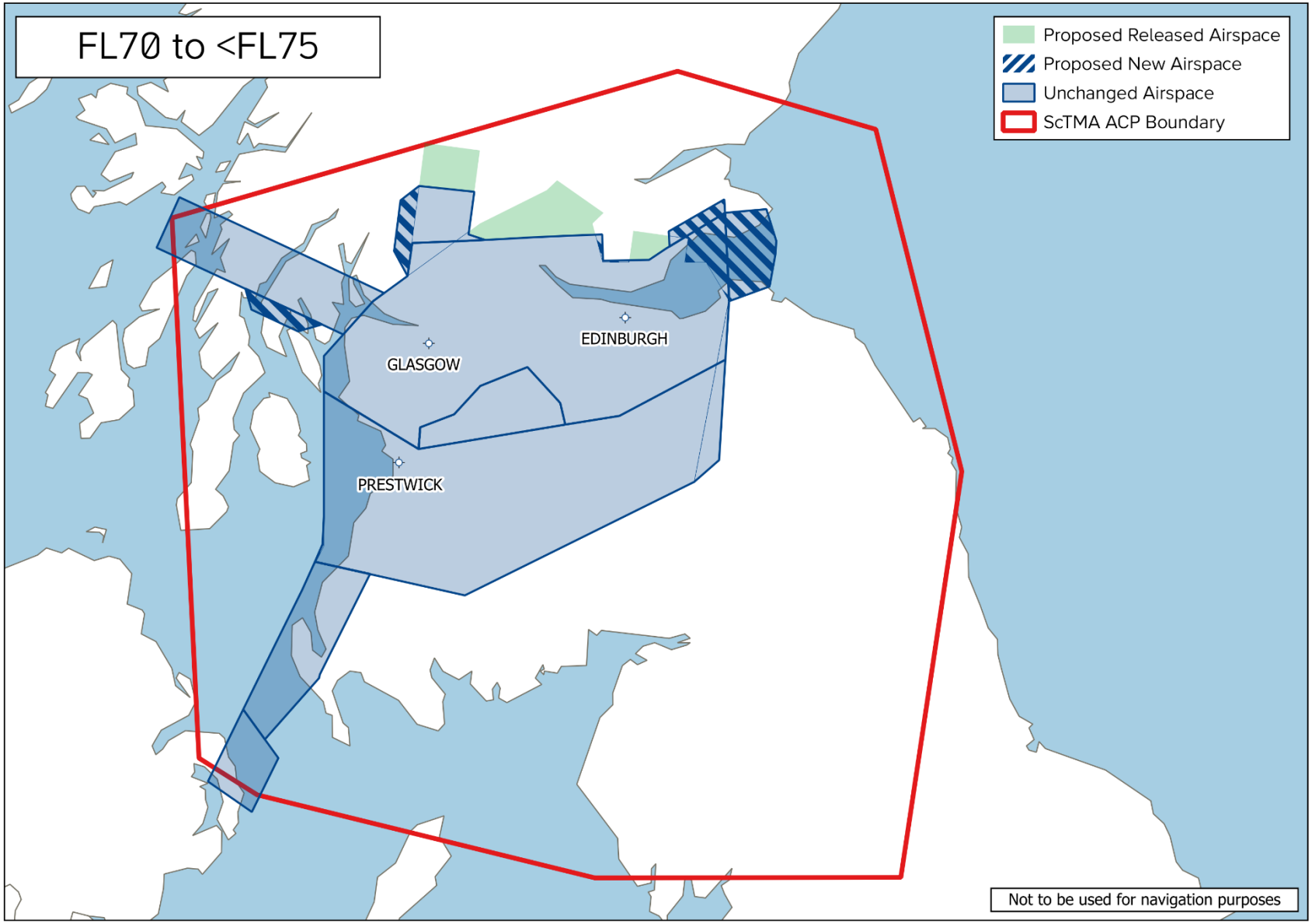

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 16: New and Released CAS FL65 to <FL70*



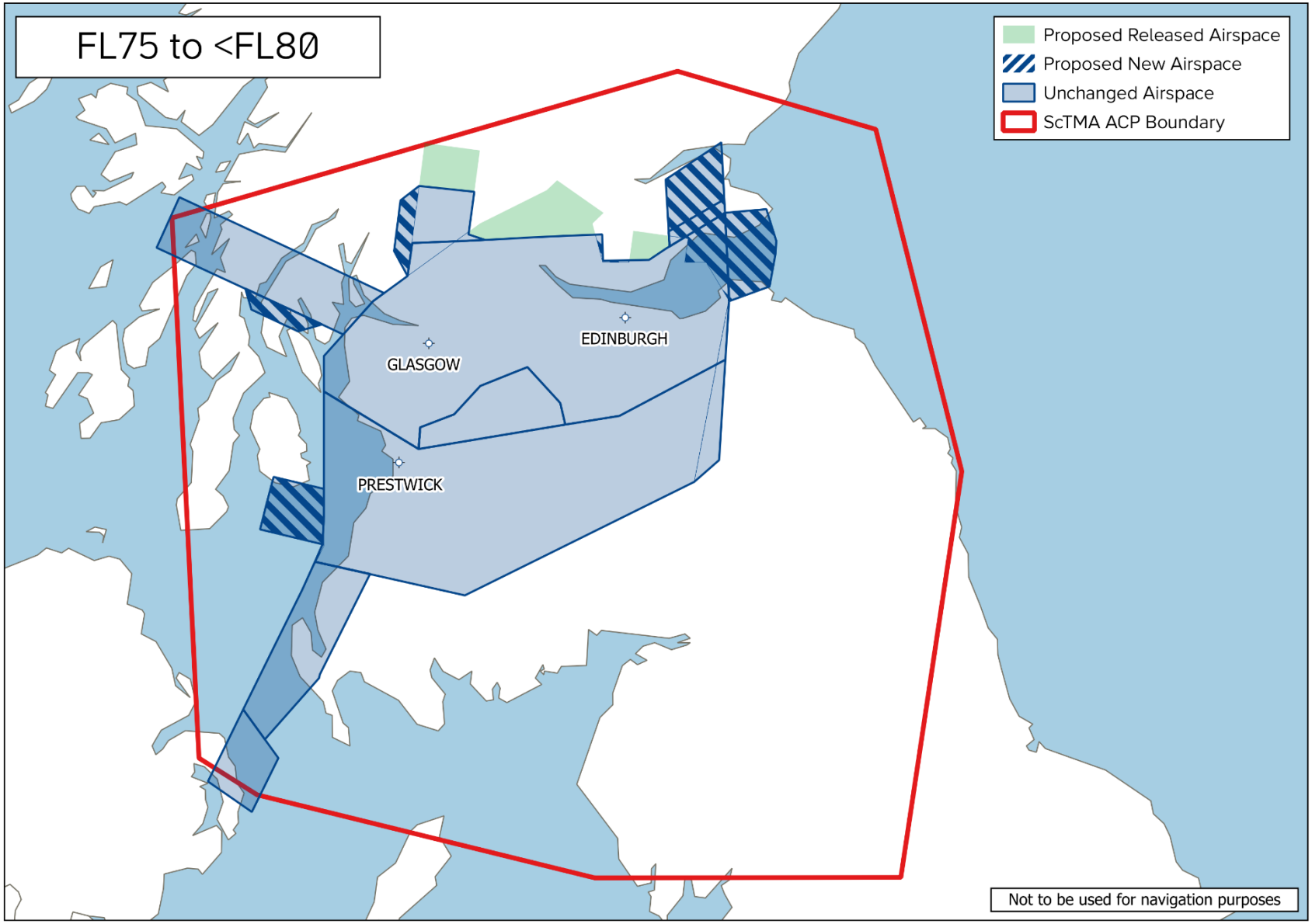

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 17: New and Released CAS FL70 to <FL75*



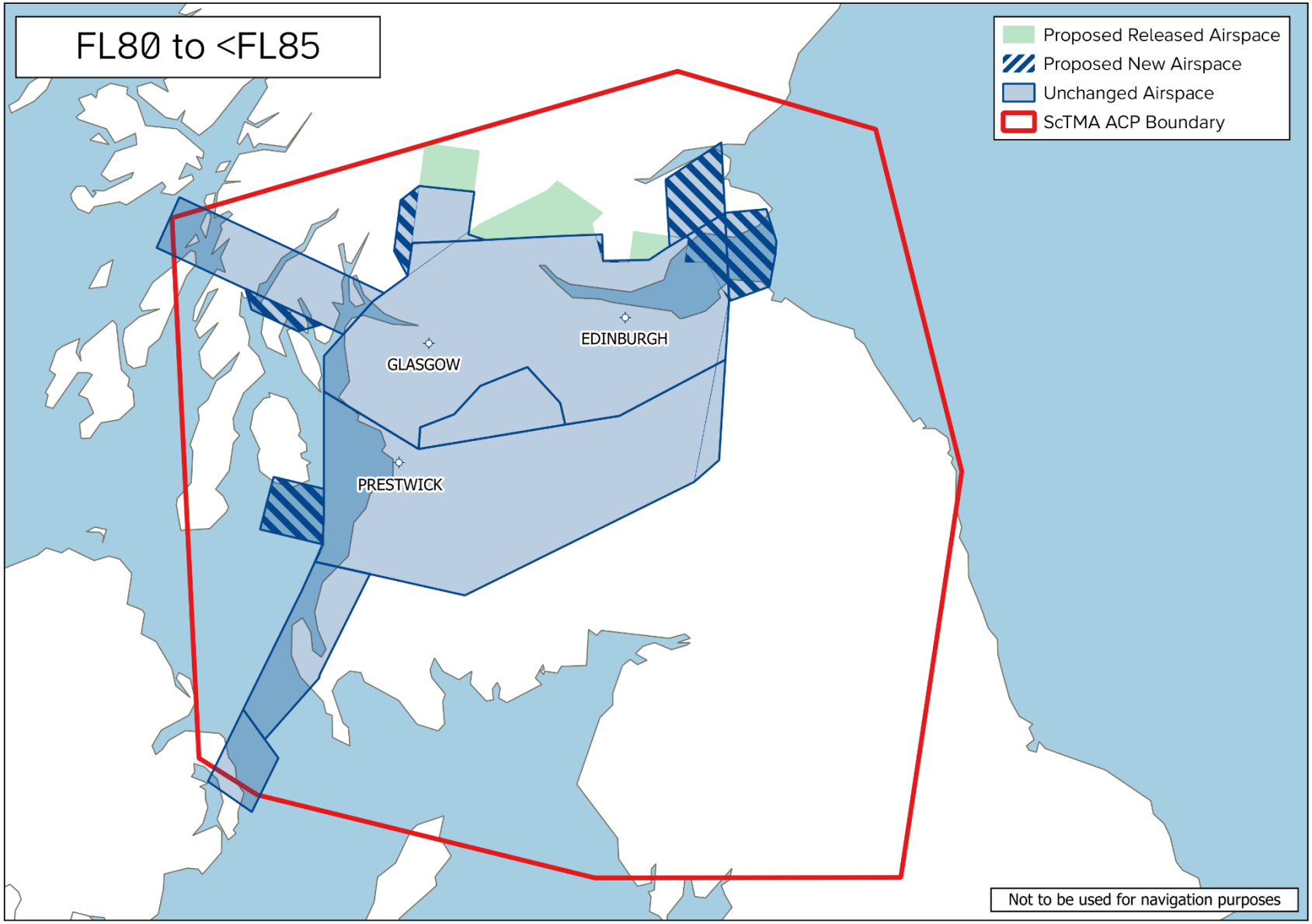

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 18: New and Released CAS FL75 to <FL80*



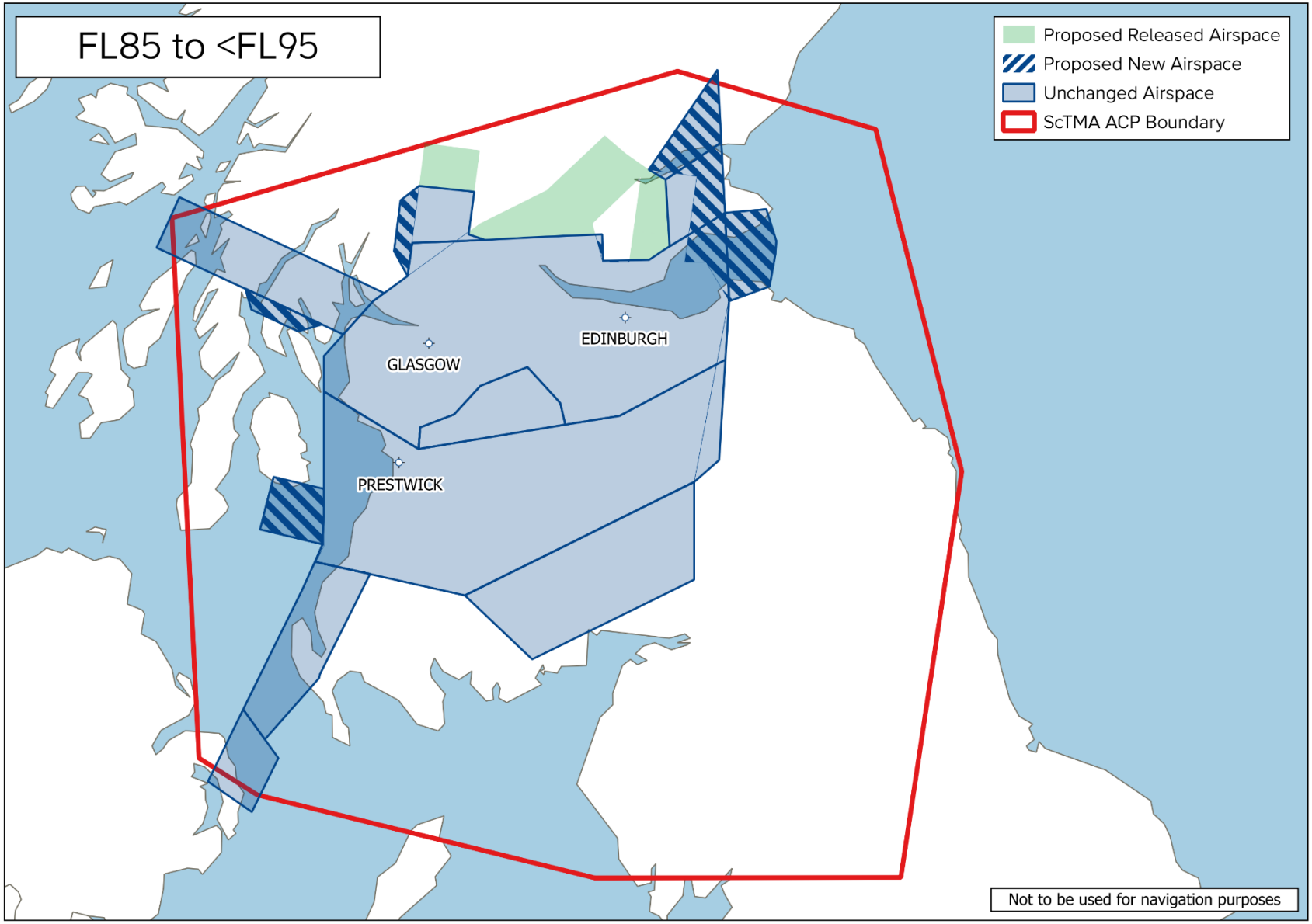

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 19: New and Released CAS FL80 to <FL85*



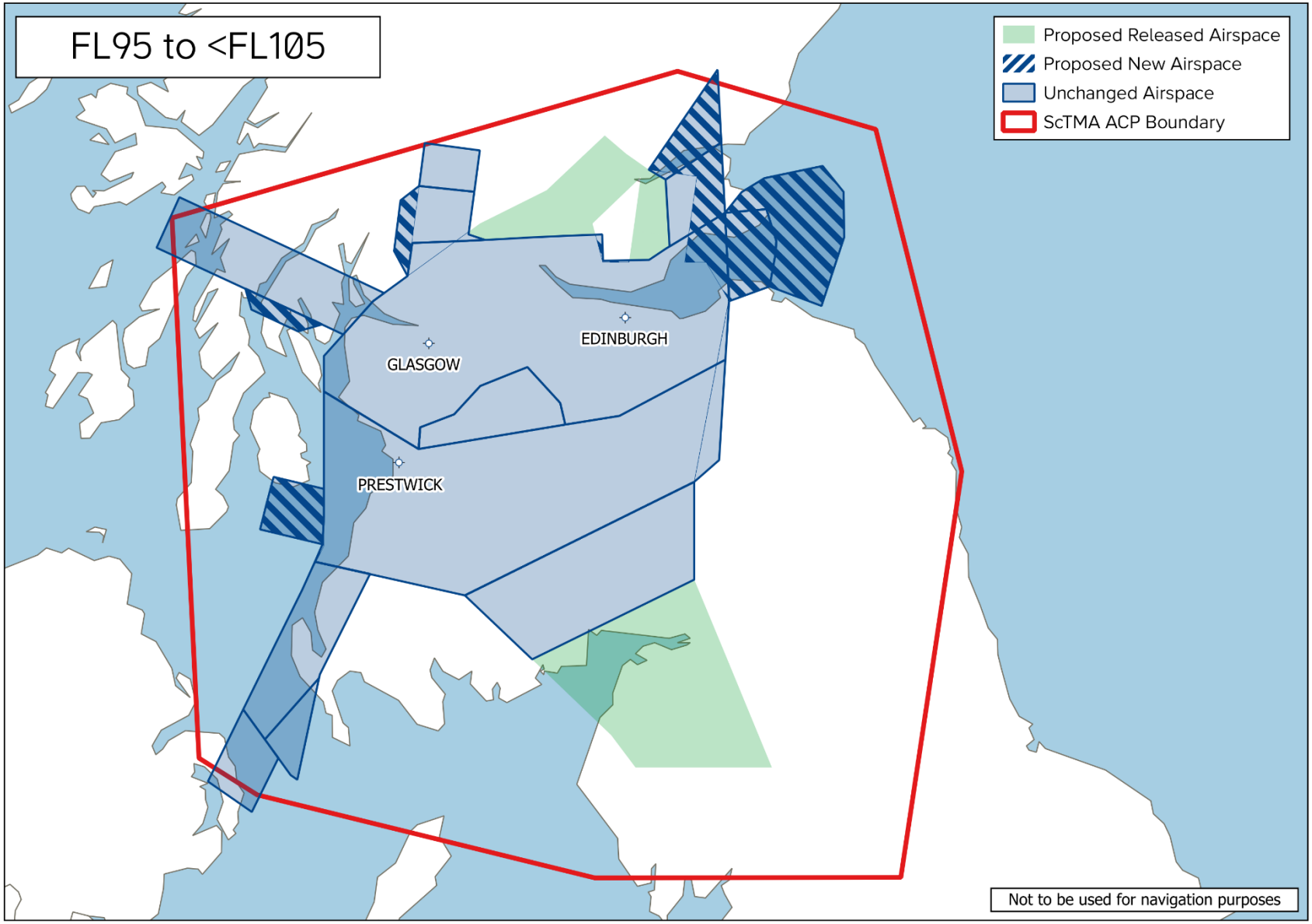

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 20: New and Released CAS FL85 to <FL95*



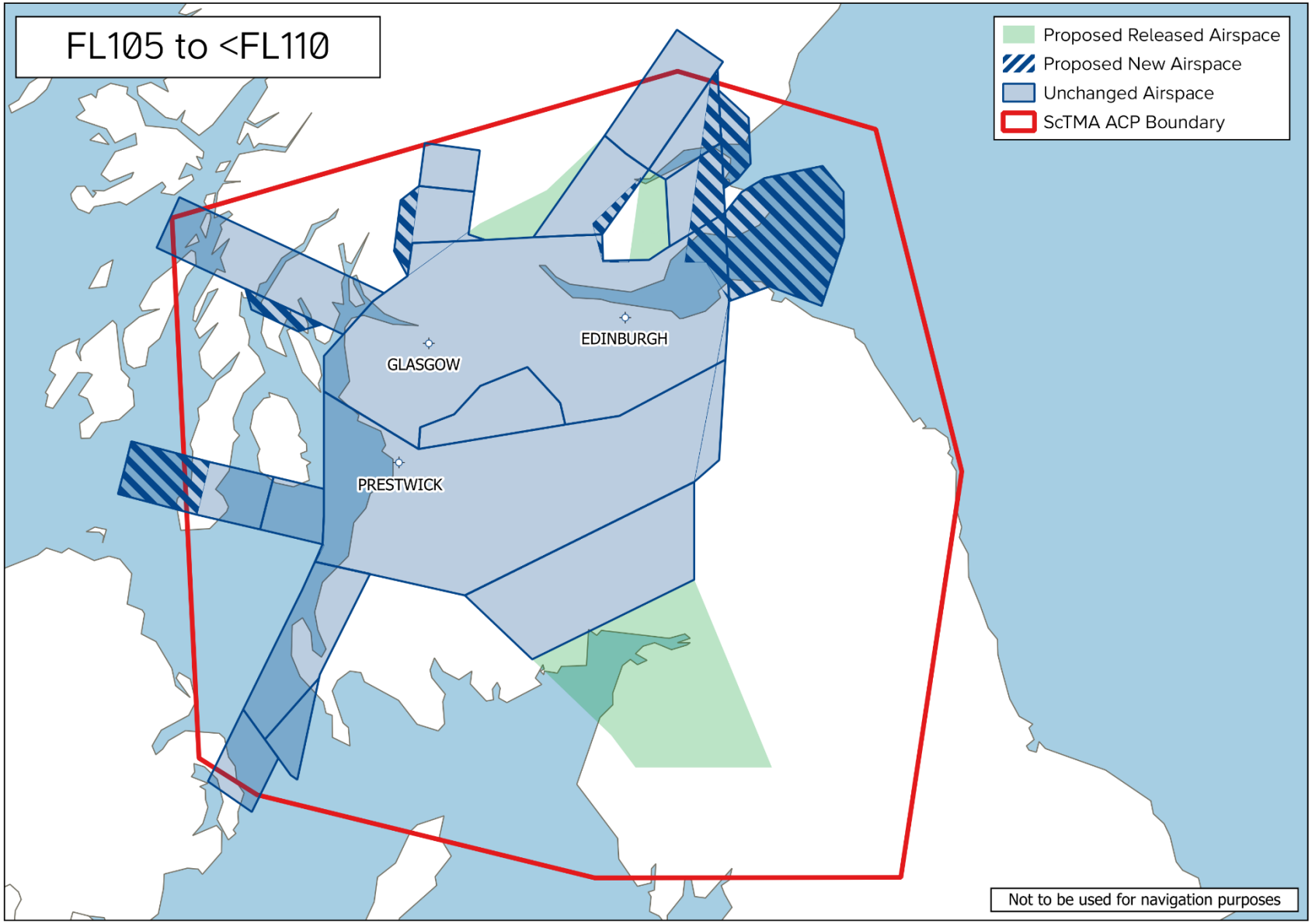

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 21: New and Released CAS FL95 to <FL105*



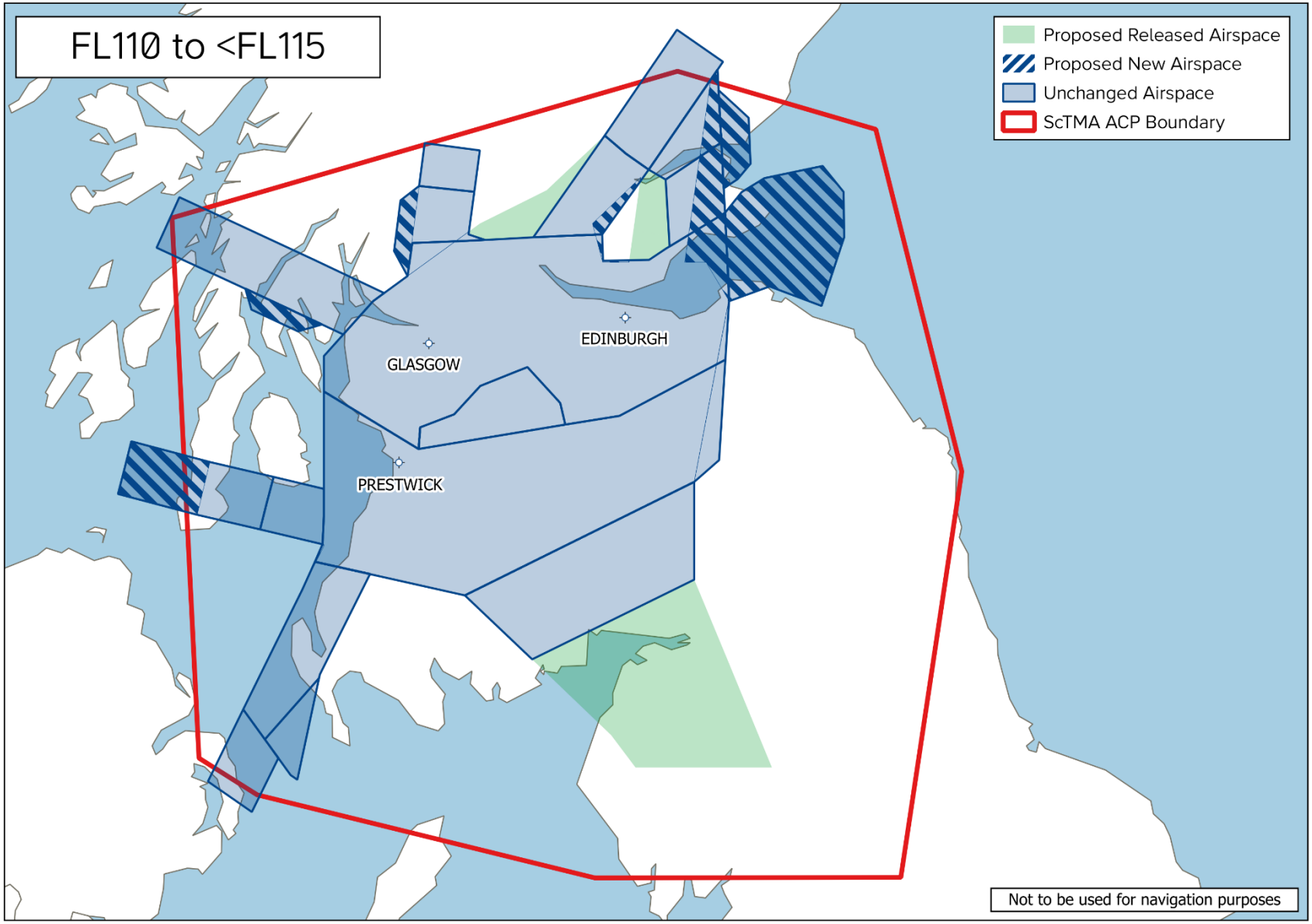

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 22: New and Released CAS FL105 to <FL110*



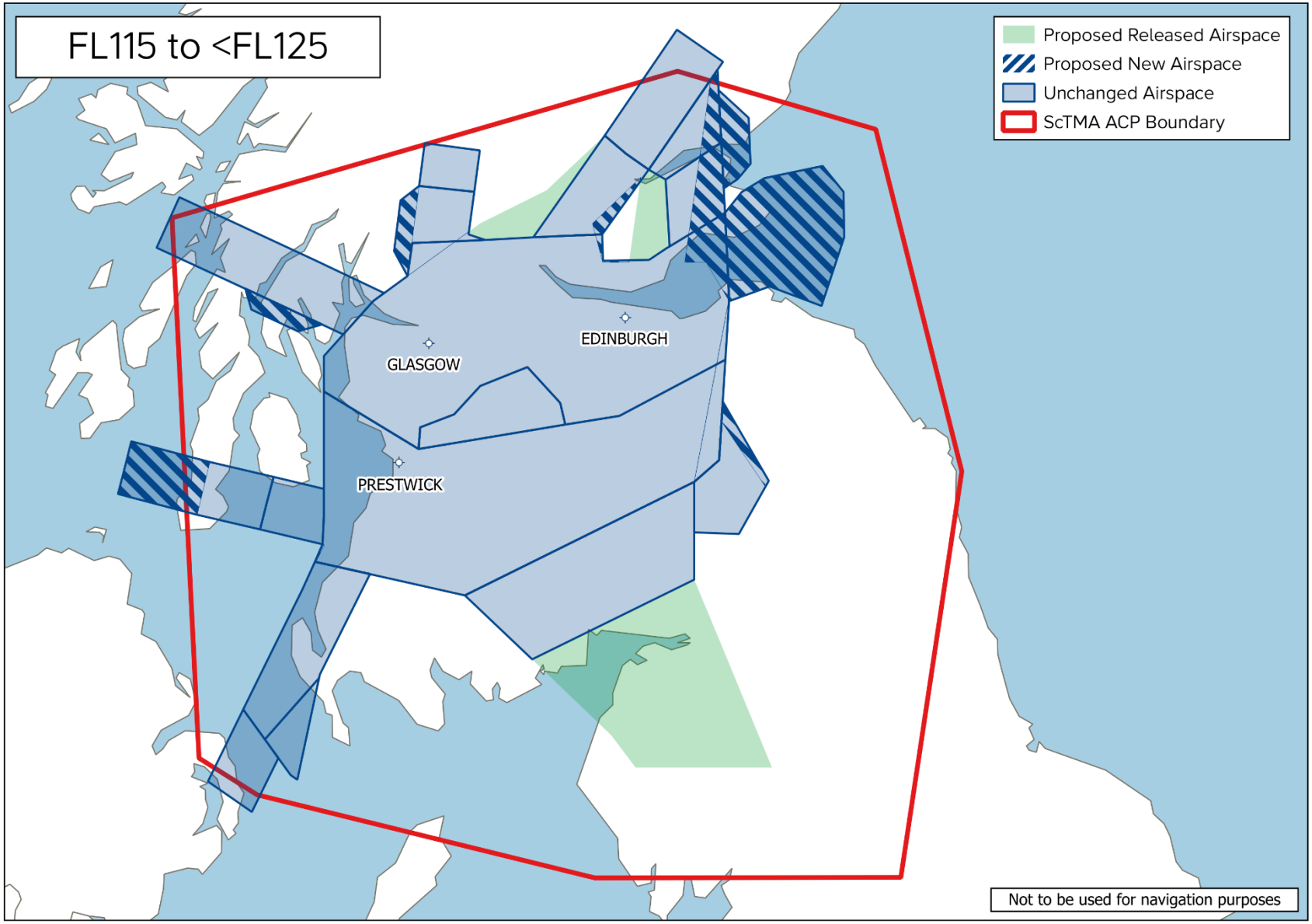

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 23: New and Released CAS FL110 to <FL115*



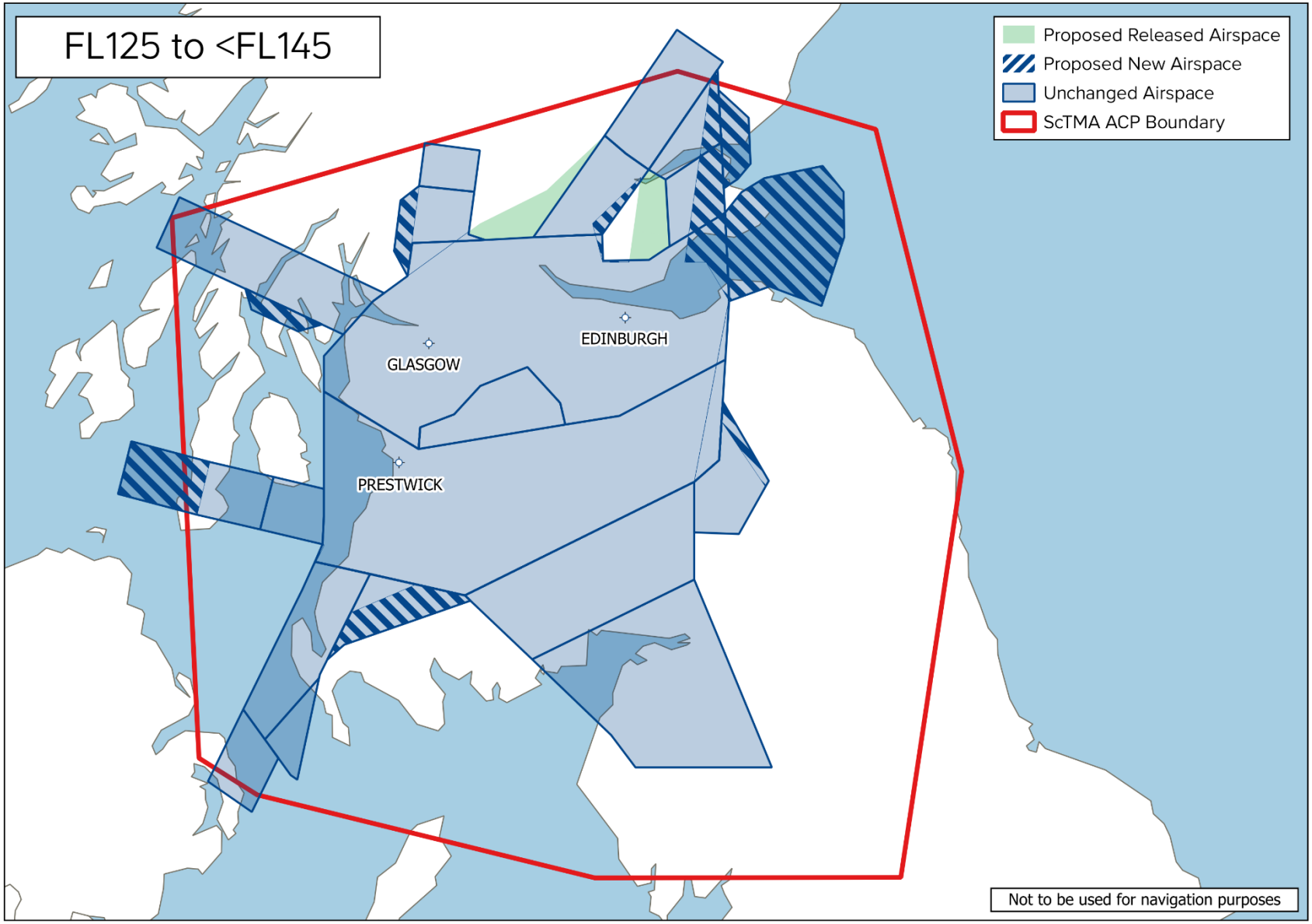

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 24: New and Released CAS FL115 to <FL125*



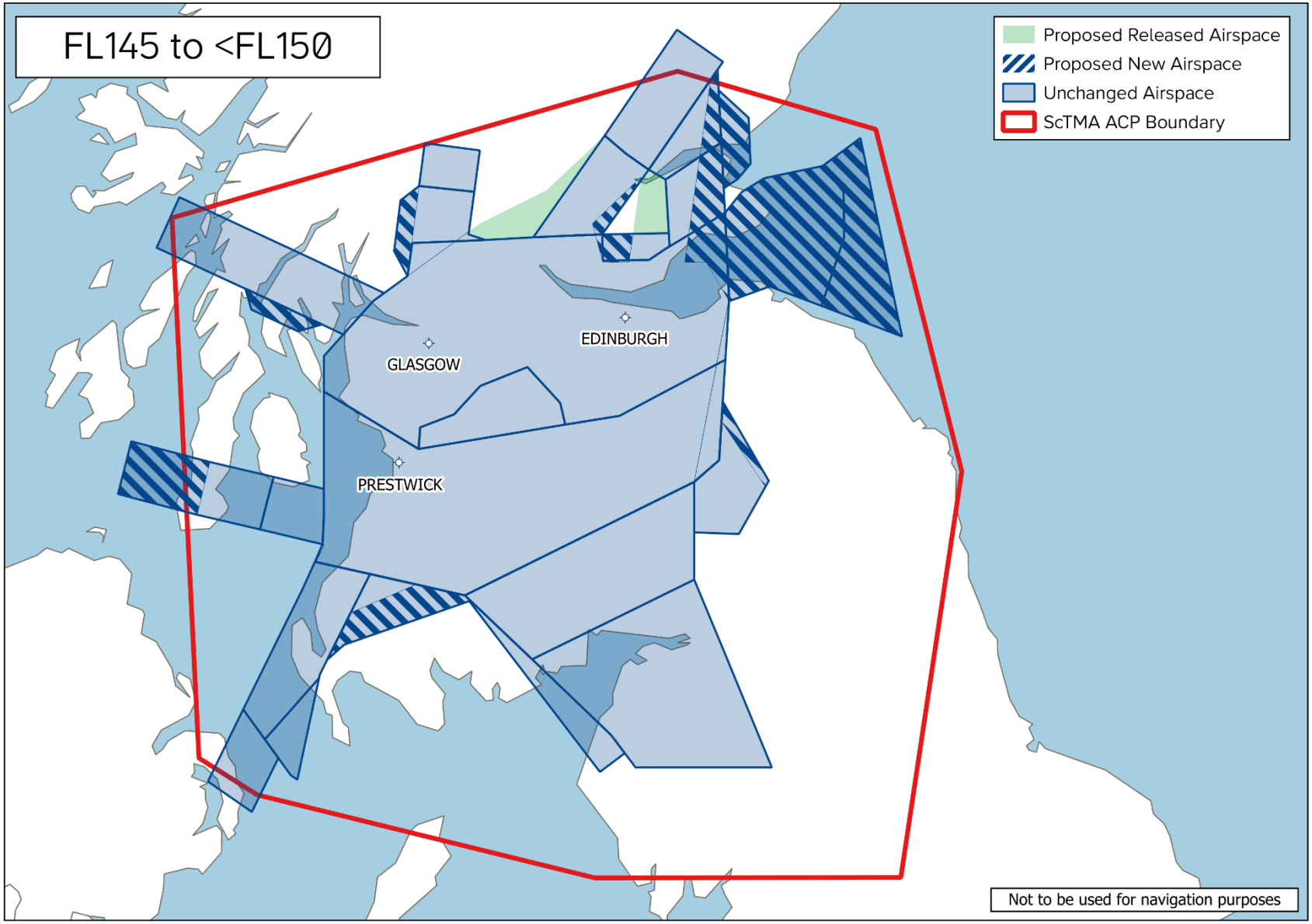

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 25: New and Released CAS FL125 to <FL145*



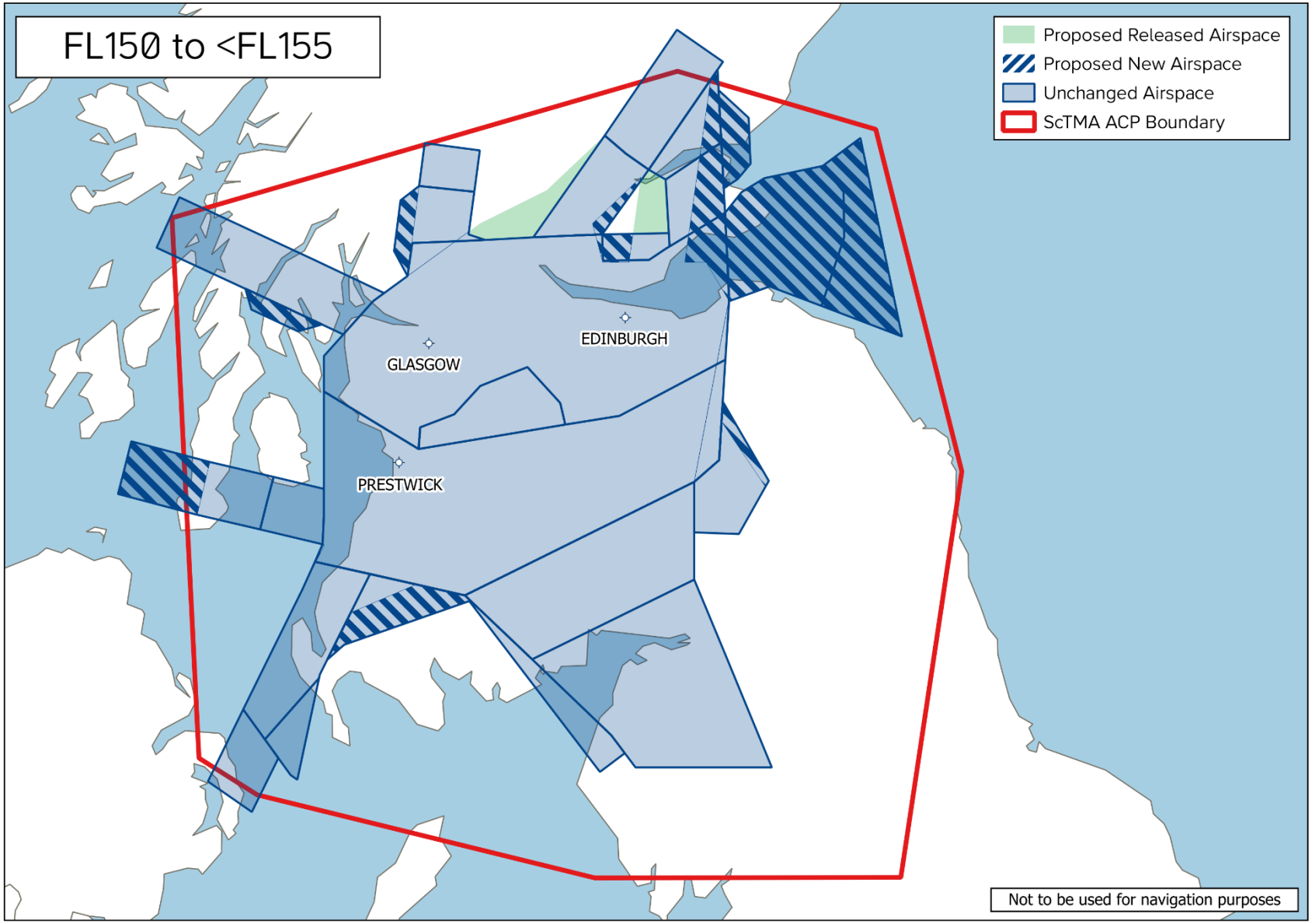

Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 26: New and Released CAS FL145 to <FL150*




Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

*Figure 27: New and Released CAS FL150 to <FL155*




Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

### Economic Impact from Increased Effective Capacity for Cluster-Wide "With Airspace Change" Proposal – General Aviation/Commercial Airlines

107. The delay benefit figures from Table 66 have been monetised by the sponsors, this monetisation is captured in the Cost Benefit Section 8.

### Fuel Burn for Cluster-Wide "With Airspace Change" Proposal – General Aviation/Commercial Airlines

108. Fuel burn is directly proportional to $CO_2e$ and so is calculated by the same method/assumptions as described in Annex A. The fuel burn comparison is shown below. This has been monetised for the cost benefit analysis in Section 8[13].

*Table 70: Fuel Burn for Cluster-Wide "With Airspace Change" Proposal vs "Without Airspace Change" Baseline 2027-2036 & Total*

| Year | Without Airspace Change | | | With Airspace Change | | | Difference | | |
|---|---|---|---|---|---|---|---|---|---|
| | Annual Fuel Burn (Kt) | Annual Fuel Burn Cost (£) 2024 prices | Average Fuel Burn per Flight (kg) | Annual Fuel Burn (Kt) | Annual Fuel Burn Cost (£) 2024 prices | Average Fuel Burn per Flight (kg) | Annual Fuel Burn (Kt) | Annual Fuel Burn Cost (£) 2024 prices | Average Fuel Burn per Flight (kg) |
| 2027 | 493.4 | £ 338,489,871 | 1,908.2 | 487.5 | £ 334,425,382 | 1,885.2 | - 5.9 | -£ 4,064,489 | - 22.9 |
| 2028 | 500.4 | £ 343,265,898 | 1,911.0 | 494.3 | £ 339,051,136 | 1,887.6 | - 6.1 | -£ 4,214,762 | - 23.5 |
| 2029 | 507.4 | £ 348,041,924 | 1,913.8 | 501.0 | £ 343,676,889 | 1,889.8 | - 6.4 | -£ 4,365,035 | - 24.0 |
| 2030 | 514.3 | £ 352,817,951 | 1,916.6 | 507.7 | £ 348,302,642 | 1,892.0 | - 6.6 | -£ 4,515,309 | - 24.5 |
| 2031 | 521.3 | £ 357,593,977 | 1,919.2 | 514.5 | £ 352,928,395 | 1,894.2 | - 6.8 | -£ 4,665,582 | - 25.0 |
| 2032 | 528.2 | £362,370,004 | 1,921.9 | 521.2 | £ 357,554,149 | 1,896.3 | - 7.0 | -£ 4,815,855 | - 25.5 |
| 2033 | 535.2 | £ 367,146,030 | 1,924.4 | 528.0 | £ 362,179,902 | 1,898.4 | - 7.2 | -£ 4,966,129 | - 26.0 |
| 2034 | 542.2 | £ 371,922,057 | 1,926.9 | 534.7 | £ 366,805,655 | 1,900.4 | - 7.5 | -£ 5,116,402 | - 26.5 |
| 2035 | 549.1 | £ 376,698,083 | 1,929.3 | 541.5 | £ 371,431,408 | 1,902.3 | - 7.7 | -£ 5,266,675 | - 27.0 |
| 2036 | 556.1 | £ 381,474,110 | 1,931.7 | 548.2 | £ 376,057,162 | 1,904.3 | - 7.9 | -£ 5,416,948 | - 27.4 |

[13] Please refer to the greenhouse gas emissions methodology section provided in Annex B for contextual information on how the use of planned flight data in the NERL modelling may affect this result

### Training Costs for Cluster-Wide "With Airspace Change" Proposal – Commercial Airlines

109. Flight procedures worldwide are updated with each aeronautical information regulation and control (AIRAC) cycle and airlines update their procedures accordingly, training as required. None of the Cluster-Wide options are not anticipated to require additional training costs for airlines.

### Other Costs for Cluster-Wide "With Airspace Change" Proposal – Commercial Airlines

110. There are no additional associated costs for airlines anticipated with any of the Cluster-Wide options.

### Infrastructure Costs for Cluster-Wide "With Airspace Change" Proposal – Airport / ANSP

111. None of the Cluster-Wide options are expected to change Airport or ANSP infrastructure, beyond the initial deployment phase which will require some systems engineering amendments.

112. Edinburgh have identified a future saving as a the implementation of Performance Based Navigation (PBN) procedures removes their dependencies on the Non-Directional Beacon (NDB) which are currently the contingency for the Instrument landing System (ILS). This will remove a cost of c.£300k (2024 prices) in c.2030. This is captured in the Cost Benefit Tables in Section 8.

### Operational Costs for Cluster-Wide "With Airspace Change" Proposal – Airport / ANSP

113. Glasgow and Edinburgh Airport have quantified some minor increases to operating costs relevant to their consultation option. NERL have not quantified any costs in this category. The airport operating costs changes are captured in the Cost Benefit Tables in Section 8.

### Deployment Costs for Cluster-Wide "With Airspace Change" Proposal – Airport / ANSP

114. There are costs associated with training operational staff prior to an airspace change. These costs are described qualitatively in each ACP where relevant.

### Other Costs for Cluster-Wide "With Airspace Change" Proposal – Airport / ANSP

115. None of the Cluster-Wide options are expected to change other costs at the Airport or ANSP.

# 8 Cost Benefits Analysis

116. The table below shows the overall monetised benefits for the 10 year analysis period for the cluster-wide "with airspace change" Proposal compared to the equivalent 'without airspace change' baseline. The overall monetised benefit for the period has been calculated as c. £130m comprising of benefits from a relative reduction in noise impact, CO2e and fuel costs for airlines. There are also some relatively minor costs and benefits to airport infrastructure and operation.

### Notes for Cost Benefit Analysis:

117. The NPV tables on the following pages contain an analysis of all relevant monetised cost and monetised benefits associated with each option. NPVs are based on the following assumptions:

- All 'nominal' costs and benefits have been adjusted into 2024 'real' costs and benefits (using published Web TAG Databook GDP deflators) and converted into GBP when necessary, using spot rates as at 22nd March 2024.
- All 'real' figures have been discounted using the Social Time Preference Rate (STPR) set by the UK Government and contained in the WebTAG Databooks. The standard STPR of 3.5% has been used for all costs and benefits discounting, apart from 'Noise' costs and benefits, which have been discounted using the Health STPR figure of 1.5%.
- 2024 is used as the base year for NPV discounting.
- Noise and $CO_2e$ costs and benefits are calculated directly using WebTAG workbooks. Please refer to the methodology section for greenhouse gas emissions for contextual information on how the use of planned flight data in the NERL modelling may affect the $CO_2e$ costs result.
- Delay covers both airborne delay calculated by NERL and ground delay calculated by Glasgow Airport. As these are different measures, they have had different methods and assumptions for their calculation. Edinburgh Airport did not present a quantified delay benefit. See the individual ACPs for details.
- For fuel burn, the jet fuel price used in the NPV calculations is based on the Average Cost per Tonne of USD $861.39 (sourced from: IATA Fuel Monitor for week ending 22nd March 2024). To convert into GBP, the USD to GBP spot exchange rate from March 24, 2024 of £0.796373298, which converts the price to GBP £685.99. Fuel prices and exchange rates are volatile, and will have changed since the analysis was undertaken. However, it is important to note that there is a forecast fuel reduction per flight for all options and so there would always be an NPV benefit, regardless of the price and conversion rates applied.

This Full Options Appraisal was undertaken on the most up to date sources of data at the time, and as part of CAF3 (undertaken on the Final Options Appraisals in CAP1616 Stage 4), the fuel prices and exchange rates will be updated.

- It is not possible to assess $CO_2e$ and fuel for changes below 7,000ft in isolation from those above 7,000ft. This means that airports have provided $CO_2e$ and fuel assessments from their flights including segments above 7,000ft, and NERL have provided a fuel and $CO_2e$ assessments for the whole proposal including segments below 7,000ft – this leads to some inevitable double counting in the individual ACP results. The presentation of cluster-wide results below does not require a distinction above and below 7,000ft and therefore the results below are the best estimates for the overall cluster-wide effect. As this is without double counting the CO2e and fuel results presented here for the cluster are less than the sum of the results in the individual ACPs. See Annex A for further detail on the methodology used to estimate the $CO_2e$ and fuel benefits.

*Table 71: Cost Benefit Table for Cluster-Wide "With Airspace Change" Proposal*

| Year | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 10 year total benefit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Net Community Benefit (Noise) | £ 3,322,963 | £ 3,284,957 | £ 3,247,348 | £ 3,210,133 | £ 3,173,309 | £ 3,136,873 | £ 3,100,820 | £ 3,065,148 | £ 3,029,852 | £ 2,994,931 | £ 31,566,333 |
| Net Wider Society Benefit (Untraded $CO_2e$) | £ 1,628,801 | £ 1,881,331 | £ 2,130,610 | £ 2,376,535 | £ 2,619,014 | £ 2,857,960 | £ 3,093,292 | £ 3,324,939 | £ 3,552,834 | £ 3,776,917 | £ 27,242,234 |
| Net Airspace Users Benefit (Traded $CO_2e$) | £ 3,082,465 | £ 2,990,068 | £ 3,032,375 | £ 2,967,476 | £ 2,785,420 | £ 2,609,613 | £ 2,440,014 | £ 2,318,053 | £ 2,128,915 | £ 1,976,873 | £ 26,331,271 |
| Net Airspace Users Benefit (Airborne Fuel Costs) | £ 3,665,762 | £ 3,672,744 | £ 3,674,923 | £ 3,673,204 | £ 3,666,681 | £ 3,657,160 | £ 3,643,648 | £ 3,627,017 | £ 3,607,146 | £ 3,584,395 | £ 36,472,681 |
| Net Airspace Users Benefit (Delay Cost Without Airborne Fuel) | £ 755,171 | £ 766,287 | £ 775,673 | £ 783,442 | £ 789,694 | £ 794,537 | £ 798,039 | £ 800,310 | £ 801,418 | £ 801,439 | £ 7,866,010 |
| Infrastructure Costs | £ - | £ - | £ - | £ 244,050 | £ - | £ - | £ - | £ - | £ - | £ - | £ 244,050 |
| Operational Costs | £ - | £ - | £ - | £ - | -£ 15,622 | £ - | £ - | £ - | £ - | -£ 12,973 | -£ 28,594 |
| Total Net Present value | £ 12,455,163 | £ 12,595,386 | £ 12,860,928 | £ 13,254,840 | £ 13,018,496 | £ 13,056,143 | £ 13,075,814 | £ 13,135,467 | £ 13,120,164 | £ 13,121,582 | £ 129,693,984 |

# 9 List of figures and data tables

**List of Figures**

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