NATS

london stansted airport

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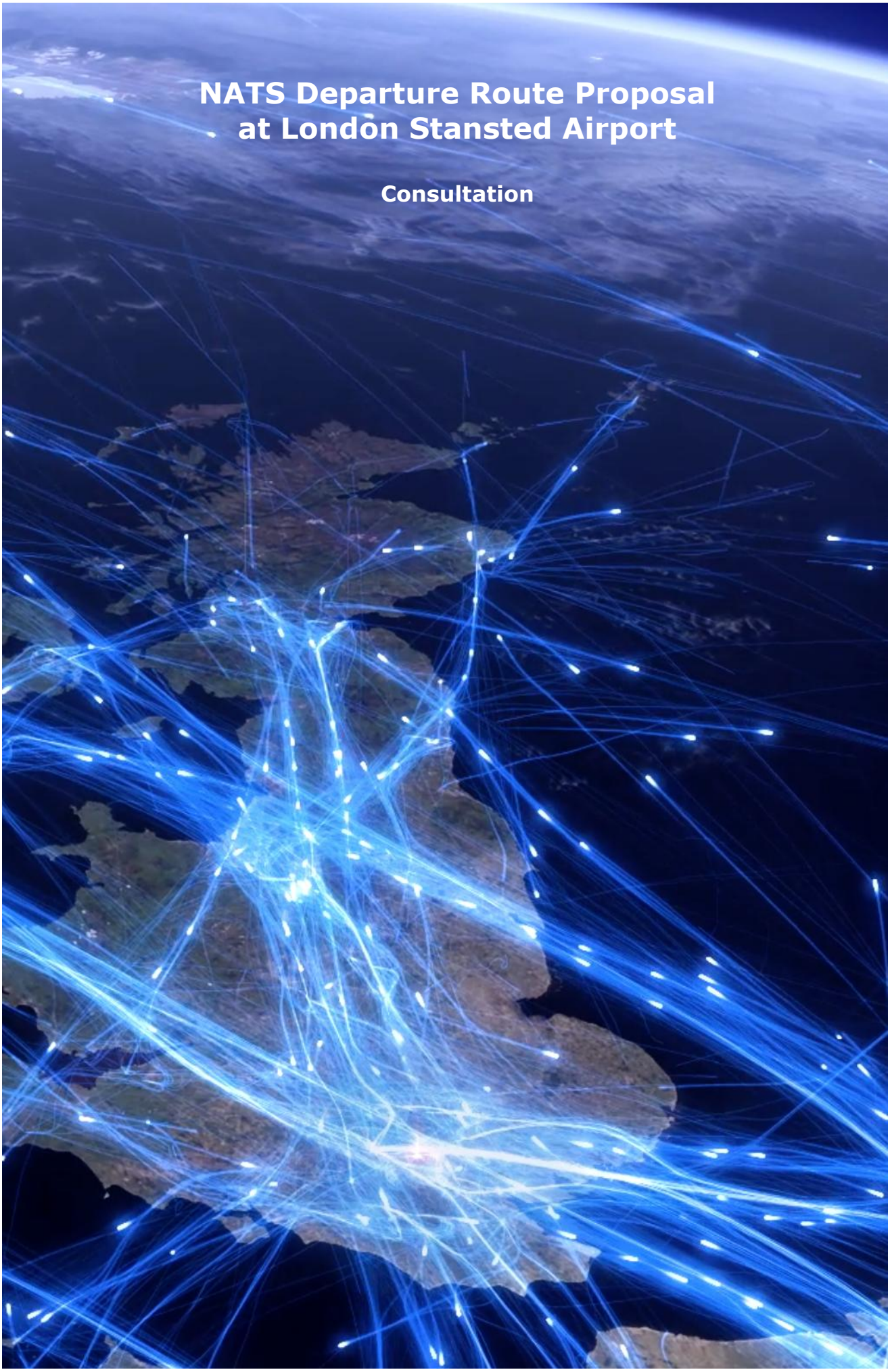

NATS Departure Route Proposal at London Stansted Airport

Consultation

Table of Contents

1 Introduction

1.1 The UK's airspace is a precious national resource, and how we use and manage it is a matter of great responsibility. The expertly controlled passage of aircraft above us ensures our safety and keeps aircraft flowing efficiently - and the more efficient we can make it, the more we can potentially minimise its impact on the environment.

1.2 This means that, from time to time, the organisations responsible for managing our airspace seek to make changes in order to enhance safety and improve efficiency. This consultation is about a change to the use of some existing routes for London Stansted Airport departures. London Stansted Airport is abbreviated to 'Stansted Airport' in this document.

1.3 Flights that currently depart Stansted Airport towards Kent are becoming more inefficient as the airspace they fly through becomes more congested. This proposal seeks to place most of these flights onto the existing eastbound departure routes, so that they may avoid the congestion, reducing delay, fuel consumption and the amount of CO_2 generated[1].

1.4 There would also be overall noise benefits since the aircraft would be able to climb more quickly and people beneath the current departure route would be overflown less; people beneath the eastbound departure route, though, would be overflown more.

1.5 Airlines are free to choose which Standard Instrument Departure (SID) routes they wish to fly on initial departure in order to get to their destinations most efficiently. They may choose to switch routes to avoid congested areas if there is a risk that one route may incur delays or be less fuel efficient than another; these choices are not subject to consultation. This case is different in that we are seeking to formalise a switch of routes, and adapt connecting routes over the North Sea so that benefits of the switch are maximised. It would also ensure that the Stansted Airport operation fits into a wider programme of change to the use of airspace structures supporting airports in South East England.

1.6 Such changes are not usually subject to local consultation. However, in this case, it would change the number of flights using the existing routes at low levels; some routes would be flown more often, some less. Given the nature of the proposal we are therefore undertaking this consultation, on advice from the CAA, primarily through the Stansted Airport Consultative Committee (STACC). The consultation also open to the general public and other interested parties; all responses will be considered.

1.7 This consultation is part of a wider programme to modernise the route system over London and the South East; this is known as the London Airspace Management Programme or LAMP. The LAMP is being progressed by NATS which

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1 CO_2 is emitted when any fossil hydrocarbon fuel is burnt, such as petrol, diesel or aviation fuel. These engines burn fuel using oxygen taken from the air because oxygen is not generally present in the fuel itself.
Burning 1kg of aviation fuel means that approximately 3.18kg of CO_2 is emitted

provides air traffic control for this route network across the whole of the UK. In turn, the LAMP is a cornerstone of the CAA's Future Airspace Strategy for the UK as a whole.

1.8 The LAMP focusses on the efficiency of the route network that connects airports in the London area with other UK airports, and with the airspace of neighbouring states.

1.9 Changes at a network level can also change the efficiency and environmental performance of low altitude[2] routes in the vicinity of airports.

1.10 The LAMP programme therefore involves collaboration between NATS and individual airports in the development of, and consultation on, changes to airspace management. Collaboration ensures that modernisation achieves both network and local benefits.

1.11 NATS is driving change at the airspace network level, supported by Stansted Airport which has a focus on low level routes in the vicinity of the airport.

1.12 For information on the proposal visit www.nats.aero/lampstansted. Here, a short video explains the role of NATS, how air traffic control (ATC) works and why we seek to change airspace. References for the consultation document can be found in Appendix A and a glossary of the terms used in this material is in Appendix B.

1.13 The introductory sections of this consultation document (1-4) provide:

- An overview of the consultation areas and the consultation document so that you can identify which parts may be of interest to you
- Context for the consultation, including the strategy and legislation driving the proposed changes, the legal framework determining how changes should be made, and the effects the proposed changes might have
- A summary of the development process, describing how the proposed changes fit with on-going development of surrounding airspace; the design work so far; the consultation process and how we will use the feedback we receive; and what happens next
- How to respond to this consultation

2 Consultation Overview

2.1 This section provides an overview of what we are consulting on, and potentially affected areas. This will help stakeholders identify areas of interest.

2 Low altitude usually refers to parts of procedures where the aircraft are below 4,000ft above mean sea level.

What are we consulting on?

2.2 This consultation is focused on changes to the frequency of use of four of the fourteen Stansted Airport Standard Instrument Departure routes (SIDs). All Stansted Airport SIDs are listed in Table 1 below, with those that would change identified.

SID	Runway	Direction	Change
CPT4R	22	West	No change
BUZAD7R	22	West	No change
BKY5R	22	North	No change
CPT2S	04	West	No change
BUZAD2S	04	West	No change
BKY2S	04	North	No change
LAM3R	22	South	No change
LAM2S	04	South	No change
CLN8R	22	East	Daytime traffic from DVR7R will be routed this way, no change for night time usage*
CLN4S	04	East	Daytime traffic from DVR5S will be routed this way, no change for night time usage*
DVR7R/ DET1R[3]	22	South	Daytime traffic will be re-routed on CLN8R during daytime, no change for night time usage*
DVR5S/ DET1S[3]	04	South	Daytime traffic will be re-routed on CLN4S during daytime, no change for night time usage*
LYD5R	22	South	No change
LYD4S	04	South	No change

*The night time period is defined as 2300-0600 for the purpose of this proposal

Table 1: List of Stansted Airport SIDs identifying those which would be affected

2.3 Figure 1 shows the geographic area for the proposed Stansted Airport changes. Locations within these areas are all potentially affected. This means that more air traffic would be positioned directly overhead some areas in the future, and less over other areas, although it is important to note that the whole area is already overflown today by other air traffic, not just these particular routes.

Additional maps and data describing this proposal are presented both within this document, and via the separately-published Appendices E, F and G (please download from the website).

[3] In May 2014 the Dover (DVR) SIDs where truncated to end at Detling (DET). This was a technical change to assist in aircraft fuel panning and did not affect aircraft flight paths in anyway. Instead of following the SID between DET and DVR aircraft instead follow the L9 air traffic service route. For simplicity this document refers to the flights exiting the UK via Dover as following the Dover route or SID rather than the new Detling designator which would be less well known.

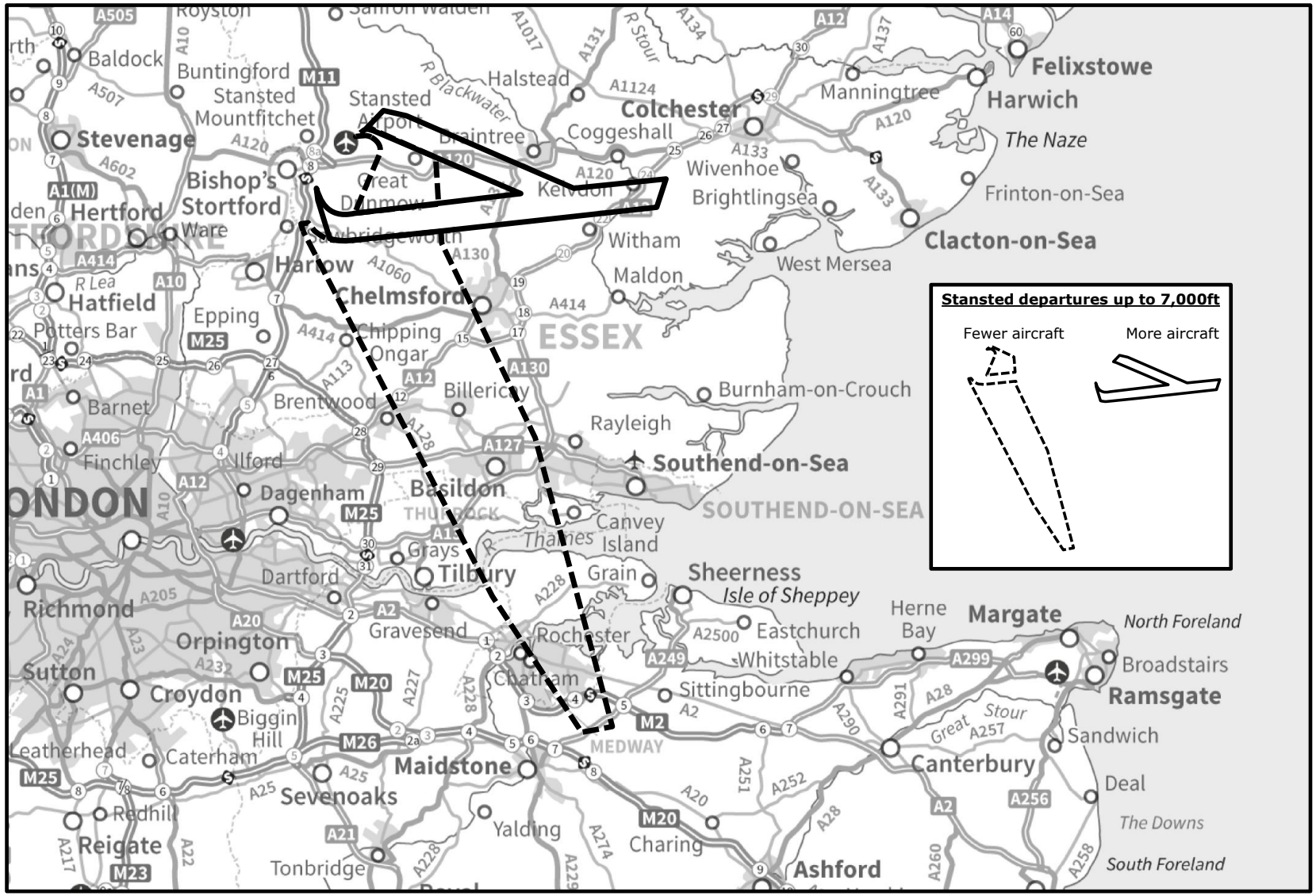


Figure 1 Stansted Airport Departures to the South and East - Proposed Areas of Change

Consultation sponsors

2.4 NATS is sponsoring this consultation with support from London Stansted Airport.

3 Context and Background to the Proposal

3.1 This section describes the strategy for airspace changes and what this means for Stansted Airport in the future. The legal framework that determines how airspace changes should be made is included at Appendix D.

Future Airspace Strategy and the 'LAMP' Programme

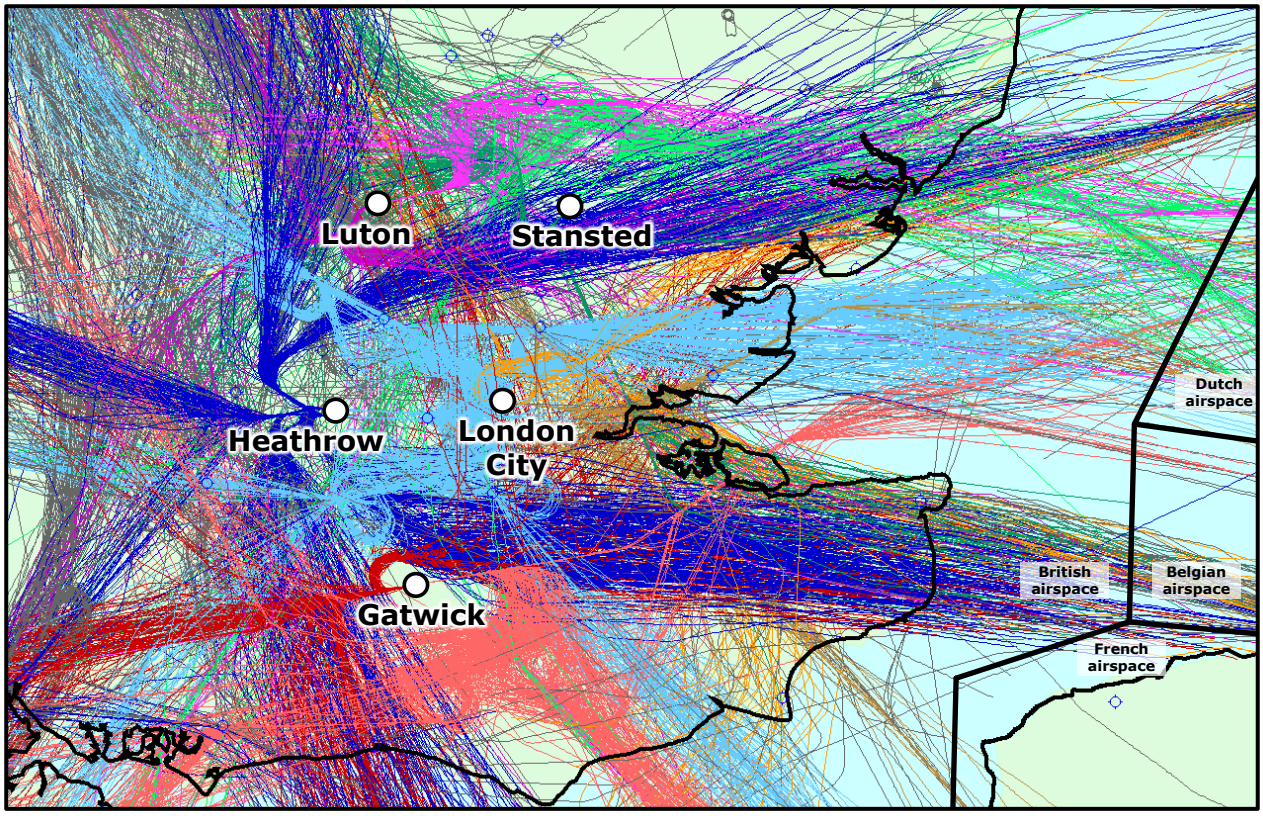
3.2 To achieve operational and environmental efficiency it is important to take advantage of the very latest technology. To ensure the UK takes full advantage of this, the CAA has been working with the aviation industry to develop the Future Airspace Strategy (FAS[4]), a blueprint for modernising UK airspace.

3.3 Implementing the FAS requires changes throughout UK airspace. For this reason NATS is working on an extensive programme of modernisation centred on London's airports and the surrounding airspace, beyond the southern and eastern coasts, and as far northwest as the Midlands; this is referred to as LAMP (see Paragraphs 1.7 to 1.10). The change being presented in this consultation is part of the first phase of LAMP.

LAMP Phases and future proposals for Stansted Airport

3.4 The complexity of the route system over South East England means that changing the whole system at once would present technical difficulties and potential safety issues. Figure 2 overleaf, demonstrates this complexity, as it shows one day's air traffic across the region (Appendix E, published separately, provides further background showing the individual flows into and out of the major airports in the South East). LAMP is therefore being addressed in phases to deliver not only short-term individual improvements, but also the best solution for the overall airspace system when all phases are complete.

4 The CAA explains the background to FAS here: www.caa.co.uk/default.aspx?catid=2408



Key: Heathrow arrivals in light blue, departures in dark blue, Gatwick arrivals in light red, departures in dark red, Stansted Airport arrivals in light green, departures in dark green, Luton arrivals in pink, departures in purple, and Northolt arrivals in light orange, departures in brown, all other flights in dark grey

Figure 2: One day of flight paths (5th August 2011) up to 25,000ft

3.5 The initial aim of LAMP was to redesign the airspace network over the whole of London and the South East and consult on a complete package of changes. However, initial design work highlighted a significant constraint in achieving an optimised airspace structure. This constraint is known as the 'transition altitude'.

3.6 It is not necessary to understand the transition altitude in order to respond to this consultation. However it is important to note that, in airspace design terms, the transition altitude caps the maximum altitude of most departure routes at 6,000ft. This doesn't stop aircraft climbing above 6,000ft but it does make the system for doing so more complex and is a major constraint to achieving an optimal airspace system for the LAMP area.

3.7 A project aiming to raise the transition altitude across the whole of the UK and continental Europe is under way at a pan-European level but will not deliver a change until at least 2017.

3.8 LAMP development will therefore be phased, which means we will progress those changes that can be made ahead of the transition altitude change (Phase 1), while the rest of the system will follow the revised transition altitude (Phase 2). Phase 1 aims to make changes in 2015, whereas Phase 2 will not be before 2017.

3.9 The proposal in this consultation forms part of Phase 1, and considers only the use of existing SIDs to the southeast and east from Stansted Airport. No new departure routes are proposed, nor any changes to the alignment of existing departure routes.

3.10 Stansted Airport, Luton, Northolt and Heathrow operations are all closely linked because of their alignment and geographical proximity, therefore a major redesign of the airspace around any one of these airports also requires significant change at the others. For this reason major redesign of the airspace serving these airports, including Stansted Airport, is not planned until Phase 2 and will be subject to a separate and much wider consultation exercise at that time.

3.11 While no significant redesign of Stansted Airport routes can be considered until Phase 2, the Phase 1 development work has identified an opportunity for early improvement. These proposed changes are summarised below:

- During daytime hours (0600-2300 local time), all of the Stansted Airport traffic that currently heads to the south (the Dover SID) would switch onto the existing eastbound SID (the Clacton SID).
- This would take aircraft initially east instead of south. These routes would then join southbound routes when the aircraft are much higher than today.
- The Dover SIDs would continue to be used at night (2300-0600 local time) for Stansted Airport departures wishing to head south.
- There would be no changes to airspace or to the route alignments. The only change would be to the proportions of departures using these existing SIDs, and the hours of operation of those SIDs.
- SIDs that route towards Lydd near the Kent/Sussex border are used relatively rarely (on average, fewer than twice per 24hr period). The use of these Lydd SIDs would not change under this proposal.

Traffic forecasts and long term runway development

3.12 Any future runway development arising from the work of the Airports Commission (chaired by Sir Howard Davies) will eventually require further changes to the airspace system. However, this will not happen quickly; the Airports Commission's report and recommendations, due in 2015, would trigger a long process starting with a decision, and including design, assessment, planning application and construction processes. We assume that any new runway(s) will not be operational before 2025.

3.13 Our focus is therefore to meet short-to-medium term demand by providing a route system to help the UK meet FAS and European requirements, and making best use of existing runways. Therefore **this consultation does not relate to, nor does it take into account, potential development of additional runways at any London airport.**

3.14 Given uncertainty over future plans, we are not able to predict future traffic levels with confidence. Therefore this proposal assesses the impact by considering two growth thresholds; 20% and 40% increase from the 2012 traffic used as the baseline for noise analysis (at the time of writing the 2013 noise analysis for Stansted Airport was not available). These are used to broadly represent the potential growth in traffic to 2016 and 2020 respectively. It should however, be noted that whilst these levels of growth have been used in this consultation to assess potential impact, they are indicative numbers only of potential growth; actual traffic levels in these periods may differ as a consequence of a range of unpredictable factors.

3.15 **Please note this consultation is not on growth in air traffic demand.** Regulation of the UK aviation sector is the responsibility of the CAA.

Required Navigational Performance Trial

3.16 The CAA, in partnership with Stansted Airport, is currently trialling two new SIDs based on a modern navigation standard referred to as Required Navigational Performance (RNP). These trials are designed to test aircraft track keeping accuracy on routes designed with RNP, to enable the CAA to develop standards for how such routes could be designed in the future at Stansted Airport and other UK airports. The trial is not part of this LAMP consultation. For more details of the potential interaction of the trial with this proposal see our FAQs page at www.nats.aero/lampstansted.

With whom are we consulting?

3.17 Given the nature of the proposed changes the CAA has agreed that the consultation is focussed through the Stansted Airport Consultative Committee. We have also notified the County and District Councils in the areas potentially affected and have likewise notified airlines that utilise the SIDs in question.

3.18 The consultation is not limited to these parties and is freely available to the general public via the NATS and Stansted Airport websites. We welcome the views of the general public and other interested parties who may or may not be affected by these proposed changes.

4 Next Steps

4.1 The period of consultation commenced 9am Monday 16th June 2014 and closes 9pm Monday 8th September 2014, a period of 12 weeks.

Responding to the consultation

4.2 You are invited to respond to this consultation online via this website:

www.NATS.aero/lampstansted

Here you can provide your feedback about this proposal, and you may upload a file such as a Word document or PDF also.

4.3 If it is not possible to submit your response online, you may do so by post to the following address:

Stansted SID Airspace Consultation
Box 25A, 4000 Parkway
PO15 7FL

4.4 Please be aware that we cannot guarantee that responses submitted directly or indirectly by any other means of delivery will be accounted for in the consultation exercise.

4.5 Online responses to the consultation will be automatically acknowledged via return email. Responses sent by post will not be acknowledged. If receipt of confirmation is required, please use a recorded delivery service.

4.6 We will not enter into correspondence with individual respondents on issues relating to this consultation.

4.7 Late postal responses received after the close of the consultation will be logged and stored but not analysed.

4.8 A summary of the issues raised in the consultation, and further details of the next steps, will be provided in a feedback report published after the end of the consultation. No personal details of respondents will be included in that document. The feedback report will be available on the NATS website. This report will also provide an update on subsequent steps in the development process.

Analysis of consultation feedback

4.9 NATS and Stansted Airport will consider all relevant feedback, taking into account guidance from the Government and the CAA. All the feedback from the consultation will be made available to the CAA as part of our airspace change proposal; this will allow them to assess independently whether we have drawn appropriate conclusions from the feedback received.

4.10 Responses will be treated with due care and sensitivity by us and by the CAA. If you do not wish your personal data (e.g. name/full address) to be forwarded to the CAA, please make it clear at the beginning whether you wish us to make your submission anonymous to them. We undertake not to disclose personal data to any other party without prior permission. All information passed to the CAA is bound by the Data Protection Act.

4.11 It will be the CAA's decision whether or not to approve any proposal that we submit following this consultation. The legal framework for this consultation can be found in Appendix D.

Compliance with the consultation process

4.12 Comments regarding our compliance with the consultation process as set out in the CAA's guidelines for airspace change (see Appendix A for references) should be directed to the CAA at:

Airspace Business Coordinator – Airspace, ATM and Aerodromes
Re: Stansted SID Airspace Consultation
Safety and Airspace Regulation Group, CAA House
45-59 Kingsway, London WC2B 6TE

E-mail: airspace.policy@caa.co.uk

NOTE: These contact details must not be used for direct response to this consultation: doing this will make it unlikely that your views will be captured.

5 Proposal and justification for switching Dover departures onto Clacton SIDs

5.1 Aircraft operate more efficiently at higher altitudes meaning that less fuel is burned creating fewer CO_2 emissions. When aircraft are at higher altitudes it is also less likely that there would be local impact from noise or visual intrusion. It is therefore in everyone's interest that aircraft can climb continuously to higher altitudes rather than being constrained to follow a 'stepped' climb with periods of level flight at lower altitudes[5].

5.2 Figure 3 on page 14 shows the existing Stansted Airport departure route structure to the south and east. It shows that air traffic leaving UK airspace via the southeast initially heads in a generally southerly direction, crossing the Thames and then turning east around Maidstone towards a navigation point in the vicinity of Dover (following the Dover SID).

5.3 This route has to pass through some of the most congested airspace in the London area (which is some of the most congested airspace in the world). In particular the Dover SID has to pass beneath the very busy air traffic flows that convey Heathrow's air traffic to and from the East. There are two of these flows that have to be avoided. The arrivals flow is descending westbound into Heathrow, north of the Thames, and the departures are climbing eastbound, south of the Thames as illustrated in Figure 3 on page 14. The arriving Heathrow traffic north of the Thames is descending to around 8,000ft which means that the Stansted Airport departures usually cannot climb above 7,000ft until they are clear of it. Typically, only 10% of Dover departures manage a continuous climb, the rest being held at 7,000ft for a portion of their flight towards Kent.

5.4 Because it has generally been held at a lower level, the Stansted Airport flow then has to merge with the Heathrow flow to head east towards Dover, rather than climbing above it. This compounds the problem as further level restrictions may be required to merge these traffic flows safely.

5.5 In summary, the altitude constraints on the Stansted Airport Dover departures, which keep them below the dense Heathrow flows, prevent continuous climbs and add significantly to congestion in the area. In turn this reduces the operational efficiency of the airspace, meaning delays are more likely, more fuel is burned and more CO_2 emitted.

5.6 Figure 3 on page 14 also illustrates occasional departures via Lydd. These are infrequent (on average, fewer than two flights per 24hr period). These Lydd departures follow the same initial route as Dover departures, splitting above the town of Detling near Maidstone. These infrequent 'Lydd SIDs' would continue to follow the Detling-Lydd route under this proposal.

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5 A short video explaining the benefits of airspace change – including those from continuous climbs and descents - can be found on the consultation website home page www.nats.aero/lampstansted

5.7 This proposal seeks to resolve these issues by switching Stansted Airport's daytime[6] traffic from the Dover SID to the Clacton SID, which enables the departures to achieve a more continuous climb because they avoid crossing the dense Heathrow arrival flow until much later in their climb profile. These flights generally reach at least 15,000ft by Clacton from where those heading southeast would turn to eventually join the Dover departure flows.

5.8 On turning south some aircraft will still have to stop their climb in order to pass under the Heathrow arrivals, however this period of level flight would be at about 17,000ft over the sea, rather than 7,000ft over densely populated areas of east London. Because aircraft are much more fuel/CO_2 efficient at higher altitudes, the proposed use of the Clacton SID would, on average, save fuel compared to the Dover SID.

5.9 Furthermore, many faster climbing aircraft types would be expected to climb sufficiently by Clacton to pass above the Heathrow arrivals, in which case they could have a continuous climb to at least 24,000ft.

5.10 While continuous climb to at least 15,000ft would generally be expected on the Clacton routes, there would continue to be occasions when ATC interrupt the climb on a tactical basis, for example, to keep the aircraft safely separated from other aircraft in the region. However, approximately 85% of Stansted Airport Clacton departures currently achieve continuous climb (compared to approximately 10% on the Dover alternative - see Para 5.3).

5.11 At night[6], Stansted Airport southbound departures would continue to use the Dover SID. This is because the route is, on average, marginally shorter and at night there are relatively few Heathrow arrivals meaning the Dover departures are likely to get a clear climb similar to that available on the Clacton route. Therefore, on balance, the shorter Dover SID would be the most efficient at night.

5.12 Figure 4 on page 15 shows how the revised Stansted Airport daytime routing would work. Dover and Clacton departures would both initially use the existing Clacton route, usually enabling an uninterrupted climb to over 20,000ft, passing 13-15,000ft in the vicinity of Clacton (traffic on the Clacton SID generally have continuous climb approximately 85% of the time). From Clacton, the Dover departures would turn south (having climbed above the dense Heathrow arrival flow) and the Clacton departures would continue eastwards as per today. They would generally keep climbing uninterrupted until leaving UK airspace (see para 5.10).

Appendix F (published separately) shows departures on both the Clacton and Dover routes at various altitudes. These flightpath maps illustrate how the Dover flights are kept lower for longer when compared with the Clacton flights.

6 Daytime is 0600-2300 (local) for the purpose of this consultation.

Figures 3 and 4 are simplified illustrations of the air traffic flows most relevant to this consultation. There are other flows that are not shown, such as Stansted Airport departures in other directions, Stansted Airport arrivals, and arrivals and departures related to other airports.

5.13 Using the alternative route would be, on average[7], slightly longer than today's; however the negative impact of that on aircraft fuel burn and CO_2 emissions would be outweighed by the ability to climb to a much more efficient altitude much earlier in the flight profile (see Section 6). By enabling more continuous climb, aircraft would climb above 7,000ft earlier; Government guidance (see Appendix A) indicates that noise from flights above this altitude is less significant. The potential environmental impacts of the proposals are discussed in more detail in Section 6 below.

5.14 As discussed in paras 1.3 and 1.5 this proposed change is to formalise alternative route usage. Without the change, flights on the Dover route would become gradually less efficient with increasing delays[8] as the airspace to the south becomes more congested. This effect would be exacerbated by changes at other airports, in particular London City Airport, that are being progressed as part of the first phase of the LAMP. This is also part of local development at London City Airport which will increase the number of their flights in the airspace to the south of Stansted Airport.

5.15 It is therefore reasonable to expect that, without the change presented in this consultation, some airlines would in any case naturally shift over time onto the less congested Clacton route. However, formalising the alternative route usage will ensure that Stansted Airport's operations fit in with the first phase of the LAMP, maximising the operational and environment benefits by providing new efficient routes over the North Sea that link the Clacton and Dover regions[9].

5.16 Note that this proposal does not remove the Dover SIDs. They would remain available for night-time flights (as described above). During the daytime they would be used by aircraft heading south on the little-used Lydd departure routes and could also be used by empty aircraft that occasionally need to repositioning to other airports to the south (such as Gatwick). These daytime flights are a very small fraction of Stansted Airport departures and therefore can be accommodated with negligible impact.

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7 Runway 22 departures (typically in use 70% of the time) would travel approximately 5nm further, if they are not given a shortcut. Runway 04 departures (typically in use 30% of the time) would likewise travel approximately 3nm less.

8 Stansted departures on the Dover route cross departure routes from London City. These departures therefore have to be coordinated so that flights from either airport may be delayed on the ground until such time that their flightpath will be clear of departures from the other airport. As both airports become busier, such delays would be expected to increase unless the Dover traffic is put on the alternative route.

9 Without this proposal, the shift on to the Clacton departure route would be gradual in line with the gradual increase in congestion and efficiency impacts associated with the Dover SID. Airlines determine the most efficient route based on a range of factors including the destination, type of aircraft and operating procedures. The optimal route will depend on these factors and so the threshold at which the Clacton route would become more efficient than the Dover route will vary; hence airlines may not all make the same decision for all their flights at the same time. However, this proposal would present a step change in the efficiency of the Clacton SID compared to the Dover SID as it would introduce more efficient link routes over the North Sea; in turn this would make the CLN route more efficient than the Dover route for all flights.

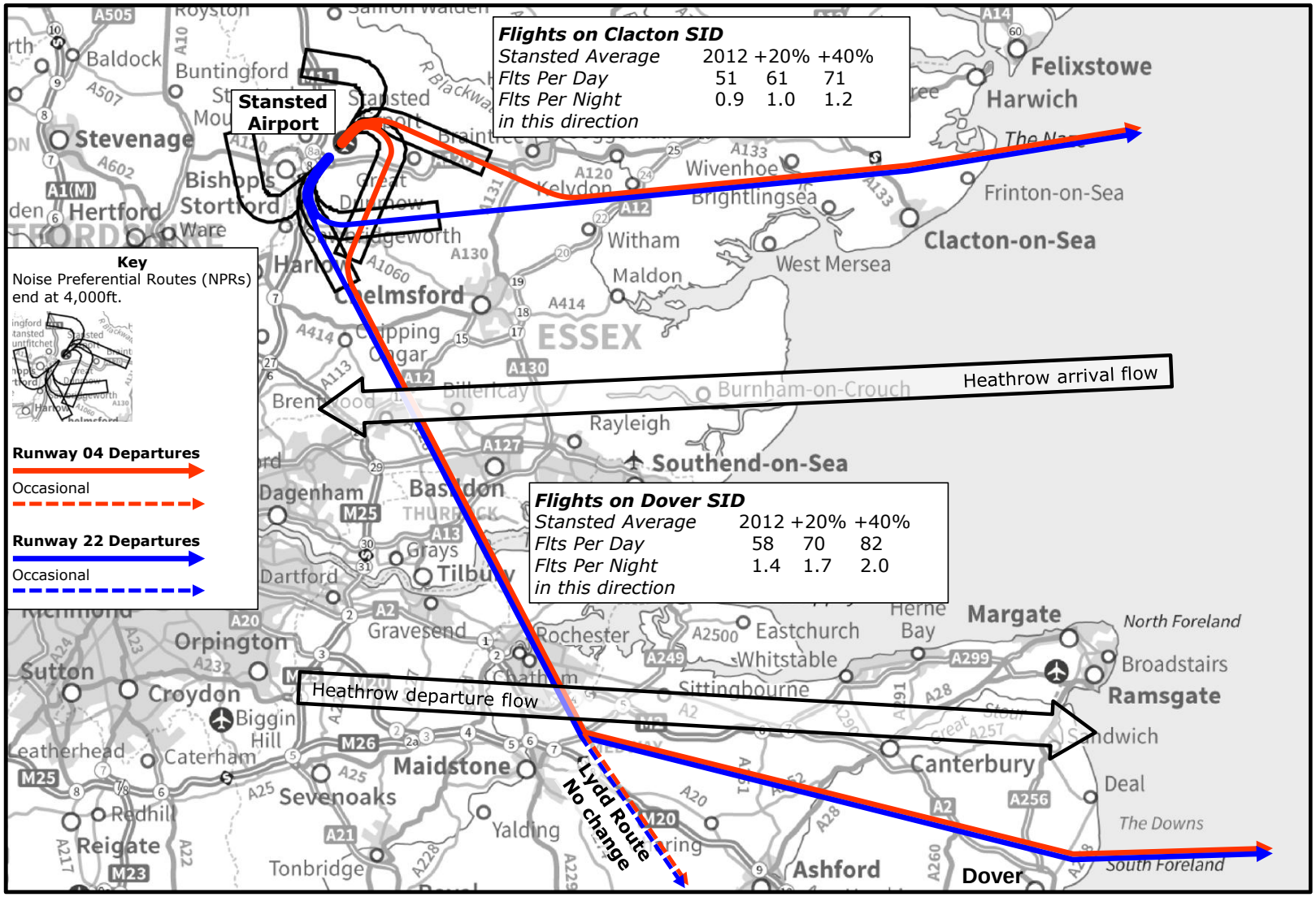

Figure 3: Illustration of Current Stansted Airport SIDs to the South (Dover, Lydd) and East (Clacton)

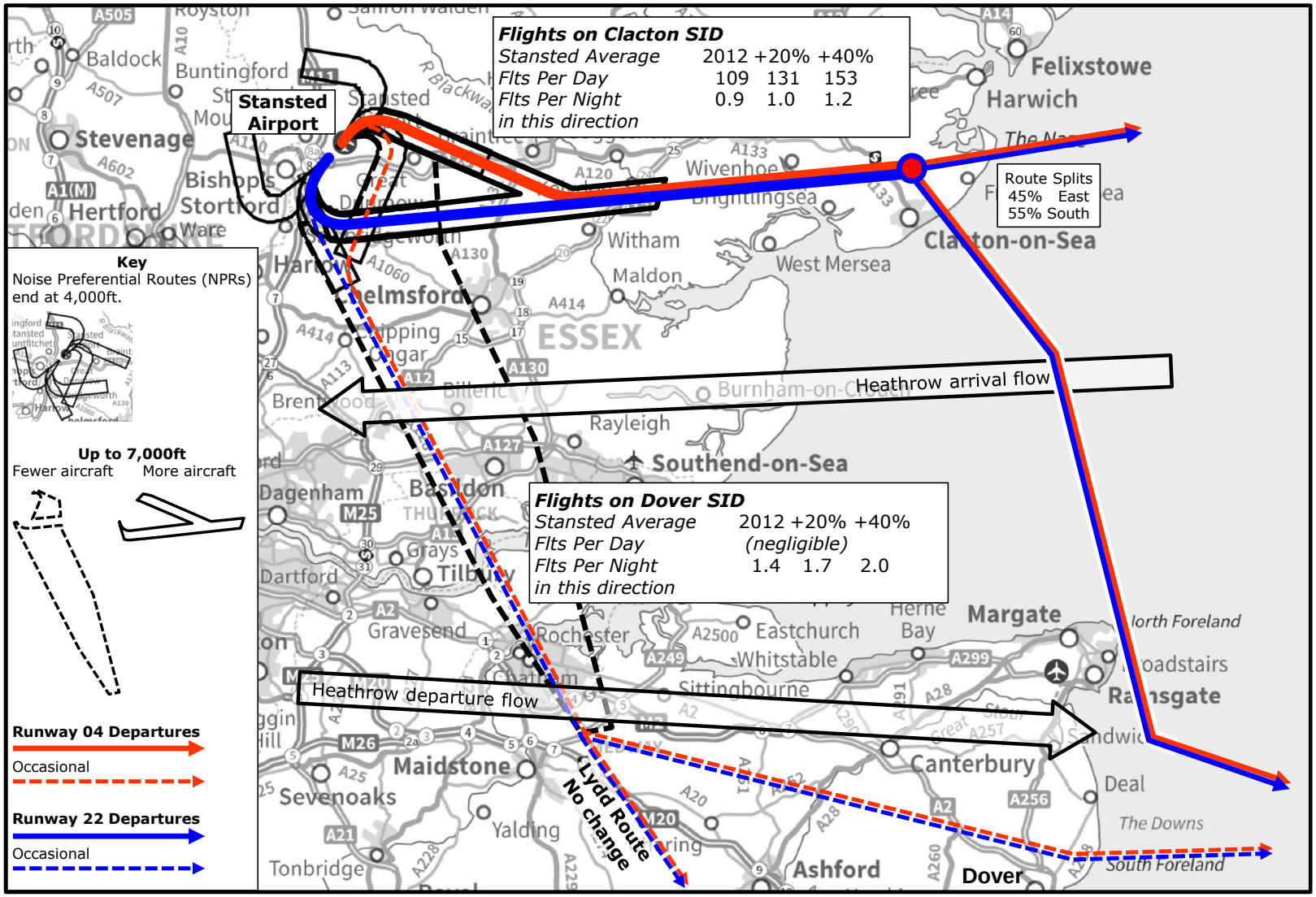

Figure 4: Illustration of Proposed Stansted Airport SIDs to the South and East

Note that the increase in traffic on the route to the east, and decrease in traffic on the route to the south, can be seen by comparing the tables alongside each SID route on the Figure above, with the equivalent tables on Figure 3 (page 14).

6 Environmental Benefits and Impacts

6.1 There are two environmental benefits of this proposal:

- Reduction in the overall area regularly overflown below 7,000ft in the daytime , and therefore populations exposed to potential noise
- Reduction in fuel burn and CO_2 emissions per flight

6.2 Whilst some areas would be overflown less often, others would be overflown more.

6.3 Implementing this proposal would concentrate southbound and eastbound Stansted Airport departures onto two low altitude routes (one per runway), which join into one intermediate altitude route climbing east towards Clacton (see Figure 4). Currently, these are distributed between the Clacton and Dover SIDs. This would mean a redistribution of noise impact. For any given location there would be no change to the noise of individual flights using the Clacton SID, however these flights would be more frequent.

Local benefits and impacts

6.4 The airspace affected by this proposal is divided into three categories; low altitude airspace (below 4,000ft), intermediate airspace (4,000-7,000ft) and network airspace (above 7,000ft). Safety is the paramount design consideration in all three categories; each category also has other, distinctive design priorities, and each is therefore considered separately below.

6.5 The Government provides guidance on environmental objectives (see Appendix A). These highlight minimising noise impact and minimising the number of people overflown at low levels as key environmental objectives. The lower the routes in question, the greater the potential for significant noise impact; there is particular emphasis on noise impact below 4,000ft.

6.6 The traffic numbers in Figure 4 show that overall the areas experiencing regular noise from aircraft below 7,000ft could be expected to reduce, because the southbound routes (Dover) would become very rarely used. These Figures also show the Noise Preferential Routes (NPRs) which are defined up to 4,000ft. These would not change as a result of this proposal. However whilst the NPRs to the south would remain for (occasional) positioning flights, people within the black dashed areas would no longer experience regular departure noise in the daytime from this route.

Local benefits and impact from changes to low altitude airspace (below 4,000ft)

6.7 Figure 5 on page 18 shows today's Runway 04 (Easterly) departure traffic patterns for flights up to 4,000ft in the vicinity of Stansted Airport. The average daily traffic numbers for aircraft up to 4,000ft are shown in the colour key. Typically, this runway is used about 30% of the time.

6.8 Figure 6 on page 19 shows the same for Runway 22 (Westerly) departures. Typically, this runway is used about 70% of the time.

Smaller-scale maps showing these flights are available in the separately-published Appendix G.

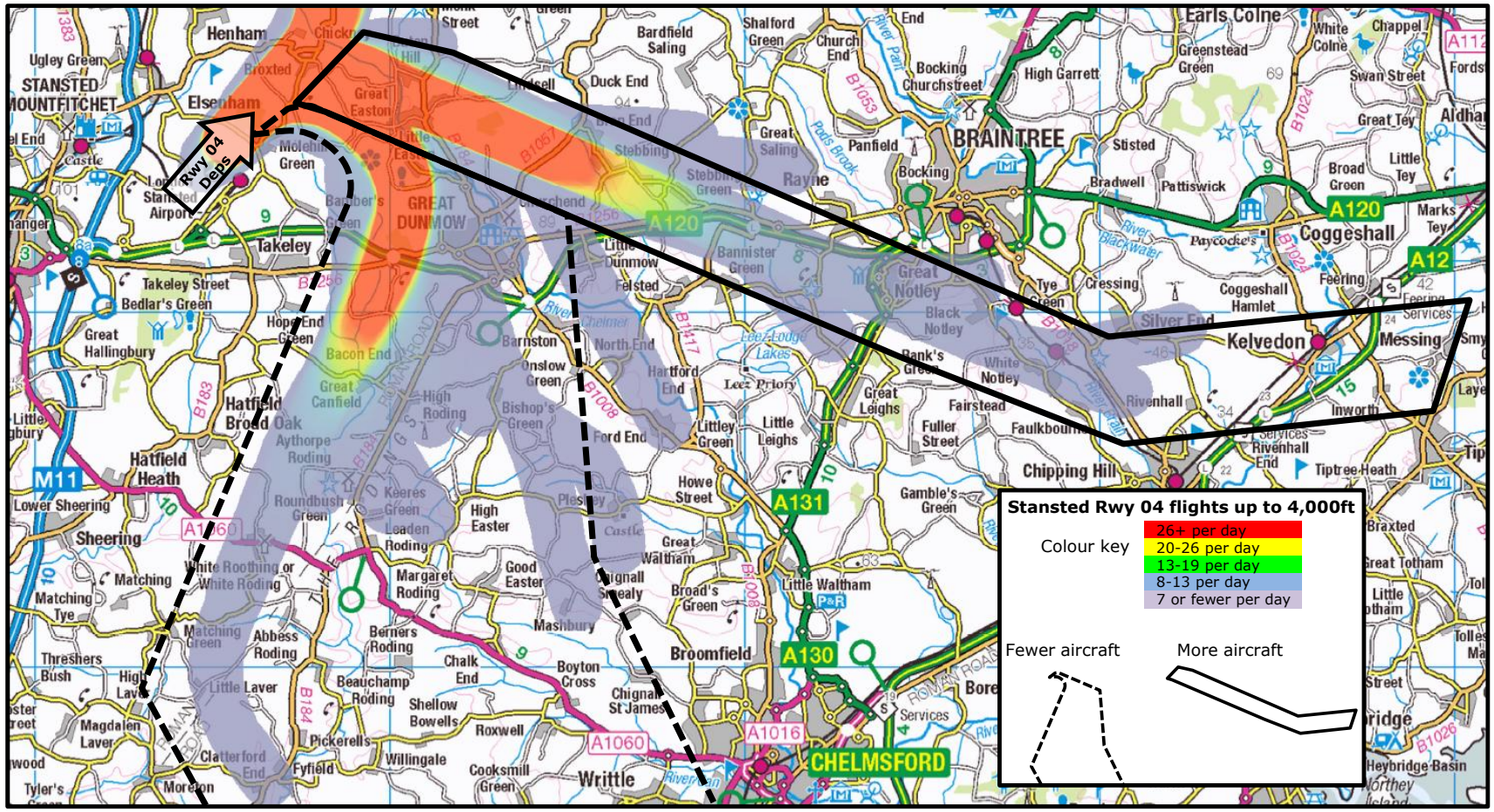

Figure 5: Current Runway 04 Departures to the South and East (radar data up to 4,000ft, this runway used about 30% of the time)

This plot is constructed from one representative week's radar data (01-07 June 2013).

Most air traffic within the black dashed area would move to fly within the black solid area instead. Compare this with Figure 4 on page 15.

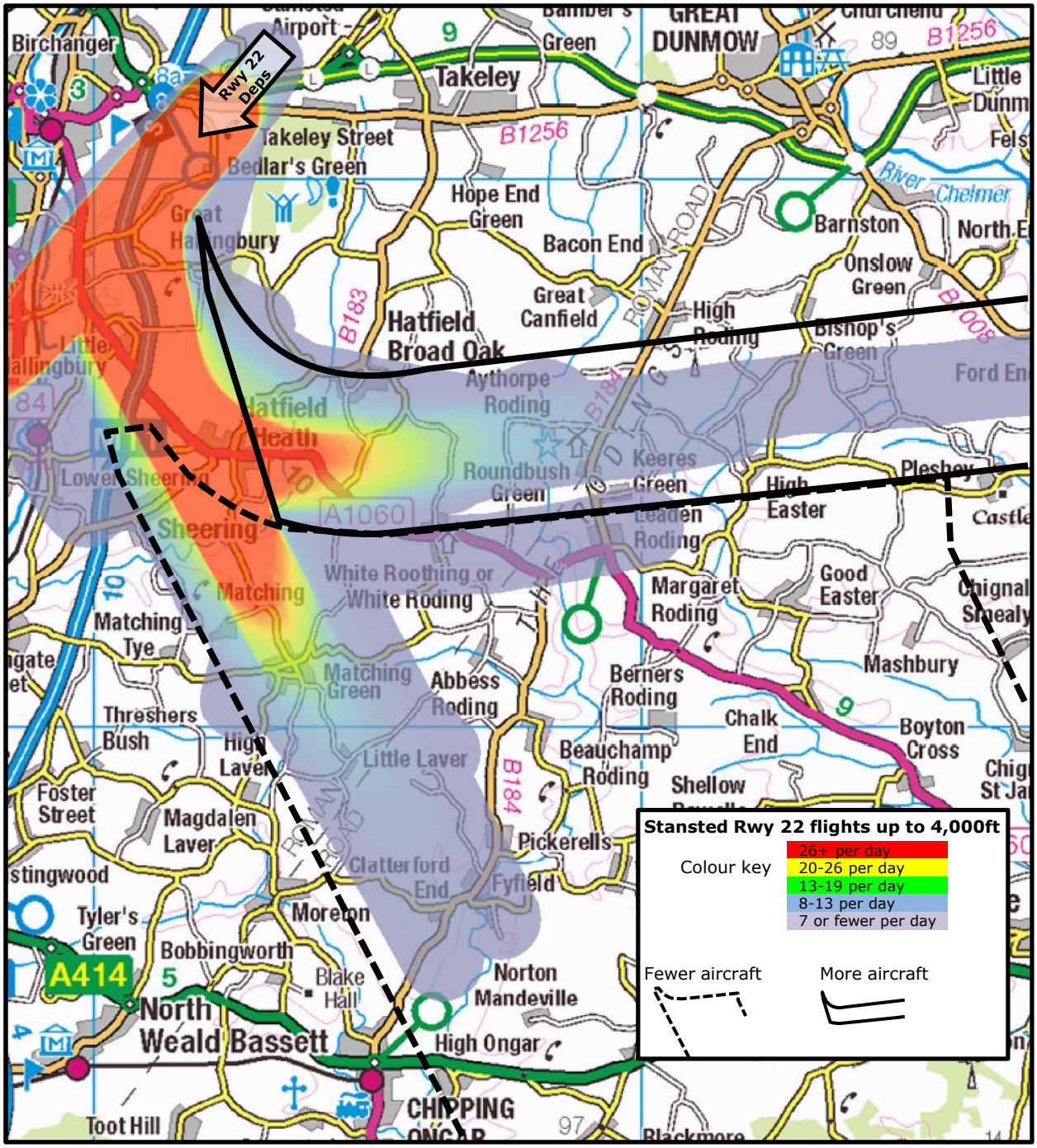

Figure 6: Current Runway 22 Departures to the South and East (radar data up to 4,000ft, this runway used about 70% of the time)

This plot is constructed from one representative week's radar data (10-16 August 2013).

Most air traffic within the black dashed area would move to fly within the black solid area instead. Compare this with Figure 4 on page 15.

6.9 For Runway 04 departures (Figure 5), the main effect below 4,000ft would be a switch from relatively equal distribution of traffic between the north and south of Little Easton, to a concentration to the north only (the change in the number of flights can be seen by comparing the tables in Figure 3 and Figure 4. Population analysis (see Appendix H published separately) shows that approximately 320 households would no longer experience regular daytime overflight below 4,000ft as a consequence of the proposed change to Runway 04 departures. Great Dunmow is not regularly overflown by either flow; however the traffic on the southbound Dover route is nearer the town, which is on the outside of the turn (generally noisier than the inside of a turn due to the presentation of the aircraft engines). The proposal would shift the main flow to the north – further away from Great Dunmow, joining the existing flow towards Stebbing and the south side of Braintree. Approximately 800 households are beneath the area that would see an increase in daytime overflights below 4,000ft. Runway 04 is in use approximately 30% of the time.

6.10 For Runway 22 departures (Figure 6), the main effect below 4,000ft would be in the vicinity of Hatfield Heath (the change in the number of flights can be seen by comparing the tables in Figure 3 and Figure 4. Instead of splitting into two routes there, the proposal would shift the main flow away from the Matchings, joining the existing eastbound flow towards Aythorpe Roding. Population analysis (see Appendix H published separately) shows that approximately 290 households would no longer experience regular daytime overflight below 4,000ft as a consequence of the proposed change to Runway 22 departures. Approximately 120 households are beneath the area that would see an increase in daytime overflights below 4,000ft. Runway 22 is in use approximately 70% of the time.

6.11 The aircraft types utilising each route are presented in Appendix C.

Impact on Noise Contours and Footprints

6.12 The process for airspace change (see Appendix A) requires noise impact analysis.

6.13 For changes in daytime flight patterns, this process requires calculation of the $L_{eq,\ 16\ hours}$ metric (herein this is referred to as Leq). The effect of the change on Leq contours for 2012 flights+20% growth, and 2012 flights+40% growth, are shown in Figure 7 and Figure 8 respectively. Leq is a measure of the distribution of total noise energy from all daytime flights, and is shown as a contour. The shape of the contour would be affected by this proposal because more flights would be on the Clacton departure, accentuating the node (bump) on the contour east towards Clacton for Runway 22 departures. The effect on the contour to the north of the airport is barely perceptible. This is because the Runway 22 is more often in use and so the shape of the contour in this region is predominantly defined by the arrivals to Runway 22, rather than Runway 04 departures.

6.14 The impact on the overflown population is shown in Table 2. The change in the shape of the contours would lead to small reduction in the overall number of

people within the 57dBA contours for both traffic scenarios, and allow a small reduction for the 60dBA contour for the 40% growth scenario.

2012 traffic grown by 20% (Figure 7)	**Population in baseline contour with no change**	**Net population *reduction* due to proposed change**	**New populations affected by proposed change**
>57dba	1,800	100	<50*
>60dba	600	0	0
>63dba	200	0	0
>66dba	<50*	0	0
>69dba	0	0	0
>72dba	0	0	0

2012 traffic grown by 40% (Figure 8)	**Population in baseline contour with no change**	**Net population *reduction* due to proposed change**	**New populations affected by proposed change**
>57dba	3,100	200	<50*
>60dba	800	100	<50*
>63dba	300	0	0
>66dba	<50*	0	0
>69dba	0	0	0
>72dba	0	0	0

Table 2: Leq Population Counts (average summer day)

Table notes:
Population and household counts are based on 2012 update of 2001 Census.
***** All figures have been rounded to the nearest 100, values below 50 are shown as '<50' rather than being rounded down to zero.
Net changes were calculated *before* rounding, in order to retain accuracy with small numbers.

6.15 Sound Exposure Level (SEL) footprints are used for illustrating changes to night time operations, where night is defined as 2300-0700. This proposal would only apply between 0600-2300, so there would be no change for the majority of the night 2300-0600. Between 0600 - 0700 around 6 Dover departures per hour would switch onto the Clacton SID; this rises to approximately 7 and 8 per hour respectively with a 20% and 40% increase in traffic numbers. For any given location beneath the Clacton SID there would be no change to the noise from an individual flight, although there would be this increased frequency of Clacton overflights.

6.16 Furthermore SEL relates to the noise footprint from a single aircraft, so they are affected only by changes to route alignment and not by changes to traffic numbers using the routes. As this proposal only affects traffic numbers, there would be no change to the SEL footprints, and therefore none have been produced for this consultation.

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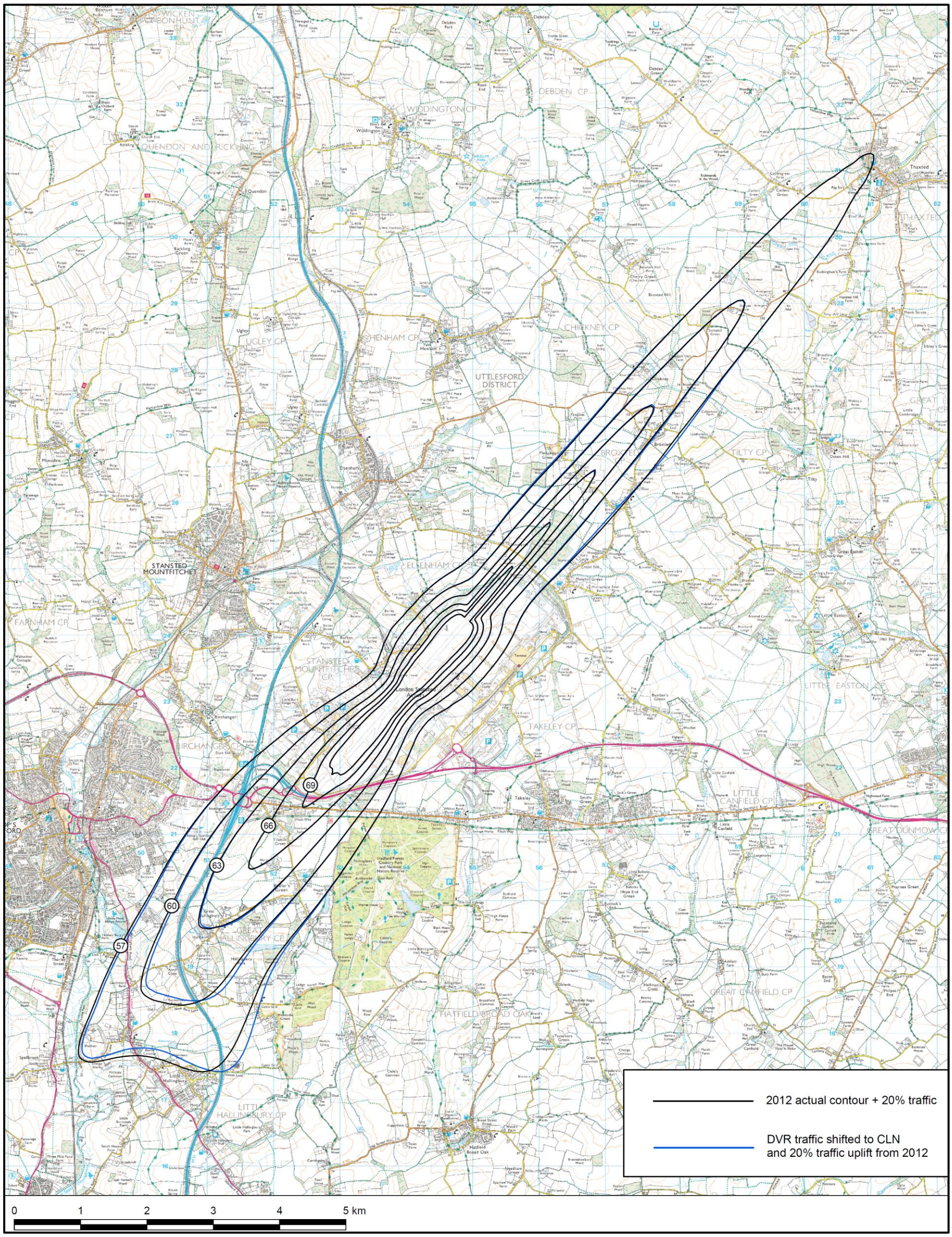

Figure 7: Stansted Airport Noise Leq Contour Chart – 2012 traffic grown by 20% (Summer, 16-hour daytime)

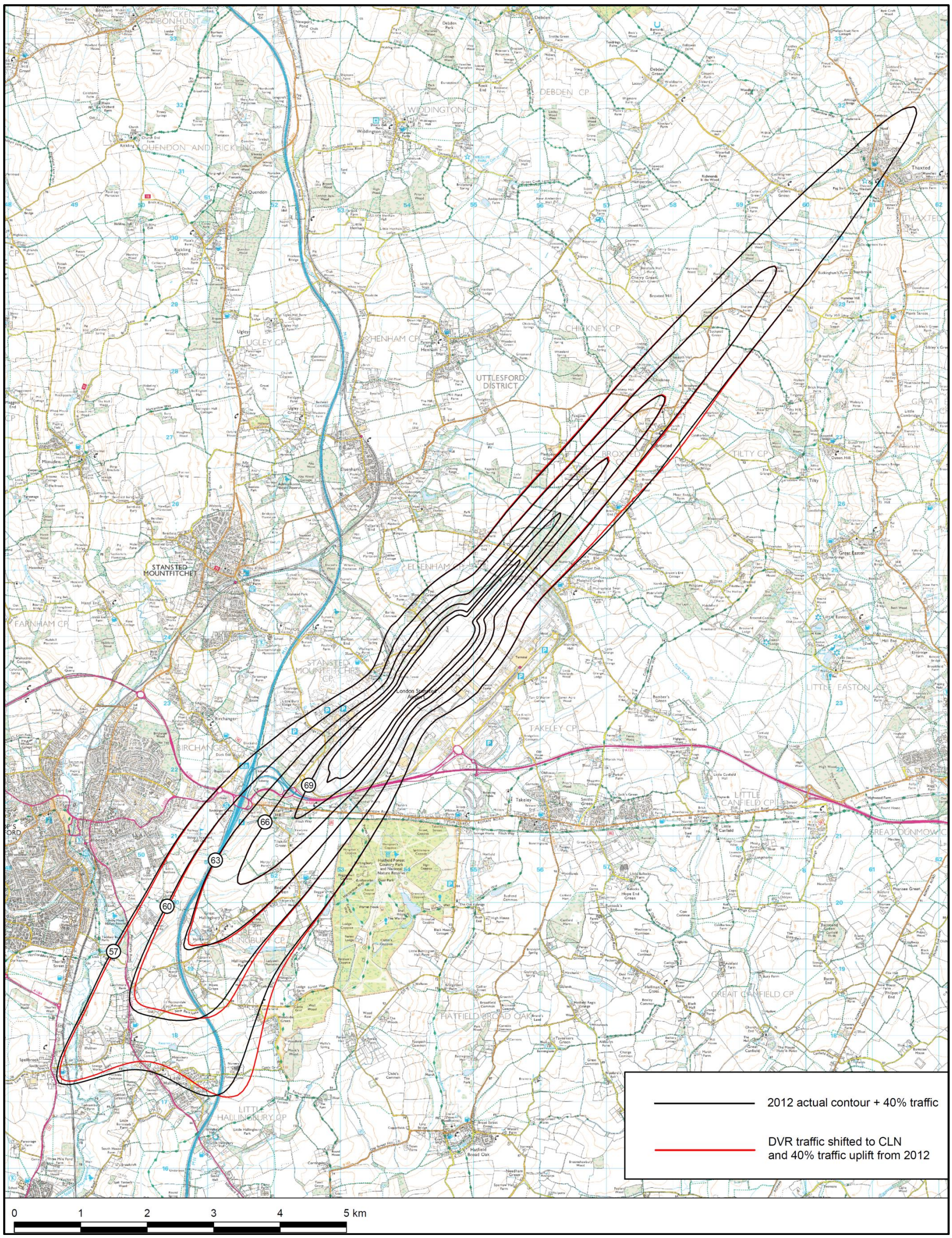

Figure 8: Stansted Airport Noise Leq Contour Chart - 2012 traffic grown by 40% (Summer, 16-hour daytime)

Local benefits and impacts from changes to intermediate altitude airspace (4,000ft-7,000ft)

6.17 Between 4,000ft and 7,000ft, noise may still be considered a significant local issue in some circumstances (albeit less so than at lower altitudes). However, Government guidance (see Appendix A) states that noise must be balanced against the consideration to reduce CO_2 emissions.

6.18 Figure 9 on page 26 and Figure 10 on page 27 show current Stansted Airport departure traffic patterns for Runways 04 and 22 respectively. The average daily traffic numbers for aircraft between 4,000ft and 7,000ft are shown in the colour key.

Smaller-scale maps showing these flights are available in the separately-published Appendix G.

6.19 The proposal would concentrate departing traffic into two flows (one per runway), where it is currently divided into four (two per runway). The effect of this would be to decrease the area regularly overflown, and to increase the potential impact on those areas which would be overflown more often. The change in the number of flights can be seen by comparing the tables in Figure 3 and Figure 4 on pages 14 and 15 respectively.

6.20 However, it can be seen that the portion of flight below 7,000ft would be shorter if the proposed change was implemented. As discussed in Section 5, if the Dover traffic switched to the Clacton SID it would climb above 7,000ft much earlier and would likely continue climbing until leaving UK airspace.

6.21 This continuous climb would provide the CO_2 emissions savings discussed later in Paragraph 6.25.

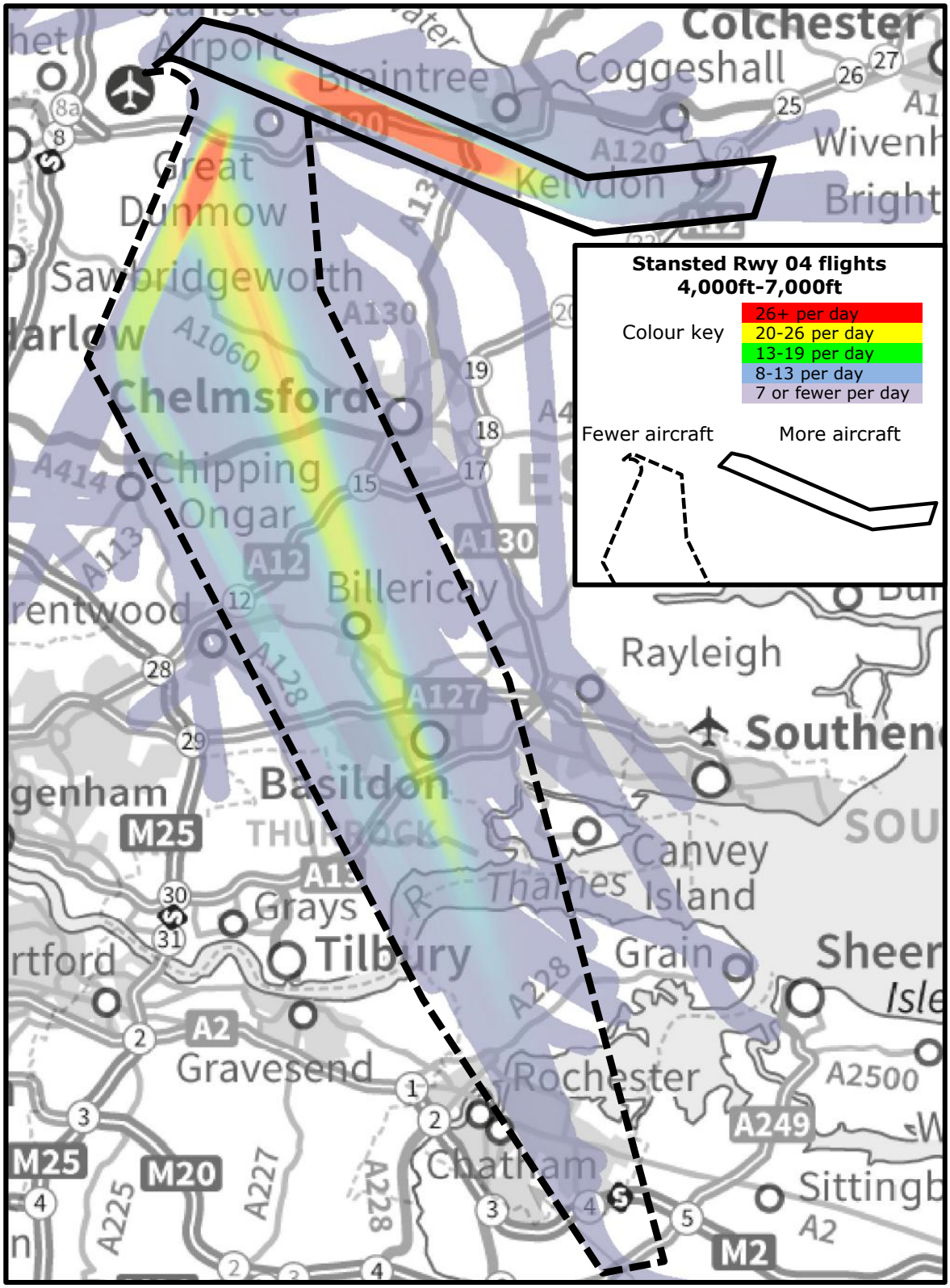

Figure 9: Current Runway 04 Departures to the South and East (radar data from 4,000ft-7,000ft, this runway used about 30% of the time)

This plot is constructed from one representative week's radar data (01-07 June 2013)

Most air traffic within the black dashed area would move to fly within the black solid area instead. Compare this with Figure 4 on page 15.

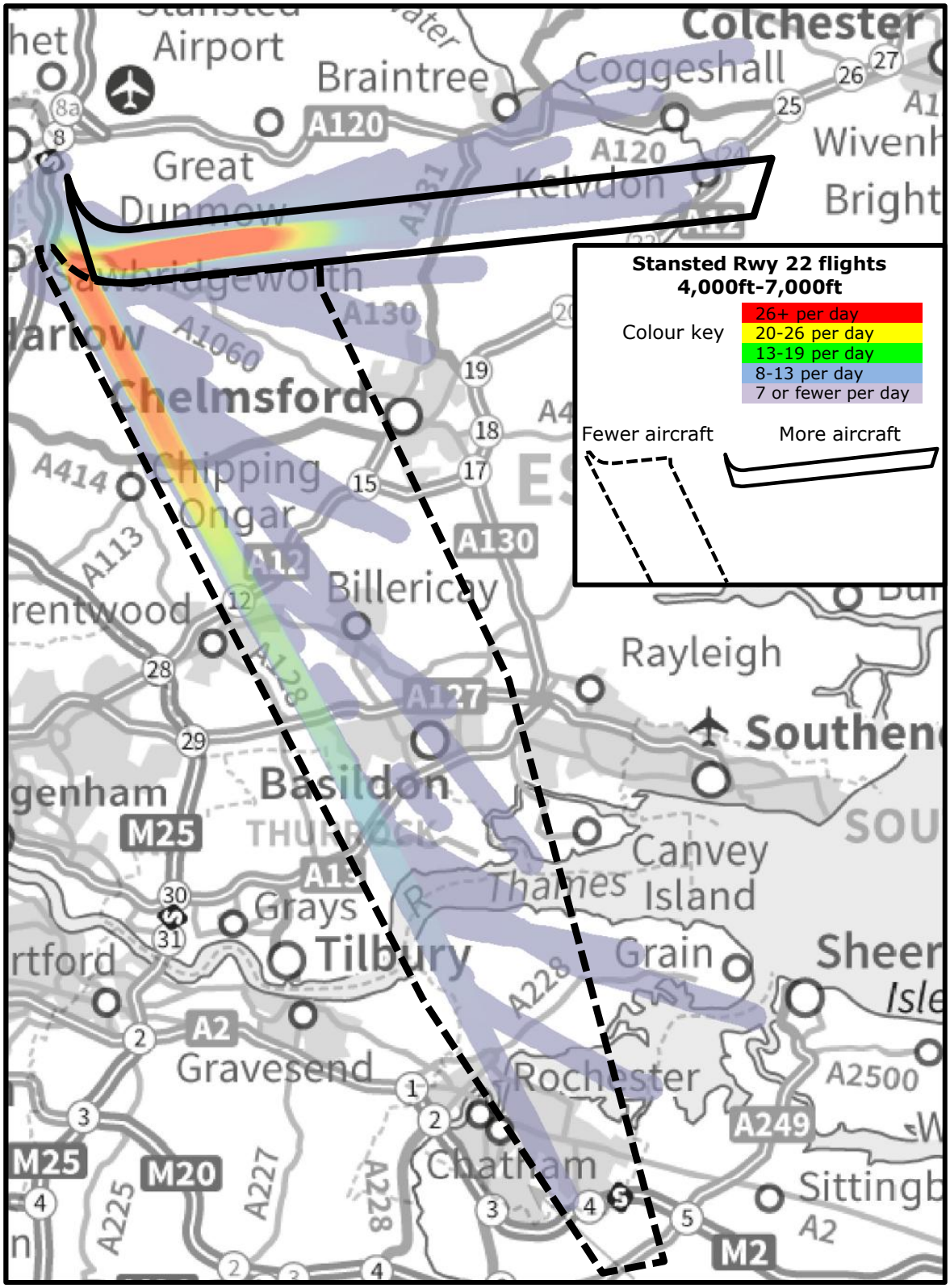

Figure 10: Current Runway 22 Departures to the South and East (radar data from 4,000ft-7,000ft, this runway used about 70% of the time)

This plot is constructed from one representative week's radar data (10-16 August 2013)

Most air traffic within the black dashed area would move to fly within the black solid area instead. Compare this with Figure 4 on page 15.

Local benefits and impact from changes to network airspace above 7,000ft

6.22 Government guidance on environmental objectives (see Appendix A) indicates that above 7,000ft, aircraft noise is considered less of an issue, but potential visual impact above Areas of Outstanding Natural Beauty (AONBs) and National Parks should be a consideration alongside the operational requirements.

6.23 The proposed route alignment also increases the likelihood of continuous climb to higher altitudes, much of this climb occurring over the North Sea

Areas of Outstanding Natural Beauty (AONBs)

6.24 This proposal almost entirely removes overflight of the Kent Downs AONB. There would be no change to flights in the vicinity of Dedham Vale or Suffolk Coast and Heaths AONBs. No National Parks are affected by this proposal.

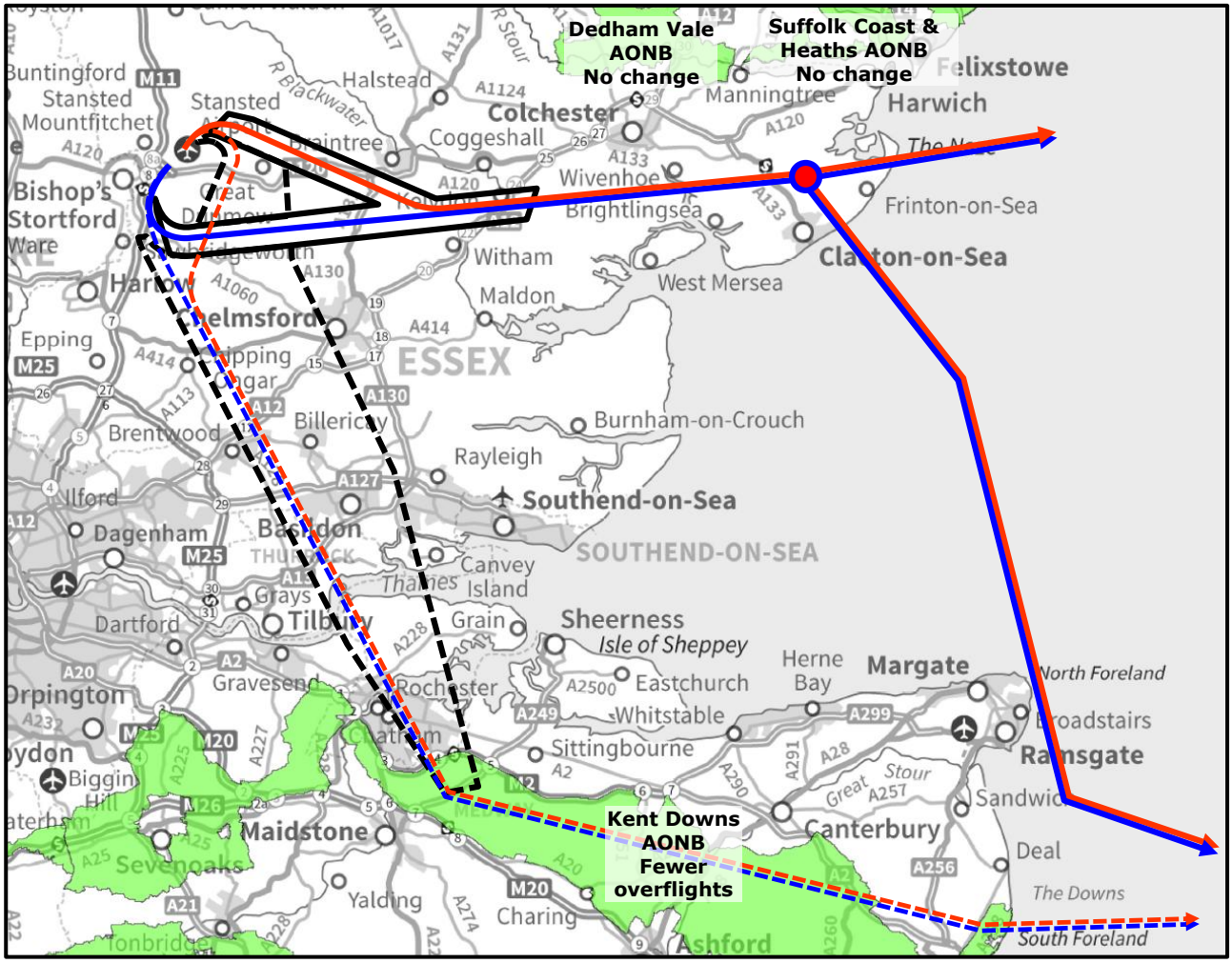

Figure 11: Proposed Routes and AONBs

Fuel Burn and CO_2 emissions

6.25 Computer based simulation modelling has been undertaken to assess the potential fuel and CO_2 emissions benefits of this change[10]. These are shown in Table 3.

	2012 traffic grown by 20%	**2012 traffic grown by 40%**
Average Enabled Fuel burn saving per departure to the Southeast	100-200kgs	100-200kgs
Approx flights via Dover that would benefit from revised route via Clacton (rounded to nearest hundred flights)*	20,000 flights	24,400 flights
Annual Fuel Saving (rounded to nearest hundred metric tonnes)	2,000-4,000T	2,300-4,700T
Annual CO_2 emissions saving (rounded to nearest hundred metric tonnes)	6,400-12,700T	7,400-14,900T

*Note that approximately 10% of flights via Dover manage a continuous climb whereas 80-90% of flights via Clacton achieve continuous climb

Table 3: Fuel savings

10 The fuel benefit measure provides an estimate of the fuel uplift difference as a result of a revised profile and not changes to aircraft weight. A reduced fuel requirement for an improved profile would, however, mean less fuel needs to be carried, making the aircraft lighter and further reducing the fuel uplift requirement. The modelling process is not able to capture this additional benefit.

Appendix A: References

References 1-5 below are the documents that make up the guidance framework that airspace change sponsors have to consider, in order to progress airspace changes

1. Transport Act 2000 – Part 1 Air Traffic

2. The Civil Aviation Authority (Air Navigation) Directions 2001 (incorporating Variation Direction 2004)

3. Department for Transport Guidance to the Civil Aviation Authority on Environmental Objectives relating to the exercise of its Air Navigation Functions (Jan 2014)

4. CAP724 Airspace Charter (30 Jan 2009)

5. CAP725 CAA Guidance on the Application of the Airspace Change Process (30 March 2007)

Other referenced documents

6. UK Aeronautical Information Publication (AIP), www.ais.org.uk

Appendix B: Glossary of Terms

Airports Commission	A commission set up by the Government to look into options for the development of runway infrastructure in the South East (also known as the Davies Commission)
Altitude	The distance in feet, above mean sea level. Due to variations in terrain, air traffic control measures distances as above mean sea level rather than above the ground. If you are interested in the height of aircraft above a particular location to assess potential noise impact, then local elevation should be taken into account when considering aircraft heights; for example an aircraft at 3,000ft above mean sea level would be 2,500ft above ground level if the ground elevation is 500ft. All altitudes in the consultation document are defined as above mean sea level
AMSL	Above mean sea level
AONB	Area of Outstanding Natural Beauty
ATC	Air traffic control
CAA	Civil Aviation Authority
Capacity	A term used to describe how many aircraft can be accommodated within an airspace area without compromising safety or generating excessive delay
Centreline	The nominal track for a published route (see Route)
CLN or Clacton SID	A departure route to the east from Stansted Airport, as defined in the UK AIP (see Appendix A)
CO_2	Carbon dioxide
Concentration	Refers to a density of aircraft flight paths over a given location; generally refers to high density where tracks are not spread out; this is the opposite of Dispersal
Continuous climb	A climb that is constant, without periods of level flight – referred to as steps
Continuous descent	A descent that is constant, without periods of level flight – referred to as steps
Controlled airspace	Generic term for the airspace in which an air traffic control service is provided as standard; note that there are different sub classifications of airspace that define the particular air traffic services available in defined classes of controlled airspace Usually abbreviated to CAS
Conventional navigation	The historic navigation standard where aircraft fly with reference to ground based navigation aids
Conventional routes	Routes defined to the conventional navigation standard
Davies Commission	See Airports Commission
Dispersal	Refers to the density of aircraft flight paths over a given location; generally refers to low density – tracks that are spread out; this is the opposite of Concentration

DVR or Dover SID	This is the historic name for the departure route to the southeast from Stansted Airport; this has recently been renamed in the UK AIP (see Appendix A) as the Detling (DET) SID
Easterly operation	When an runway is operating such that aircraft are taking off and landing in an easterly direction. At Stansted Airport, this refers to Runway 04
FAS	See Future Airspace Strategy
Flight paths	The tracks flown by aircraft when following a route, or when being directed by air traffic control
ft	Feet, the standard measure for vertical distances used in air traffic control
Future Airspace Strategy	The CAA's blueprint for modernising the UK's airspace. The CAA explains the background to FAS here: www.caa.co.uk/default.aspx?catid=2408
General Aviation	All civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire. General aviation flights range from gliders and powered parachutes to corporate jet flights
Holds/Holding Area/ Holding Stacks	An airspace structure where aircraft circle above one another at 1,000ft intervals when queuing to land
Leq	See 'noise contour'
Low altitude airspace	Airspace in the vicinity of the airport containing arrival and departure routes below 4,000ft. Airports have the primary accountability for this airspace, as its design and operation is largely dictated by local noise requirements, airport capacity and efficiency
LYD or Lydd SID	A departure route to the southeast from Stansted Airport, as defined in the UK AIP (see Appendix A)
NATS	The UK's licenced air traffic service provider for the en route airspace that connects our airports with each other, and with the airspace of neighbouring states
Nautical Mile	Aviation measures distances in nautical miles. One nautical mile (nm) is 1,852 metres. One road mile ('statute mile') is 1,609 metres, making a nautical mile about 15% longer than a statute mile.
nm	See Nautical Mile
Noise contours	The depiction of noise across a period of the day as a series of contours around the airport; major airports annually publish the noise contours for the 'daytime' period of 07:00-23:00; these are referred to as the Leq(16 hours) noise contours
Noise footprints	The depiction of noise from a single aircraft as a 'footprint' around the airport; these are referred to as SEL footprints
PBN	See Performance Based Navigation
Performance Based Navigation	Referred to as PBN; a generic term for modern standards for aircraft navigation capabilities (as opposed to 'conventional' navigation standards). See www.eurocontrol.int/navigation/pbn for details

Route	Published routes that aircraft plan to follow. These have a nominal centreline that gives an indication of where aircraft on the route would be expected to fly; however, aircraft will fly routes and route segments with varying degrees of accuracy based on a range of operational factors such as the weather, ATC intervention, and technical factors such as the PBN specification
Route system or route structure	The network of routes linking airports to one another and to the airspace of neighbouring states
Runway 04 (RWY04)	The name given to the runway at Stansted Airport when operating in an 'easterly' direction (i.e. taking off and landing on the easterly heading of 040º)
Runway 22 (RWY22)	The name given to the main runway at Stansted Airport when operating in a 'westerly' direction (i.e. taking off and landing on the westerly heading of 220º)
SEL	Sound Exposure Level - See Noise footprint
SID	See Standard Instrument Departure
Standard Instrument Departure	Usually abbreviated to SID; this is a route for departures to follow straight after take-off as specified in the UK AIP (see Appendix A)
Statute mile	A standard mile as used in normal day to day situations (e.g. road signs) but not for air traffic where nautical miles are used
Stepped climb	A climb that is interrupted by periods of level flight required to keep the aircraft separated from another route in the airspace above
Stepped descent	A descent that is interrupted by periods of level flight required to keep the aircraft separated from another route in the airspace below
'Tactical' air traffic control	Air traffic control methods that involve air traffic controllers directing aircraft off the established routes structure for reasons of safety or efficiency
Westerly operation	When a runway is operating such that aircraft are taking off and landing in a westerly direction; see Runway 22 for definition of westerly operations at Stansted Airport

Appendix C: Aircraft Types by current and proposed Stansted Airport SIDs

Aircraft Types	% of all aircraft using CLN route	% of all aircraft using DVR route	% of all aircraft using proposed route (equiv to CLN+DVR)
B737+var	64%	67%	65%
A320+var	20%	23%	21%
Medium Turboprop	8%	0%	4%
B747+var	2%	2%	2%
Executive Jet	2%	3%	2%
Other	4%	5%	6%

Based on 2011 data, source NEST tool, using data from Eurocontrol, cross referenced with UKFDB
This is a typical representative sample

Appendix D: Legal framework

Once the sponsors have submitted their ACP, the CAA decides whether it should be approved. To do this, they are required to consider a framework of legislation and guidance. This sets out the CAA's obligations, and the factors that it must take into account in assessing the merits of an ACP. These are outlined below.

The CAA's primary obligation is to exercise its air navigation functions so as to maintain a high standard of safety in the provision of air traffic service. This duty, which is imposed on the CAA by the Transport Act 2000 (the 'Transport Act'), takes priority over all of the CAA's other duties.

The Transport Act also directs the CAA to exercise its air navigation functions in the manner it thinks best calculated to:

- secure the most efficient use of airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic
- satisfy the requirements of all airspace users
- take account of Government guidance on environmental objectives

In addition to the duties imposed by the Transport Act, the CAA is obliged, by the Civil Aviation Authority (Air Navigation) Directions 2001, to take into account the need to reduce, control and mitigate as far as possible the environmental impacts of civil aircraft operations, and the need for environmental impacts to be considered at the earliest possible stages of planning, designing, and revising, airspace procedures and arrangements.

NATS and Stansted Airport have sought to reflect these duties and objectives, and the framework as a whole, in our development of this proposal and its consultation. We also take into account Government guidance on environmental objectives set out in the Department for Transport's document 'Guidance to the Civil Aviation Authority on environmental objectives relating to the exercise of its air navigation functions' (see Appendix A).

Sponsors must also take into account the guidance published by the CAA entitled 'CAP725 CAA Guidance on the Application of the Airspace Change Process' (see Appendix A). This guidance states that the environmental impact of a change must be considered from the outset, which we have done and continue to do.

The following appendices are published separately:

Appendix E: Background on London area flight paths (built up by airport)

Appendix F: Stansted Airport departures shown in 1,000ft 'slices'

Appendix G: Detailed maps of the area, showing flightpath densities

Appendix H: Population analysis for daytime overflights

End of consultation document