Airspace Change Proposal
Stage 2A

Options Development & Design Principle Evaluation

London Southend Airport FASI(S)

ACP-2018-90

03 November 2023

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Version	Date	Description of Changes
Version 1	09/11/2022	
Version 1.1	03/11/2023	All changes and updates from Version 1 are in blue text and the sections with changes summarised below. • 1.1 - Overview – updated • 1.10 – Future Traffic Forecasts – new section • 2.1 – Swathes – updated description and process • 2.2 – Baselines – new redefined baselines and description • 3.1 – Workshops – updated • 3.2 – Feedback – updated • 3.3 – Stage 2 rework additional swathes – new section • 3.4 – ACOG as a stakeholder – new section • 4 – Departure Procedures – new definitions of the baselines and options, new maps to show the amended baselines and swathes. OS maps included. • 5 – Arrival Procedures – new definitions of the baselines and options, new maps to show the amended baselines and swathes. OS maps included. • 6.1 – Methodology – updated • 6.4 – Discounting of Options – new section • 7 – Design Principle Evaluation Summary – updated following the rework on the Design Principle Evaluation document. • Annex A – Additional Options Feedback Session – new • Annex B – Qinetiq/DAATM Meeting Notes – new • Annex D – Feedback for Stage 3 – new • Annex E – Design Principle Evaluation Criteria - updated

Executive Summary

The Civil Aviation Authority wrote to 21 airports in the Southeast of England (including London Southend Airport) to advise them that it is essential that they participate in a programme of Airspace Modernisation. This programme consists of a coordinated attempt to improve the efficiency of airspace usage across the region, whilst implementing the latest technology. It aims to reduce the Environmental impacts associated with aviation.

London Southend Airport passed the CAA CAP 1616 Stage 1 Gateway in March 2022 and commenced Stage 2 activities. A comprehensive list of options was developed through internal workshops and stakeholder engagement. These options were assessed against the Design Principles developed during Stage 1 of the ACP process.

Workshops were held on the 8th of April 2022, which introduced the List of options to the Stakeholders and our assessment of the Options against the Design Principles they helped develop. Following these workshops stakeholders were invited to take part in an online survey from the 13th of April 2022 to the 16th of May 2022. The survey asked whether the Stakeholders considered the Design Principles were correctly applied and consistent in each option. It also provided an opportunity for stakeholders to comment if they considered this was not the case.

The Feedback from the Stakeholders was incorporated into the Design Principle Evaluation document, which is an Annex to this document and available on the ACP Portal.

London Southend Airport initially had a January 2023 Gateway for Stage 2, following this gateway recommendations were made by the CAA. These needed to be addressed before this ACP can progress to Stage 3 of the CAP 1616 process.

This document reflects all additional work carried out and forms part of the Stage 2 submission. This report details the comprehensive list of options that were developed for the ACP. It also includes a summary of the Design Principle Evaluation.

London Southend Airport would like to thank stakeholders for their time, consideration, and valuable input. London Southend Airport look forward to continuing to work with them to improve our system of flight procedures and our airspace configuration.

Abbreviations

ACOG	Airspace Change Organising Group
ACP	Airspace Change Proposal
AMS	Airspace Modernisation Strategy
AONB	Area of Outstanding Natural Beauty
ATC	Air Traffic Control
ATM	Air Traffic Management
BKY	Barkway
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAT	Commercial Air Transport
CTA	Control Areas
CTR	Control Zones
DFT	Department for Transport
DME	Distance Measuring Equipment
DP	Design Principle
FAS	Future Airspace Strategy
FASI-S	Future Airspace Implementation South
FASI-N	Future Airspace Implementation North
GA	General Aviation
GNSS	Global Navigation Satellite Systems
IAP	Instrument Approach Procedure
ICAO	International Civil Aviation Organisation
LSA	London Southend Airport
LTMA	London Terminal Manoeuvring Area
NAP	Noise Abatement Procedures
NERL	National Air Traffic Services En-Route Limited
NTK	Noise and Track Keeping
PBN	Performance-Based Navigation
RNAV	Area Navigation
SID	Standard Instrument Departures
SME	Subject Matter Expert
STAR	Standard Arrival
UK	United Kingdom

References

[1] Commission Implementing Regulation EU 2018/1048, PBN-IR

[2] Civil Aviation Authority, CAP 1616, 1 March 2021, Version 4

[3] Civil Aviation Authority, CAP 2312B: UK Airspace Change Masterplan Iteration 2, 11 May 2022, Version 2.2

[4] Civil Aviation Authority, Decision Letter on ACP-2017-25, 23 January 2015

[5] ACP-2017-25, Introduction of CTA 10X and CTA 11, 31 March 2017

[6] CPJ-5641-PRE-022, LSA Stakeholder Workshop Stage 2a Presentation, 8 April 2022

[7] CPJ-5641-RPT-020, LSA Design Principle Evaluation, 9 November 2022

[8] Planning Obligation by Agreement, Pursuant to Section 106 of the Town and Country Planning Act 1990 and Section 111 of the Local Government Act 1972 in relation to land at London Southend Airport, Southend on Sea, Essex

Contents

List of Figures

List of Tables

1. Introduction

1.1. Overview

1.1.1. The London Southend Airport (LSA) Future Airspace project has reached Stage 2 -Develop and Assess of the CAP1616 process. This Stage is made up of 2 components: Step 2A – Option development and Step 2B – Options appraisal. This report covers Step 2A and is complemented by the Options Appraisal report which relates to Step 2B.

1.1.2. Step 2A requires the Change Sponsor to develop an initial comprehensive list of options that address the Statement of Need and align with the Design Principles from Stage 1. This report describes how the comprehensive list of Arrivals and Departures options has been derived and tested with stakeholders in the Design Principle evaluation.

1.1.3. This report is a part of a set of documents submitted to the CAA at Gateway 2 of the CAP1616 process. The submitted documents are available on the Airspace Change Portal and comprise of:

- ACP Options Development and Design Principle Evaluation.
- LSA Design Principle Evaluation.
- Options Appraisal Stage 2B.

1.1.4. This report begins by providing an outline of relevant UK airspace governance. This is followed by sections that look at the Airspace Modernisation Strategy (AMS), the CAP1616 Airspace Change Process, the Design Principles adopted and Current Operations at Southend.

1.2. Background

1.2.1. Airspace Modernisation Strategy (AMS) The Civil Aviation Authority (CAA) published its AMS in December 2018. This Strategy was developed in response to the Department for Transport (DFT), tasking the CAA with preparing and maintaining a co-ordinated plan for the use of the United Kingdom (UK) Airspace up to 2040, including the modernisation.

1.2.2. The AMS, which replaced the Future Airspace Strategy (FAS), sets out the ways, the means and ends of modernising airspace through 15 initiatives intended to modernise the Design, Technology and Operations of airspace. Amongst other initiatives, this includes a fundamental redesign of the Terminal route network using precise and flexible satellite navigation.

1.2.3. It describes what the AMS must deliver, drawn from relevant national and international policy and law. Paragraphs 1.2 – 1.4 set out factors that airspace modernisation must deliver, drawn from Section 70 of the Transport Act 2000 and relevant policy as:

- To increase aviation capacity in the Southeast.
- Growth to be sustainable; and
- To make the best use of existing runways.

1.2.4. The UK's Airspace, particularly that of Southern England, was originally designed decades ago; it has evolved over time to manage the increasing volumes of climbing and descending aircraft travelling to and from the various airports all within close proximity. This complex evolution has resulted in an environmentally inefficient and overly complicated design, which places a burden on Air Traffic Controllers (ATC) and limits airspace capacity. Prior to the worldwide pandemic, flights in Southern England were forecast to double over the next 20 years. Whilst COVID-19 has undoubtedly had a significant impact upon the Aviation and Travel industries, if the Airspace is not modernised, the benefits of reduced carbon emissions and noise reduction may not be realised.

1.2.5. The Airspace Change Organising Group (ACOG) was established in 2019, as a fully independent organisation at the request of the DFT and CAA, to coordinate the delivery of key aspects of the AMS.

1.2.6. ACOG's role is to coordinate the delivery of two major national Airspace Change programmes known as Future Airspace Implementation South (FASI-S) and Future Airspace Implementation North (FASI-N). FASI-S is a complete redesign of the existing Airspace structure in Southern England and LSA is one of 18 airports included within this programme.

1.2.7. ACOG in collaboration with NATS En-Route Limited (NERL) and each of the Airports, must deliver a Masterplan that provides detailed information on the Airspace Design options. The Masterplan must consider potential areas of overlap between individual Airspace Change Proposals (ACPs), the compromises and trade-offs that may need to be made to integrate them effectively.

1.2.8. LSA and the other airports must ensure that their modernisation proposals are aligned with neighbouring airports and connect efficiently with the Upper Airspace. The FASI(S) airports are responsible for modernising or upgrading their individual arrival and departure routes up to 7,000ft. NERL are responsible for redesigning the route network above 7,000ft. Therefore, it is possible that despite the new LSA Standard Instrument Departures (SIDs) and the Instrument Approach Procedures (IAPs) not having been implemented yet, alterations may be required to comply with the Overarching Airspace plan for the region. These dependencies will begin to become clearer as we progress through Stage 2 and work within the Cumulative Analysis Framework (CAF), facilitated by ACOG.

1.2.9. For more information, including a brief video, on the importance of modernising UK airspace, see https://www.ourfutureskies.uk/why-modernise/.

1.3. Performance-Based Navigation (PBN)

1.3.1. One of the major aims of the AMS is to optimise future airspace designs by considering modern aircraft performance and functional capabilities. This will improve efficiency, saving time, fuel and reduce emissions.

1.3.2. Key to achieving the AMS aims is the application of PBN. In parallel, the UK Navigation Infrastructure will also be optimised to take advantage of the Lateral Navigation accuracy from Global Navigation Satellite Systems (GNSS). Conventional Ground-Based navigation aids will be retained for resilience.

1.3.3. PBN is being adopted world-wide. The International Civil Aviation Organisation (ICAO) States are expected to modernise airspace through International, Regional and State level initiatives, including regulations. It impacts both the high-level airways and the lower-level arrival and departure routes into and out of airports and IAPs.

1.3.4. European-wide legislation[1] was developed to drive the deployment of PBN in the European region to meet the international vision laid down by ICAO.

1.4. Important context

1.4.1. LSA has already commenced the modernisation of its airspace having submitted a proposal for the introduction of PBN procedures in the form of Area Navigation (RNAV) SIDs and IAPs. In addition, the FASI(S) programme may result in more requirements for the Airport to implement new Arrival Transitions, to enable aircraft to establish on an IAP.

1.4.2. It is possible that, in the development of options for new departure and arrival profiles for the other airports in the region, the Existing Airspace configuration may also require re-configuration. This will be managed as part of the FASI(S) programme as all of the Airports within the cluster progress through the CAP1616 process.

1.5. Civil Aviation Publication 1616 Process

1.5.1. CAA regulations[2] define the ACP process. The ACP is designed to be transparent, comprehensible and proportionate. It is aligned with Government Policy [3] on managing airspace.

1.5.2. The 7-Stage process contains 14 ‘Steps’ and 4 ‘Gateways’. The Change Sponsor must satisfy the CAA at each of these ‘Gateways’ that it has fully followed the prescribed process. Failure to do so results in further work until such time as the CAA is satisfied.

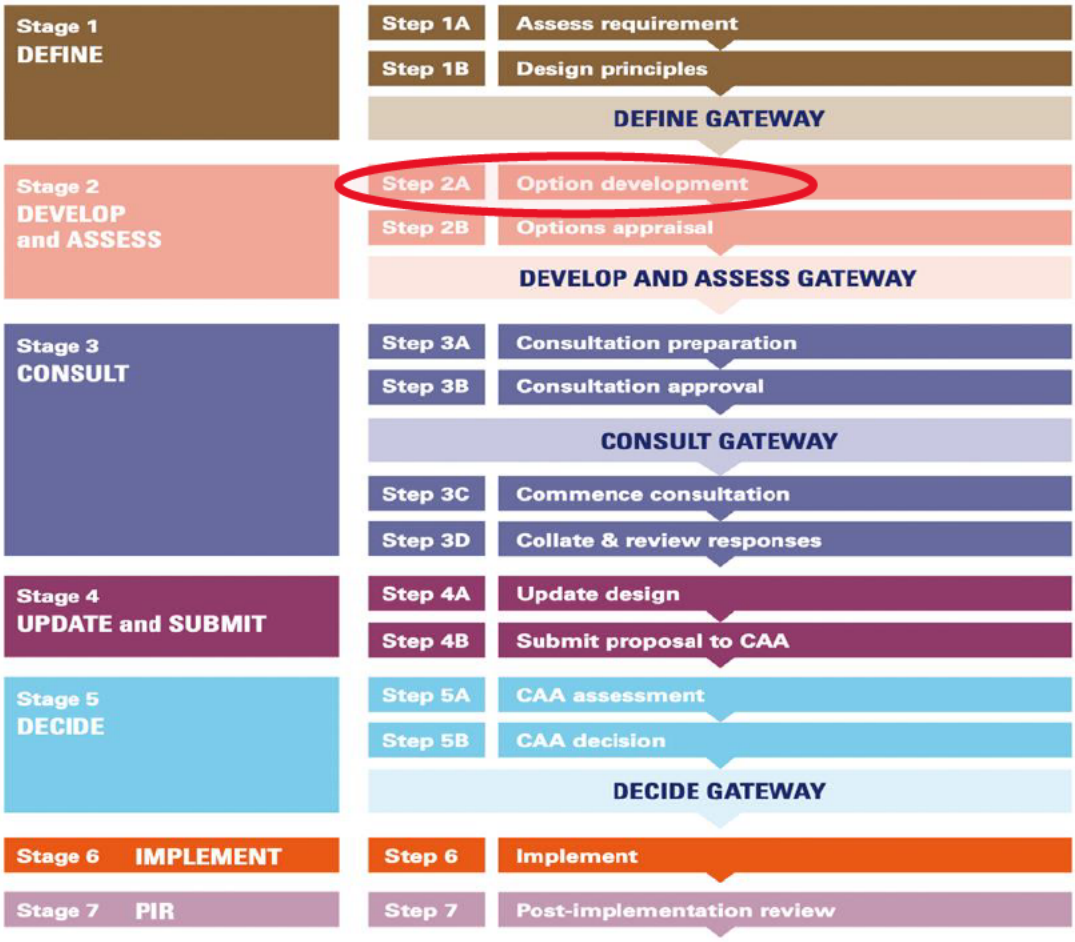

Figure 1: The CAP1616 Process

1.5.3. LSA has completed Stage 1 and has now embarked upon the development of the Options (Step 2a). These Options have been developed through a two-way engagement process with stakeholders.

1.6. Stage 1

1.6.1. LSA began their ACP in September 2021 and subsequently passed through the Stage 1 Gateway of the CAP 1616 process in March 2022. The Stage 1 documentation can be found on the ACP Portal.

1.7. Stage 2

1.7.1. This report forms part of the Stage 2 submission and details the Comprehensive List of Options developed for this ACP. Over the course of the CAP1616 ACP process, these options will be developed and refined through the following means:

- Design Principle Evaluation.
- Safety and Environmental Assessments.
- Appraisals.
- Stakeholder Engagement; and
- Consultation.

1.8. Current Operations at London Southend Airport

1.8.1. Esken (previously known as the Stobart Group) bought LSA in 2008 and set about the first phase of the re-development, utilising a longer runway with upgraded navigation and lighting systems. A new state-of-the-art ATC tower and mainline railway station were opened in 2011, the same year that EasyJet signed a ten-year agreement to use Southend as a new hub, with flights to a range of European destinations. In 2012, the runway extension became operational and a new passenger terminal building was officially opened. LSA was able to handle a new generation of medium capacity, high-efficiency jets for short-haul scheduled flights and holiday charters.

1.8.2. A month later, a proposed extension to the new terminal at LSA was approved by Rochford District Council to help meet the target of serving 2 million passengers by 2020. The extended terminal building was opened in 2014 delivering a larger check-In facility, improved security screening channels and larger departure and arrival areas. These improvements provided space and a better customer experience for passengers.

1.8.3. LSA has won 'Best Airport in London' by the survey company 'Which?' six times in a row. With a catchment of 8.2 million users, 60% of which come from London, it has become the Airport of choice. The onsite train station located 100 paces away from the passenger terminal, provides a 15-minute journey time from plane to train.

1.8.4. However, recent years have been particularly challenging for the aviation sector. This is reflected in LSA's performance for the period March 2020 to February 2021, coinciding with the spread of the COVID-19 virus. Airport passenger numbers reduced from 2.15 million in 2019 to 147,000 for the period March 2020 to February 2021, a reduction of 93%. This was a complete reversal from 2019, when it recorded its busiest year ever, to its lowest throughput post development.

1.8.5. During Covid restrictions, LSA were able to attract training activity that was permitted within Government guidance. As a result, LSA ATCs remained "recent" as required by their CAA licence conditions. LSA remains ready for an increase in commercial flying and in the Business Aviation market.

1.9. Types of Operations

1.9.1. LSA can accommodate a wide range of aircraft from medium sized twin engine jets to small business jets and single/twin engine propeller aircraft for training and private (General Aviation) use.

1.9.2. LSA supports the following types of operation:

- Commercial Air Transport (CAT) operations providing scheduled and charter services.
- Non-Commercial operations, which include:
  - Business Aviation;
  - Military Training and Refuelling;
  - Private and Commercial Pilot Training;
  - Skill testing; and
  - Private recreational flying.

1.9.3. LSA supported a total of 36,327 movements in 2019 (just over 2 million passengers), this number halved in 2020 owing to the Global pandemic to 18,401 and there was a significant downward shift in passenger carriage (only 400,000 passengers). LSA supported a total of 34,114 movements in 2021 and 26,624 movements in 2022.

1.9.4. Movement figures are expected to fluctuate as the Aviation Industry comes to terms with the effect of the COVID pandemic. It is the desire of LSA to return operations to pre-pandemic levels in keeping with the Section 106 conditions detailed in **Section 1.17**. The 25V2026olume of General Aviation (GA) traffic is likely to remain static or in a growth scenario, as can be accommodated.

1.10. Future Traffic Forecasts

1.10.1. These are the future traffic forecasts for the next 10 years (shown as financial years) for London Southend Airport. Please note the 53,000 cap which is the movement limit in the Section 106 agreement detailed in Section 1.17.

Year	2024	2025	2026	2027	2028	2029 - 2040
Total Movements	33,442	35,875	40,898	47,399	53,173	53,300

1.11. Operational Hours

1.11.1. Whilst LSA is operational 24 hours a day, the published operational hours are 0630-2200hrs (local), outside of these hours aircraft operations are only permitted by prior arrangement.

1.12. Runways

1.12.1. LSA has a single runway with two ends known as ‘05’ and ‘23’; these are given their names as their true bearing is rounded to two figures, e.g., Runway 05 has a true bearing of 054.16 degrees.

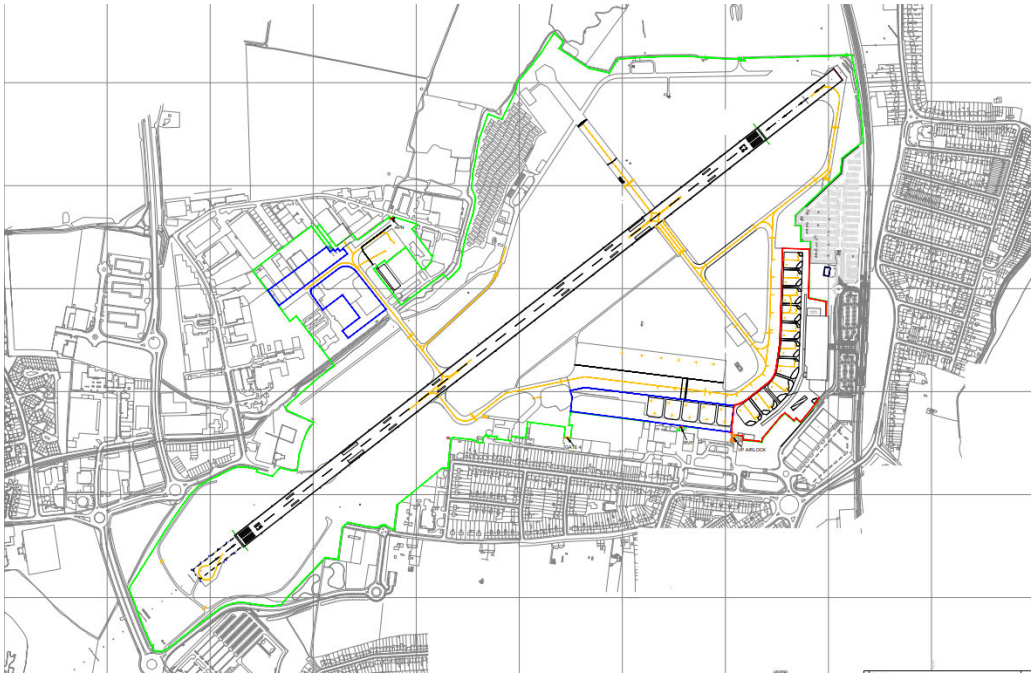

Figure 2: Runway Layout

1.12.2. Aircraft normally land and take off heading into the wind, thus the wind direction at the time of an aircraft approach or departure usually determines which runway is chosen. The prevailing wind direction at LSA is from the Southwest, therefore Runway 23 is in operation roughly 70% of the year. This means, aircraft typically depart initially to the West before turning and typically arrive from the East.

1.12.3. LSA has a 'Preferred Runway Scheme' agreed with the Local Authorities forming part of the Section 106 Agreement[8], detailed in **Section 1.17**. The Airport has committed to use Runway 23 for arrivals and Runway 05 for departures at night (2300-0630hrs) if weather and safety conditions permit. In the daytime, the Airport has committed to do the same (for more than 50% of its operations) if weather, safety conditions and movement volumes allow. The rationale for the employment of this Scheme is that the area to the Northeast of the Airport (Rochford) is less densely populated. **This ACP is not seeking to shift away from this policy.**

1.13. Airspace

1.13.1. LSA is overflown by some of the busiest and most complex airspace in the world. It is affected by flights to and from the major airports of:

- London Stansted.
- London Luton.
- London City.
- London Gatwick; and
- London Heathrow.

1.13.2. As LSA is located near other London airports, its traffic flies beneath their traffic flows. **Figure 3** shows the Departure and Arrival traffic from London City Airport and Stansted Airport (the Airports which interface with LSA to the greatest extent). When the traffic flows

for the other airports are added (not illustrated) the picture becomes extremely busy. Although the diagram indicates 2016 traffic flows, these have not changed significantly.

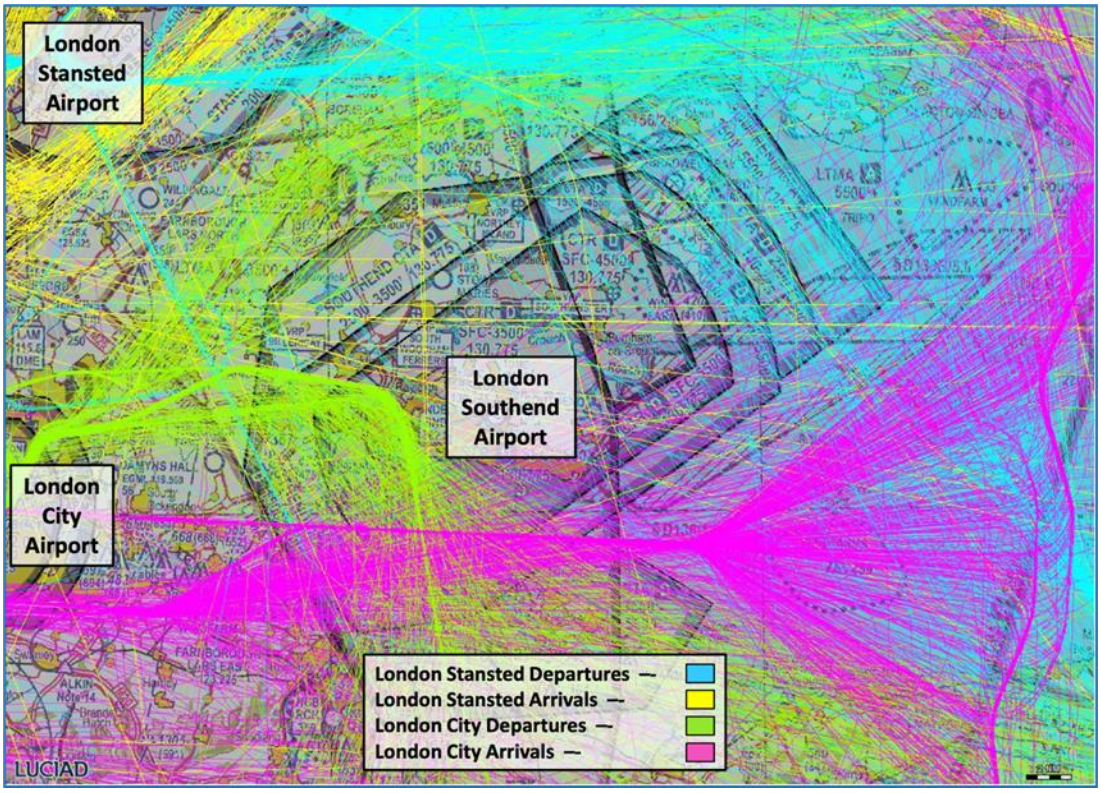

Figure 3: Stansted & London City Arrivals & Departures Over LSA Surrounding Area (One Week August 2016)

1.13.3. The Terminal Airspace surrounding LSA is very complex because of the proximity to London Stansted, London Luton, London City, London Gatwick, and London Heathrow. LSA sits underneath the London Terminal Manoeuvring Area (LTMA) airspace. The LTMA and the respective Control Areas (CTA) and Control Zones (CTRs) are depicted in Figure 3**.** This shows the layers of 'Controlled Airspace' used by ATC units to manage the flights of LSA and other airports. These layers of LTMA airspace dictate the vertical and horizontal extent of LSA's own airspace.

1.13.4. The LSA CTR extends from the surface to 3,500ft above mean sea level (amsl) and in other parts extends to 4,500ft and 5,500ft respectively. The CTR is surrounded by several CTAs that provide continuous Controlled Airspace containment from the Airport into the LTMA above.

1.13.5. Military Danger Areas, densely populated areas and the Kent Downs Area of Outstanding Natural Beauty (AONB) to the South, further restrict the LSA airspace.

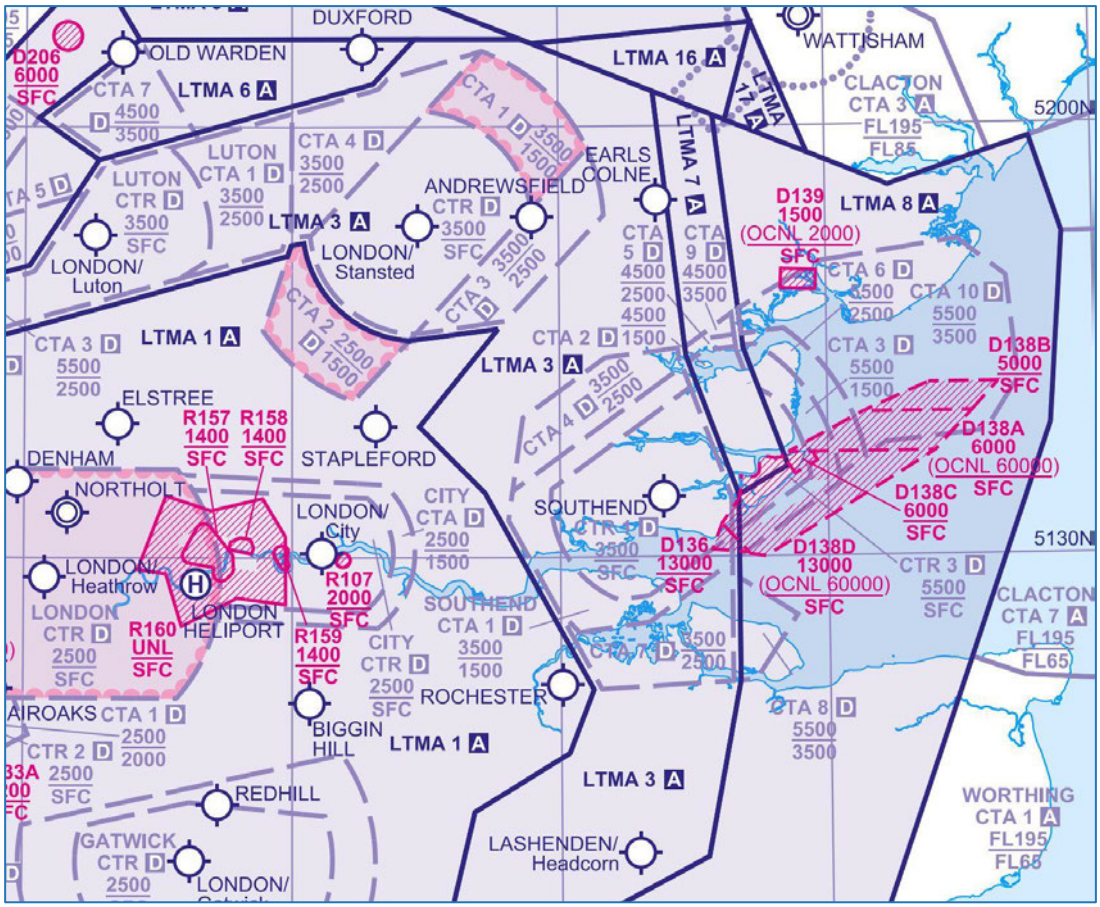

Figure 4: London TMA

Source: UK AIP ENR 6-42

1.14. Current Operational Requirement

1.14.1. The current operation requires departure procedures to the Northwest, the Northeast and the South for each Runway. The Northeast routing is increasing in importance because it meets the needs of our operators wishing to access destinations in Eastern Europe (a growth market for the Airport).

1.14.2. Arrivals are predominantly from the South and East, however, there remains a requirement for arrival procedures from the Northwest.

1.15. Control Area 10X

1.15.1. An ACP[5] was submitted to the CAA on 31 March 2017 requesting the establishment of: Class D Controlled Airspace near LSA to ensure the safety of the increasing CAT operating at the Airport.

1.15.2. The CAA Decision Letter[4], whilst approving most of the requested controlled airspace, did not approve the introduction of two portions (namely CTA-11 to the Southeast and a major portion of CTA-10 to the Northeast). The CAA stated that the then extant traffic levels and Air Traffic Management (ATM) complexity, did not justify the introduction of these volumes of controlled airspace. The Decision Letter[4] made provision for the future introduction of the CTA-10 and CTA-11 controlled airspace segments, if increasing traffic levels and airspace complexity is justified.

1.15.3. LSA has now met these requirements and the implementation of the additional airspace for CTA10 (Known as CTA10X) was approved by the CAA and implemented in September 2022 AIRAC. (CTA11 has not been progressed as part of the ACP.)

1.15.4. The CTA10X volume of airspace is in the baseline and will be included in the development of options for this ACP.

1.15.5. **Figure 5** shows additional volume of CTA10X and **Figure 6** shows the new associated airspace map.

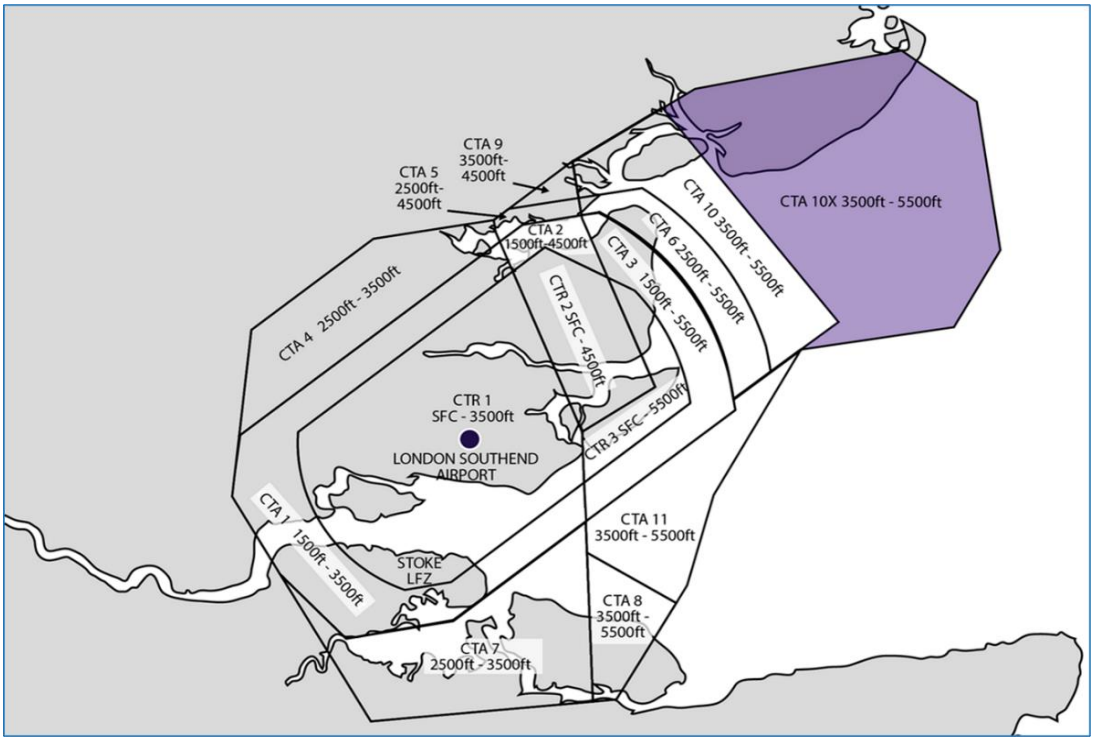

Figure 5: CTA 10X

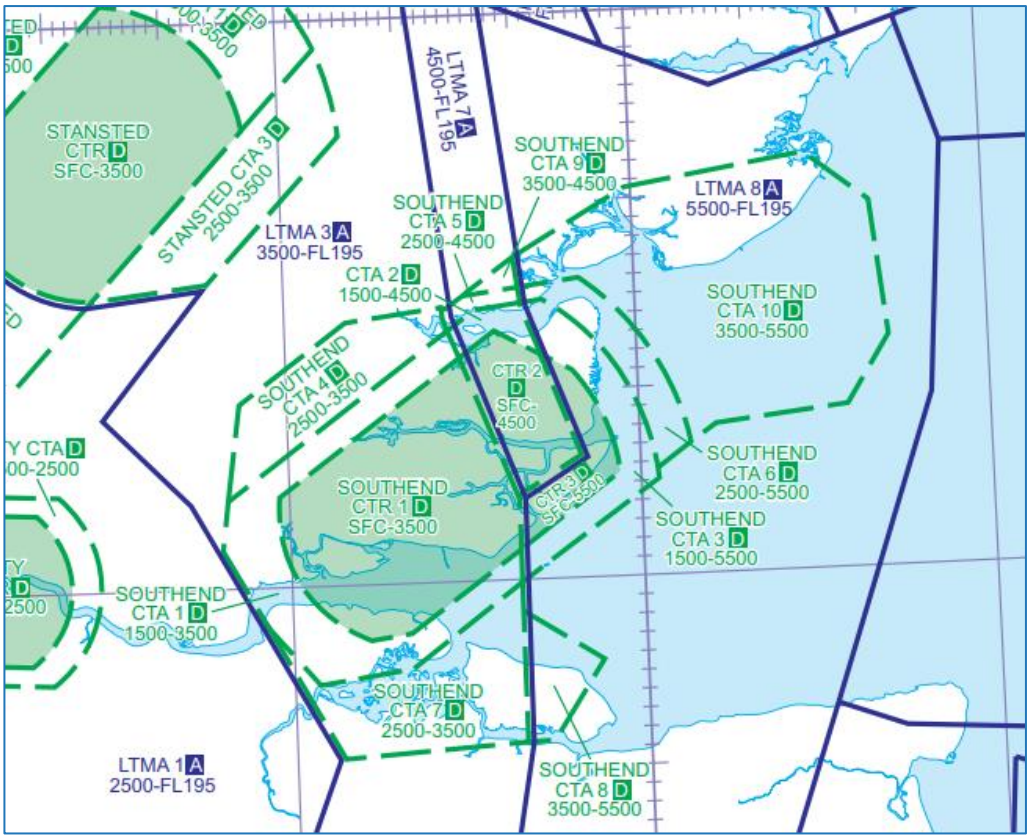

Figure 6: LSA Airspace Map

1.16. Known Constraints

1.16.1. Shoeburyness Range (D136/D138) is typically active 0800-1600hrs Monday to Friday. The nature of the activity in this Danger Area precludes LSA from being able to take aircraft through it during these hours. This is not considered to be a constraint that can be challenged. However, outside of the published hours of activity, the Airspace becomes available and may afford more advantageous routings for aircraft.[1]

1.16.2. Departures from LSA are currently required to transit through 'gates' as part of a Letter of Agreement with Thames Radar operated by NERL. These 'gates' (EKNIV to the South and EVNAS to the North) are positioned such that they are known channels through which departing aircraft will pass at an altitude of 3,000ft. LSA departing traffic is often forced into a stepped climb i.e., they are often held for a period at 3,000ft. It is unknown whether this constraint can be amended. Not all the Departure options developed will meet this existing requirement, however the constraint will be investigated later in the CAP1616 process.

1.16.3. Arrivals to Runway 23 at LSA must be spaced in a 10 Nautical Mile (NM) trail to allow the preceding aircraft to backtrack on the runway. There is not a taxiway alternative to conducting a 180 degree turn on the runway and backtracking. Arrivals to Runway 05 are not constrained in the same way and require only a 5NM spacing to be applied.

[1] See Annex B for meeting minutes with Qinetiq/DAATM about Danger Area availability.

1.17. Noise Abatement Procedures & Section 106 Agreement

1.17.1. As mentioned in **1.12.3**, LSA operates a Preferred Runway Usage Scheme as follows:

'Subject to over-riding Pilot and ATC safety/performance and separation requirements, whenever the tailwind component is 5 KT or less, the preferred runway for departures is Runway 05, and for arrivals is Runway 23.'

1.17.2. Furthermore, on departure, aircraft of more than 5.7 tonnes Maximum Certified Weight are required to adhere to the following:

- When departing Runway 05 shall climb straight ahead until a range of 1 DME (I-SO or I-ND) and an altitude of 1500 FT is reached before turning.
- When departing Runway 23 shall climb straight ahead until a range of 2.5 DME (I-SO or I-ND) and an altitude of 1500 FT is reached before turning; and
- Aircraft of more than 5.7 tonnes weight intending to operate at below 1500 FT altitude shall conform to the DME distances above before commencing any turn on track.

1.17.3. **LSA is not seeking an amendment to these requirements and accordingly any options developed will continue to adhere to these requirements.**

2. Methodology

2.1. Swathes

2.1.1. The options for this ACP have been designed as swathes. A swathe is an area where we can design route options. It is a wide area of airspace that extends from the runway to 7000ft and is based upon a 6% climb gradient. The swathes are a minimum of 5 nautical miles wide at 7000ft.

2.1.2. The Swathe development process involved internal workshops with Subject Matter Experts SMEs) from LSA and Cyrrus, these took place during January 2022. Having considered the Current Operational requirement, the team conceived unconstrained options which started by using a 'blank sheet of paper' approach. Whilst it was accepted that this may result in unrealistic options, it was considered important to think as broadly as possible via this technique to identify as wide a range of options as possible. These options were then tested with operational controllers at LSA in February 2022, to assess their feasibility and were developed further to create the long list of options we took forward for the Stakeholder engagement.

2.1.3. The long list of options described hereafter will be refined to a short list through a process of:

- Design Principle Evaluation
- Stakeholder Engagement; and
- Options Appraisal (Step 2b).

2.1.4. The Options developed are purely swathes at this stage (i.e. areas within which a final departure or arrival nominal track might ultimately be designed). It is intended that the fine tuning from swathes to definitive options (actual tracks) will take place during Stage 3 of the process ahead of the Formal consultation.

2.1.5. Some swathes have been created to facilitate potential respite routes.

2.1.6. In order to ensure that as wide a range of options as possible were developed, stakeholders were invited to provide further options for consideration in the Options Development workshops described in **Section 3**. No additional options were suggested or identified by the stakeholders.

2.2. Baseline

2.2.1. In December 2022, LSA submitted their Stage 2 documentation to the CAA for the FASI(S) ACP. Feedback from the CAA indicated a requirement to redefine the Baselines for this ACP. An internal operational workshop was held on the 19th of July 2023 to address this issue.

2.2.2. Based on the findings of the workshop the baselines have been redrafted. These redefined baselines are being used for the Design Principle Evaluation and Initial Options Appraisal for this ACP.

2.2.3. The Baseline is reflective of today's operation and encompasses the Airspace and Procedures as they would remain if there were to be no change. For the purpose of this ACP, the 'Baseline' is defined as our 'do-minimum' option. It is recognised that should the Baseline be retained as it is today, there would still be work required to develop new procedures to satisfy the AMS and as such it is not considered to be an option to 'do-nothing'. With that in mind, at this stage of the ACP Process, the approach we have taken using high level swathes means that the Baselines relate to the Geographical tracks flown over the ground and not the Current procedures that support them. Our baseline and 'do-minimum' scenario is a reference point for current track placement and that alone.

2.2.4. The Baseline was originally considered to be the existing track data, which in some cases formed all or part of a swathe. The revised baselines now form their own individual option in each suite of options. This has meant that the benefits and impacts of the Options can now be more concisely assessed against the redefined baseline.

2.2.5. The New baselines have been defined using NTK data, current procedures, and discussion with Operational Air Traffic controllers during the Workshop held in July.

2.2.6. Each individual baseline is described in full later in this document within each design option section.

3. Stakeholder Engagement

3.1. Workshops

3.1.1. The Stakeholders were drawn from the existing Stakeholder list (see **Annex C**) which had been developed during Stage 1. All stakeholders were invited to attend a workshop and were then assigned to one of the two separate Stakeholder Workshops (as described below) which were held on the 8th of April 2022, with stakeholders invited to attend either in person or online. The purpose of this engagement was to introduce stakeholders to the Airspace Design options, the approach to assessing options against the Design Principles they had helped us to shape and seek feedback in terms of other options that had not yet been considered.

3.1.2. Prior to the Workshops, the Stakeholders were split into two groups: Technical Stakeholders (airports, GA, etc.) and Non-Technical Stakeholders (community groups, local councils, environmental bodies etc.). Each group received the same presentation with the same information, one group in the morning and the other in the afternoon. This was done so we could focus the discussions on the topics each group was most interested in: Learning from our Stage 1 engagement which revealed that: Noise, Tranquillity and Overflight were more emotive issues to the Non-Technical Stakeholders, whereas the Technical group had more interest in airspace issues, like complexity and airspace dimensions.

3.1.3. The technical workshop was attended by;

- NATS
- Biggin Hill Airport
- London Gatwick Airport
- London Heathrow Airport
- London Stansted Airport
- British Hang Gliding and Paragliding Association
- Earls Colne Airfield
- Manston Airport
- Private Pilot

The non-technical workshop was attended by;

- RSPB
- Natural England
- Essex County Council
- Essex County /Rochford District Council
- Southend Borough Council
- AONB – Kent Downs

3.1.4. The Presentation outlined the Options development process. It included the Comprehensive List of options and our initial assessment of these options against the Design Principles established in Stage 1. The Presentation can be found on the ACP Portal titled: 'LSA Stakeholder Workshop Stage 2a Presentation'[6] and has been updated to include a more comprehensive introduction.

3.2. Feedback

3.2.1. After the workshops, an email was forwarded to all the Stakeholders on the 19th of April 2022 asking them to provide feedback on the Design Principle Evaluation(DPE) and add additional comments through an online survey. The deadline for responses was Friday 6th May 2022. After several requests from stakeholders, on the 26th of April 2022 LSA sent an email extending the deadline for responses to the 16th of May 2022.

3.2.2. We received 13 responses from stakeholders who included:

- Heathrow Airport.
- Biggin Hill Airport.
- London Stansted Airport.
- Tillingham Airstrip Users.
- Manston Airport.
- NATS (NERL.)
- MoD.
- Natural England.
- Private Pilots.
- Local Councils.

3.2.3. Responses received from the Stakeholders were assessed and incorporated into the Design Principle Evaluation document[7] available on the ACP Portal. The feedback provided is included in its entirety and addressed in that document.

3.2.4. While full details of the process are available via the document on the ACP Portal, in summary the assessment consisted of the evaluation of any stakeholder comments by Design Principle with each comment being assessed and validated for accuracy and relevance. The feedback was then incorporated into the DPE and the RAG score (Red, Amber, Green assessment as detailed in Annex A) changed accordingly.

3.2.5. During the Engagement period we received some further feedback from stakeholders, outside of the Survey which was not in relation to the Design Principles and will be addressed in full at Stage 3, this feedback is contained within **Annex D.** Additionally, some of the feedback given as part of the Survey was outside of the parameters of this engagement and was not considered for assessment. This feedback will be fully addressed at Stage 3 and has been detailed as such in the Full assessment in the Design Principle Evaluation document[7]. This feedback has been collated and for completeness is provided in **Annex D.**

3.3. Stage 2 Rework Additional Swathes

3.3.1. In December 2022 LSA submitted their Stage 2 documentation to the CAA for the FASI(S) ACP. Feedback from the CAA indicated that two sets of options were not as comprehensive as they could have been. These areas have been re-visited to improve upon our suite of options.

3.3.2. After an internal operational workshop on the 19th of July 2023, it was decided that, for completeness, we would introduce two additional swathes in these areas to ensure we had captured all possible options. These additional options are:

- Departures - D23-NE-E.
- Arrivals - A05-SE-H.

3.3.3. Both the additional swathes show potential routes through the Shoeburyness Danger Areas (DAs) – D136/D138, and are shown in Sections 3.7 (D23-NE-E) and 4.2 (A05-SE-H).

3.3.4. A presentation, showing the additional swathes, was sent out to stakeholders on the 5th of September 2023 with a link to an online feedback form and an invite to an online feedback session on the 26th of September 2023. Reminder emails were sent to all stakeholders on the 25th of September 2023, the 2nd of October 2023 and the 5th of October 2023. The Engagement ran for a period of 31 days ending on the 6th of October 2023. The Presentation can be found on the ACP Portal titled 'LSA Stakeholder Stage 2 Additional Swathes Presentation' [2].

3.3.5. Fifteen responses were received via the Online feedback form with a further two responses by email (see respondents listed below). This feedback is contained in its entirety in the full Design Principle Evaluation document, under the respective option assessment, and can be found on the ACP Portal titled: 'LSA Design Principle Evaluation'.

3.3.6. In total we received 17 responses from stakeholders who included:

- Heathrow Airport.
- Biggin Hill Airport.
- London Stansted Airport.
- Rochester Airport.
- St Lawrence Airstrip.
- Barling Airfield.
- Seawing Flying Club.
- General Aviation Alliance.
- NATS (NERL).
- MoD.
- British Gliding Association.
- RSPB.
- Private Pilots.
- Local Councils.
- ACC Member.

3.3.7. The feedback session on 26th September 2023 was attended by 4 stakeholders and the minutes from this meeting can be found in **Annex A**. However, it is important to note that queries had been captured from stakeholders prior to the feedback session to enable an informed discussion to take place during the meeting. These questions are also available in **Annex A**.

[2] It should be noted that we had already considered the potential of using the area contained within the additional swathes for the other departure and arrival directions not included in this supplementary presentation. As a result, the airspace and land beneath these additional swathes has already been assessed through previously considered options.

3.3.8. Following the engagement request, LSA had a meeting with Qinetiq (the operator of the Shoeburyness Danger Areas) on the 18th of October 2023 to discuss the two proposed additional options and capture any supplementary feedback. There were no additional comments made during the meeting and they confirmed they had already responded to the engagement via DAATM. The minutes of the meeting are included in **Annex B.**

3.3.9. While London City Airport didn't respond directly to our invitation to take part in either the initial engagement or the subsequent rework engagement, we have engaged with them at various bilateral sessions throughout the ACP process. These have included ACOG led LTMA workshops and NATS led simulation[3]. Interdependencies with current London City Airport procedures were also highlighted by NATS feedback on both rounds of engagement.

3.4. ACOG as a Stakeholder

3.4.1. ACOGs role was introduced in Section 1. They are also an important stakeholder in this ACP. LSA has engaged with them throughout this ACP process through monthly meetings and other regular communications. These include but are not limited to;

Meetings	Date
LTMA Technical coordination group meeting.	26.01.23
	23.03.23
	04.05.23
	25.05.23
	27.07.23
	28.09.23
ACOG FASI Programme Board.	12.01.22
	16.03.22
	11.05.22
	13.07.22
	14.09.22
	16.11.22
	11.01.23
	15.03.23
	10.05.23
	19.07.23
	13.09.23
LTMA Workshop.	28.10.21
Operational Safety Assurance Delivery Plan Session.	19.01.23
CAF Brief.	12.08.22

[3] 26th October 2022 at Swanwick

Meetings	Date
BPK workshop part 2.	04.10.22
CAF 2 Strawman and technical fact finding.	07.12.22
BIG SND AMS process review update.	13.03.23
ACOG BPK3 Workshop.	16.11.22
LTMA Workshop LAM Pre Brief.	22.12.22
LTMA Workshop- LAM.	03.01.23
	04.01.23
LTMA Workshop CLN Pre Brief.	06.01.23
LTMA Workshop LAM (please note change of RSW Sector).	10.01.23
	11.01.23
LTMA Workshop – LAM.	17.01.23
	18.01.23
LTMA Workshop - BPK & LAM Combo Review.	31.01.23
	01.02.23
Review of CAF1A Route Separation Workshops.	09.02.23
LTMA Next Steps.	15.06.23
LTMA Programme Update.	13.07.23
LTMA Programme Co-ordination Meeting.	09.08.23
LTMA Next Steps.	16.08.23
Taking the Network to the Next Level.	27.04.23
MC/NERL Catch Up.	05.09.23

4. Departure Procedures

4.1. Overview

4.1.1. The Options conceived for each runway and departure direction are depicted in this Section of the report in four figures:

I. Google Earth Mapping with existing NTK data,
II. Google Earth Mapping,
III. En-Route Chart; and
IV. Google Maps Mapping.

4.1.2. The relative pros and cons of each option are not considered at this stage (these will be looked at during Stage 3); the Options are simply presented and explained. The extent to which each option does or does not meet the Design Principles is covered in the Design Principle Evaluation document[7] on the ACP Portal.

4.1.3. It is possible more than one option for each departure direction may be progressed, through to implementation. Such a scenario would facilitate dispersion of impacts and the potential for relief and respite.

4.2. Runway 05 – Northeast

Baseline

Departures to the Northeast off Runway 05 typically route straight ahead with a slight deviation to the left of track, as is evidenced by the green NTK data **in Figure 7** (taken over a three-month period in 2019- pre pandemic). Our baseline is defined as option D05-NE-BASELINE. This has been established from the NTK data, current procedures, and operational expertise.

Options

Two swathes options were considered, an option to the right of the baseline (D05-NE-B) and an option with a left turn towards the Northeast (D05-NE-A).

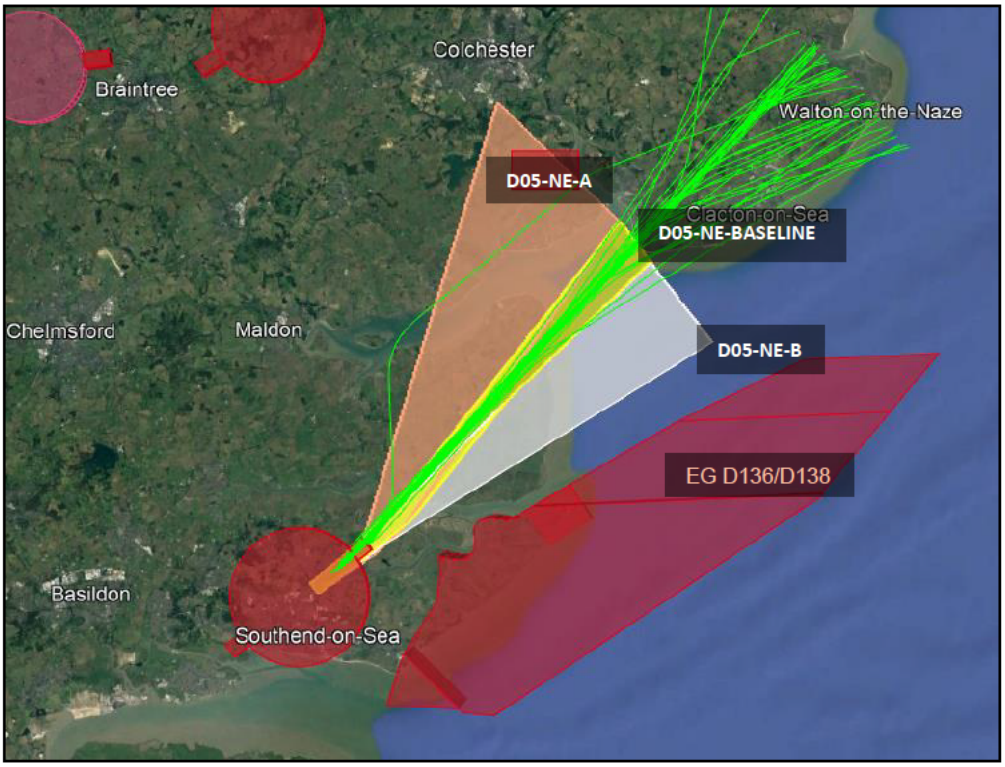

Figure 7: RW05 Northeast Departures with NTK on Google Earth

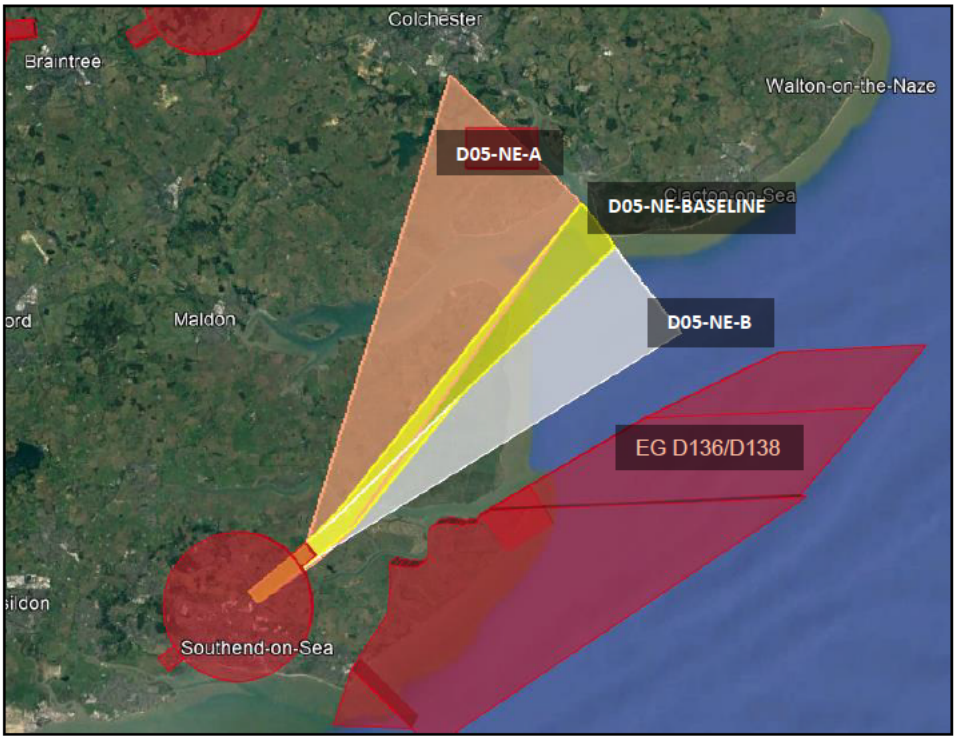

Figure 8: RW05 Northeast Departures on Google Earth

Figure 9: RW05 Northeast Departures with En-route (ENR) Chart

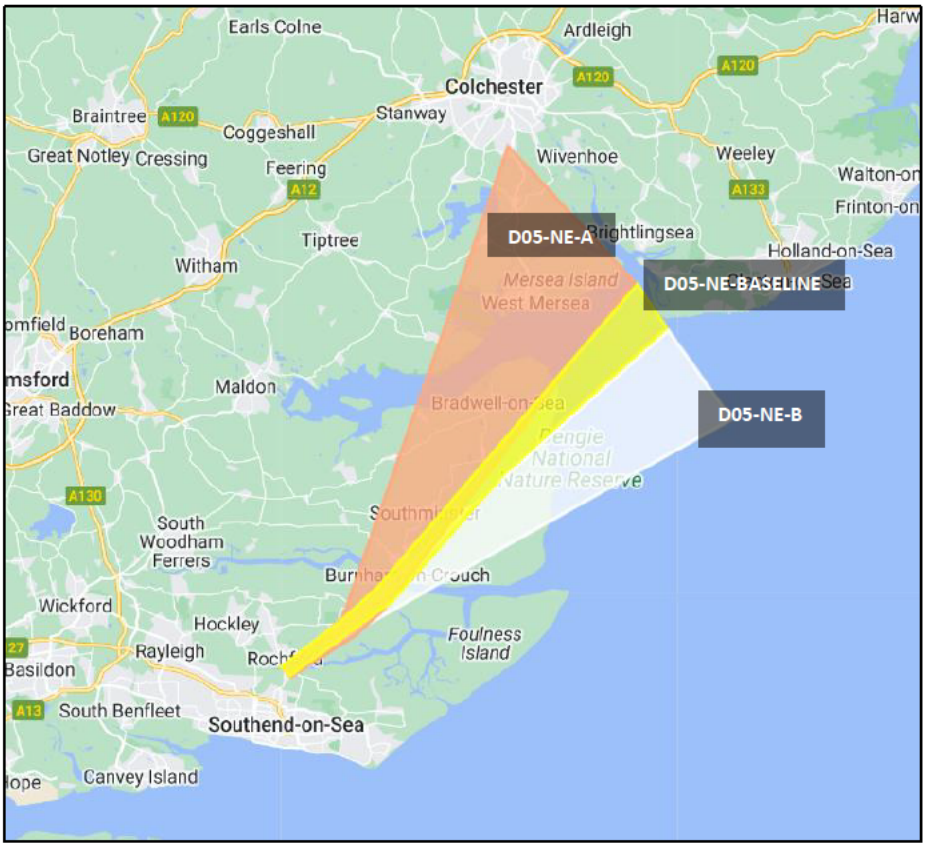

Figure 10: RW05 Northeast Departures on Google Maps

4.3. Runway 05 – Northwest

Baseline

Departures to the Northwest off Runway 05, turn after adherence to the Noise Abatement Procedures (NAPs) directly to the Northwest. However, as can be seen by the track data in **Figure 11** (taken over a three-month period in 2019- pre pandemic), these tracks disperse quite broadly once North-abeam the Airport. Our baseline is defined as option D05-NW-BASELINE. This has been established from the NTK data, current procedures, and operational expertise.[4]

Options

One additional option was considered and looked at a shallower turn than the current baseline, resulting in a swathe that is displaced to the North (D05-NW-B).

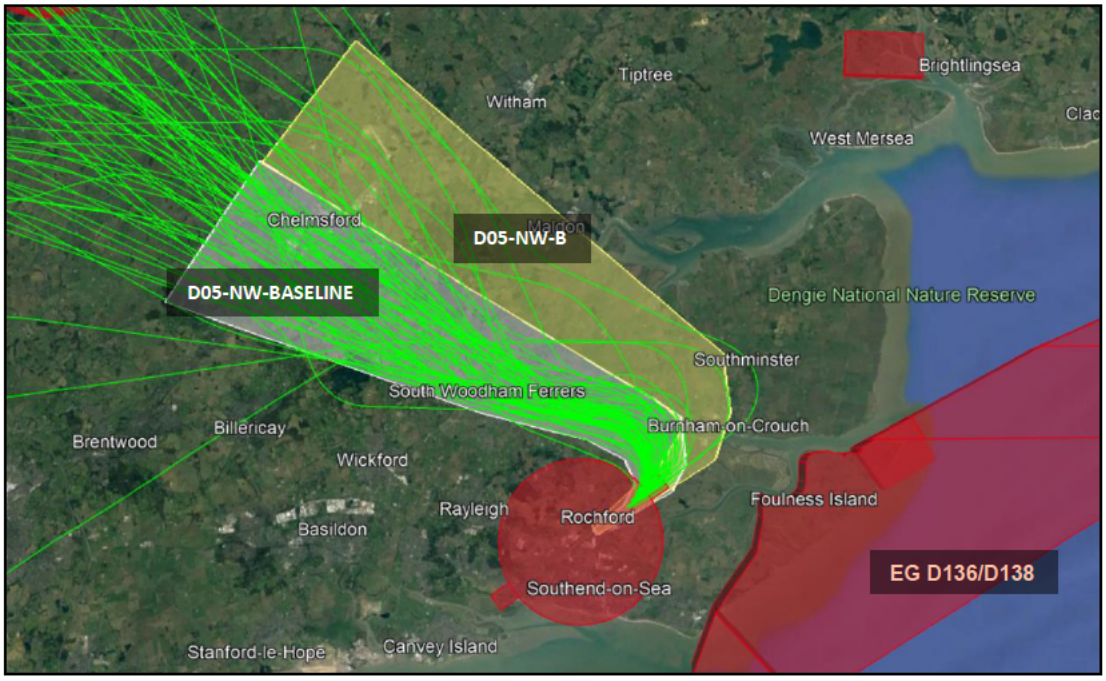

Figure 11: RW05 Northwest Departures with NTK on Google Earth

[4] Originally this option was defined as D05-NW-A and has now been renamed to more clearly define our baseline option.[4]

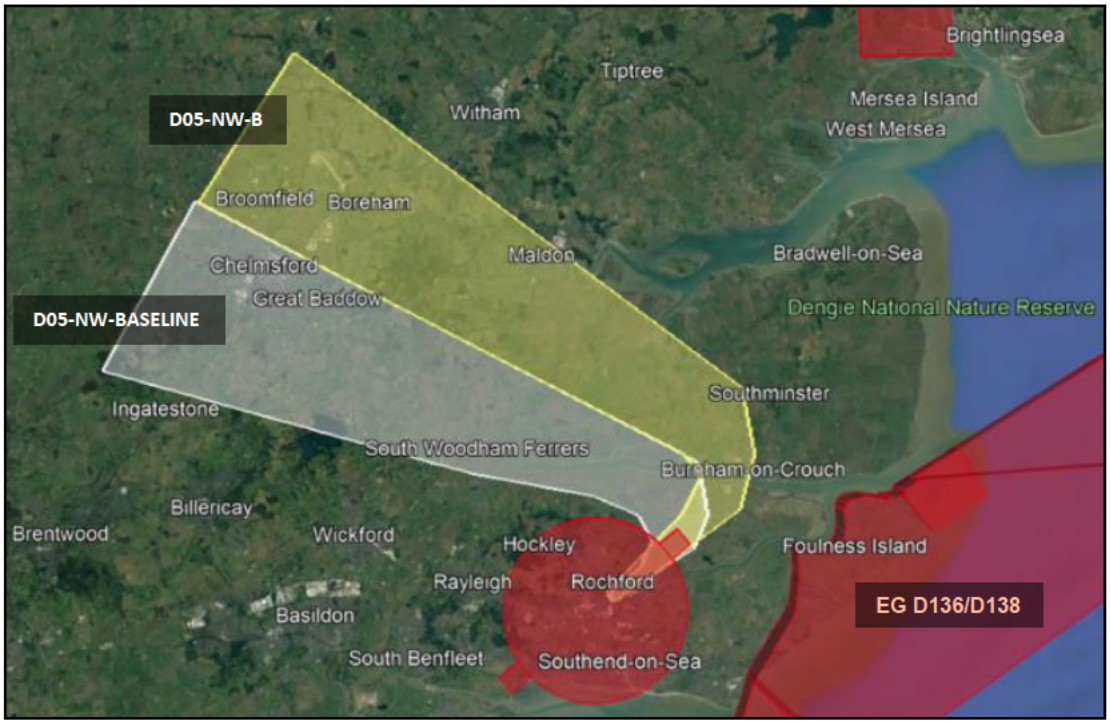

Figure 12: RW05 Northwest Departures on Google Earth

Figure 13: RW05 Northwest Departures with ENR Chart

Figure 14: RW05 Northwest Departures on Google Maps

4.4. Runway 05 – South/Southeast

Baseline

The Departures to the South off Runway 05 turn once they have adhered to the NAPs and route directly to the South as shown in **Figure 15** by the green track data (taken over a three-month period in 2019- pre pandemic). Our baseline is defined as option D05-S-BASELINE. This has been established from the NTK data, current procedures, and operational expertise.[5]

Options

Option A (D05-S-A) has been amended to remove the new baseline from its parameters and replicates the current departure tracks with a continued turn to the right and doesn't include our baseline option. The alternatives considered include a wraparound to the North (D05-S-B) and a shallower right-turn (D05-S-C) through Shoeburyness Range (only available when the Range is inactive).

[5] Originally the baseline was contained within option D05-S-A.

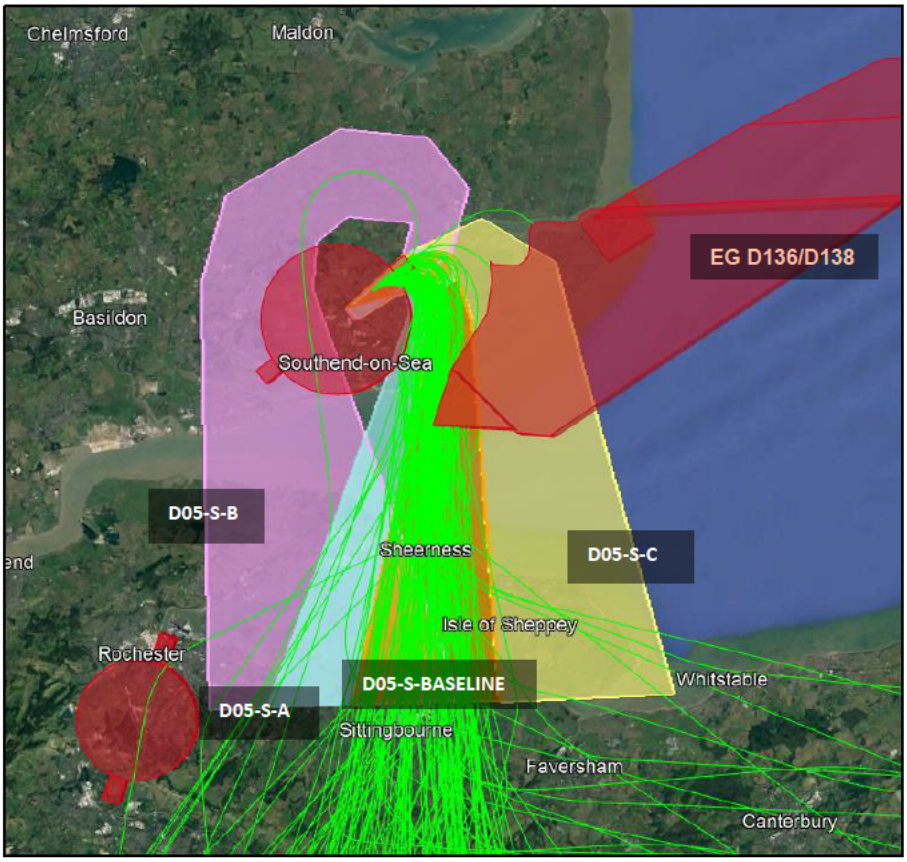

Figure 15: RW05 South Departures with NTK on Google Earth

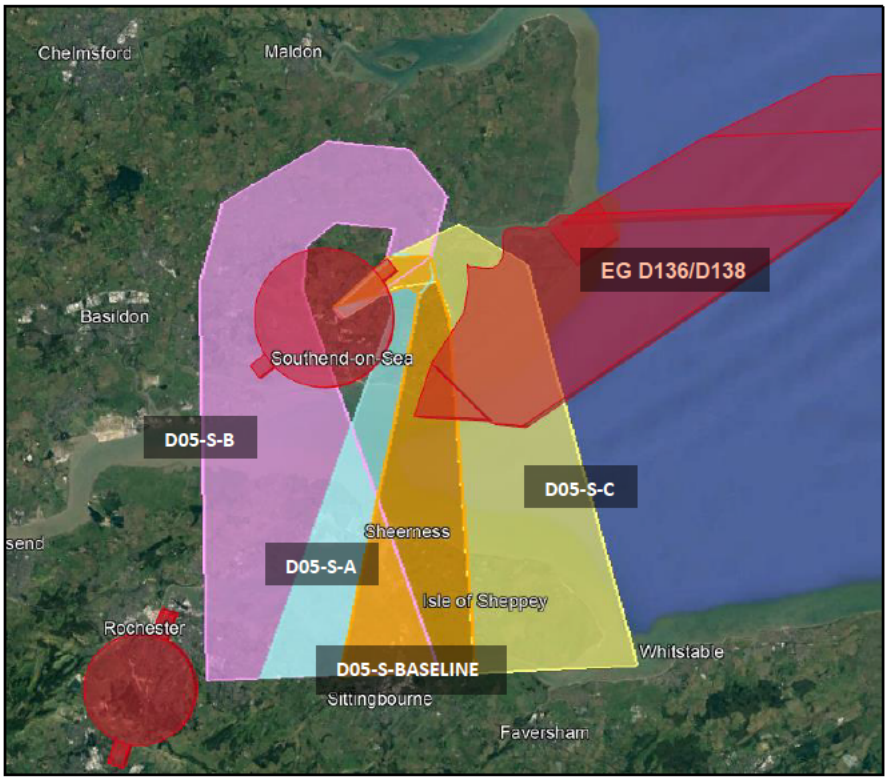

Figure 16: RW05 South Departures on Google Earth

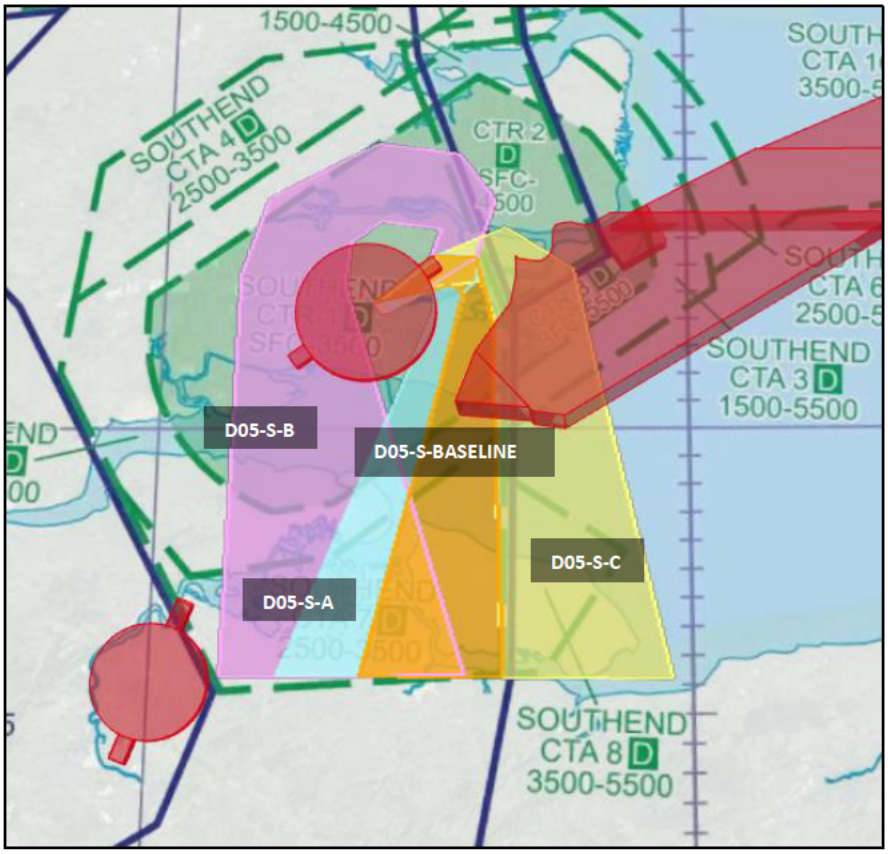

Figure 17: RW05 South Departures with ENR Chart

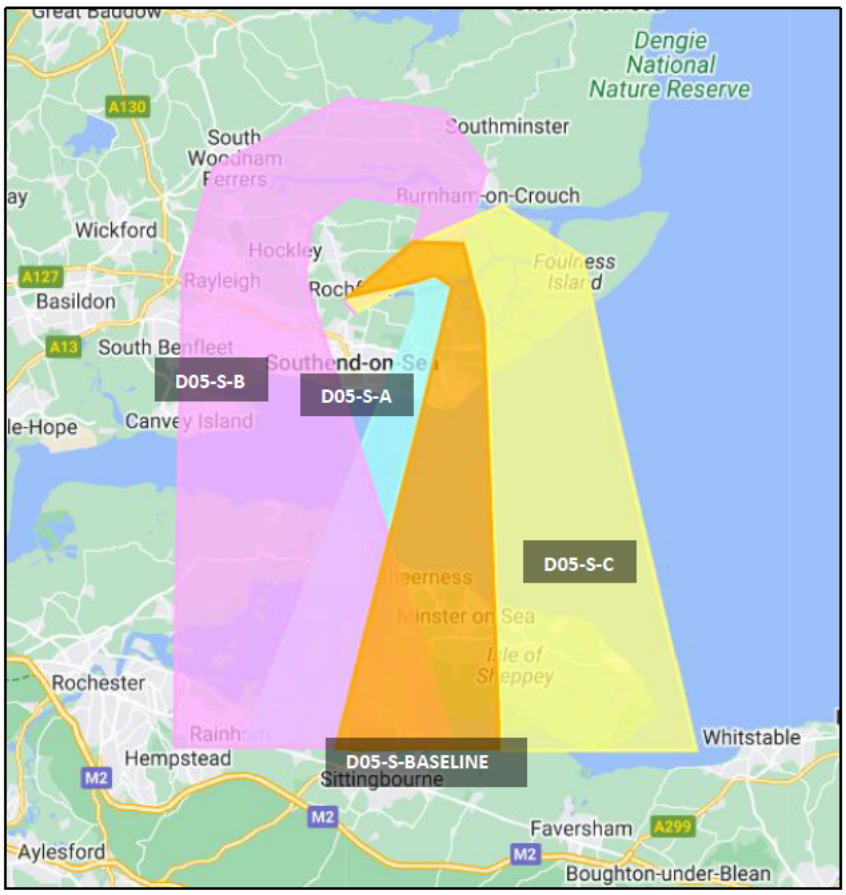

Figure 18: RW05 South Departures on Google Maps

4.5. Runway 05 - All Options

Figure 19 and **Figure 20** depicts all the options considered for departures off Runway 05.

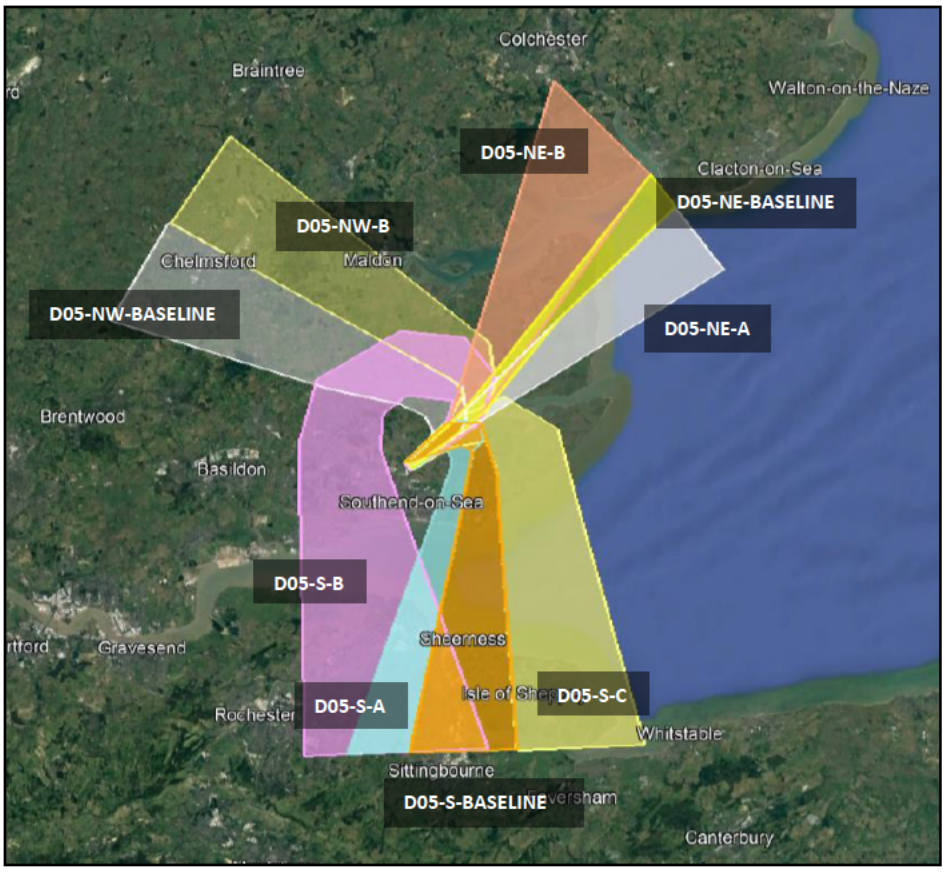

Figure 19: RW05 Departure Options

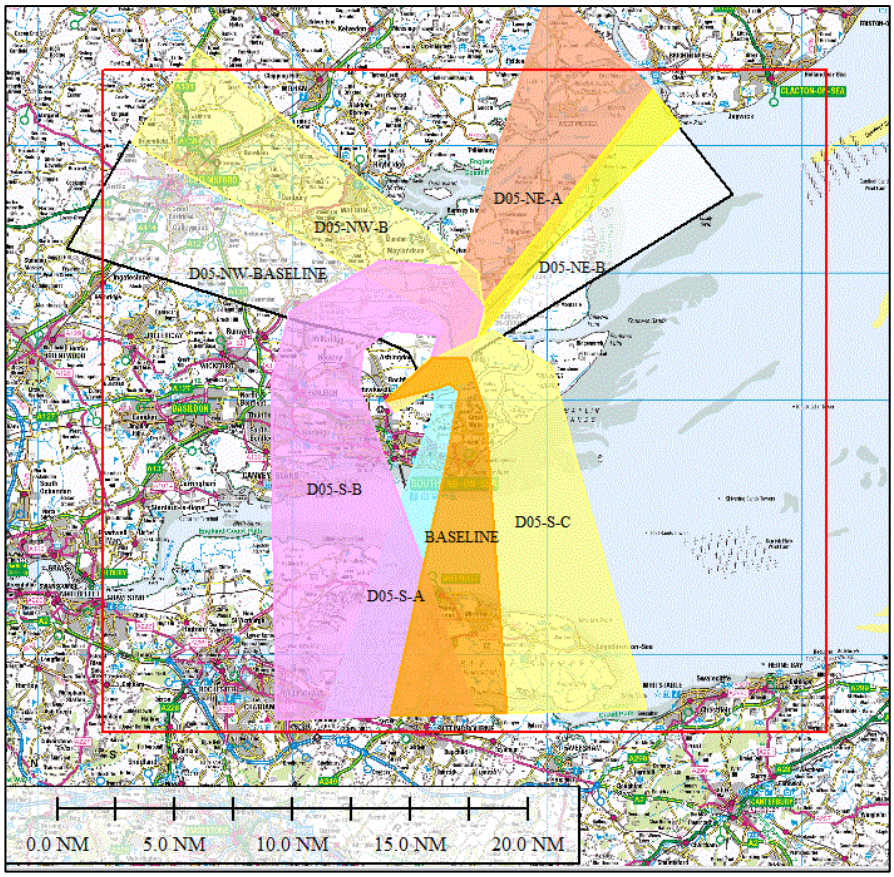

Figure 20: RW05 Departure Options on OS Map

4.6. Runway 23 – Northeast

Baseline

Departures bound for the Northeast off Runway 23 turn to comply with the NAPs and remain in a tight and direct Northeasterly swathe, depicted by the green lines in **Figure 21** (taken over a three-month period in 2019- pre pandemic). Our baseline is defined as option D23-NE-BASELINE. This has been established from the NTK data, current procedures, and operational expertise.[6]

Options

Option A (D23-NE-A) originally replicated the departure tracks and included the baseline, this has now been amended to remove the new baseline from its parameters and covers a smaller area to the NW of the current departure tracks. A shallower right turn to the Northeast was considered (D23-NE-B) with a Northeasterly track displaced to the North. A left-turn out proceeding a track North of the Range (D23-NE-C) and one with an outbound track South of the Range (D23-NE-D) make up the other options for this departure procedure. A new option has been created following feedback from the CAA, this option is

[6] Originally the baseline was contained within option D23-NE-A.

D23-NE-E, more details of this additional swathe and the associated engagement can be found in section 2.3.

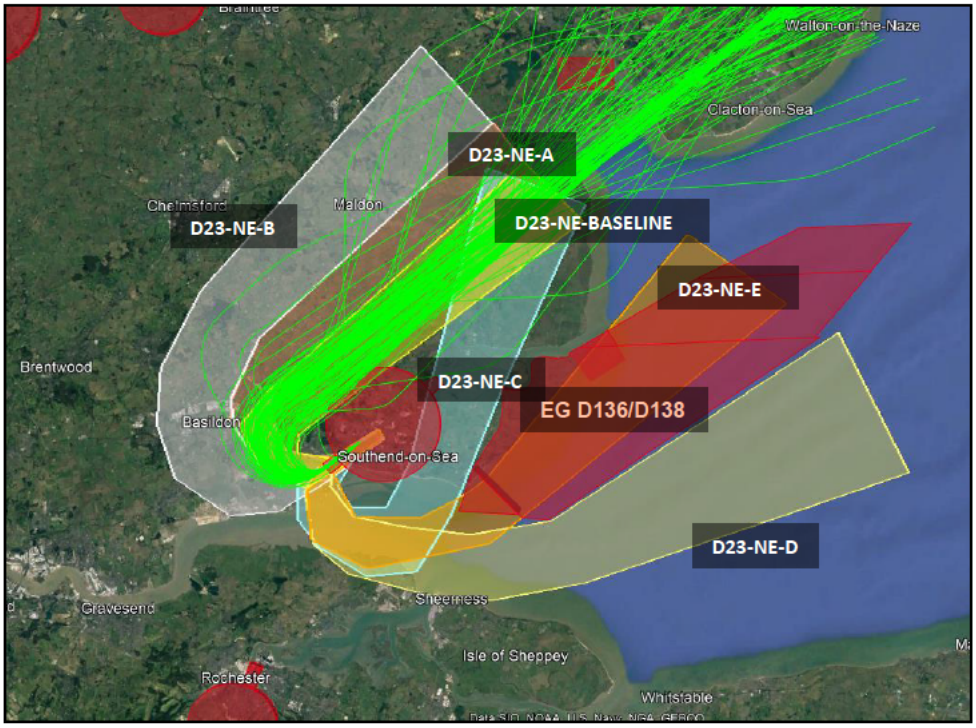

Figure 21: RW23 Northeast Departures with NTK on Google Earth

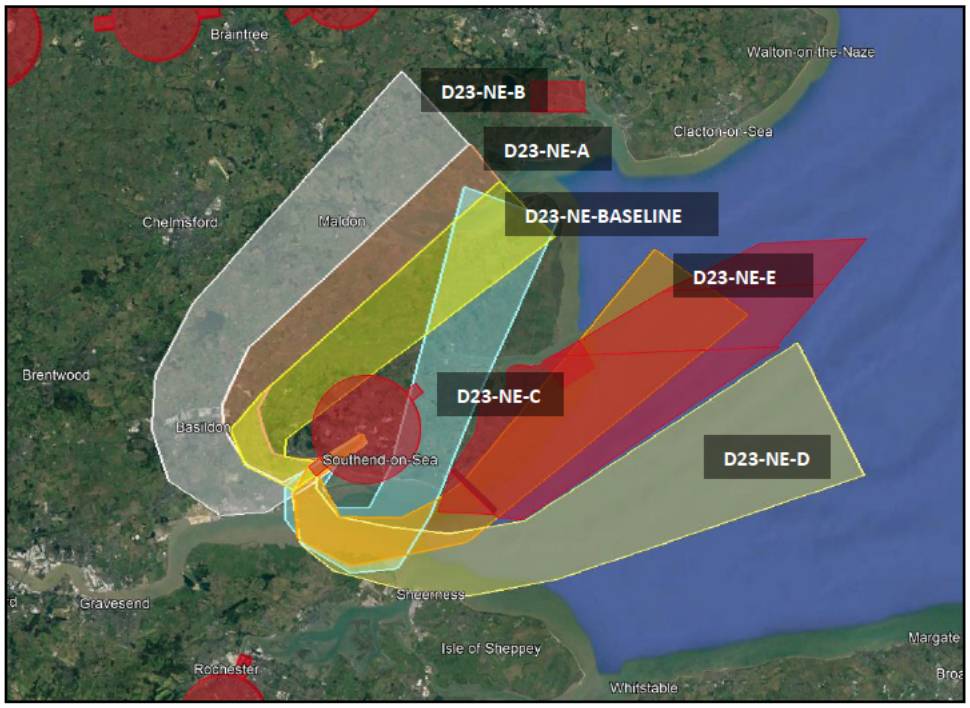

Figure 22: RW23 Northeast Departures on Google Earth

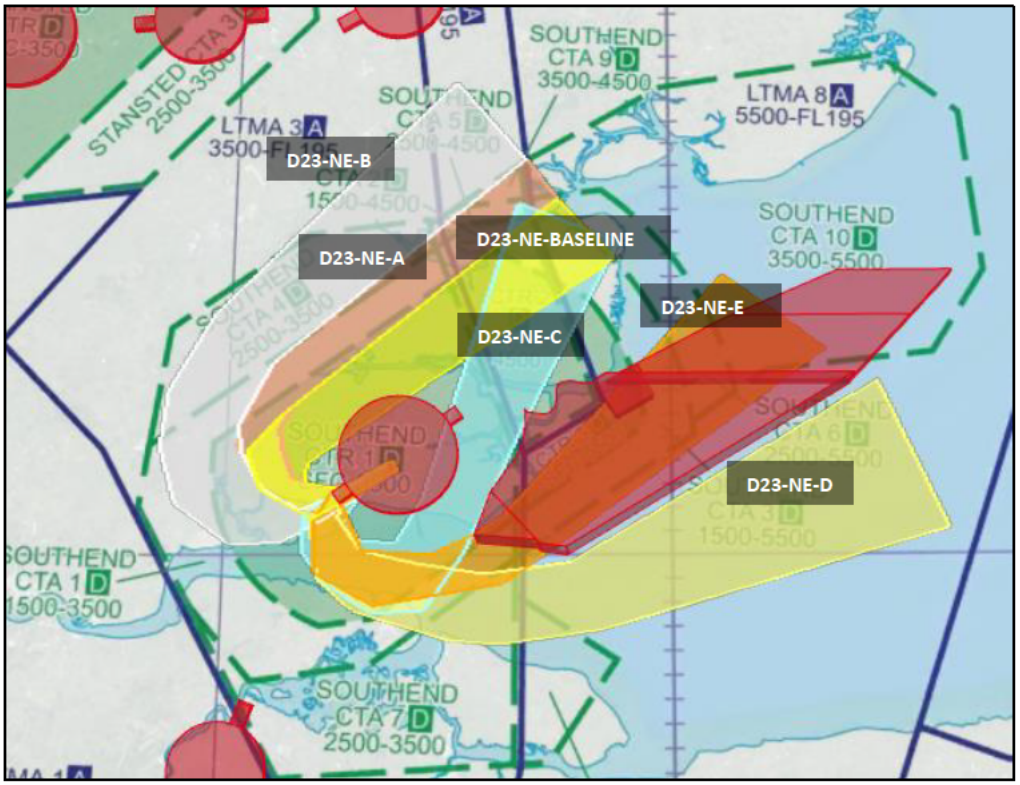

Figure 23: RW23 Northeast Departures with ENR Chart

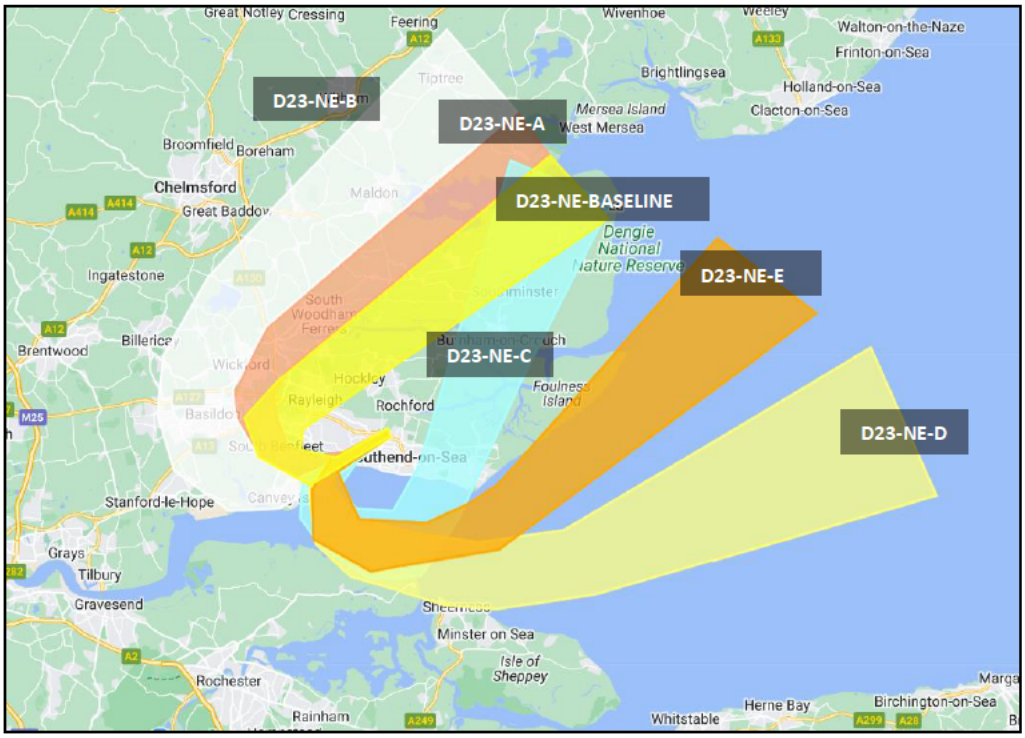

Figure 24: RW23 Northeast Departures on Google Maps

4.7. Runway 23 – Northwest

Baseline

Departures to the Northwest off Runway 23 turn to comply with the NAPs and do not fan out broadly until aircraft are 15-20NMs Northwest of LSA depicted by the green lines in **Figure 25** (taken over a three-month period in 2019- pre pandemic). Our baseline is defined as option D23-NW-BASELINE. This has been established from the NTK data, current procedures, and operational expertise. [7]

Options

An earlier turn (i.e., routing East of the existing tracks) provided Option A (D23-NW-A) and a later right-turn with a track displacement to the West became Option B (D23-NW-B).

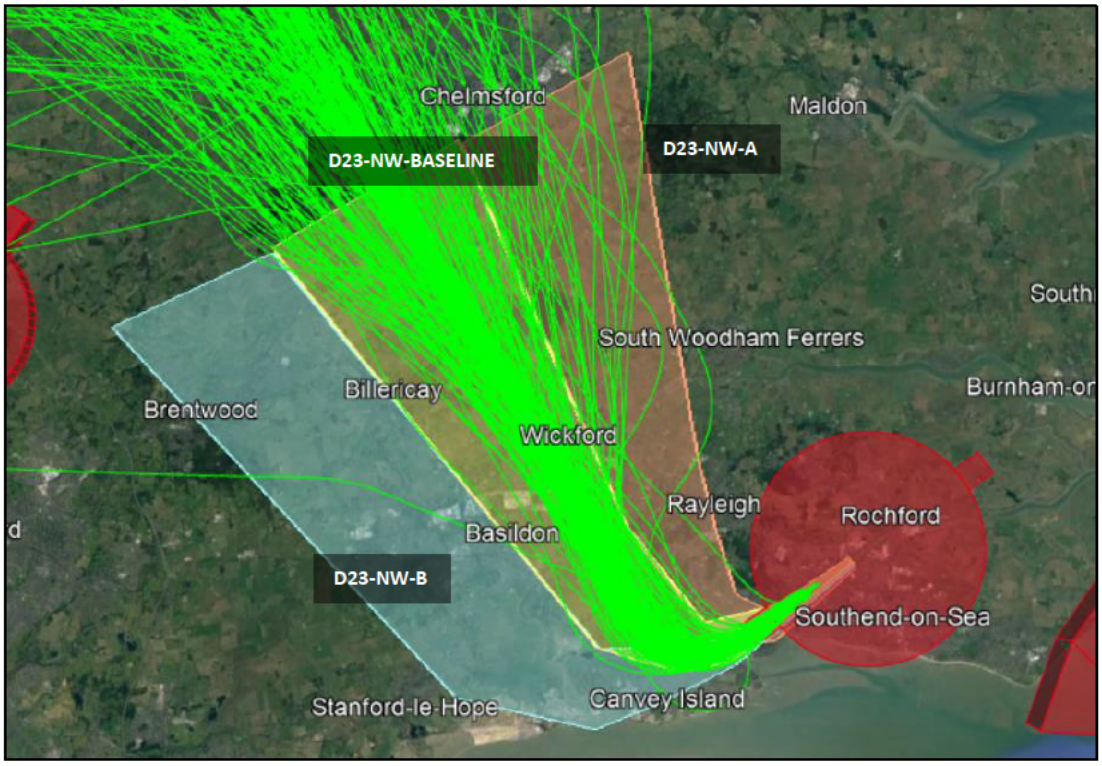

Figure 25: RW23 Northwest Departures with NTK on Goole Earth

[7] Originally this option was defined as D23-NW-C and has now been renamed to more clearly define our baseline option.

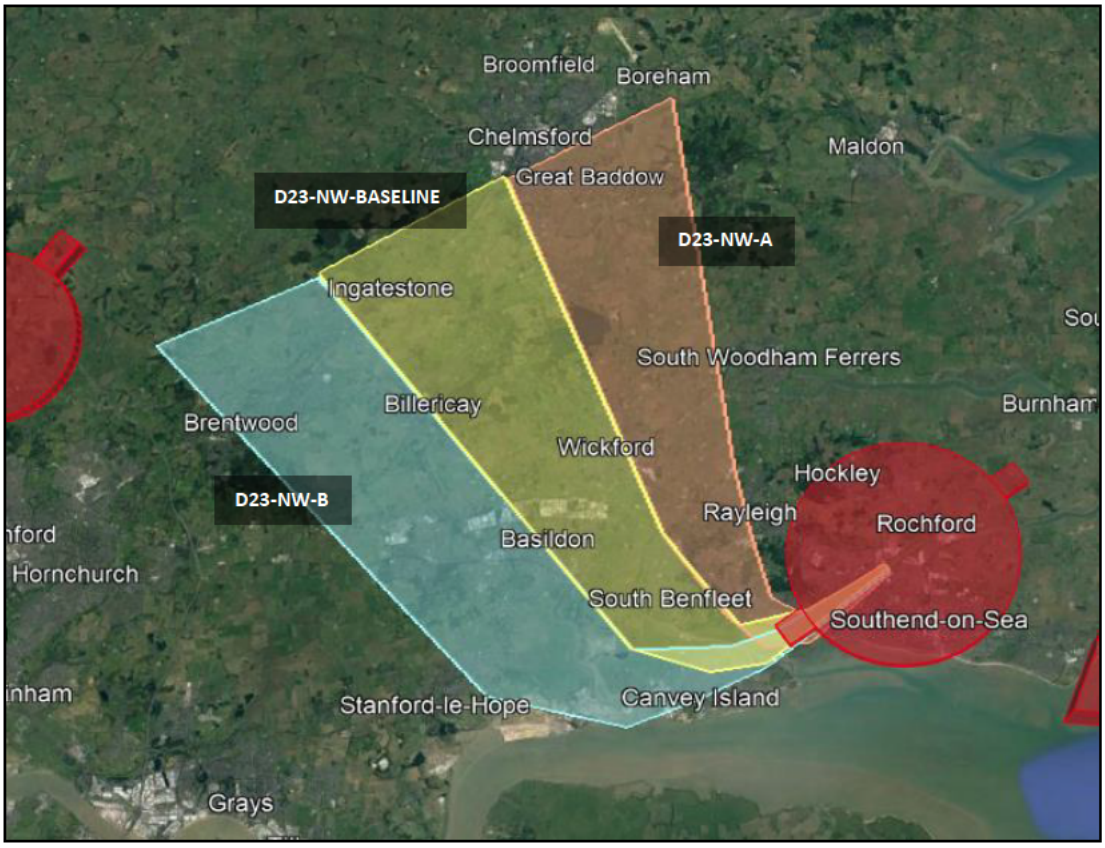

Figure 26: RW23 Northwest Departures on Goole Earth

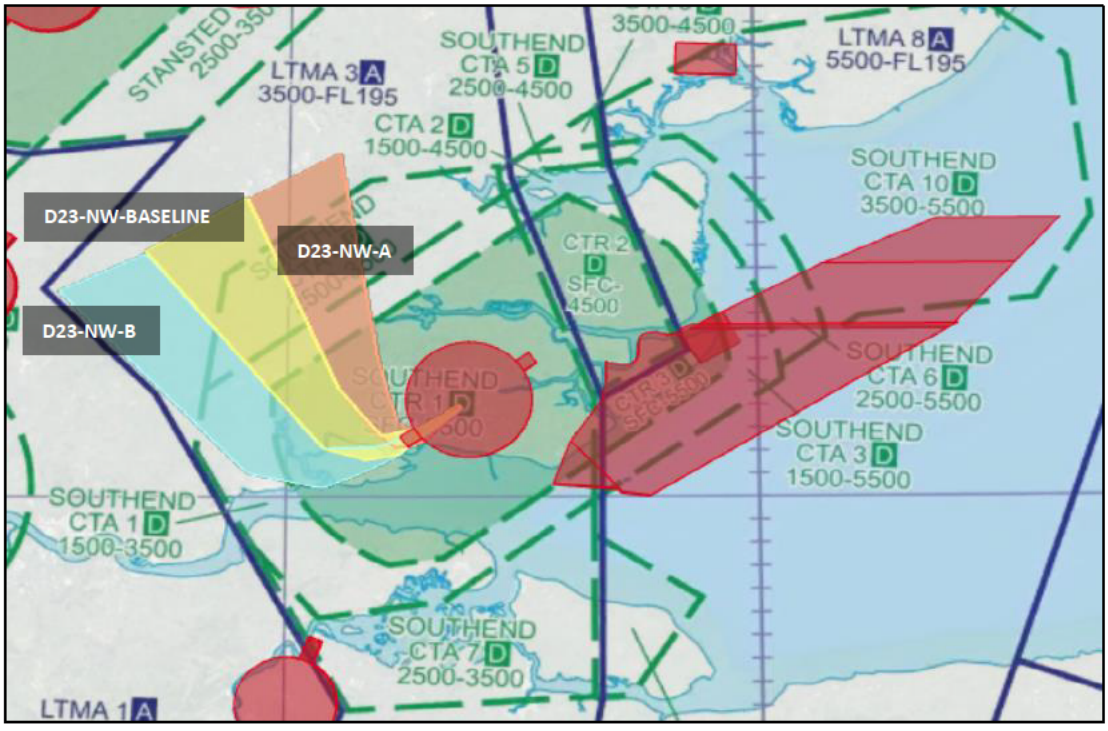

Figure 27: RW23 Northwest Departures with ENR Chart

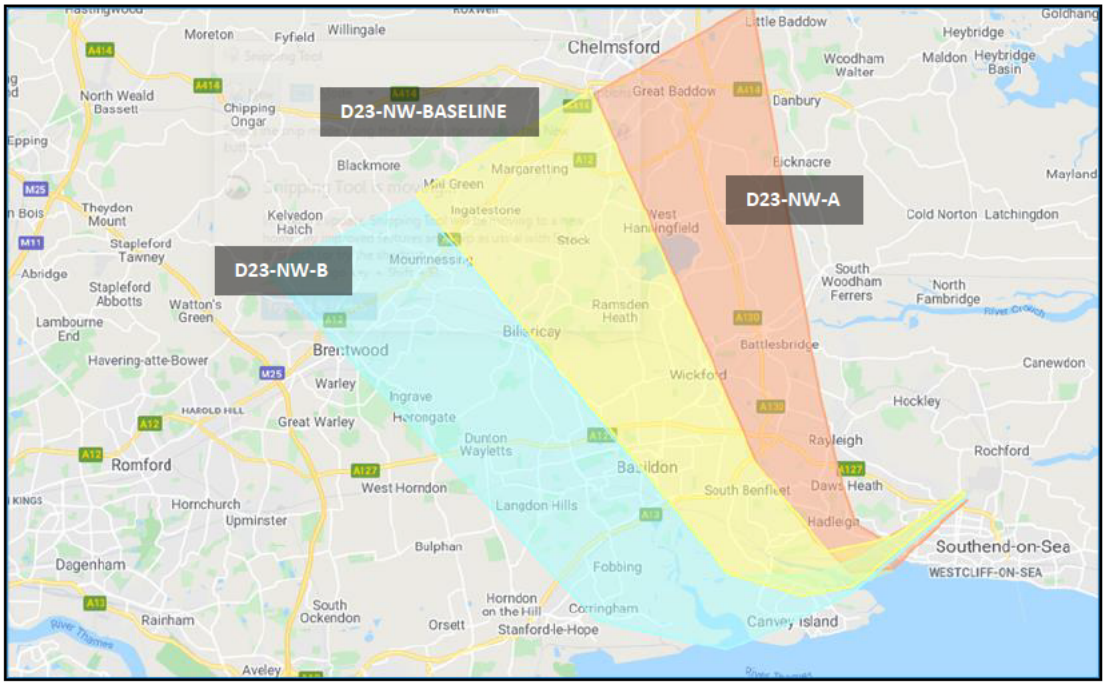

Figure 28: RW23 Northwest Departures on Google Maps

4.8. Runway 23 – South/Southeast

Baseline

Departures to the South off Runway 23 turn South upon adherence to the NAPs and start to fan out approximately 10-15nms from take-off. Options have been assessed against these nominal tracks, depicted by the green lines in **Figure 29** (taken over a three-month period in 2019- pre pandemic). Our baseline is defined as option D23-S-BASELINE. This has been established from the NTK data, current procedures, and operational expertise.[8]

Options

Options A and B (D23-S-A and D23-S-B) are a variance on the existing operation with Option A (D23-S-A) displacing the main outbound track to the East. Option B (D23-NE-A) originally replicated the departure tracks and included the baseline, this has now been amended to remove the new baseline from its parameters and covers a smaller area to the SW of the current departure tracks. Option C (D23-S-C) has a later turn to the South displacing the tracks to the West of where they go today.

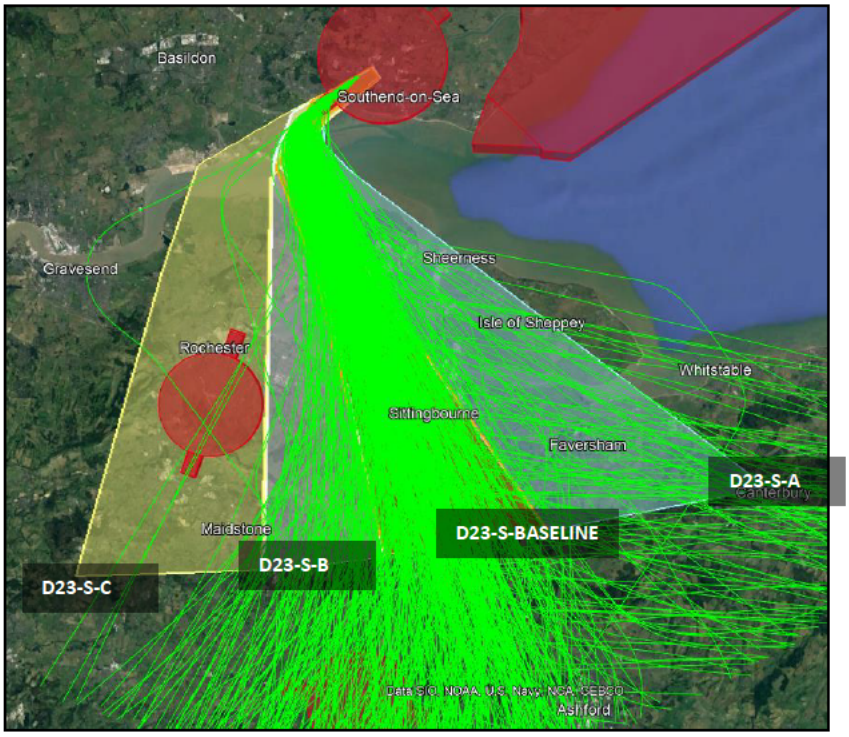

Figure 29: RW23 South Departures with NTK on Google Earth

[8] Originally the baseline was contained within option D23-S-B.

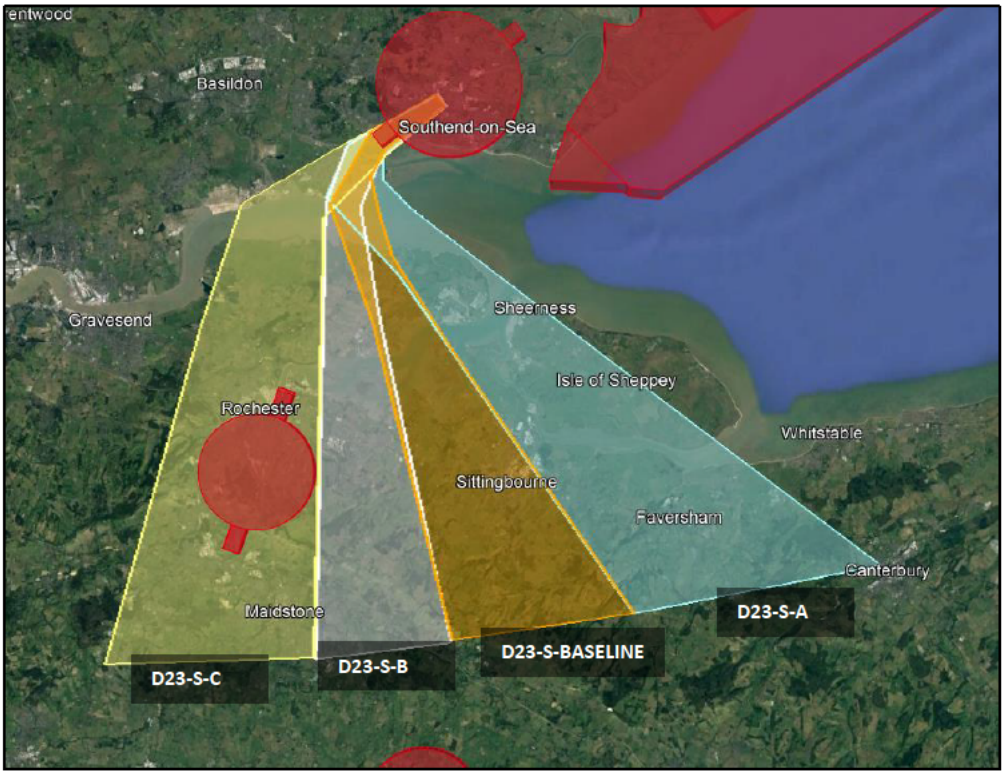

Figure 30: RW23 South Departures on Google Earth

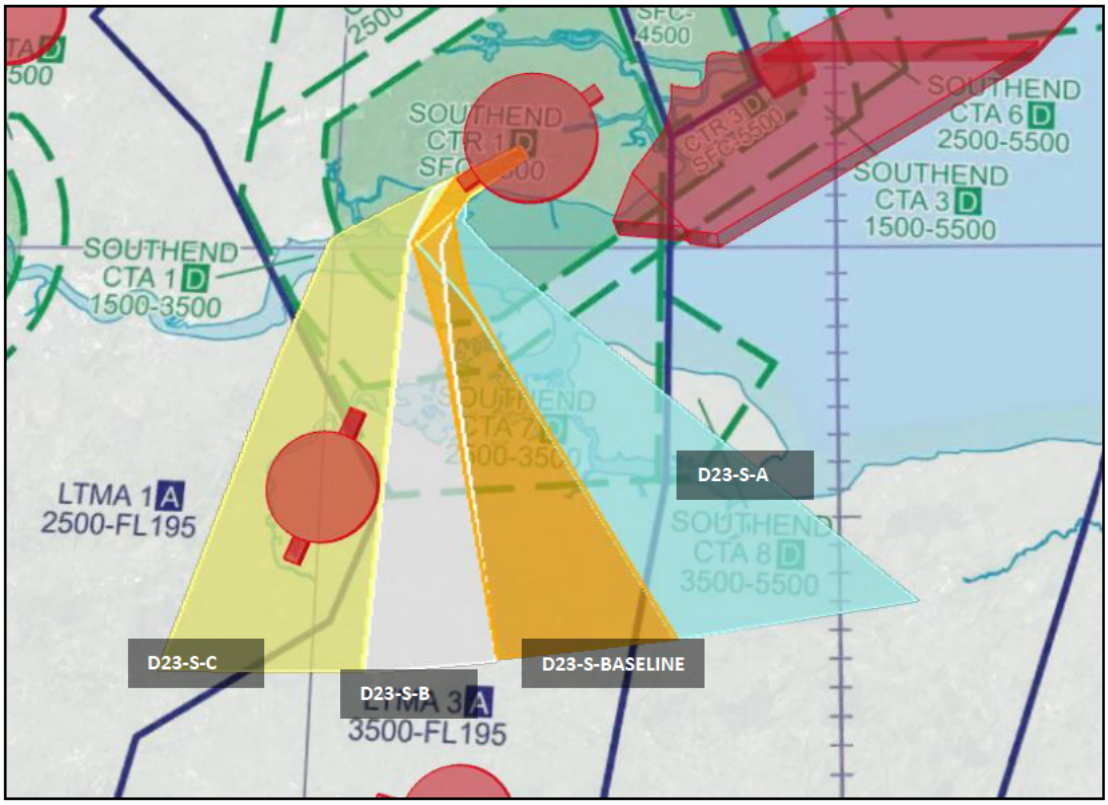

Figure 31: RW23 South Departures with ENR Chart

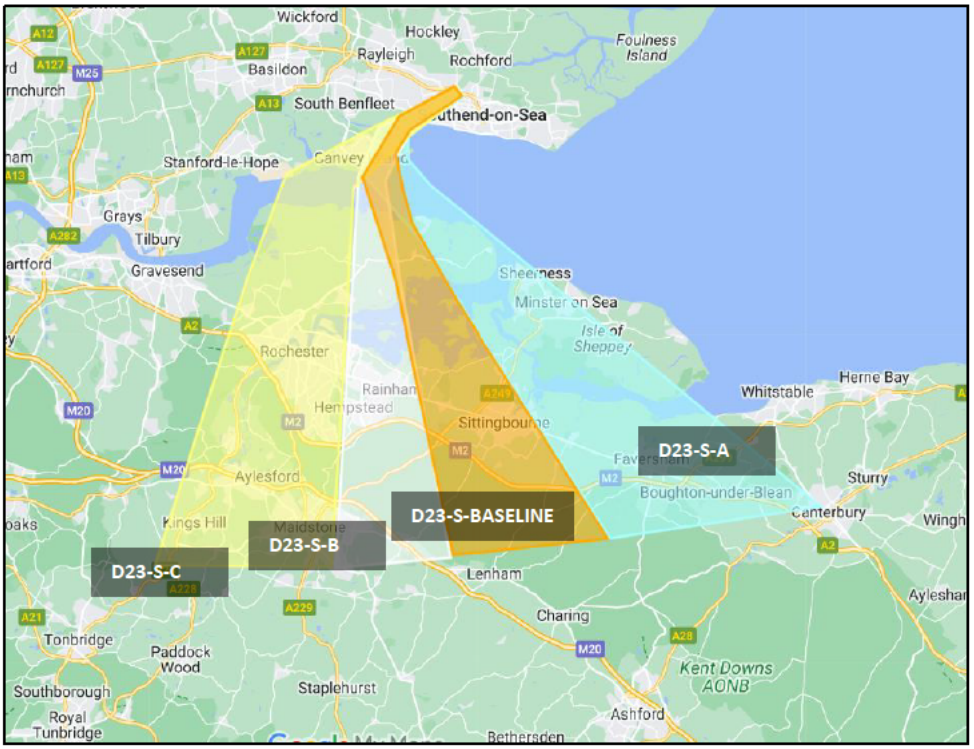

Figure 32: RW23 South Departures on Google Maps

4.9. Runway 23 - All Options

Figure 33 and **Figure 34** depicts all the options considered for Runway 23 departures.

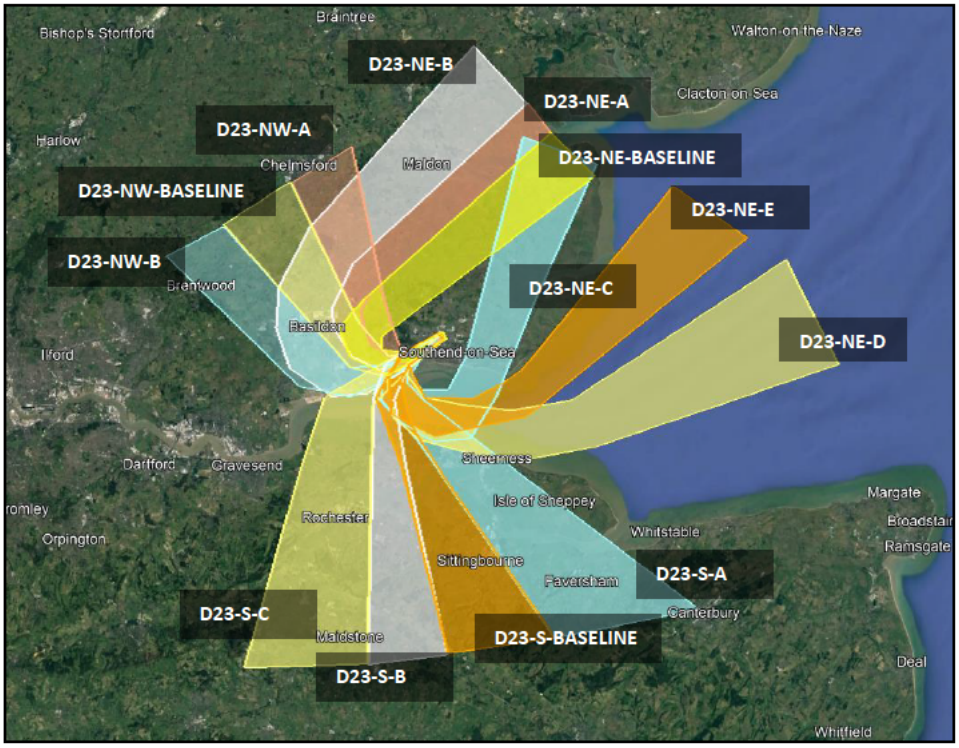

Figure 33: RW23 Departure Options

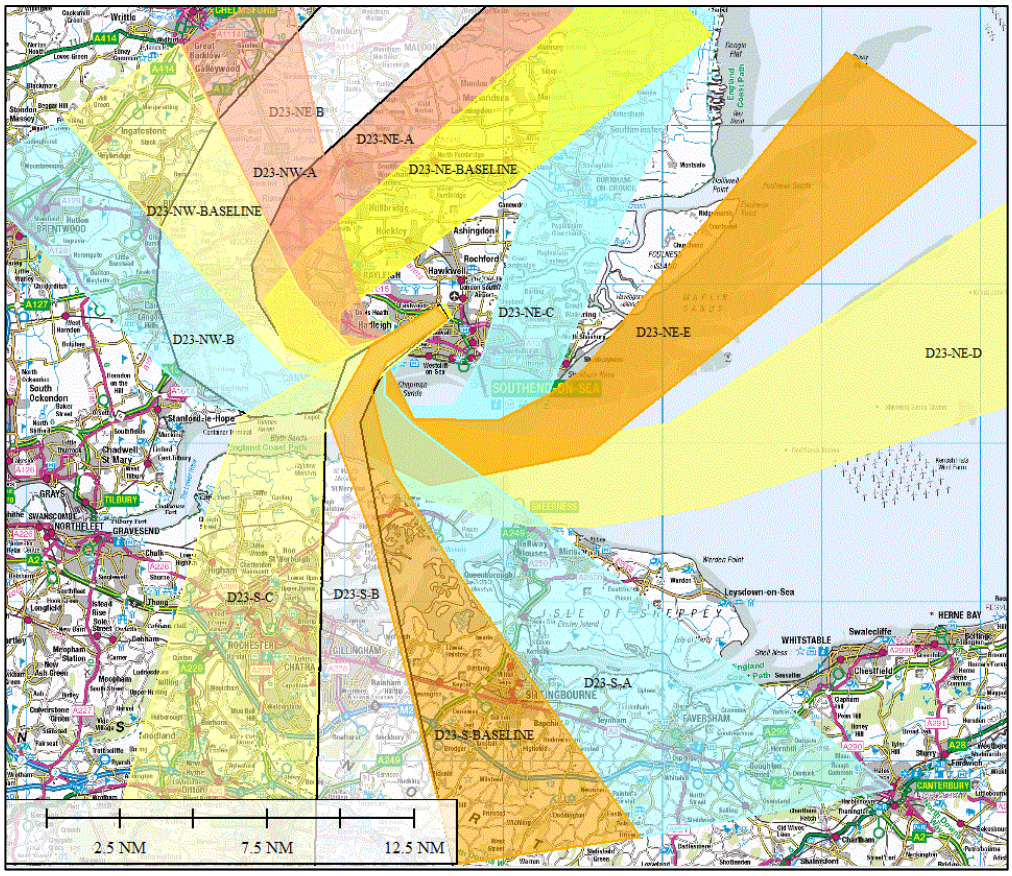

Figure 34: RW23 Departure Options on OS Map

5. Arrival Procedures

5.1. Runway 05 Arrivals from Northwest

Baseline

The Existing Standard Arrival (STAR) from Barkway (BKY) routes to BRAIN and then a hold in the vicinity of MAYLA.

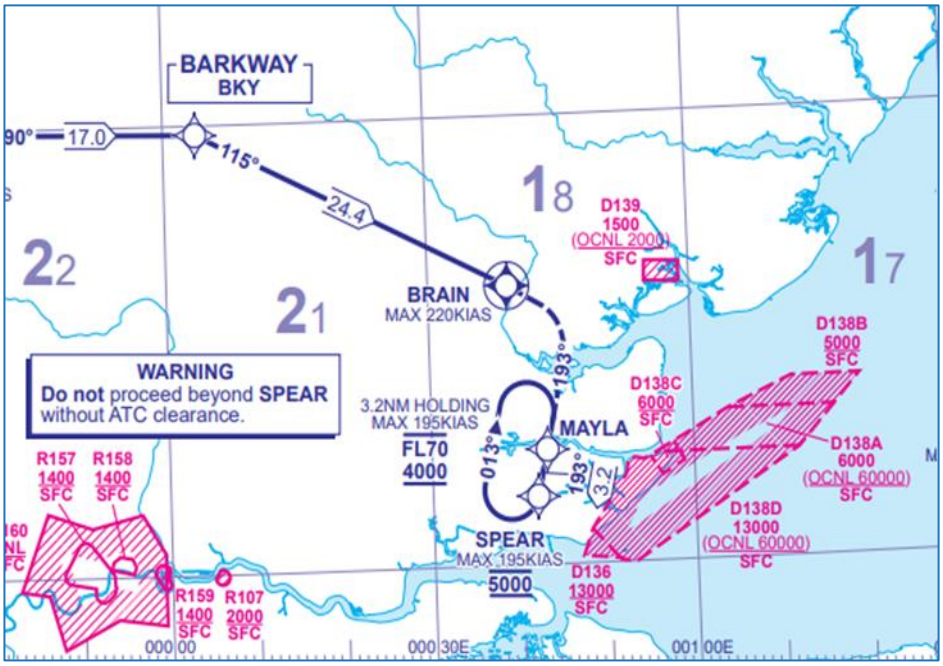

Figure 35: Existing Northwest STAR

Aircraft generally follow the STAR initially then turn early to the south to join the final approach, depicted by the green lines in **Figure 36** (taken over a three-month period in 2019-pre pandemic).

Our baseline is defined as option A05-NW-BASELINE. This has been established from the NTK data, current procedures, and operational expertise.[9]

Options

The Options presented below consider a variety of direct routings (some more expeditious than others).

[9] Originally the baseline was contained within option A05-NW-C.

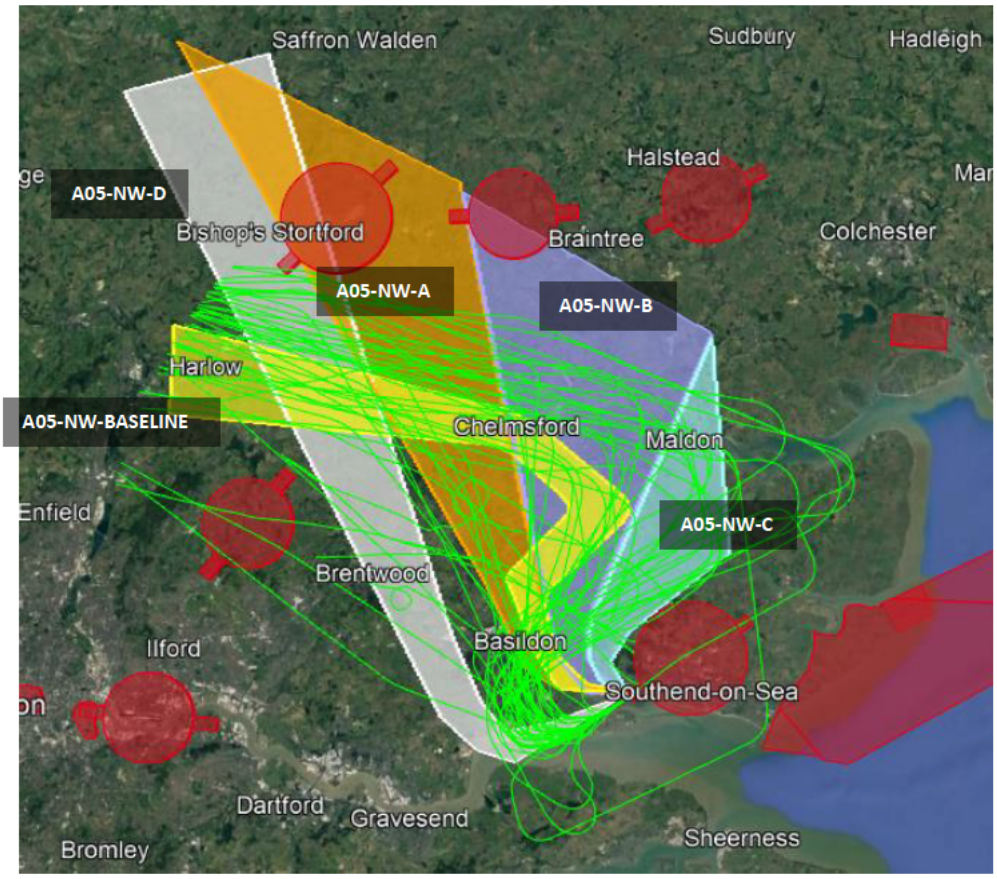

Figure 36: RW05 Arrival Options from Northwest with NTK on Google Earth

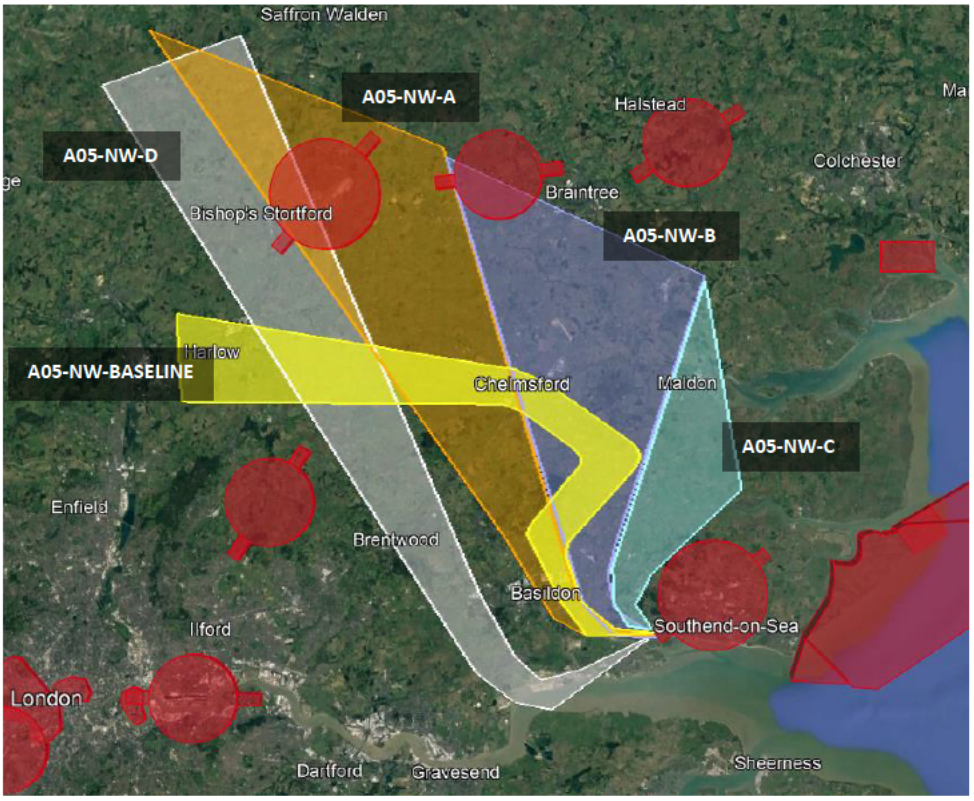

Figure 37: RW05 Arrival Options from Northwest on Google Earth

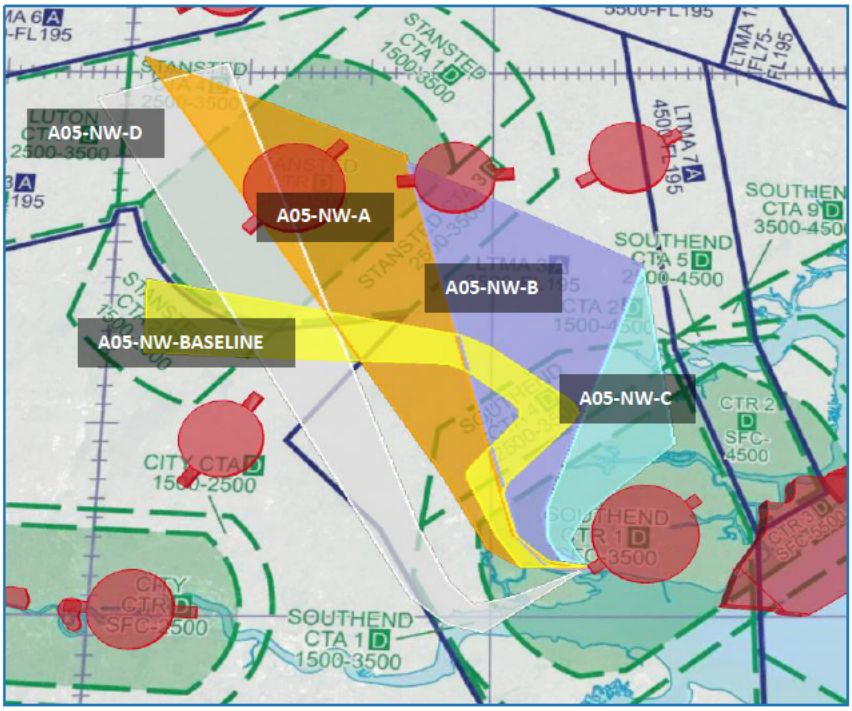

Figure 38: RW05 Arrival Options from Northwest ENR Chart

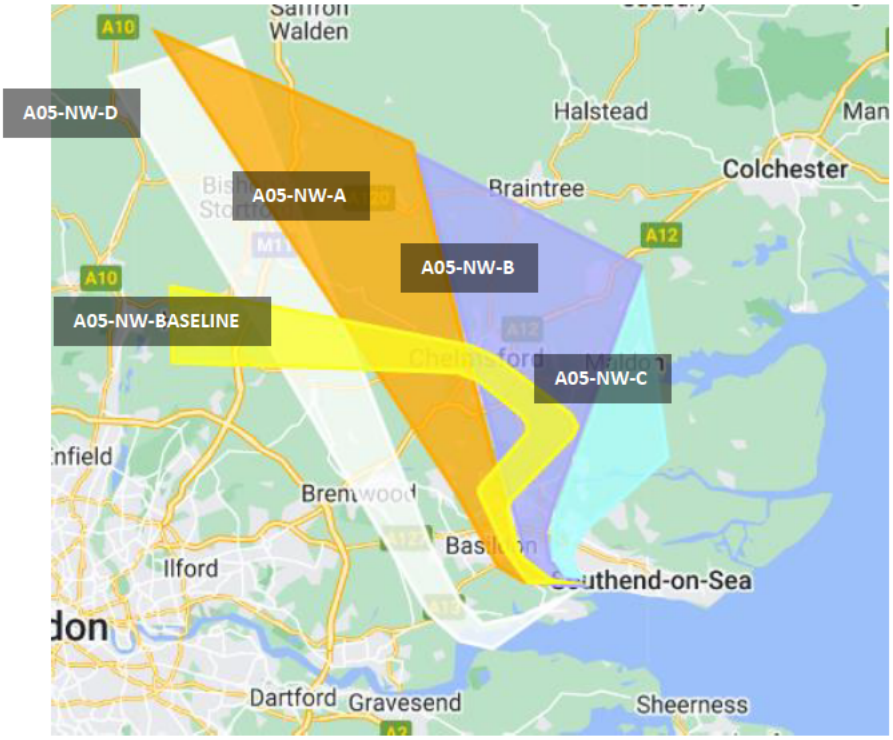

Figure 39: RW05 Arrival Options from Northwest on Google Maps

5.2. Runway 05 Arrivals from the South and the East

Baseline

The Existing STAR from the South and the East routes to ADVAS and then the hold at GEGMU. The NTK data shows aircraft routing across the fan of options (**Figure 40)**. Our baseline is defined as option A05-SE-BASELINE.This has been established from the NTK data, current procedures, and operational expertise.[10]

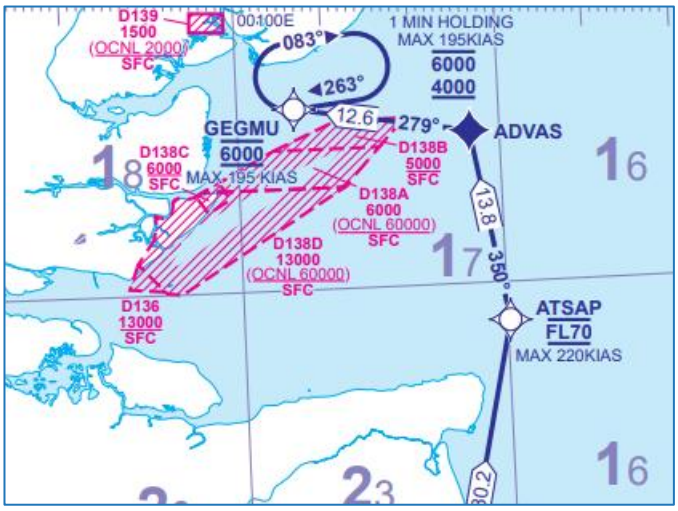

Figure 40: Existing South and East STAR

Options

The Options for arrivals from the South consist of a fan array. A new option has been created following feedback from the CAA, this option is A05-SE-H, more details of this additional swathe and the associated engagement can be found in section 2.3.

[10] The baseline was originally named A05-SE-G and has been renamed for clarity.

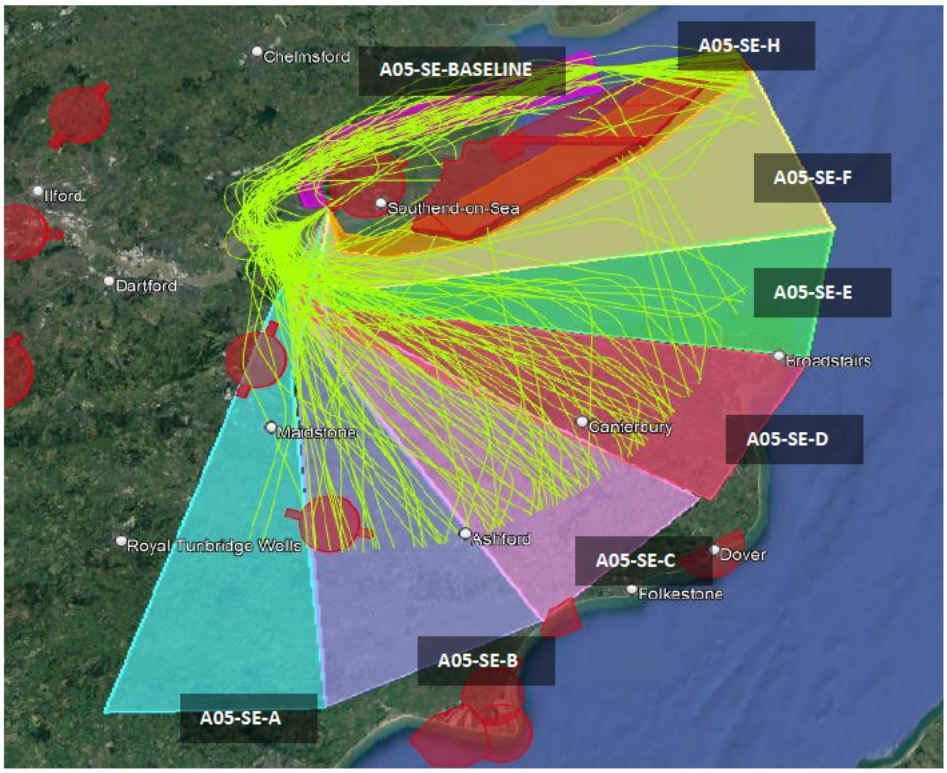

Figure 41: RW05 Arrival Options from the South and the East with NTK on Google Earth

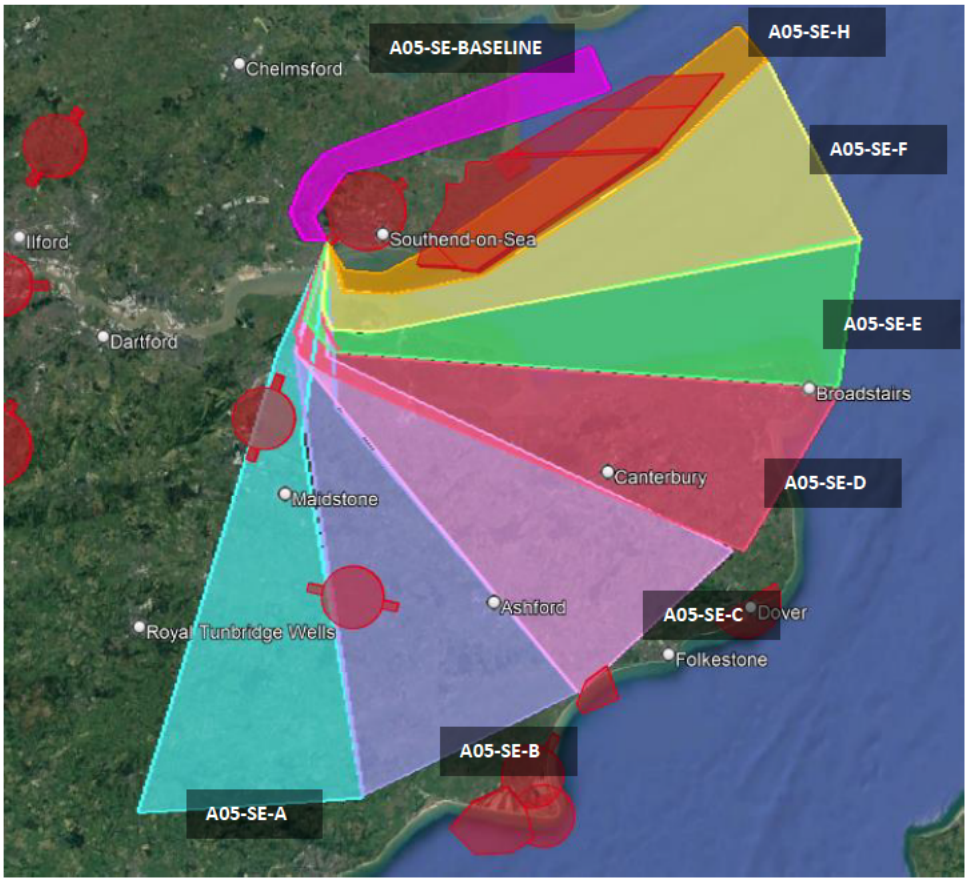

Figure 42: RW05 Arrival Options from the South and the East on Google Earth

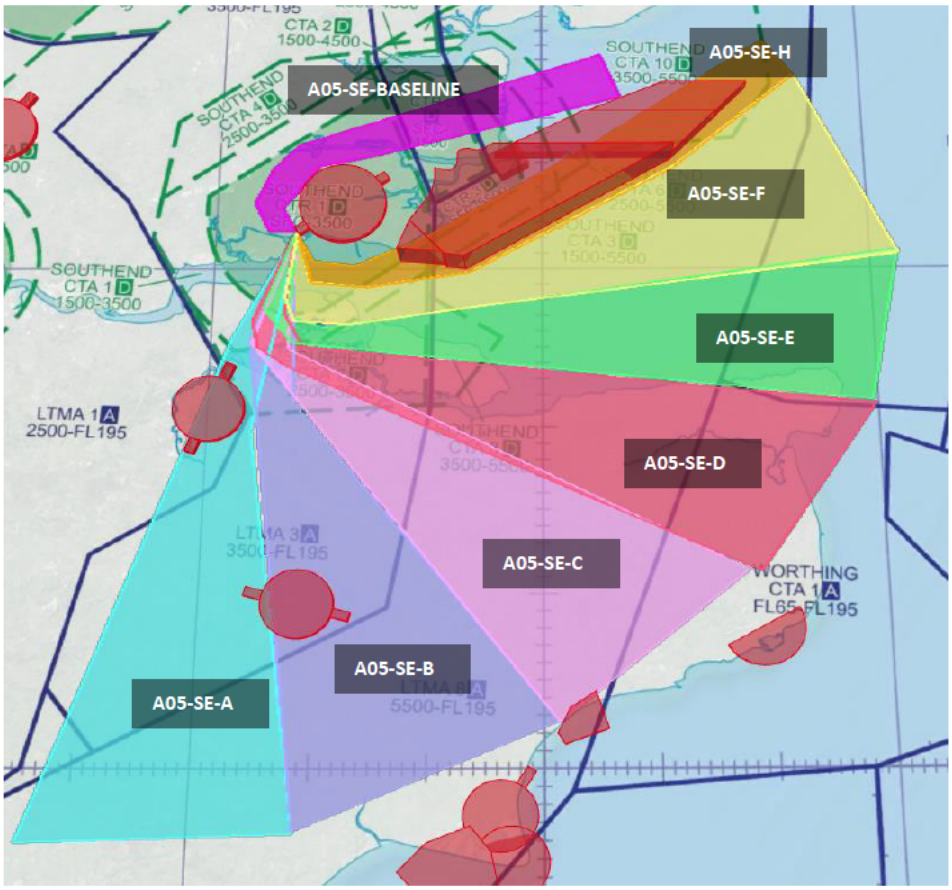

Figure 43: RW05 Arrival Options from the South and the East ENR Chart

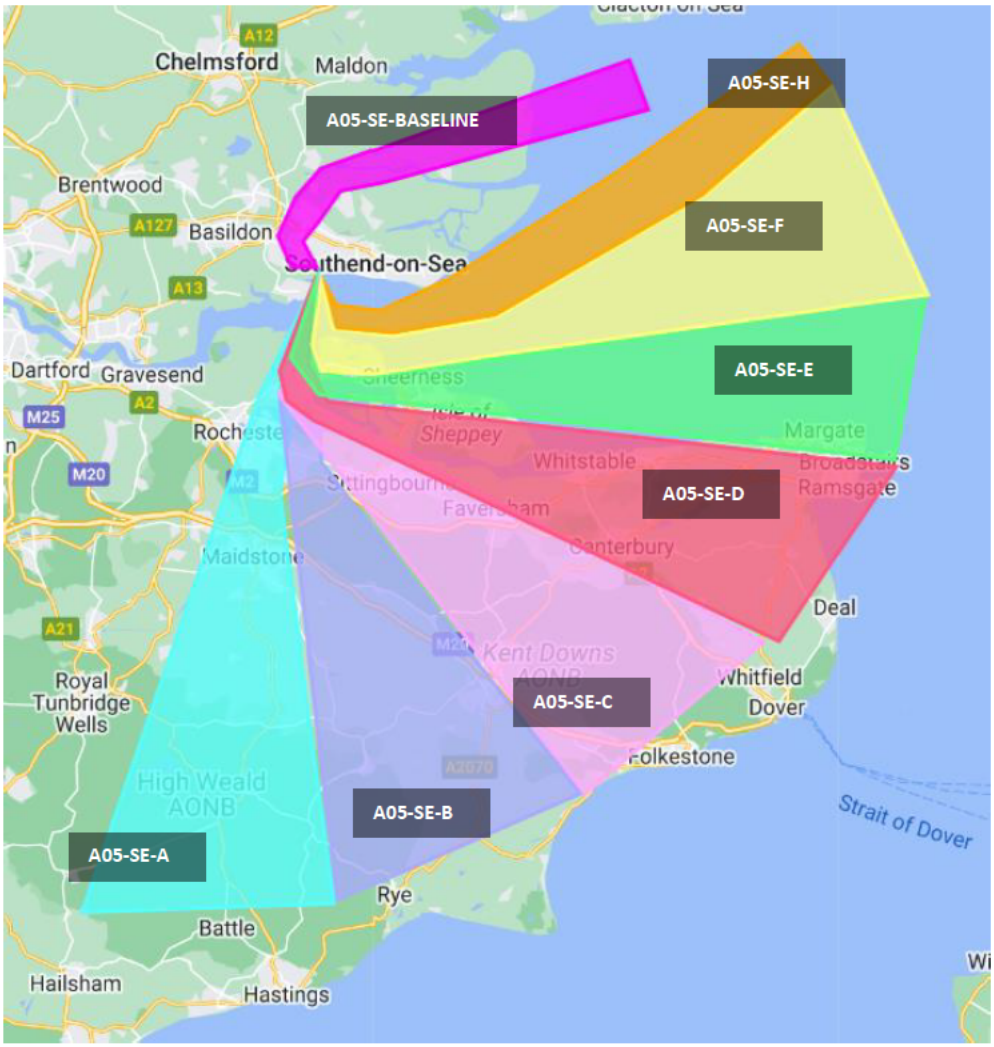

Figure 44: RW05 Arrival Options from the South and the East on Google Maps

5.3. Runway 05 Arrivals – All Options

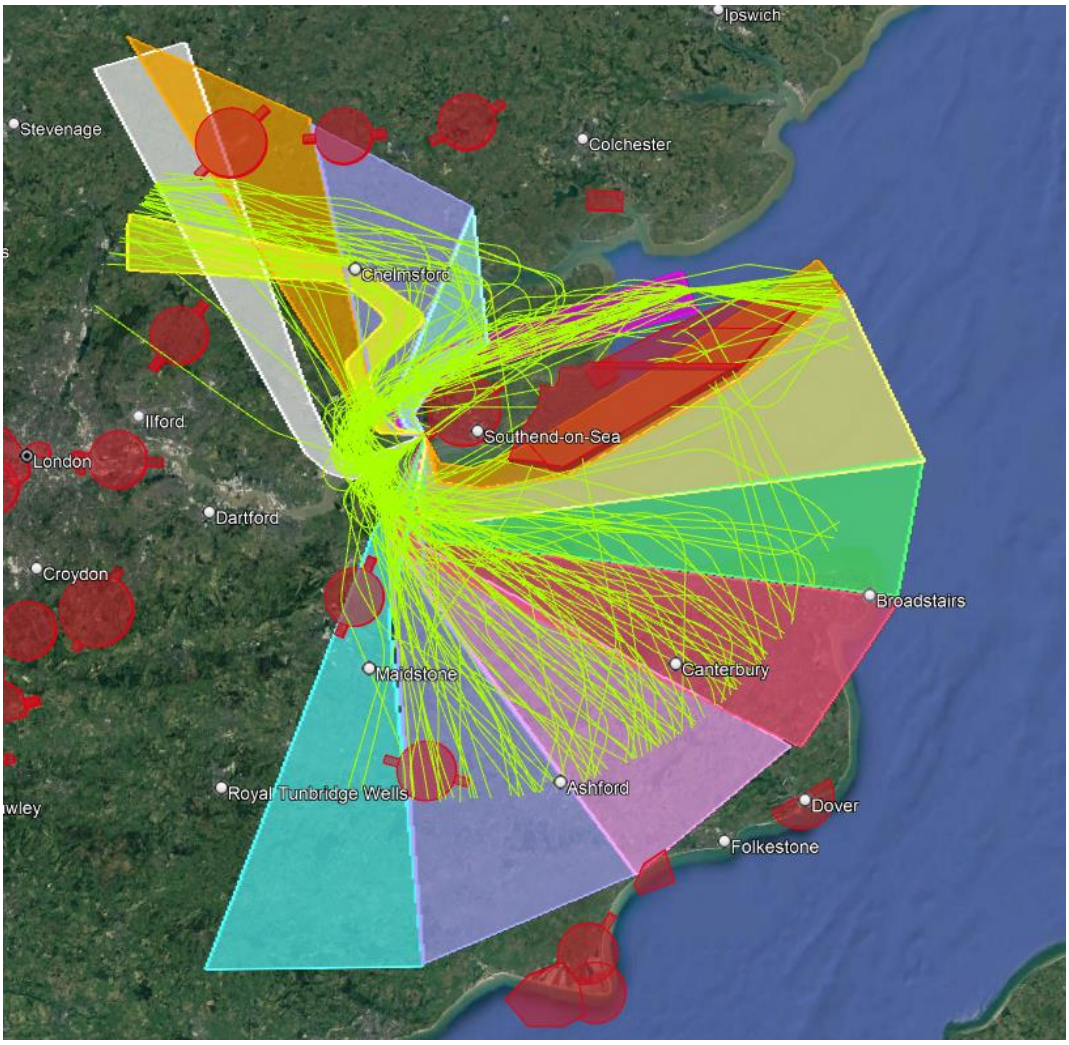

Figure 45: Runway 05 All Options with NTK data

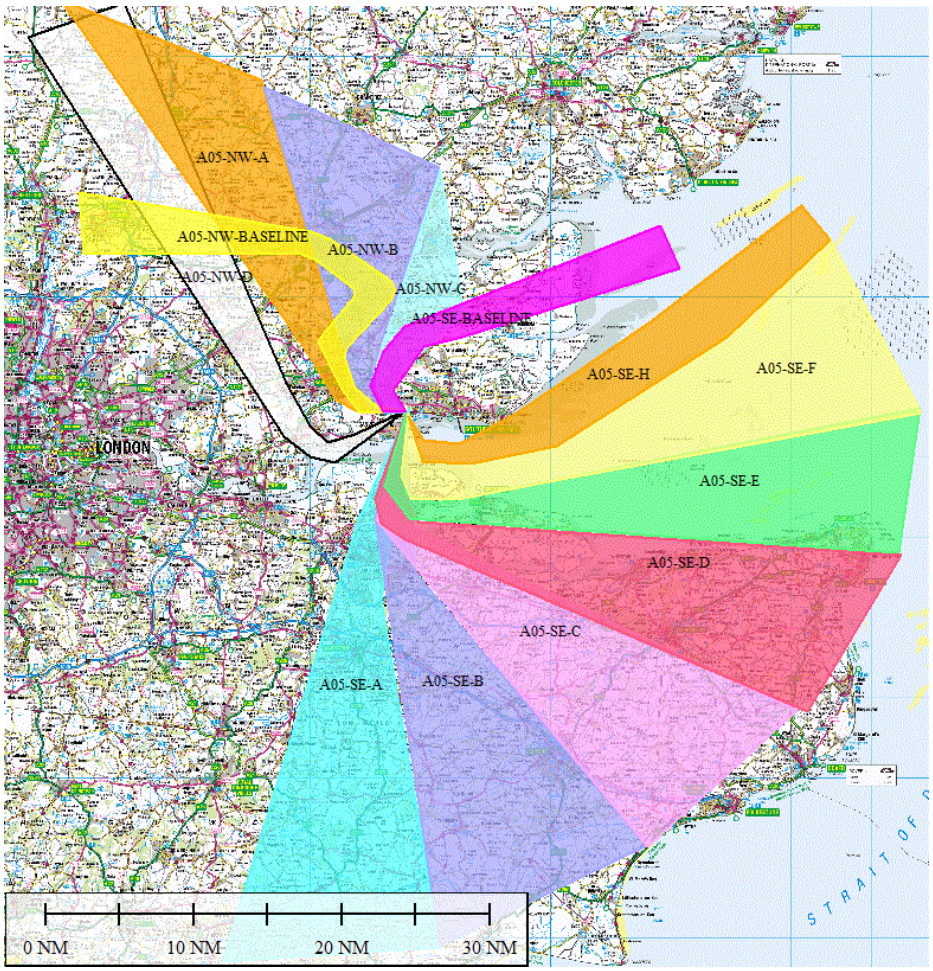

Figure 46: Runway 05 Arrivals All Options on OS Map

5.4. Runway 23 Arrivals from the Northwest

Baseline

The Arrival options to Runway 23 from the Northwest largely follow the existing track of the STAR although displaced slightly to the South as is illustrated by the NTK data (the green lines) in **Figure 48** (taken over a three-month period in 2019- pre pandemic).

Our baseline is defined as option A23-NW-BASELINE. This has been established from the NTK data, current procedures, and operational expertise.[11]

[11] Originally the baseline was contained within option A23-NW-B.

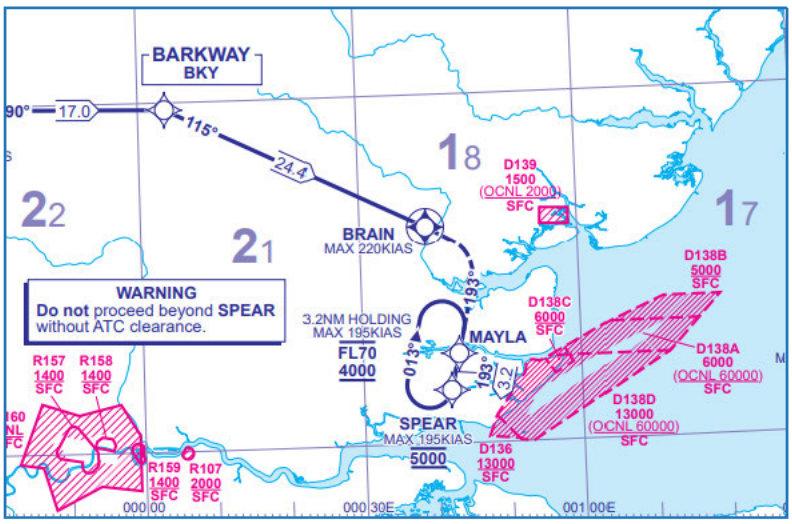

Figure 47: Arrivals from the Northwest

Options

Option A (A23-NW-A) follows the existing STAR then takes an early turn to the South whilst Option B (A23-NW-B) does not.

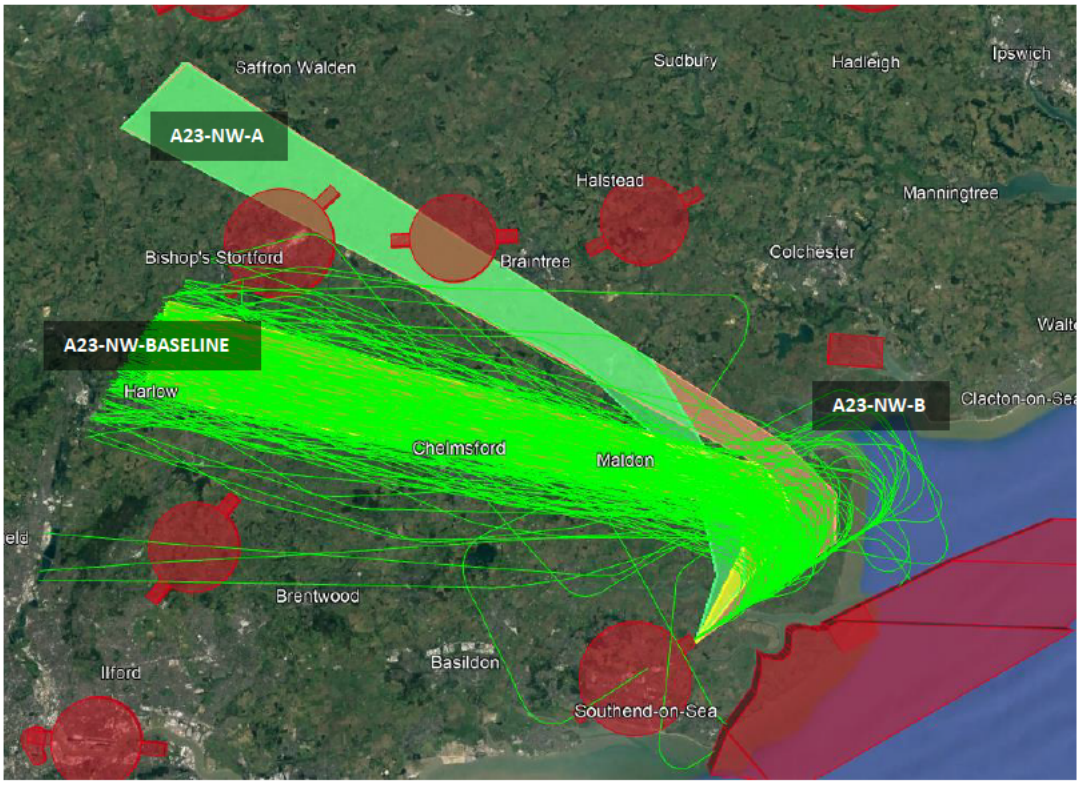

Figure 48: RW23 Arrival Options from the Northwest with NTK on Google Earth

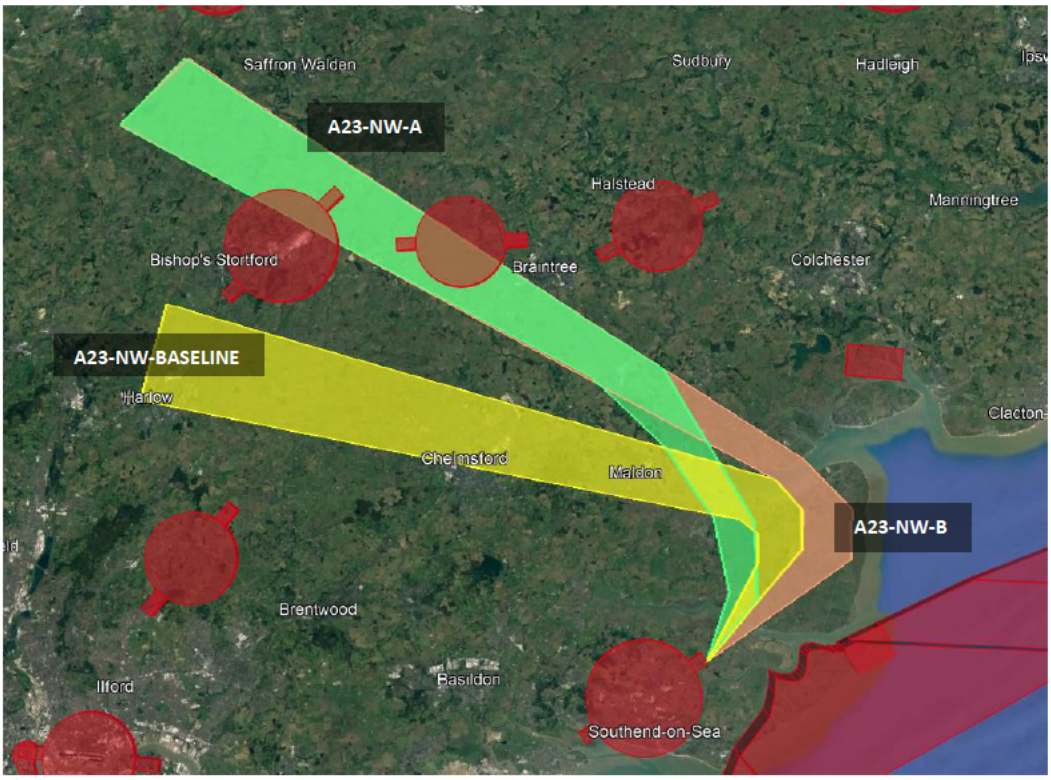

Figure 49: RW23 Arrival Options from the Northwest on Google Earth

Figure 50: RW23 Arrival Options from the Northwest ENR Chart

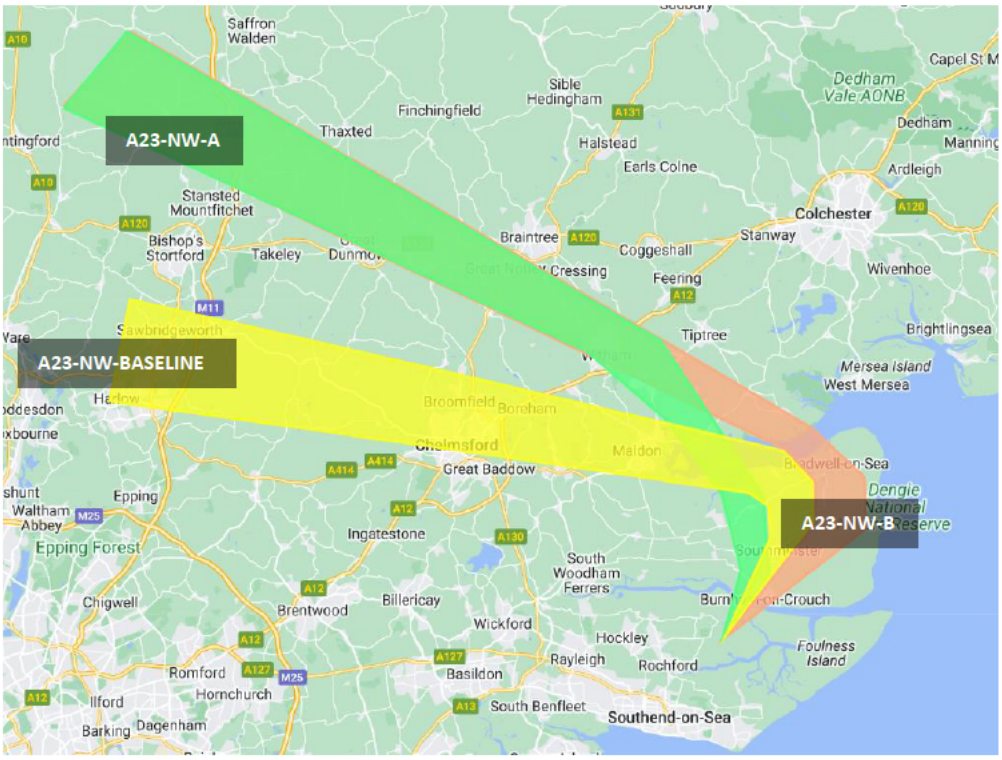

Figure 51: RW23 Arrival Options from the Northwest on Google Maps

5.5. Runway 23 Arrivals from the South and the East

Baseline

The existing STAR from the South and the East, routes to ADVAS and then the hold at GEGMU, as shown in **Figure 51**. Our baseline is defined as option A23-SE-BASELINE. This has been established from the NTK data, current procedures, and operational expertise.[12]

Figure 52: Arrivals from the South and the East

[12] The baseline was originally named A05-SE-A and renamed for clarity.

It is interesting to note, from the data presented in **Figure 53**, that the array of arrivals fan out across the land to the Southeast of Southend. There are also many tracks that route through Shoeburyness Range when it is inactive. The Options developed capture most of these routes.

Options

A fan array of options is available for arrivals from the South. The arrival traffic data shows aircraft routing across these options (**Figure 53**).

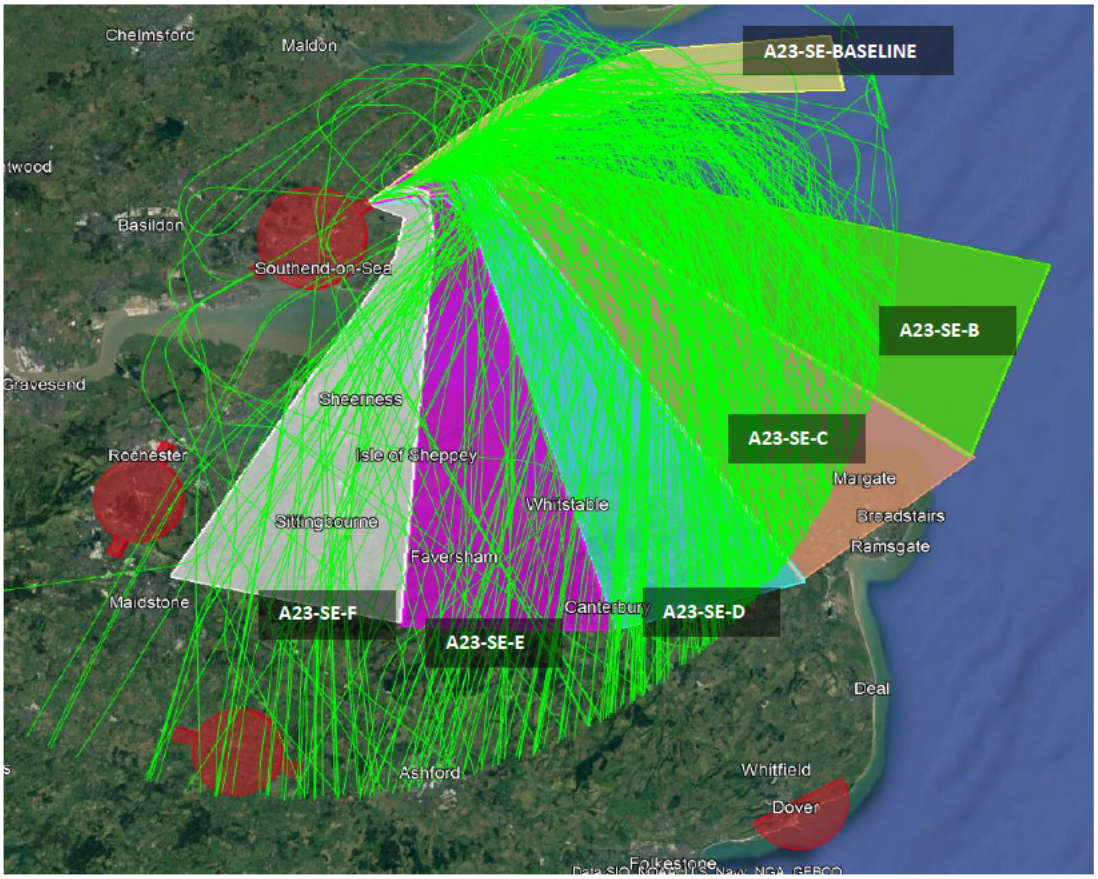

Figure 53: RW23 Arrival Options from the South and the East with NTK on Google Earth

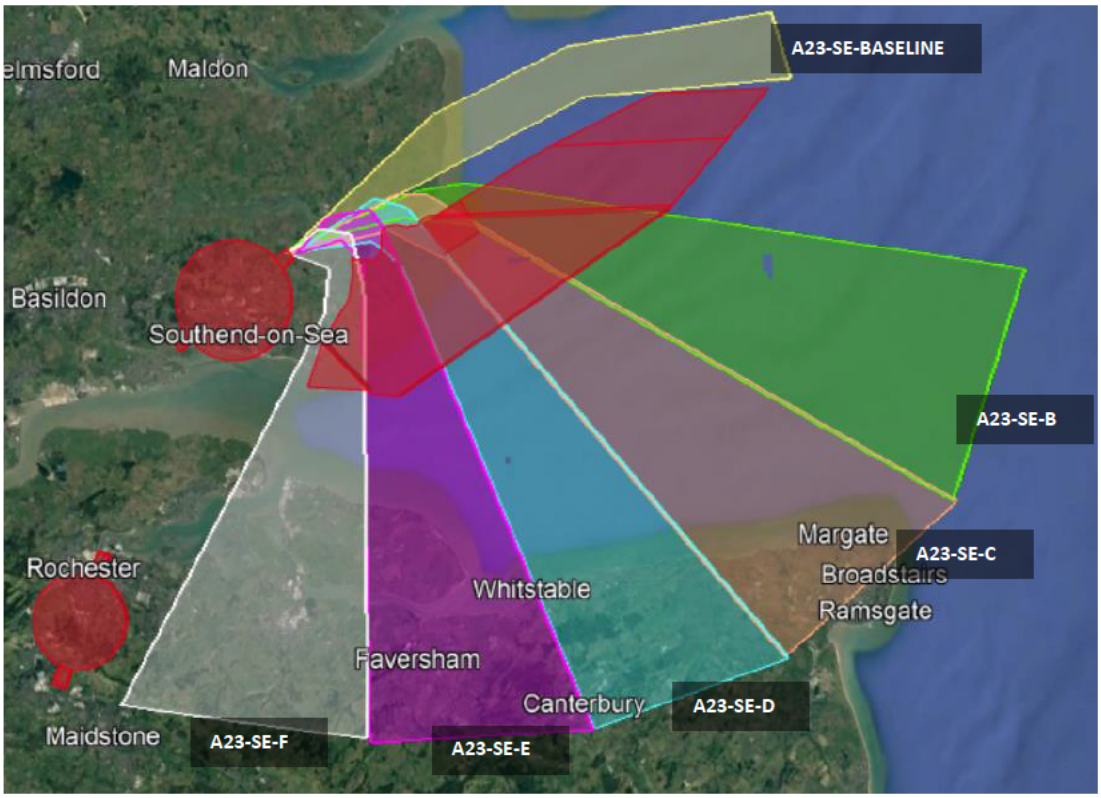

Figure 54: RW23 Arrival Options from the South and the East on Google Earth

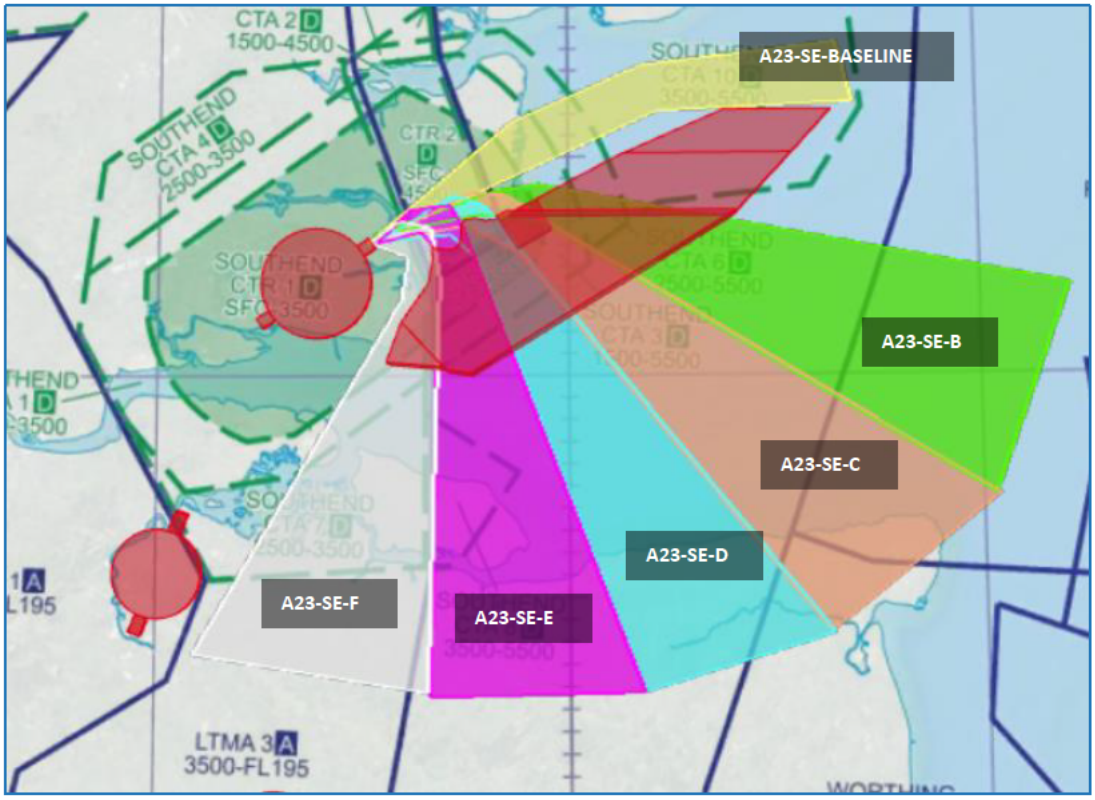

Figure 55: RW23 Arrival Options from the South and the East ENR Chart

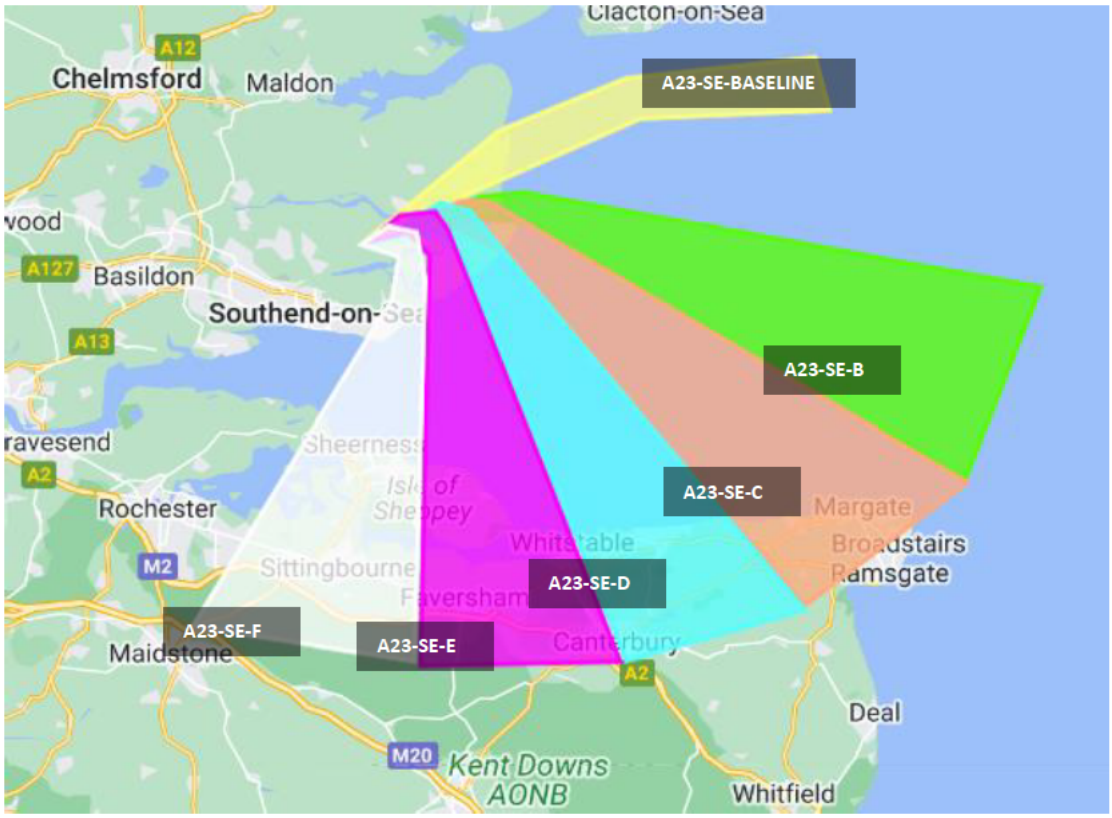

Figure 56: RW23 Arrival Options from the South and the East on Google Maps

5.6. All Arrival Options Runway 23

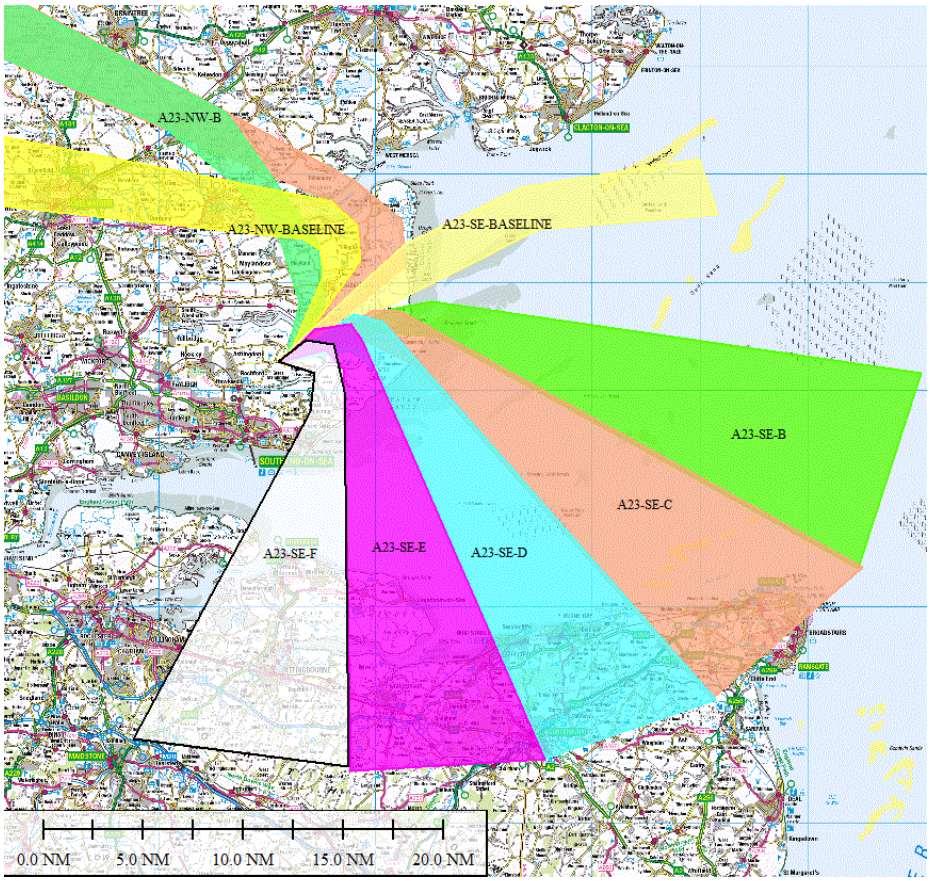

Figure 57: RW23 All Arrival Options on OS Map

6. Design Principle Evaluation

6.1. Methodology

6.1.1. The Design Principle evaluation takes each of the options and qualitatively assesses them against the Design Principles developed in Stage 1 (detailed in **Section 6.2** Design Principles) and the baseline option.

6.1.2. A joint team of LSA and Cyrrus conducted an internal basic Design Principle evaluation on all of the Options Prior to the Stakeholder workshops on the 8th of April 2022. This was a basic assessment of the Options, where each swathe was assessed against each Design Principle and assigned a colour depending on whether it was deemed to meet the Design Principle:

- fully met (Green).
- partially met (Amber).
- not met (Red).

This was presented to the Stakeholders at the workshop and their feedback was requested. The basic Design Principle Evaluation can be seen in the presentation titled 'Options Development and Design Principle Stakeholder Workshop Presentation' and is available on the ACP Portal. For reference, the initial RAG (Red, Amber, Green) assessment for each option can also be seen in the full 'Design Principle Evaluation' document (also available on the ACP Portal) in the column named 'Initial Eval.'

6.1.3. As previously mentioned, stakeholders were invited to take part in an online survey from the 13th of April 2022 to the 16th of May 2022. This survey asked whether the stakeholders felt we had applied the Design Principles correctly and consistently to each of our options. It also provided an opportunity to comment on areas where they felt this may not have been the case.

6.1.4. A full Design Principle Evaluation for each option was then carried out by the Joint team using the Feedback from the Survey and following the Evaluation criteria laid out in **Annex E.** Where there has been a change in the initial RAG score justification has been provided within the tables and all stakeholder feedback has been addressed and included where applicable.

6.1.5. The Full evaluations and stakeholder feedback are contained within the Design Principles Evaluation document[7] which is available on the ACP Portal.

6.1.6. During Summer 2023 following feedback from the CAA, we created two additional options and ran a supplementary round of engagement with our stakeholders. Full details can be found in **Section 3.3**.

6.1.7. We also spent some time redefining our baseline options (see **Section 2.2** for more details). The redefined baseline options have all been assessed as fully meeting the Design Principles in the Full assessment. This is due to the high level approach using swathes we have taken, and at this stage of the ACP process we are concerned only with the geographical area where final track placement may lie and are not currently assessing associated procedures. It is assumed that due to the large area each individual swathe covers that there would be an

available route within each swathe that would satisfy our more technical Design Principles, these will be assessed at Stage 3 of the ACP process.

6.2. Design Principles

6.2.1. The following table details the Design Principles established at the end of Stage 1 that have passed through the CAA CAP1616[2] 'DEFINE' Gateway. These Design Principles will be used to evaluate each of the options in turn.

Design Principle Number & Title	Description
1- Importance of Safety	The airspace design and its operation must maintain or where possible, enhance current levels of safety.
2- Overflight	The new procedures should not increase the number of people overflown by aircraft using the Airport and where possible options that provide a level of dispersion should also be considered.
3- Noise Footprint	The design should limit, and where practicable reduce, the impact of noise to stakeholders on the ground and where possible periods of built in respite should be considered.
4- Tranquillity	Where practical, route designs should limit effects upon sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONB's.
5- Emissions and Air Quality	The proposed design should minimise CO2 emissions per flight.
6- Operational Requirements	The new procedures should address the needs of most operators at LSA.
7- Airspace Dimensions	The volume and classification of controlled airspace required for LSA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.
8- Airspace Complexity	The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.
9- Technical Requirements	The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.
10- Systemisation	The arrival transitions and departure procedures shall be deconflicted and integrate with the en-route network, as per the FASI(S) programme, and in the case of the arrival transitions shall integrate with the Instrument Approach Procedures (IAPs) reducing the requirement for tactical coordination.
11- Operational Cost	Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.
12- AMS Realisation	This ACP must serve to further, and not conflict with, the realisation of the AMS.
13- PBN	The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.

Figure 58: Design Principles

6.3. Design Principle Evaluation Assessment Criteria

6.3.1. To ensure consistency when evaluating each option, we have followed the assessment criteria detailed in Annex D for all the options.

6.4. Discounting of Options

6.4.1. Due to our high level approach using swathes, we have decided that none of the options will be discounted on the basis of the DPE alone. This enabled us to take all of the proposed options through to Stage 2b and conduct an individual Initial Options Appraisal (IOA) on each

one. The assessment of the DPs has been carried forward to the IOA and included in the relevant sections, this has allowed us to perform one overall assessment of the options to decide which will be taken forward to Stage 3. The assessment criteria table in Annex D describes where and when the DP assessments will be utilised[13]. It should be noted that where options have been scored a Red for Safety in the DPE, this has been carried through to the IOA for assessment and these options have subsequently been discounted.

[13] In the document titled 'Initial Options Appraisal' - section 3.2 – available on the ACP Portal, the IOA assessment methodology also describes which DPs are considered and where.

7. Design Principle Evaluation Summary

7.1. Assessments

7.1.1. Full details of the Design Principle Evaluation can be found in the Design Principles Evaluation document[7] which is on the ACP Portal.

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	DP12	DP13
D05-NE-BASELINE													
D05-NE-A													
D05-NE-B													

Table 1: Departures Runway 05 - Northeast DP Assessment

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	DP12	DP13
D05-NW-BASELINE													
D05-NW-B													

Table 2: Departures Runway 05 - Northwest DP Assessment

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	DP12	DP13
D05-S-BASELINE													
D05-S-A													
D05-S-B													
DO5-S-C													

Table 3: Departures Runway 05 - South/Southeast DP Assessment

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	DP12	DP13
D23-NE-BASELINE													
D23-NE-A													
D23-NE-B													
D23-NE-C													
D23-NE-D													
D23-NE-E													

Table 4: Departures Runway 23 - Northeast DP Assessment

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	DP12	DP13
D23-NW-BASELINE													
D23-NW-A													
D23-NW-B													

Table 5: Departures Runway 23 - Northwest DP Assessment

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	DP12	DP13
D23-S-BASELINE													
D23-S-A													
D23-S-B													
D23-S-C													

Table 6: Departures Runway 23 - South/Southeast DP Assessment

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	DP12	DP13
A05-NW-BASELINE													
A05-NW-A													
A05-NW-B													
A05-NW-C													
A05-NW-D													

Table 7: Arrivals Runway 05 - Northwest DP Assessment

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	DP12	DP13
A05-SE-BASELINE													
A05-SE-A													
A05-SE-B													
A05-SE-C													
A05-SE-D													
A05-SE-E													
A05-SE-F													
A05-SE-H													

Table 8: Arrivals Runway 05 - South and East DP Assessment

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	DP12	DP13
A23-NW-BASELINE													
A23-NW-A													
A23-NW-B													

Table 9: Arrivals Runway 23 - Northwest DP Assessment

Option	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	DP12	DP13
A23-SE-BASELINE													
A23-SE-B													
A23-SE-C													
A23-SE-D													
A23-SE-E													
A23-SE-F													

Table 10: Arrivals Runway 23 - South and East DP Assessment

8. Next Steps

8.1. Overview

8.1.1. In the next stage, Stage 3, of this ACP, we will take each of the Options in this report through an Initial Options Appraisal as stipulated in CAP1616 Stage 2B.

Extract from CAP1616 below:

'Step 2B requires the change sponsor to carry out an 'Initial' appraisal of the impacts of each of the viable options identified in Step 2A using the design criteria against which the options are being assessed (the first of three iterative phases of options appraisal, as explained below). The Initial appraisal should, as a minimum, contain qualitative assessments of the different options. This highlights to change sponsors, stakeholders, and the CAA the relative differences between the impacts, both positive and negative, of each option. The change sponsor assesses each option against a 'do nothing' scenario (the 'counterfactual'), even where there is only a single change option, to understand these impacts.'

8.1.2. Initially, LSA had a January 2023 Gateway for Stage 2. While this deadline was met, the regulator required the change sponsor to make amendments and additions and resubmit the Stage 2 documentation. LSA had originally agreed submission in the September Gateway, however due to LSA's decision to carry out further engagement a new Gateway in December was agreed.

A. Additional Options Feedback Session

Project Title/No:	Stage 2 Rework for Additional Swathes. London Southend Airport (LSA) FASI(S) ACP	Date:	26/09/2023
Venue:	LSA and online	Time:	10:00
Attendees:	[redacted]		

A.1. PRESENTATION

Reference	Subject	Description
	Intro	Overview of presentation. [redacted] covers progress to date; Stage 1 Design Principles (DP). Response on DP. 15 responses to online survey and 2 additional via email. Further information available on the portal. DP list recap.
	Stage 2	Options Development. Stage 2 was submitted in December 2022 and did not pass. One of the issues highlighted was: potential options not exhaustive; two areas where swathes could have been designed but were not, these routes are through Shoeburyness Danger area. Following internal workshop, it was decided to introduce these options. Now additional options require engagement.
	Review CAP1616	[redacted] provided recap on CAP1616 process.
	DPE	Recap of Design Principle Evaluation (DPE) process.
	Purpose	Additional feedback required for 2 additional swathes. These areas have already been considered; therefore, the airspace and land have already been assessed during the consideration of other options. DPE required for these 2 swathes only.
	Required	Presentation is being sent to all stakeholders for feedback on: Departures D23-NE-E and Arrivals A05-SE-H. Stakeholders are those engaged with in stage one and stage 2 initial engagement. We are holding this session as part of the engagement. High level feedback on 2 swathes only against the DPs. (full DPE list available in the portal)
	Gateway	15th December, submission 3rd November.

Reference	Subject	Description
	Runway 23 NE-E	[redacted] shows comparison of original swathes with new option (E) over different maps. Recap pf DPE including new option.
	Arrivals A05-SE-H	Additional options for Arrivals shown over map identifying danger area. New option illustrated alongside original swathes. DPE reviewed.

A.2. Feedback session

Reference	Question/comment	Response	Action
Question in the room.	Operating hours of Shoeburyness Danger area?	Monday – Friday 9-4 are core operating hours. Makes sense to consider utilise this area out of operating hours.	

Reference	Question/comment	Response	Action
See 'questions doc' ref Q1 & Q2	Understanding feedback from the CAA (Southend CC & Essex CC)	Sponsors must set out how decisions they have taken relate to stakeholder feedback (CAP1616). In addition to the 2 new swathes feedback from the CAA, in the submission was not clear where we made changes to reflect the stakeholder feedback, and who the feedback was from. [redacted]. The changes will be clear in the resubmitted documentation, they will be shown in a different colour. [redacted]. Additionally, the DPE was enhanced, and we will make clearer by including the RAG scores for the initial submission, therefore easy to see where feedback has been influential. [redacted]. Need to demonstrate consistent approach to the RAG rating, have identified inconsistencies in the new options. Recommend getting document peer reviewed to check this. [redacted]. We have expanded our team to address this. [redacted]. Also need to be clear about the definitions of the RAG rating, provide the rationale behind the RAG rating.	[redacted]. Review consistency and RAG descriptions

Reference	Question/comment	Response	Action
See questions doc, ref. Q3	Heights of aircraft over Barling and Wakering. (Seawing)	[redacted]. Difficult to answer before feedback from NERL and decisions as to which options are going forward. Won't be fundamentally different from today due to the Section 106 agreement. We would look for opportunities to improve this situation where possible. [redacted]. Need to consider noise as well as efficiency.	
See questions doc, ref. Q4	Proposals to allow large aircraft to expedite vacating runway 23 on landing. (Private pilot)	[redacted]. Not part of this proposal however, no plans at present, will be considered at a strategic level and on a mid-long term plan.	
Question in the room.	Q. do you have any preferred options, or ones you are hoping will be accepted? ([redacted])	[redacted]. There are preferred routes but have to be in development with NERL. If the network has a requirement for us to be in a particular area, then this is a strong consideration. In terms of the DP, this is pivotal for the project, needs to be part of the wider modernisation project. Additionally, we need to work with neighbouring stakeholders / airfields.	
Question in the room.	[redacted]. When are these routes and potentially routes for respite be covered? (thinking about noise.)	[redacted]. this will be considered at the next stage. Need to consider the (dis) benefits associated with respite routes etc. If operationally there is a preferred route, yet another which could provide respite, then we would seek to look into the (dis) benefits providing it's feasible. Possibly costs involved so therefore also a consideration.	

A.3. Questions for feedback session

Question Reference	Question	Asked by
Q1	It would be useful to understand more about the feedback from CAA because as I understand it there were some comments regarding the consultation process, but we are not clear what these were. The previous submission indicated that Consultee responses had been received but didn't explain how they had been incorporated or influenced the submission.	Southend City Council
Q2	Can we receive a clear understanding on the feedback from the Civil Aviation Authority? and an appreciation of how previous consultee views have been considered and shaped future proposals.	Essex County Council
Q3	What heights are the aircraft expected to strain passing barling and Wakering please look at the map and use the space over the danger area to keep away from population or turn aircraft earlier to the south, so they are on track before they get near Wakering and Barling	Seawing
Q4	Are there any proposals to allow larger aircraft to expedite vacating runway 23 on landing. Taxiway Charlie requires a 180 turn and significant backtrack	Private Pilot

B. Qinetiq/DAATM Meeting Notes 18th October 2023

Qinetiq / DAATM

[redacted]

LSA

[redacted]

Introductions

Talked through the process to date and why LSA was conducting further engagement.

LSA not successful in Stage 2 Gateway.

Did not consider all viable options.

LSA has added two new swathes and has engaged on these.

DAATM confirmed D136/138 would remain operational, which LSA confirmed they understood and that if any routes were designed in that area, they would only be available outside of the operational hours of the Danger Area with appropriate LoAs in place.

DAATM confirmed they had responded to the previous engagement and also the additional engagement. LSA confirmed that feedback would be taken on board as part of the resubmitted documentation for Stage 2, which would be available on the CAA portal following submission.

LSA confirmed currently NOTAMed closed at night to facilitate ATCO training during the daytime period but that H24 operations would return.

[redacted] asked about the next steps in the process and timescales. LSA confirmed Stage 2 resubmission would be made in Nov for the Dec 23 gateway. If successful, Stage 3 would begin early in 2024. Stage 3 requires LSA to consult with stakeholders on more defined routes. Consultation anticipated end of 2024 / beginning of 2025. In terms of implementation, assuming a successful ACP, this wouldn't be until at least 2030.

LSA confirmed that they would share regular updates with progress via email.

C. Stakeholder List

C.1. Community Stakeholders

LSA Consultative Committee (ACC) members	
Castle Point Borough Council	Southend Residents Association (including West Leigh Residents Association)
Essex County Council	Independent Representative
Leigh Town Council	Essex Chambers of Commerce
Maldon District Council	Rochford Board of Trade
Rochford District Council	Southend Business Partnership
Rochford Hundred Association of Local Councils	Southend Flying Clubs
Southend-on-Sea Borough Council	

Community Stakeholders	
Friends of North Kent Marshes	Kent County Council
RSPB – Wallasea Island	
SAEN (Stop Airport Expansion & Noise)	

C.2. Environmental Stakeholders

Environmental Bodies	
CPRE Essex	Friends of the Earth
CPRE Kent	National Trust
English Heritage	Natural England
Environment Agency	Kent Downs AONB

C.3. Technical Stakeholders

Air Navigation Services Providers/ATC/DA Operators	
NATS En-Route Ltd (NERL)	D&D (Distress & Diversion)
LTC (London Terminal Control)	QinetiQ (Operator of Danger Area)

Aircraft Operators	
ASL Airlines	TBMI Aviation
easyJet	Titan
Essex Air Ambulance	Wizz
Essex PASU	2Excel Aviation
Vista Jet ltd	Net Jets
London Executive Aviation (LUX)	Muskany Ltd

C.4. Local Aviation Stakeholders

Neighbouring Airports/Airfields/Flying Clubs/LSA Tenants	
London Luton Airport	London City Airport
London Stansted Airport	London Gatwick Airport
London Heathrow Airport	London Biggin Hill Airport
Headcorn Aerodrome	Stapleford Aerodrome
Rochester Airport	Earls Colne Airfield
St Lawrence Aerodrome	Stoke Airfield
Tillingham Aerodrome	Barling Airfield
Stow Maries Great War Aerodrome	Maylandsea (Paragliding)
Avionicare Ltd	Air Livery Ltd
Seawing Flying Club	Southend Flying Club
Canewdon Paragliding	Essex and Suffolk Gliding Club
Kent Gliding Club	Manston Airport

C.5. Statutory Aviation Stakeholders

National Air Traffic Management Advisory Committee	
Airspace4All	General Aviation Alliance (GAA)
Airfield Operators Group (AOG)	Honourable Company of Air Pilots (HCAP)
Aircraft Owners and Pilots Association (AOPA)	Helicopter Club of Great Britain (HCGB)
Aviation Environment Federation (AEF)	Isle of Man CAA
British Airways (BA)	Light Aircraft Association (LAA)
BAe Systems	Low Fare Airlines

National Air Traffic Management Advisory Committee	
British Airline Pilots Association (BALPA)	Military Aviation Authority (MAA)
British Balloon and Airship Club	Ministry of Defence - Defence Airspace and Air Traffic Management (MoD DAATM)
British Gliding Association (BGA)	NATS
British Helicopter Association (BHA)	PPL/IR (Europe)
British Microlight Aircraft Association (BMAA) / General Aviation Safety Council (GASCo)	UK Airprox Board (UKAB)
British Parachute Association (BPA)	

D. Feedback for Stage 3

D.1. Feedback from Essex County Council

Section 2 - Overarching Matters for Consideration:

Local Factors to be Considered

Table 1 sets out some of the environmental and noise sensitive receptors that should be considered when reviewing possible airspace arrival and departure options at London Southend Airport. These may be used as part of the assessment for DP4 – tranquillity.

Table 1 – Information that ECC can Supply to Inform Airspace Change Proposals

Data Theme	Data Type	Information Source
Environmental	RSPB Sites	https://opendata-rspb.opendata.arcgis.com/datasets/
	Special Areas of Conservation (SACs)	https://naturalengland-defra.opendata.arcgis.com/datasets/special-areas-of-conservation-england
	Special Protection Areas (SPAs)	https://naturalengland-defra.opendata.arcgis.com/datasets/
	RAMSAR Sites	https://naturalengland-defra.opendata.arcgis.com/datasets/ramsar-england
	Priority Habitats	http://naturalengland-defra.opendata.arcgis.com/datasets/
Social and Community Infrastructure	• Location of Primary and Secondary Schools • Location of Early Years and Child Care Facilities. • Location SEN Facilities • Location of Residential Care Homes	ECC can provide GIS coordinates and data for school locations

ECC recommends that as part of DP4 the sensitive receptors include schools, Early Years and Child Care Facilities, facilities for Special Educational Needs, and Residential Care Homes. It should be noted that the noise threshold to avoid a breach on school sites is 55db LAeq (30min).

It is also recommended that DP4 gives consideration to designated and non-designated heritage sites. Some of these sites are protected and the impact of overflight may impact the sites status of designation.

ECC recommends that consideration be given to the relevant authorities adopted and emerging Local Plans. Local Plans shape growth and development within the respective Local Authority administrative boundary. They allocate land for housing, jobs and infrastructure as well as providing protection for the natural environment. They also contain policies and proposals that will be considered when assessing planning applications.

It is recommended that in determining the impact and constraints evident in certain areas, due consideration should be given to Essex Green Infrastructure, 2020, in particular the following sites of environmental importance within Essex including SSSI, AONB, RAMSAR, SAC, Local Wildlife Sites - (sites of national, regional and local importance) etc. It is recommended that appropriate assessments are undertaken including Environment Impacts Assessment, Ecology assessment etc.

In assessing sites of environmental importance, consideration should be given to the impact of air and noise pollution have on these environmental sites, as some wildlife are sensitive to aircraft noise. This may lead to wildlife changing their patterns of migration and impact on the ecology of the sites and justification for designation.

Any alterations to routes should assess the impact this may have on local air pollution and wildlife. ECC recommends that consideration be given to biodiversity net gain. It should be noted that ECC is working with Essex Wildlife Trust, RSPB and Natural England outlining a Local Nature Recovery Strategy and opportunity mapping as one of their core action of the Essex Local Nature Partnership (LNP). The LNP will be setting up a Task and Finish group to take this forward.

Airspace Modernisation Strategy

ECC welcomes the need for reviewing and modernising UK airspace. It is supported that London Southend Airport have sought and continue to develop air routes and air traffic management practices that use modern technology. It is also expected that with reviewing the departure and arrival routes at London Southend provides the opportunity to ensure that future routes can benefit from using the capabilities of modern technology.

ECC notes that CAA is keen to modernise airspace use, to ensure that modern technology is used, and that aircraft can climb and reach their optimum cruising altitude as soon as possible. ECC appreciates that this ensures greater efficiency, less fuel burn and lower emissions. Whilst ECC supports the environmental benefits that modernising airspace can bring, ECC is eager to ensure that noise impacts are reduced/minimised for our local, living and investing communities. It is therefore recommended that for the public consultation, the information presented from each route highlights how the route has been designed to optimise environmental and noise benefits.

Respite

ECC is interesting in appreciating how the proposed air routes may provide respite. It is important that persons engaging have a full appreciation of the respite options available. ECC are mindful there are many options available for respite including time based variations, and alternate routes for differing days. It is important that partners have a full appreciation of the respite potential and limitations for routes (e.g. the prevailing wind may limit the use of some routes for respite purposes).

Concluding Remarks

ECC welcome ongoing discussions with the airport and welcome working with the airport as you seek to progress the airspace change proposals.

If you require any further information or wish to discuss this response my contact details are below.

D.3. Non DP related Survey Feedback

DPE Feedback

Option **D05-NE-A**

'No; the departure DO5 NE-A Aircraft should be encouraged to have a maximum gradient of climb, utilising maximum performance, ensuring thrust reduction altitude is at 1500' and acceleration altitude is 3,000'or preferably 4,000 which will then ensure a minimum noise impact on Great Stambridge, aircraft are then to be kept mid-way between Ashingdon and Canewdon avoiding the major population areas of these villages, and being at the base of London airspace by the river Crouch, reducing the noise footprint at Burnham. How does the current proposal meet (Design principle 9, page 4 of the presentation). DP9. The current actual green lines take aircraft over the populated areas of the area which is unnecessary however with the reduction of VOR and increased RNP the requirement to route to CLN will be reduced allowing a more varied departure routing and aircraft to be higher when over local villages.'

'No; Looking at runway 05 NE-A DP4 have 5 possible conflict areas, with a bit of tweaking and use of RNP (RNAV) positions the overflight of populated areas 2,3 and the bird sanctuary 5 could be completely avoided, certainly the aircraft could be a lot higher overpopulated areas if departure option 2 described above is stated in the text on the departure routes. Aircraft then don't have to follow the green tracks to CLN before turning. TUGPO TRIPO then enroute could be the solution. Overflight of the bird sanctuary at Wallasea could easily be at or above 6,000' if departure option 2 described above would be stated.'

Option **D05-NE-B**

'No; the departure DO5 NE-B Aircraft should be encouraged to have a maximum gradient of climb, utilising maximum performance, ensuring thrust reduction altitude is at 1500' and acceleration altitude is 3,000'or preferably 4,000 which will then ensure a minimum noise impact on the villages of Great Stambridge Paglesham ,improving the importance of safety by ensuring aircraft are significantly above the major hazard of the increased number of birds around the RSPB Wallesea Island area. Not below 4000 on reaching the river crouch or increase the base of the Southend Class D airspace to allow reduction of the noise footprint at Burnham. How does the current proposal meet DP9. The current actual green lines take aircraft over the populated areas of the area, which is unnecessary, however with the reduction of VOR and increased RNP the requirement to route to CLN will be reduced allowing a more varied departure routing and aircraft to be higher when over local villages.'

Option **D05-NW-A**

'No; DO5 NWA Aircraft should be encouraged to have a maximum gradient of climb, utilising maximum performance, ensuring thrust reduction altitude is at 1500' and acceleration altitude is 3,000'or preferably 4,000 and allowed unrestricted climb to be above 5,000' by the river crouch, avoiding all built up areas, by at 400' turning to follow the river roach until clear of Great Stambridge then turning North until above 5000' and east abeam canewdon before turning northwest. How does the current proposal meet DP9. The current actual green lines take aircraft over the populated areas of the area which is unnecessary however with the reduction of VOR and increased RNP the requirement to route to LAM or

BPK will be reduced allowing a more varied departure routing and aircraft to be higher when over local villages.'

Option **D05-NW-B**

'No; Aircraft should be encouraged to have a maximum gradient of climb, utilising maximum performance, ensuring thrust reduction altitude is at 1500' and acceleration altitude is 3,000'or preferably 4,000 which will then ensure a minimum noise impact on the villages of Great Stambridge Paglesham, improving the importance of safety by ensuring aircraft are significantly above the major hazard of the increased number of birds around the RSPB Wallesea Island area. Routing to SABRE or south of SABRE but being above 4000' on reaching the river crouch or increase the base of the Southend Class D airspace to allow reduction of the noise footprint at Burnham. How does the current proposal meet DP9. The current actual green lines take aircraft over the populated areas of the area which is unnecessary however with the reduction of VOR and increased RNP the requirement to route to LAM or BPK will be reduced allowing a more varied departure routing and aircraft to be higher when over local village'

Option **D05-S-C**

'No; Departures runway 05 South /Southeast D05 C DP 2 Over flight DP 3 Noise DP 4 Tranquillity. This could be adopted if the initial routings kept the aircraft along the river crouch to potton creek keeping them away from overflying the towns of Southend, Shoeburyness Great and Little Wakering and Barling or ensuring the aircraft fly not below 6000' over these areas. Utilisation/ coordination of the DA/ other air traffic control agencies would have to be more proactive and should be easy to co -ordinate allowing aircraft unrestricted climb to their cruise altitude.'

Option **D23-S-C**

'Allow aircraft maximum rate of climb.'

Option **A05-SE-A**

'Arrivals allow aircraft a constant 500' 1000' descent rate which will keep engine power at a minimum and slow down, so they are 180kts at 10 miles slowing to 160kts then from 4nm free speed which is best for noise and fuel burn.'

Option **A05-SE-G**

'No; Very convoluted to fly and takes the aircraft into areas of training.'

Option **A23-SE-E**

'Arrivals 23 via e and f over the built-up areas and flying level isn't a good plan, re design these to avoid the built-up areas isn't difficult.'

Option **A23-SE-F**

'No; A variant of F is to go closer to the EGMC ATC, to maybe Southend Pier and then fly 055 before hooking left into 23. Keeps you further away from the DA.'

'Arrivals 23 via e and f over the built-up areas and flying level isn't a good plan, re design these to avoid the built-up areas isn't difficult.'

E. Design Principle Evaluation Criteria

	Design Principle	Qualitative Assessment	Green	Amber	Red
1.	**Importance of Safety –** The airspace design and its operation must maintain or where possible, enhance current levels of safety.	Initial qualitative assessment to determine any potential safety concerns. A more detailed assessment will be conducted in Stage 2B in the IOA section 'Safety'.	No safety concerns	Work needed to make safe	Unsafe
2.	**Overflight**-The new procedures should not increase the number of people overflown by aircraft using the Airport and where possible options that provide a level of dispersion should also be considered.	High level qualitative assessment of people overflown. A more detailed assessment will be conducted in Stage 2B in the IOA section 'Noise impact on health and quality of life'.	No different to today or less people overflown	Different not necessarily more	More AND different
3.	**Noise Footprint** – The design should limit, and where practicable reduce, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.	Initial high level qualitative assessment of noise impact to stakeholders on the ground (approximately 4000ft and below). A more detailed assessment will be conducted in Stage 2B in the IOA section 'Noise impact on health and quality of life'.	No different to today or less people overflown	Different not necessarily more	More AND different
4.	**Tranquillity -** Where practical, route designs should limit effects upon sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONB's.	Initial high level qualitative assessment. A more detailed assessment will be conducted in Stage 2B in the IOA section 'Tranquillity'.	No different to today or less people overflown	Different not necessarily more	More AND different
5.	**Emissions and Air Quality** – The proposed design should minimise CO2 emissions per flight.	Initial high level qualitative assessment. A more detailed assessment will be conducted in Stage 2B in the IOA sections 'Greenhouse gas impact' and 'Fuel burn'.	No different or less than today	Different and more	Extra track miles - significantly more than baseline
6.	**Operational Requirements** – The new procedures should address the needs of most operators at LSA.	Initial high level qualitative assessment. This DP will be assessed more thoroughly in Stage 3 when the options are refined to give more precise routes- currently the option will be considered to have met this Design Principle if there is somewhere within the swathe that can meet this requirement.	Fully	Partially	Not Met
7.	**Airspace Dimensions** – The volume and classification of controlled airspace required for LSA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.	High level qualitative assessment of the airspace required for each option. A more detailed assessment will be conducted in Stage 2B in the IOA section 'Access'. This DP will also be assessed more thoroughly in Stage 3 when the options are refined to give more precise routes.	Contained within existing controlled airspace	Would require more controlled airspace- but the minimum necessary	Significant new volume of controlled airspace required (minimum necessary)
8.	**Airspace Complexity** – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.	High level qualitative assessment against the baseline 'do minimum' option. Further assessment will be conducted in Stage 2B in the IOA section 'Capacity/resilience'.	No worse or different to today	Potential for more complexity	Marked increase in complexity

9.	**Technical Requirements** – The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.	This DP is difficult to evaluate at this stage of the process. With the options as they currently stand, we believe that within each swathe there will be an available route that would meet this Design Principle. As such, all options have been assessed as fully meeting this DP. Further, more detailed, analysis will be conducted within Stage 3 of this process when the options have been refined to individual routes rather than high level swathes.	Fully	Partially	Not Met
10.	**Systemisation** – The arrival transitions and departure procedures shall be deconflicted and integrate with the en-route network, as per the FASI(S) programme, and in the case of the arrival transitions shall integrate with the Instrument Approach Procedures (IAPs) reducing the requirement for tactical coordination.	Qualitatively assessed between the different arrival and departure options for conflictions and also interdependencies between neighbouring airports current and planned routes. Further assessment will be conducted in Stage 2B in the IOA section 'Capacity/resilience'.	No current conflicts	Possibility of resolvable conflicts	Unable to be separated from other interdependent airports current procedures
11.	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.	Assessed similarly to DP5 - Emissions and Air Quality, more track miles will incur more fuel cost. Initial high level qualitative assessment. Further assessment relating to this DP will be conducted in Stage 2B in the IOA section 'Fuel burn'.	No different or less than today	Different and more	Extra track miles, significantly more than baseline
12.	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.s	This DP is difficult to evaluate at this stage of the process. With the options as they currently stand, we believe that within each swathe there will be an available route that would meet this Design Principle. As such, all options have been assessed as fully meeting this DP. Further, more detailed, analysis will be conducted within Stage 3 of this process when the options have been refined to individual routes rather than high level swathes.	Fully	Partially	Not Met
13.	**PBN** – The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.	This DP is difficult to evaluate at this stage of the process. With the options as they currently stand, we believe that within each swathe there will be an available route that would meet this Design Principle. As such, all options have been assessed as fully meeting this DP. Further, more detailed, analysis will be conducted within Stage 3 of this process when the options have been refined to individual routes rather than high level swathes.	Fully	Partially	Not Met

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