
NATS
Advancing aviation,
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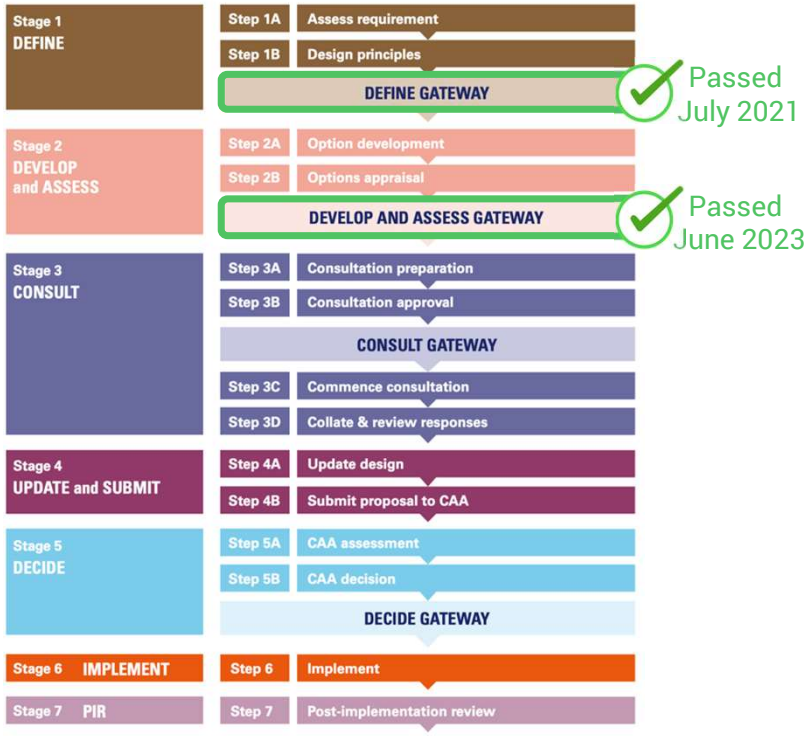
LTMA of the Future: Position Report
October 2023

Welcome



This slide pack presents our **early** Stage 3 work completed so far. We invite feedback on the proposed key elements and constraints within the overall scope of the design.

In this session, we shall take you through the material at quite high level and explain how to use the animated slides so that you can digest them in slower time.

Once all the engagement sessions have been completed, the full slide deck will be made available to all participants and feedback invited via an easy-to-use questionnaire.

Welcome

Introduction
The complexity of this airspace requires an informed, staged approach, considering inputs from key stakeholders as we work to design the most efficient and effective network, aligned with stakeholder aspirations as far as possible.

Purpose of this engagement:
To seek feedback on the initial development of the network design, specifically:

- the constraints and design elements which are underpinning the network design at this stage
- the impact of these network design features on the airport arrival options and design envelopes

Key Definitions:

- '**Constraint**' = a feature which limits the design area or not within scope of this project to change e.g. Danger Areas; FIR co-ordination points (COPs); airport runways.
- '**Element**' = a feature of the network design e.g. an ATS route or arrival structure (new or current)
- **'Design Envelope'** = an identified area of airspace, unique to each airport, assessed as viable for an arrival structure.

Welcome

Network Quadrants

The LTMA and adjoining airspace is presented as quadrants, to enable sufficient detail to be presented for each geographical area.

This is not an indication of a deployment schedule - the scope and sequence of each deployment has yet to be determined, although we know it will require at least 3 deployments.

Key Assumptions:

- At this stage, the design is based on traffic requirements for core (busy) hours of the day.
- The design is not yet developed enough to consider any potential revisions to airspace classifications.
- Network connectivity will be provided for airports.
- Airport design options below 7,000ft are being progressed by airport sponsors and outside the scope of the network design.

Graphics for illustrative purposes

Welcome

Airport Connectivity

The network design features we have developed so far means we can refine the airport design envelopes from those defined at Stage 2.

We have started work on some initial design concepts within these and assessed the viability of arrival structure types in these refined design envelopes.

Each airport has a refined design envelope, with reduced options for viable arrival structures.

As the network elements, and airport designs below 7,000ft progress, these will reduce further and will develop to design options rather than concepts.

Latest information for each airport's ACP can be found on the relevant CAA portal page (link on table).

Airport	ACP ID and Link
Biggin Hill	ACP-2018-69
Bournemouth	ACP-2019-043
Farnborough	ACP-2022-038
Gatwick	ACP-2018-60
Heathrow	ACP-2021-056
London City	ACP-2018-89
Luton	ACP-2018-70
Manston	ACP-2018-75
Northolt	ACP-2018-66
Southampton	ACP-2019-03
Southend	ACP-2018-90
Stansted	ACP-2019-01

Welcome

Feedback
This engagement material, with all airports, will be made available to our key stakeholders at this stage.

We invite feedback and would request you complete a feedback form.

We specifically welcome your thoughts on:
- Our assessment of the identified constraints and elements for the network design
- Our assessment of the refined design envelopes for each airport
- Our assessment of the reduced arrival structure options for each airport

We are very much still in a developmental stage as we progress our design concepts, assessing impacts, interdependencies and benefits of different options.

Feedback is essential to our design process, as we seek to develop an efficient, effective network design in support of our design principles.

Design Principles

The framework against which we are developing our designs

DP	Priority	Category	Design Principle
0	A	Safety	Safety is always the highest priority
1	B	Operational	The airspace will enable increased operational resilience
2	B	Economic	Optimise network fuel performance
3	B	Environmental	Optimise CO_2 emissions per flight
4	C	Environmental	Minimising of noise impacts due to LAMP influence will take place in accordance with local needs
5	C	Technical	The volume of controlled airspace required for LAMP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users
6	C	Technical	The impacts on GA and other civilian airspace users due to LAMP will be minimised
7	C	Technical	The impacts on MoD users due to LAMP will be minimised
8	B	Operational	Systemisation will deliver the optimal capacity and efficiency benefits
9	B	Technical	The main route network linking airport procedures with the En Route phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN
10	A	Policy	Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it

Legend/Glossary

Key to maps /diagrams within this presentation.
Routes and points shown are indicative only.

Icon	Key	Icon	Key
	LTMA inbound traffic connectivity point (FIR /wider network)		Route for LTMA inbound traffic
	LTMA outbound traffic connectivity point (FIR /wider network)		Route for LTMA outbound traffic
	Connectivity point – NEW		Network route - NEW
	Connectivity point – NEW planned as part of another ACP		Network route - NEW planned as part of another ACP
	Airspace elements - NEW		Highlighted airspace
	Military airspace		

Glossary of terms

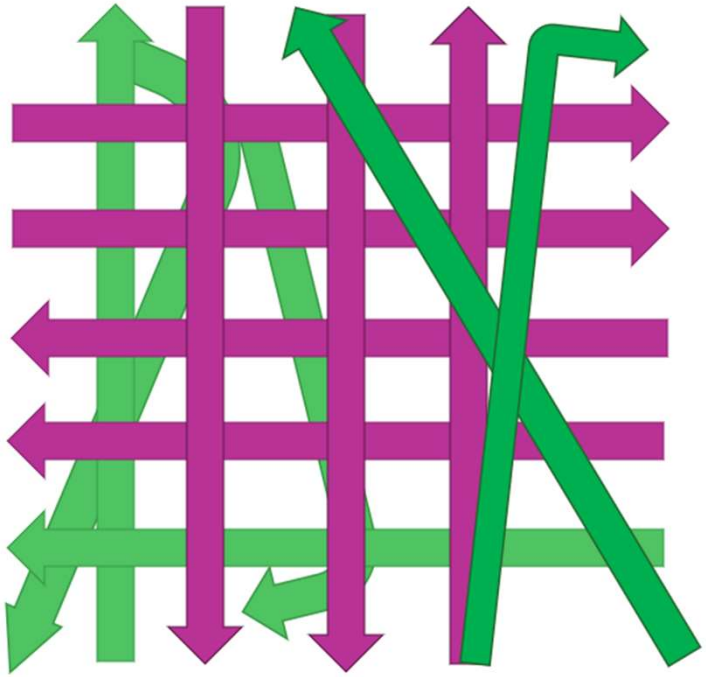
Acronym	Meaning
ACP	Airspace Change Process
ATA	Aerial Training Area
ATC	Air Traffic Control
ATS	Air Traffic Service
COP	Co-ordination Point
DA	Danger Area
FIR	Flight Information Region
FL	Flight Level
LFA	Local Flying Area
LTMA	London Terminal Control Area
MTA	Military Training Area
PBN	Performance Based Navigation

Network

Network Options

Stage 2 Recap Network

NERL concluded Stage 2 with one viable option for the network design:
Hybrid Systemisation



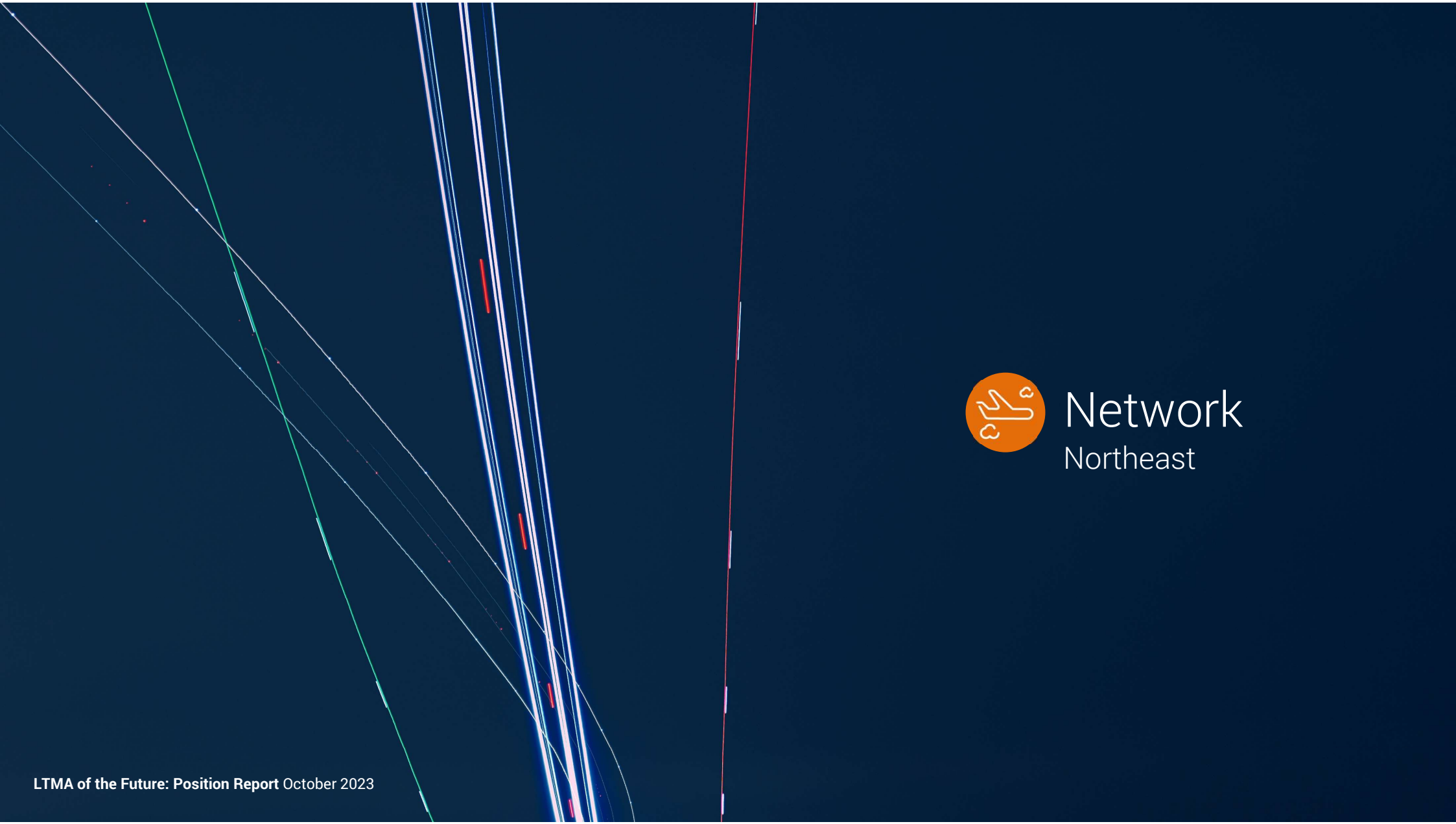
Purple arrows are indicative systemised routes/volumes

Green arrows are indicative of non systemised routes/non systemised volumes

Hybrid systemisation is based upon the predominant use of systemisation to create the route network, using an appropriate standard of PBN.

Some routes may not be wholly separated by design thereby creating a balance between capacity and environmental performance.

Where routes are not separated by design, this will be managed tactically, as per today, to ensure a safe and efficient service.



Network

Northeast

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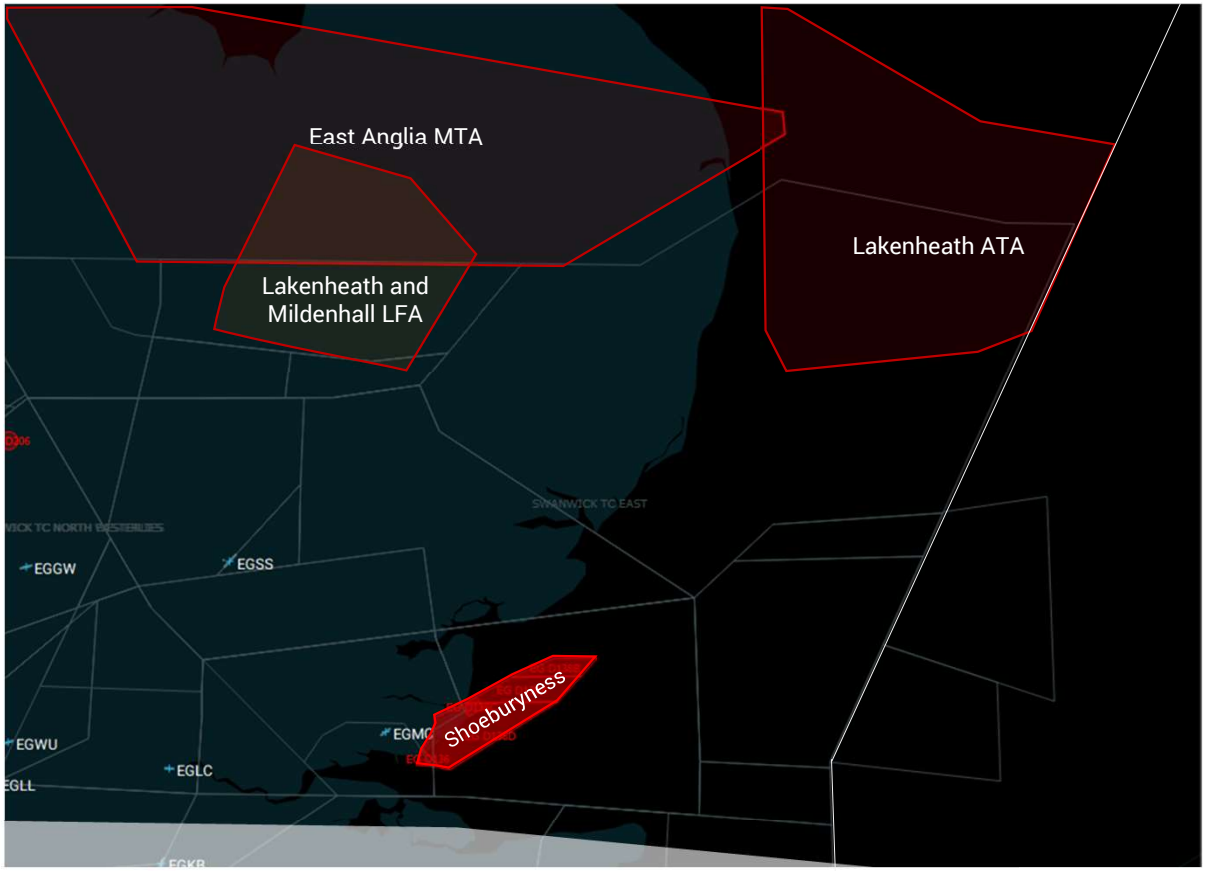
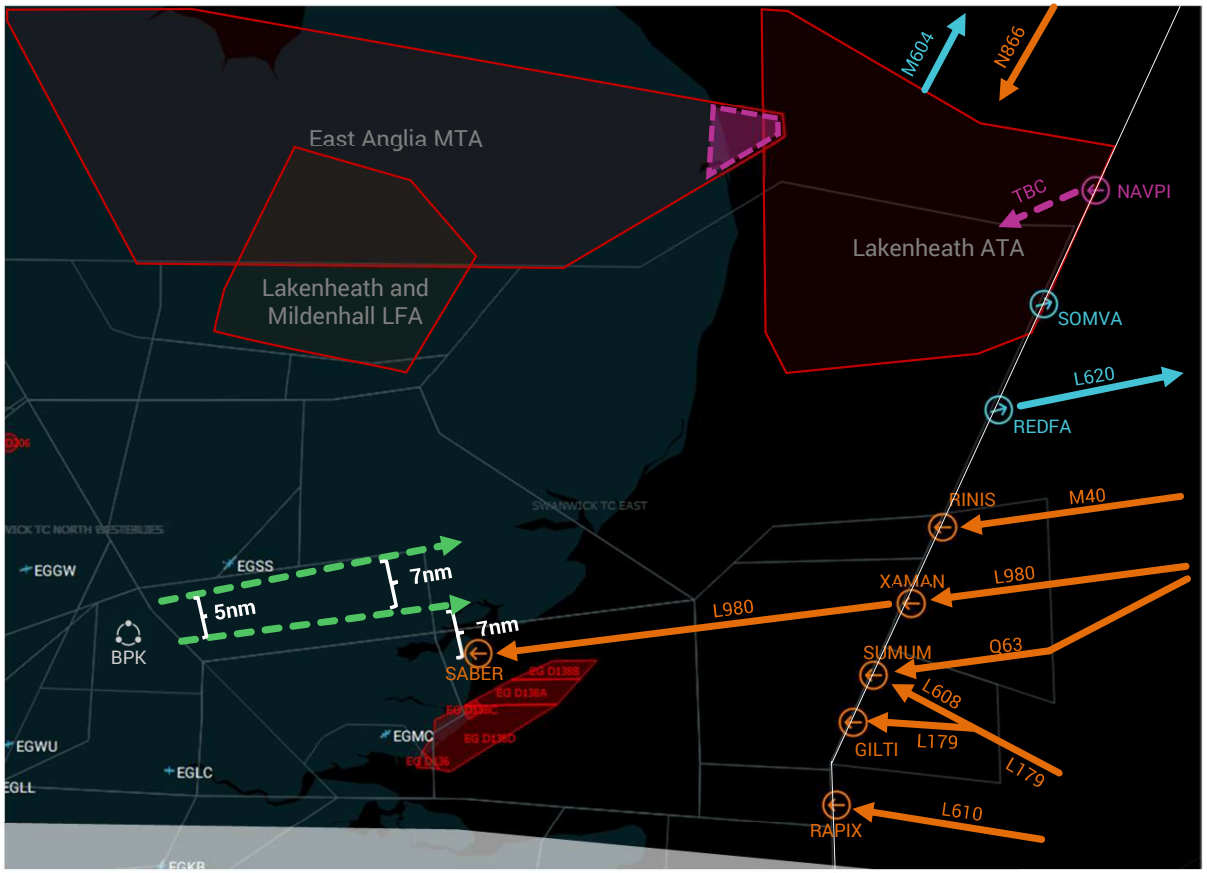
Network Quadrant Northeast

Constraints / Elements	Considerations / Rationale
Danger Areas	**Shoeburyness Complex:** Generally active up to 6,000ft / 13,000ft. Occasionally active to 60,000ft. • Any routes designed over the DA complex will require alternatives for when the DA is active at higher levels, providing sufficient capacity for westbound flows.
Military Training Areas	**East Anglia Military Training Area (MTA):** Active FL245 to FL660. • Traffic can be routed under the MTA, and up to the boundary. • Any routes designed through the MTA will require alternatives for when the MTA is active at impacted levels. **Lakenheath and Mildenhall Local Flying Area (LFA):** Utilised up to FL110. • Routes crossing this must be FL120 or above. **Lakenheath Aerial Training Area (ATA):** Utilised up to FL195 / FL245. • Routes crossing the southern portion must be FL200 or above.



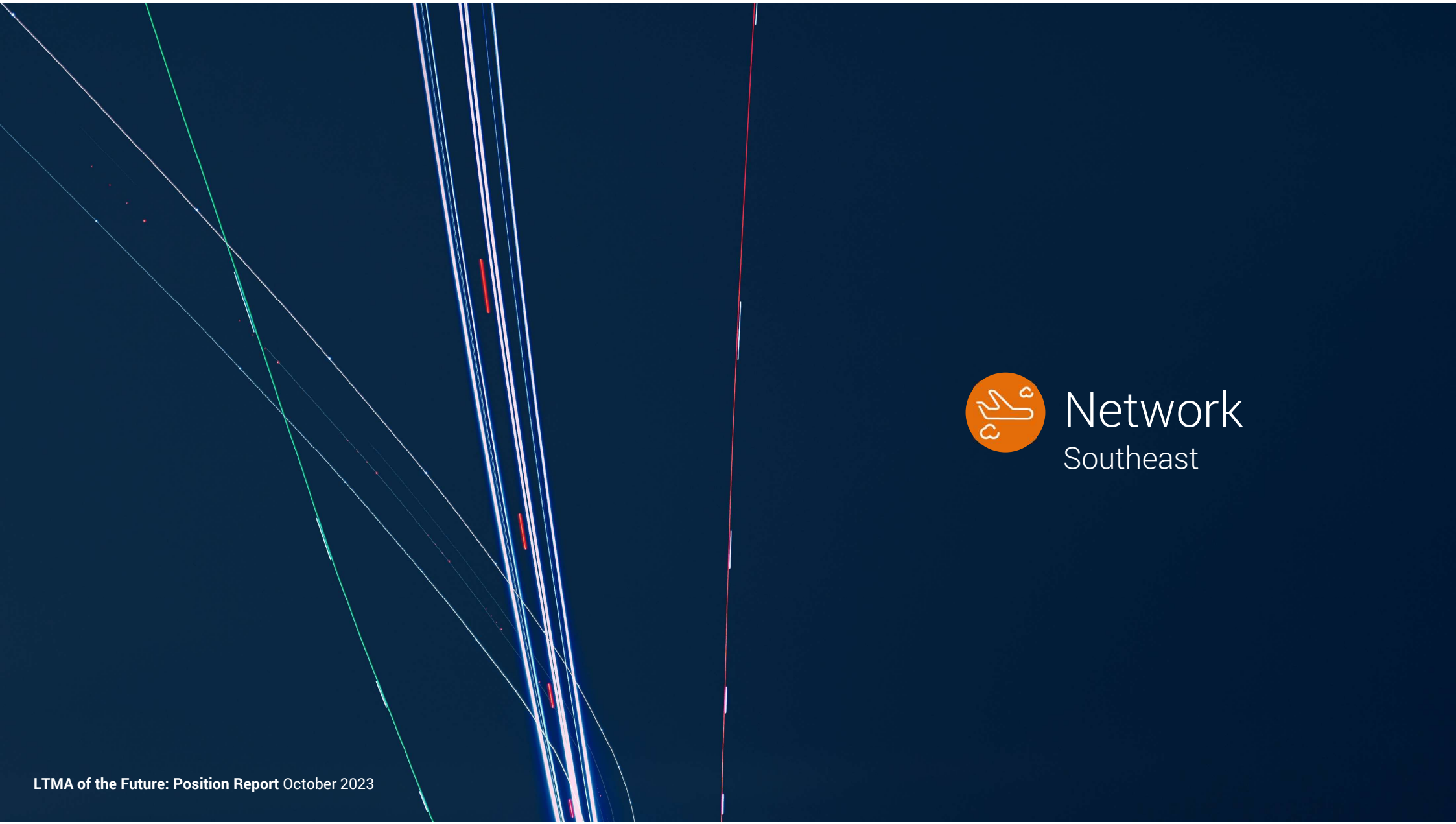
Network Quadrant Northeast

Constraints / Elements	Considerations / Rationale
Network Connectivity	Network flow from the northeast will remain to connect with current day routes. Network changes at the FIR boundary are not possible without neighbouring ANSP agreement. • Routes that cross the FIR boundary will likely remain consistent with today.
Network Connectivity: Impact of other ACPs	In a separate ACP[1], NERL are seeking to implement changes in this airspace which will impact this design: • New COP at NAVPI, with ATS route connectivity, allowing earlier separation of EGGW and EGSS inbounds. • Revising the East Anglian MTA boundary to provide more direct ATS routings.
Network Routes / systemisation	Route L980 proposed to be retained east of SABER. • This route already provides the minimum separation from the Shoeburyness DA complex. Current airspace is extremely complex at BPK. • Based on CAP1385 separation, two eastbound departure routes could replace today's single route.



Routes/revisions are indicative only
[1]OSEP CLN ACP – ACP-2021-061

Graphics for illustrative purposes



Network
Southeast

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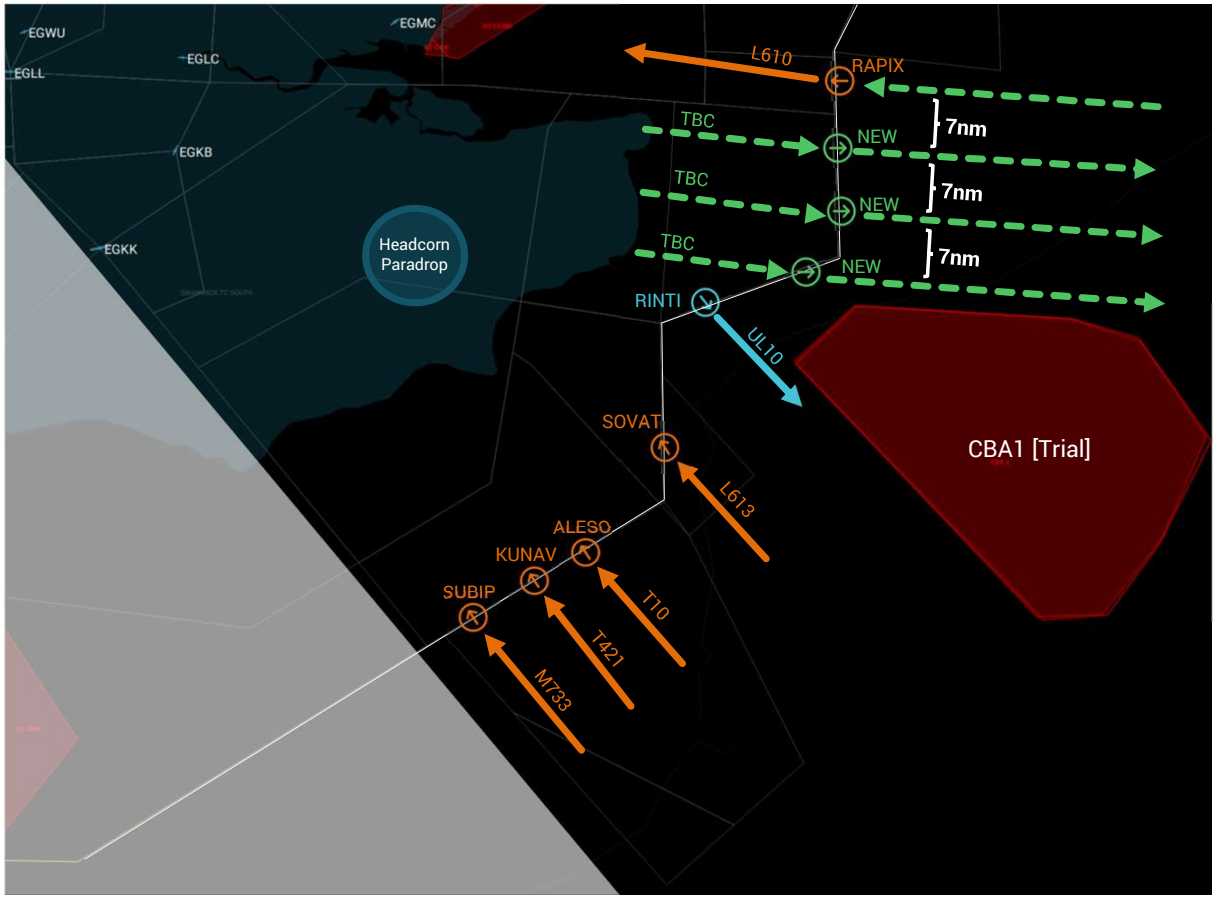
Network Quadrant Southeast

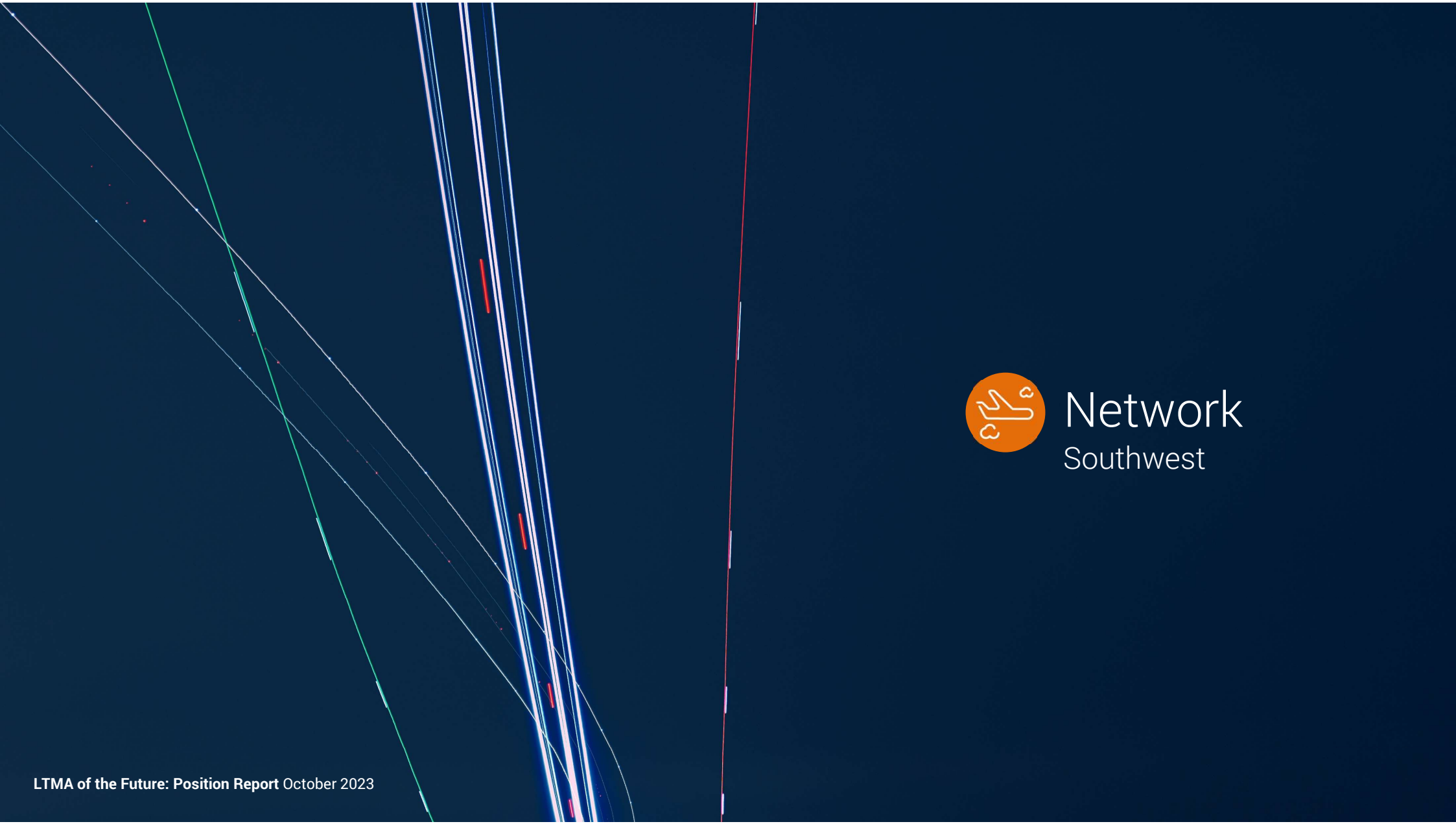
Constraints / Elements	Considerations / Rationale
Danger Areas	**CBA1:** • Trial of new CBA1 volume starts 30th November 2023 for 12 months. • Activation level will vary but unlikely to be more than a few levels at any one time up to FL355.
Paradropping Sites	**Headcorn Paradropping site:** Operationally active up to FL120. • Procedures that accommodate Headcorn Paradropping site will need to be retained.
Network Connectivity	Assuming the CBA1 trial is made permanent, NERL[1] will seek to implement: **Arrival Flows:** • Realignment of the L610, east of RAPIX. • Other flows remaining consistent with today. **Departure Flows:** • Based on CAP1385 separation, three eastbound departure routes could replace today's two routes. Traffic will be orientated by departure airfield with Maastricht accepting responsibility for crossing the traffic over as required further downstream (provisionally agreed with Brussels and Maastricht). • Unrestricted use of UL10 (limited destinations due to French RAD).



Routes are indicative only

1 These changes will be in scope of this project, if not implemented before.

Graphics for illustrative purposes



Network Southwest

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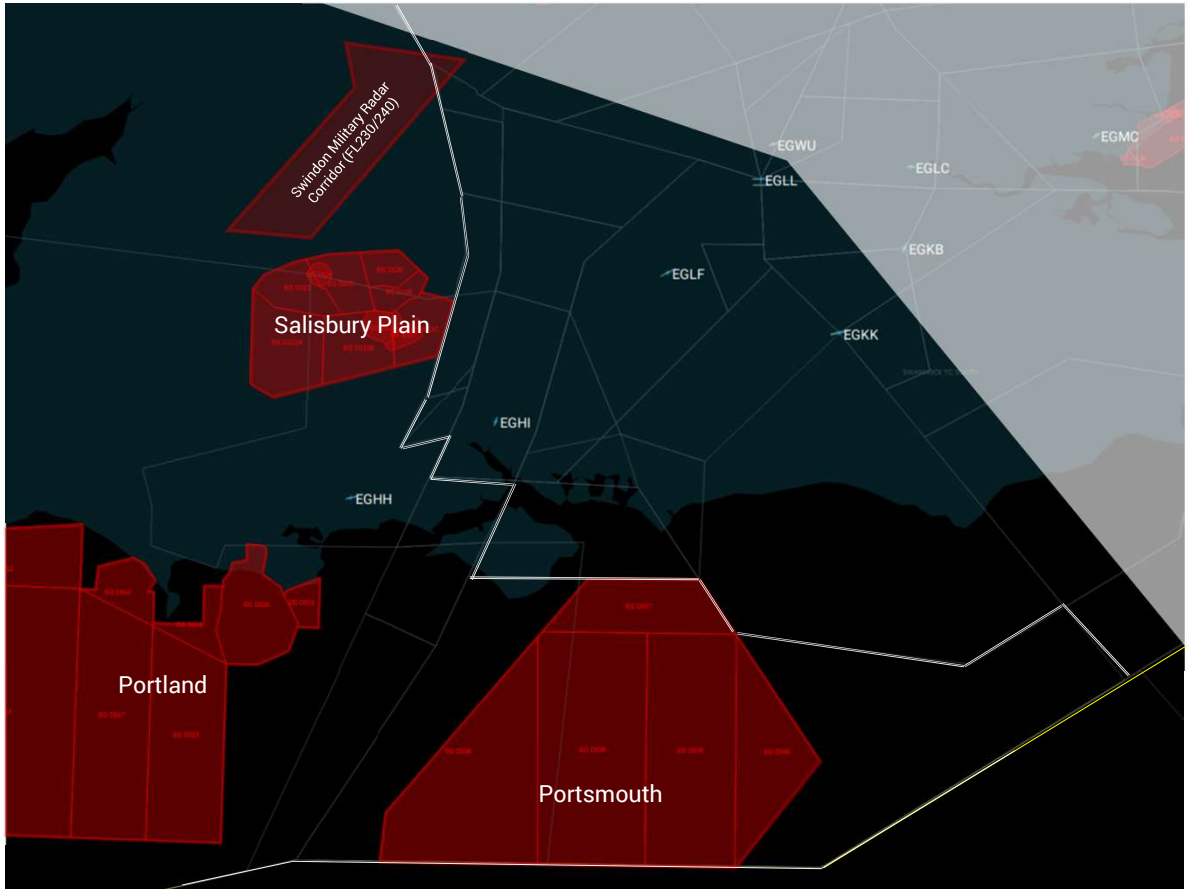
Network Quadrant Southwest

Constraints / Elements	Considerations / Rationale
Danger Areas	**Salisbury Plain Complex:** Various activations up to unlimited. **Portland Complex:** Active up to 22,000ft. Occasionally up to 55,000ft. **Portsmouth Complex:** Active up to 10,000ft. Occasionally up to 55,000ft. • Any routes designed through the DA complex will require alternatives for when the DAs are active at impacted levels.
Military Corridors	**Swindon Military Crossing Corridor** Established at FL230 / 240. • No changes proposed at this point in the design. • Any routes designed at FL230 / FL240 will require alternatives for when the corridor is active at impacted levels.

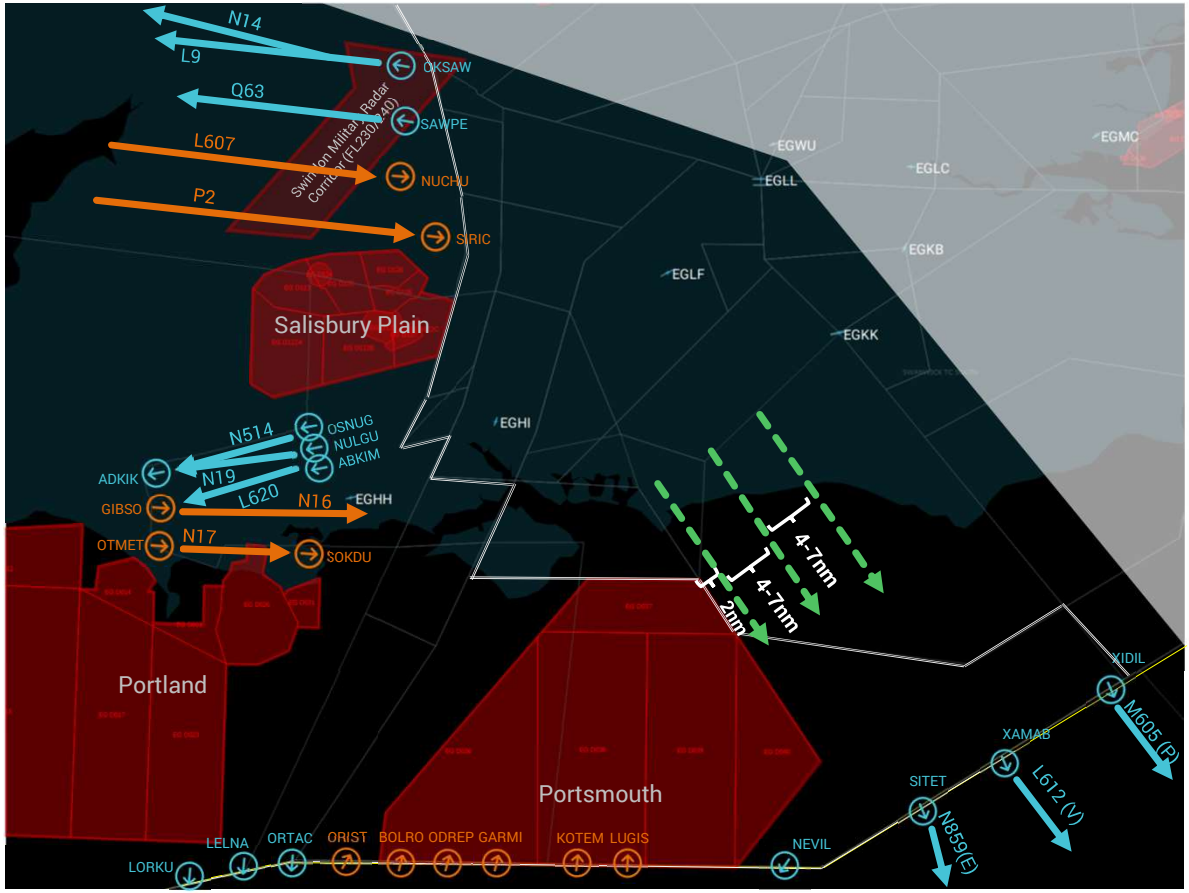


Routes are indicative only

Graphics for illustrative purposes

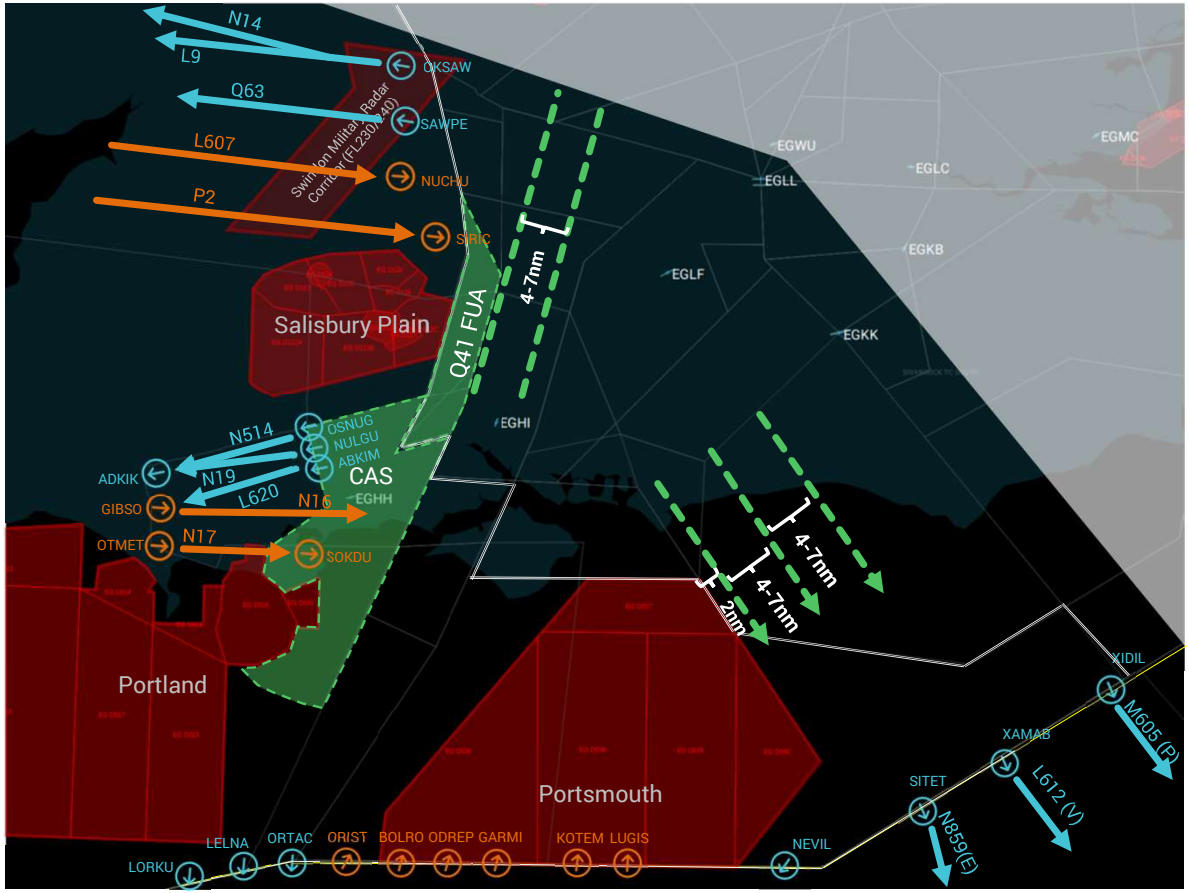
Network Quadrant Southwest

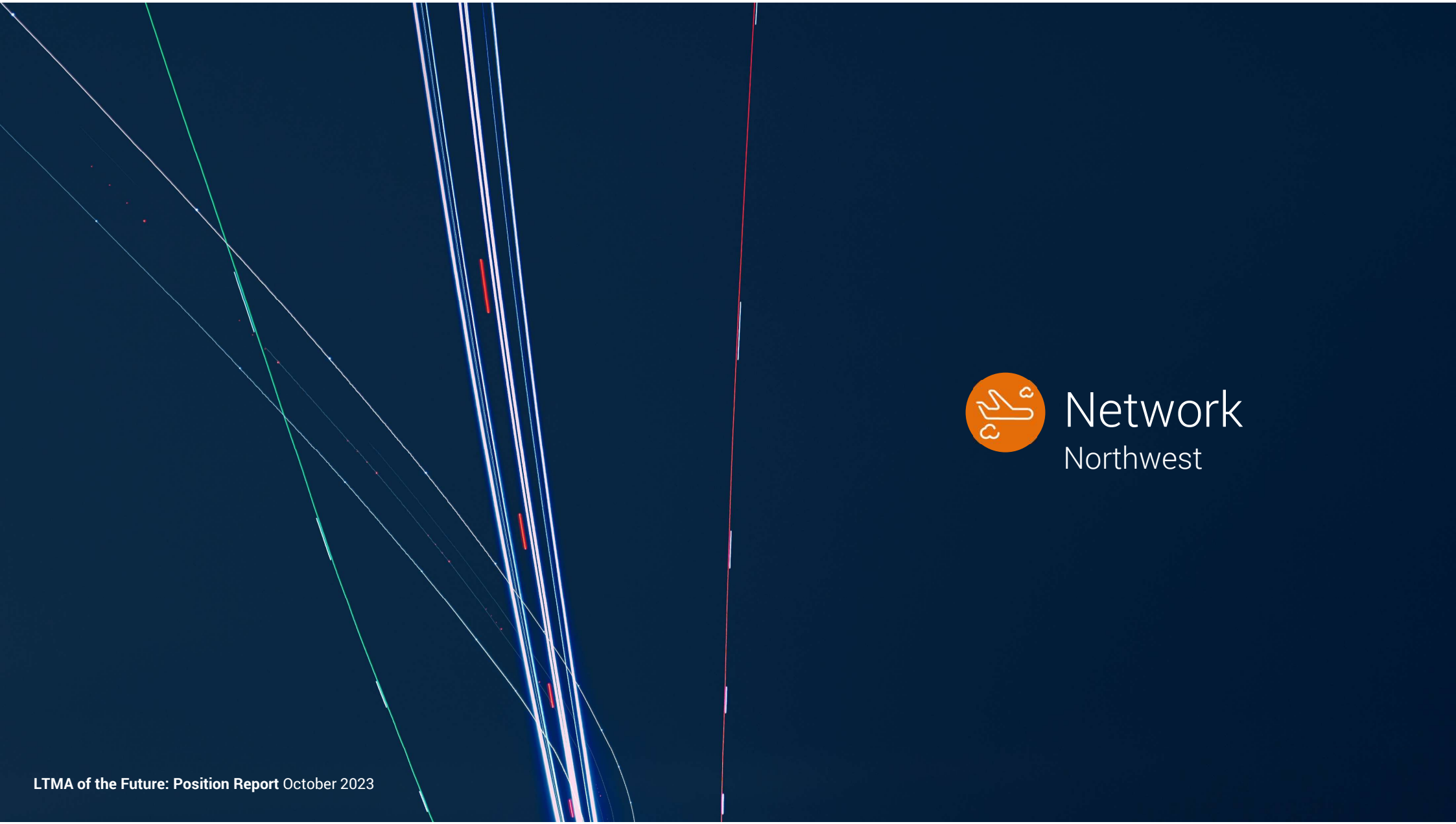
Constraints / Elements	Considerations / Rationale
Network Connectivity	Network changes at the FIR boundary are not possible without neighbouring ANSP agreement. • Routes that cross the FIR boundary will likely remain consistent with today. Project must retain connectivity from the LTMA to the wider UK network. • Linking with systemised airspace in West.
Systemised Routes	Requirement for traffic routing south to be orientated by destination (ETRAT, VEULE & DPE) by the FIR boundary. • 3 systemised routes are proposed to be positioned parallel to the Portsmouth DA complex. • Traffic switchover to the correct route to exit the UK FIR is currently in design development. • A safety case will be required for a 2nm buffer (in line with current route to the west of complex).



Network Quadrant Southwest

Constraints / Elements	Considerations / Rationale
Flexible Use Airspace	Q41 – current parameters restrict the use of this airspace. • NERL would like to explore the feasibility of changing the current FUA airspace to become flight plannable. • The addition of airspace in this area could facilitate 2 systemised parallel routes north/south reducing ATC workload and complexity.
Controlled Airspace	Current airspace restrictions around EGHH don't allow for efficient arrival and departure routes which keep aircraft inside CAS at all times. • NERL would like to explore the feasibility of providing contiguous airspace to enhance safety in this region.





Network Northwest

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Network Quadrants Northwest

Constraints / Elements	Considerations / Rationale
Danger Areas	**Weston-on-the-Green (D129):** Active up to FL120. • Any routes designed through the DA will require alternatives for when the DA is active at impacted levels.
Military Training Areas	**East Anglia Military Training Area (MTA):** Active FL245 and above. • Traffic can be routed under the MTA. • Any routes designed through the MTA will require alternatives for when the MTA is active at impacted levels.

Graphics for illustrative purposes

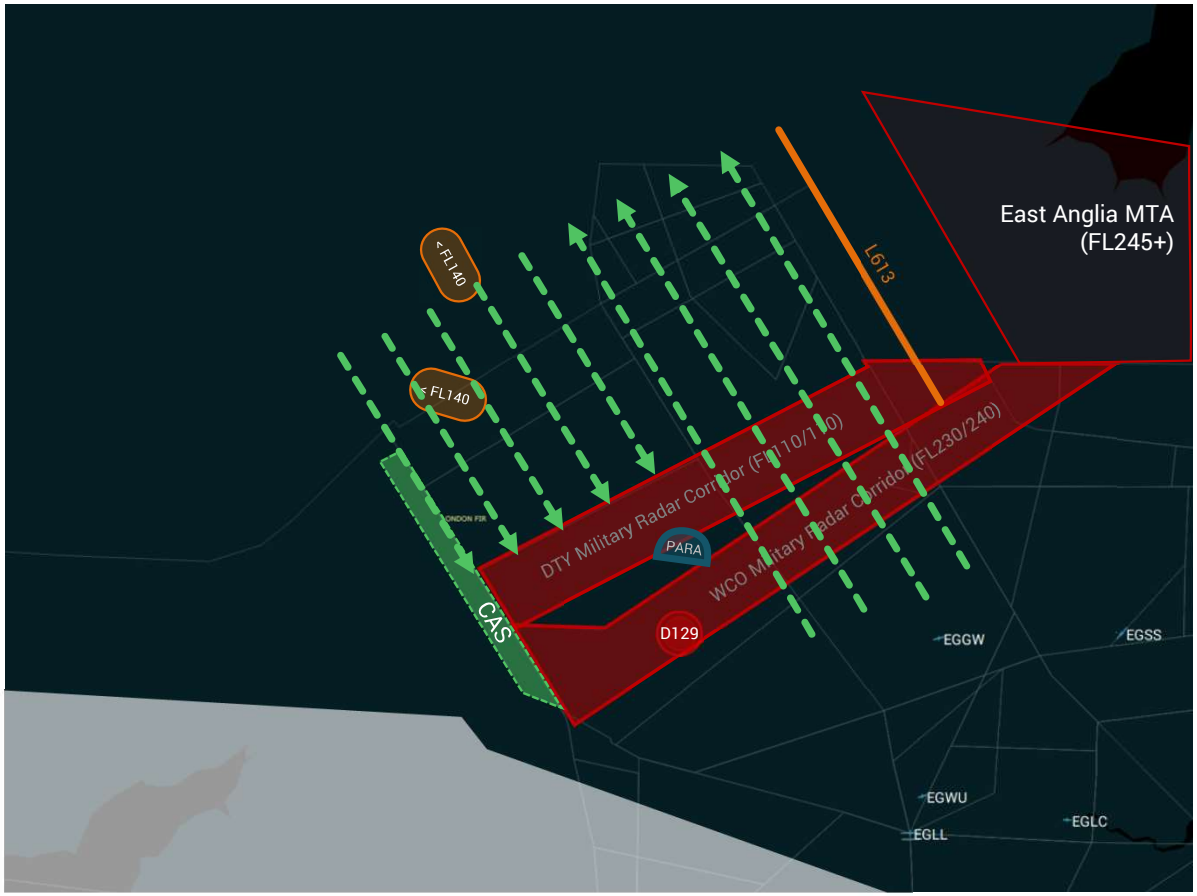
Network Quadrants Northwest

Constraints / Elements	Considerations / Rationale
Military Corridors	**DTY Military Radar Crossing Corridor:** Established at FL100 / FL110. • No changes proposed at this point in the design. • Any routes designed at FL100 / FL110 will require alternatives for when the corridor is active at impacted levels. **WCO Military Radar Crossing Corridor:** Established at FL230 / FL240. • No changes proposed at this point in the design. • Any routes designed at FL230 / FL240 will require alternatives for when the corridor is active at impacted levels.
Paradropping Site	**Hinton-in-the-Hedges Paradropping site:** Operations up to FL150. • Procedures that accommodate Hinton-in-the-Hedges Paradropping site will need to be retained.

Graphics for illustrative purposes

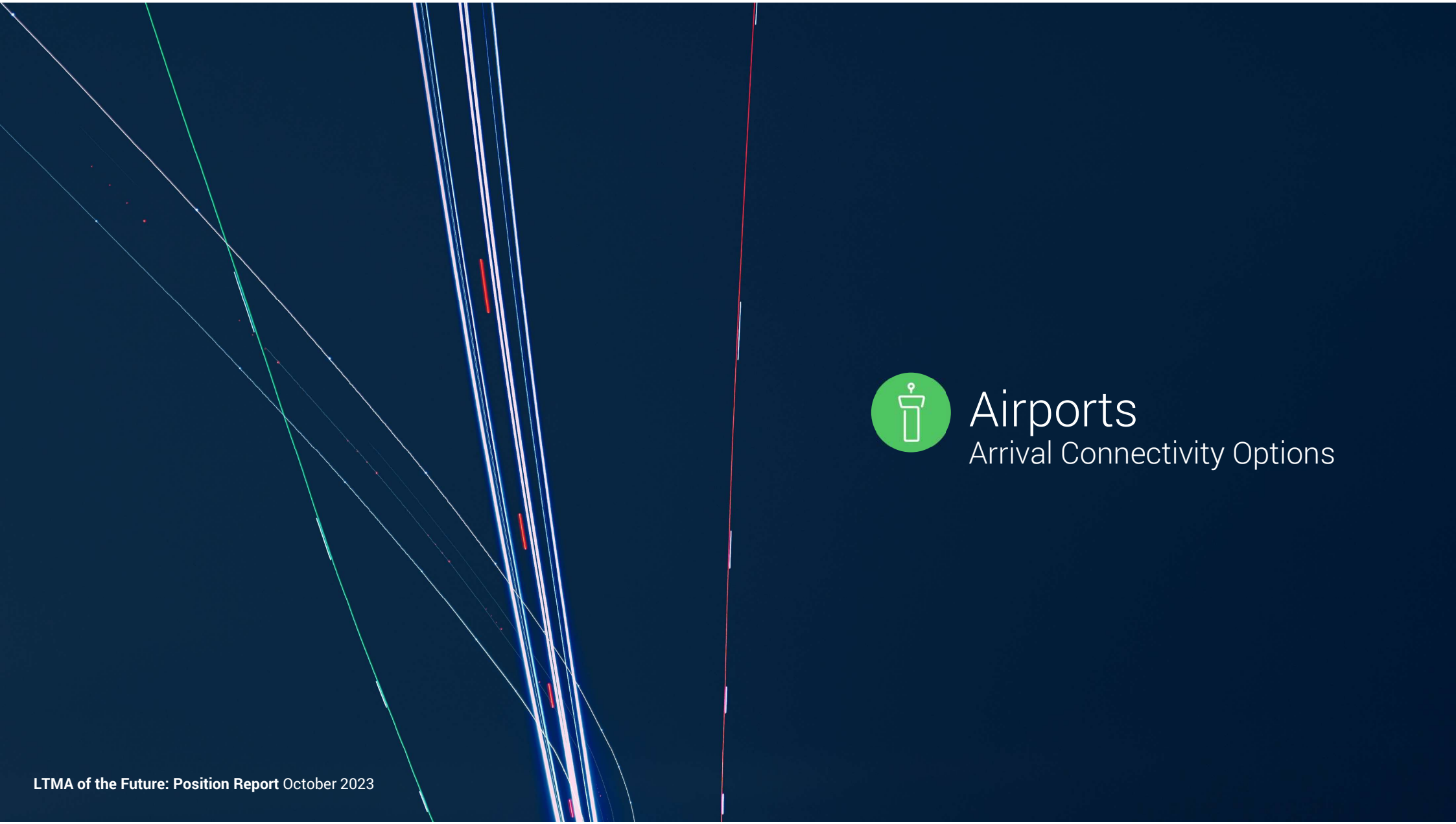
Network Quadrants Northwest

Constraints / Elements	Considerations / Rationale
Airport Constraint	Birmingham (EGBB) do not have an active ACP. • Holding structures (up to FL140) are a fixed constraint. • Any network changes must ensure there will be no changes to traffic flows below 7,000ft.
Network Connectivity / Systemised Routes	L613 will potentially be retained west of East Anglia MTA. • This route already provides the minimum separation from the MTA. Systemised 'spine' connecting LTMA to MTMA. • Based on CAP1385 separation, up to 10 routes can be placed within the 'spine'. • Indicative primary flow directions shown based on current network development. • Designs will need to be aligned with the MTMA[1] project.
Controlled Airspace	Additional CAS in COTS CTA. • Required to enable 10 routes within 'spine'.



1 Future Airspace Strategy Implementation - MTMA ACP-2019-77

Graphics for illustrative purposes



Airports

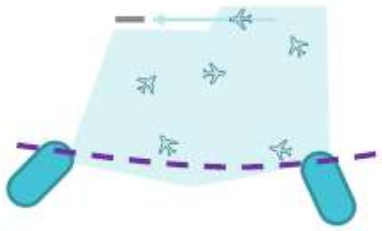
Arrival Connectivity Options

Stage 2 Recap Arrival Structures

There were two key aspects to determine for each airport:
the possible types of arrival structure which could be viable, and the geographic feasibility.

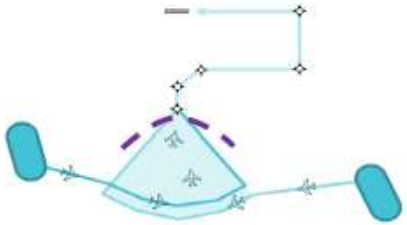
Optimised[9] Holds

Illustration of network/airport boundary (indicative c.7,000ft)



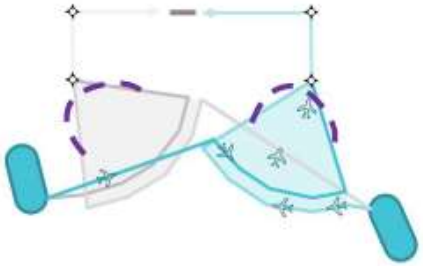
Point Merge

Illustration of network/airport boundary (indicative c.7,000ft)



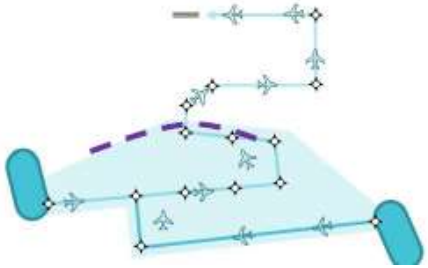
Switch Merge

Illustration of network/airport boundary (indicative c.7,000ft)



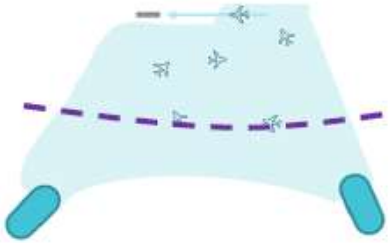
Trombone

Illustration of network/airport boundary (indicative c.7,000ft)



Holds Further Out

Illustration of network/airport boundary (indicative c.7,000ft)

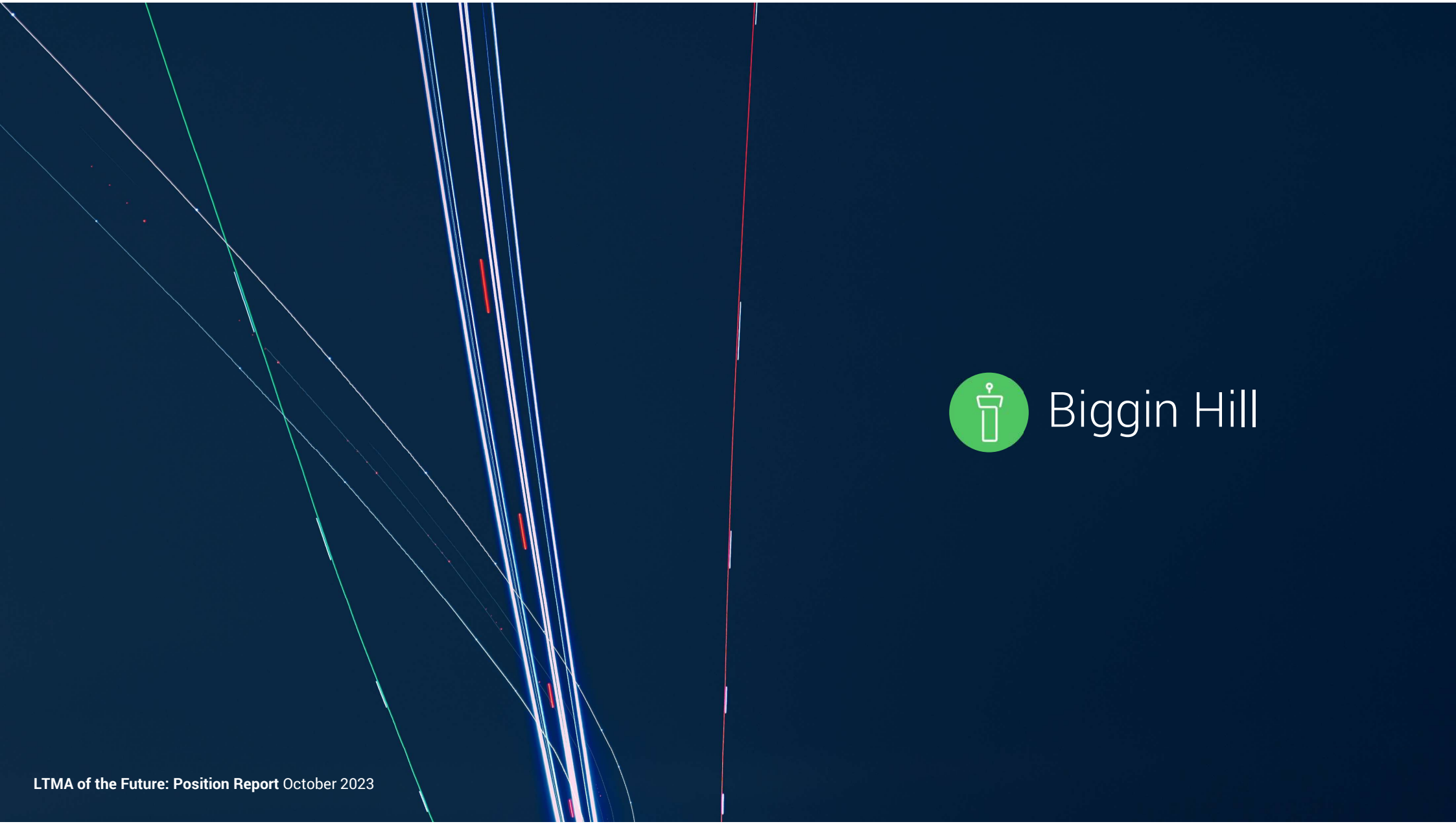


Initially, five arrival structure types were identified as being viable options for potential arrival connectivity across the LTMA airports, but 'Holds Further Out' and 'Trombones' were removed following SME assessment.

NERL therefore concluded Stage 2 with three viable arrival structure types for potential arrival connectivity (at and above 7,000ft) for each LTMA airport.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes



Biggin Hill

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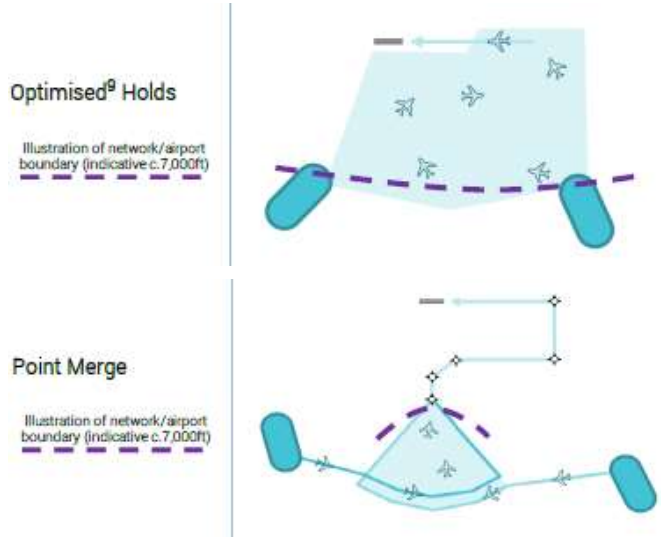
Stage 2 Recap Biggin Hill

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Biggin Hill:

Biggin Hill Design Options progressed to Stage 3
Inner Holds – Northeast
Inner Holds – East
Inner Holds – Southeast
Inner Holds – Southwest (Shared)
Inner Holds – West (Shared)
Point Merge – Northeast (Maybe shared)
Point Merge – East (Do Minimum) (Maybe shared)

NERL also assessed that based on the required traffic loading Biggin Hill would require proprietary or shared access to at least **one** holding facility within the network, either attached to an RMA or attached to a systemised arrival structure.

Biggin Hill currently has shared access to a Point Merge structure and the associated holds within the network.



To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Biggin Hill arrival connectivity options.

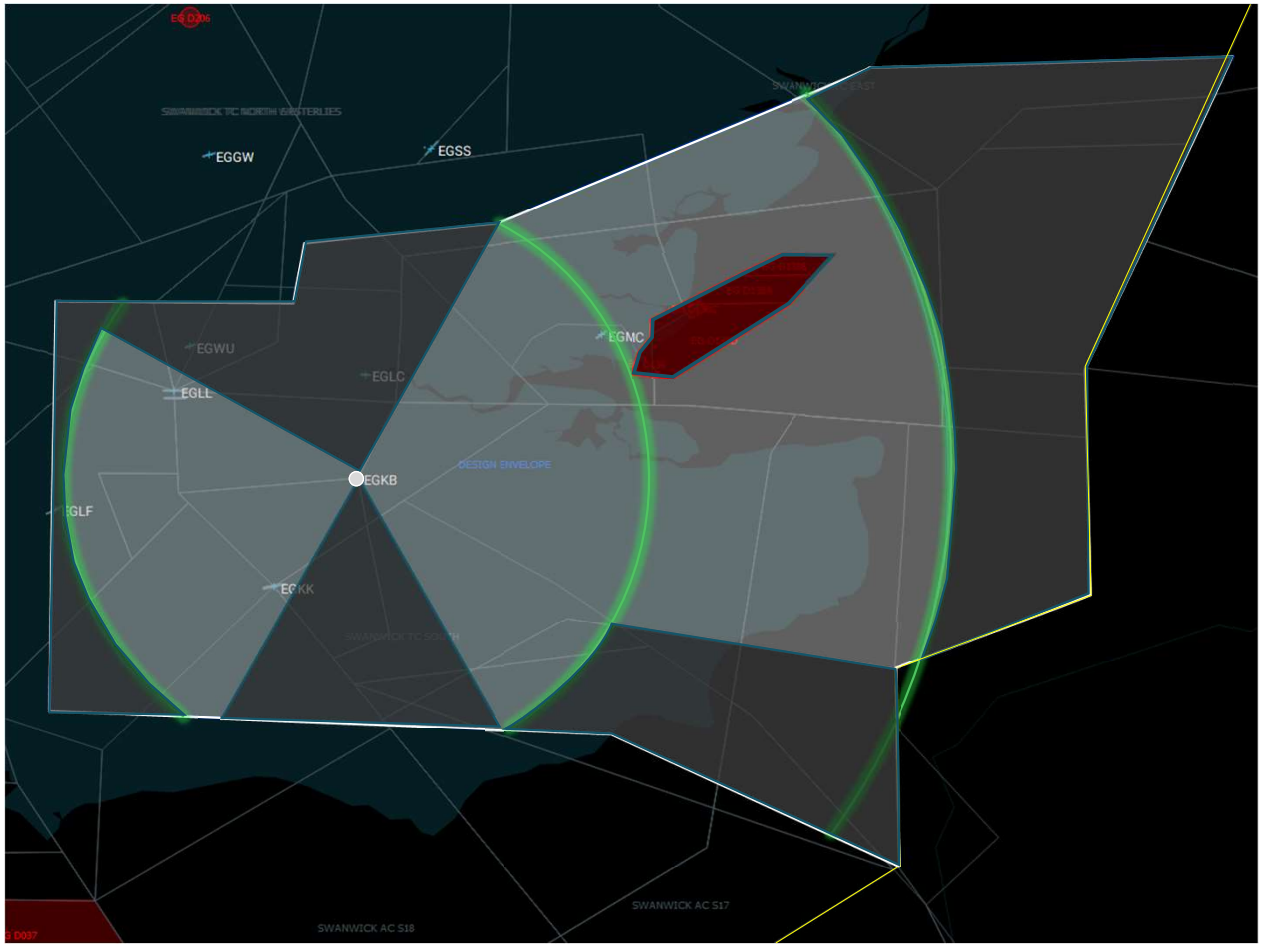
Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

Refining the Design Envelope Biggin Hill

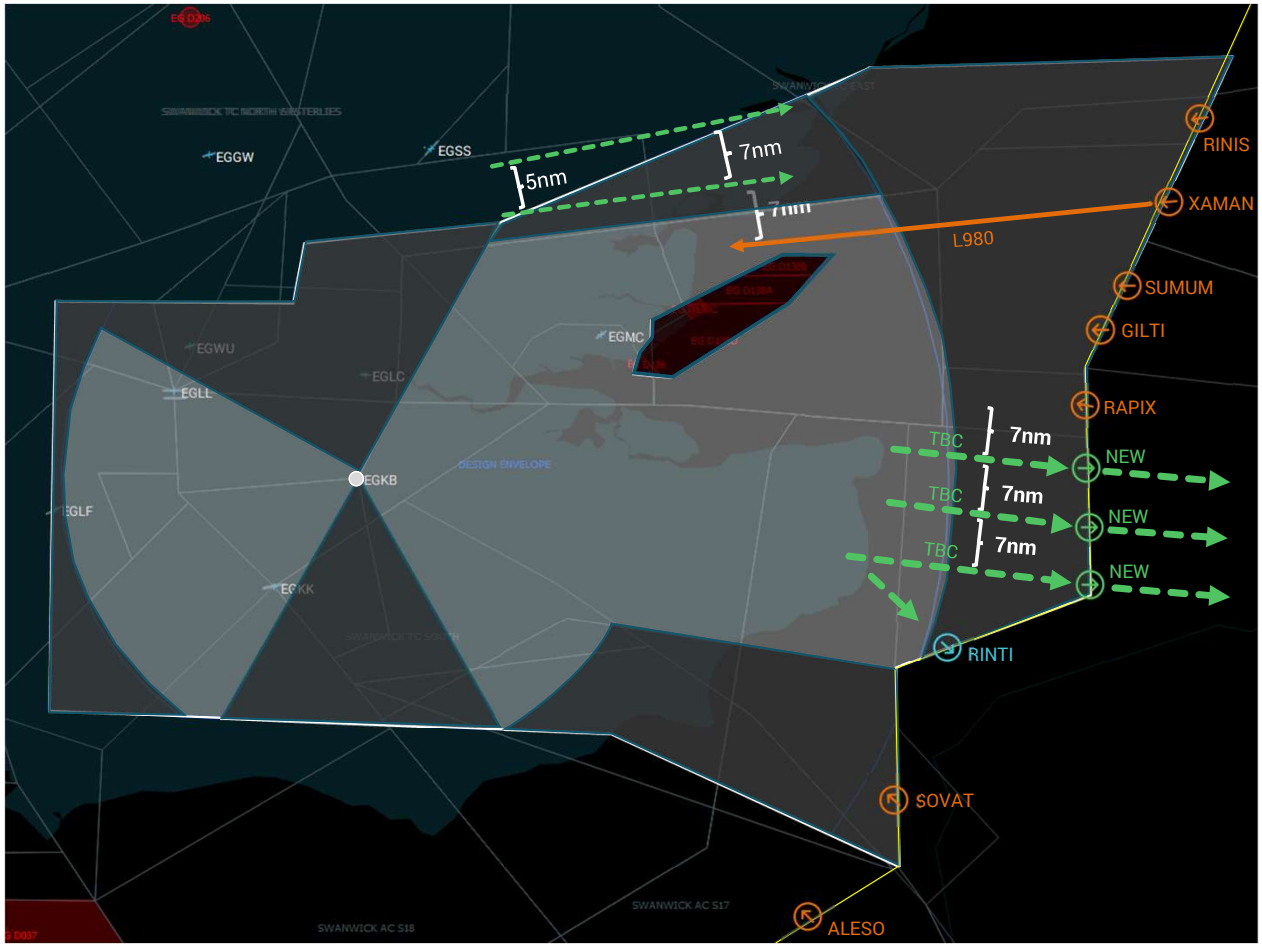
Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Inner holds were progressed for **northeast, east, southeast, southwest** and **west**. • Areas within 30nm not progressed from Stage 2 removed from design envelope. • The airspace to the west of the airport will only be viable for an inner hold; any hold here would be shared with another airport, for traffic from the west only and in addition to a structure to the east. Point Merge in the **northeast** or **east** was progressed from Stage 2. The current Point Merge is within 60nm of the airfield. NERL considers that any development or optimisation of a Point Merge would unlikely result in the structure being located beyond this. • Design envelope is reduced to reflect this.
Danger Areas	**Shoeburyness Complex:** Generally active up to 6,000ft / 13,000ft. Occasionally active to 60,000ft. • Due to the nature and frequency of those activities taking place, this area will be excluded from the design envelope. Other danger areas shown are out of the vertical or lateral scope of the design envelope.



Graphics for illustrative purposes

Refining the Design Envelope Biggin Hill

Constraint / Design Element	Considerations / Rationale
Network Routes / Flows	**Departure Flows:** Proposed network departure flow to the southeast: • Network design proposes 3 systemised routes. • Connectivity for EGKB departures would be provided. • These routes would not prohibit an arrival structure within this area as levels could be deconflicted. Proposed network departure flow to the northeast: • Network design proposes 2 systemised routes. • It would not be suitable to place a structure here due to level conflictions. • This area is removed from the design envelope. **Arrival Flows:** Network inbound flow from the east via current COPs. • Proposed to retain L980 inbound route as today. • No current limitation on design envelope whilst network is in development. • Any arrival structure should not obstruct these traffic flows to reduce complexity.



Graphics for illustrative purposes

Options Summary Biggin Hill

NERL proposes to progress an Inner Hold or a Point Merge within the refined Design Envelope (indicated in white).

These facilities could be shared with another airport.

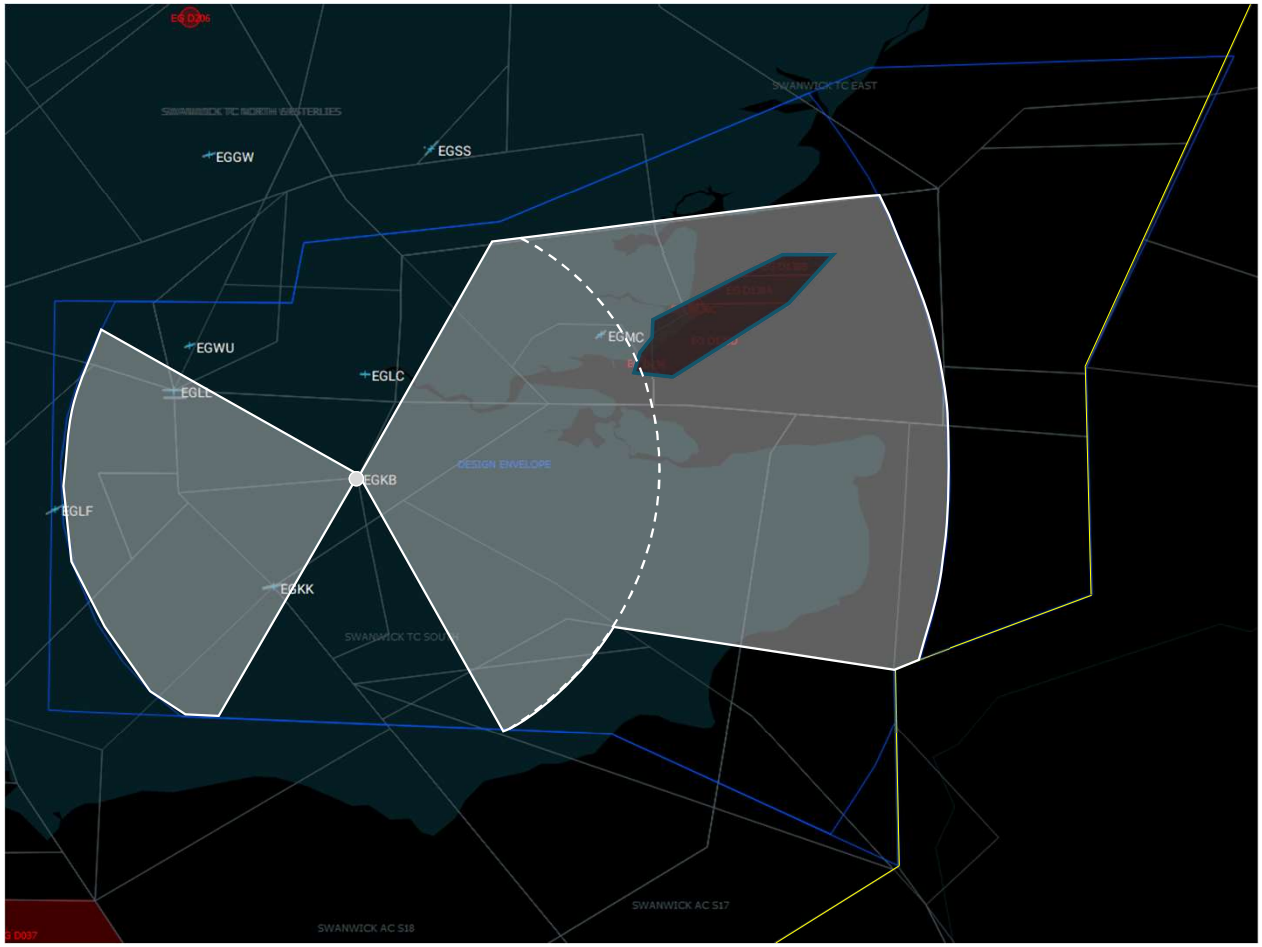
NERL understands the aspirations of Biggin Hill for an arrival route from the west and is committed to exploring the feasibility of this at levels within the network as the holistic designs mature.

Further constraints may apply to this Design Envelope, in particular the departing and arriving flows for London City and Southend. NERL would like to work closely with the stakeholders to explore a workable option or combination of options that benefits all parties in this area.

NERL also recognises that the arrival flows to the current Point Merge structure were designed to cross the departure flows in locations suitable for the current network. NERL will adapt or change these to better meet the demands of the future network and Biggin Hill's arrival structure as the holistic designs mature.

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.



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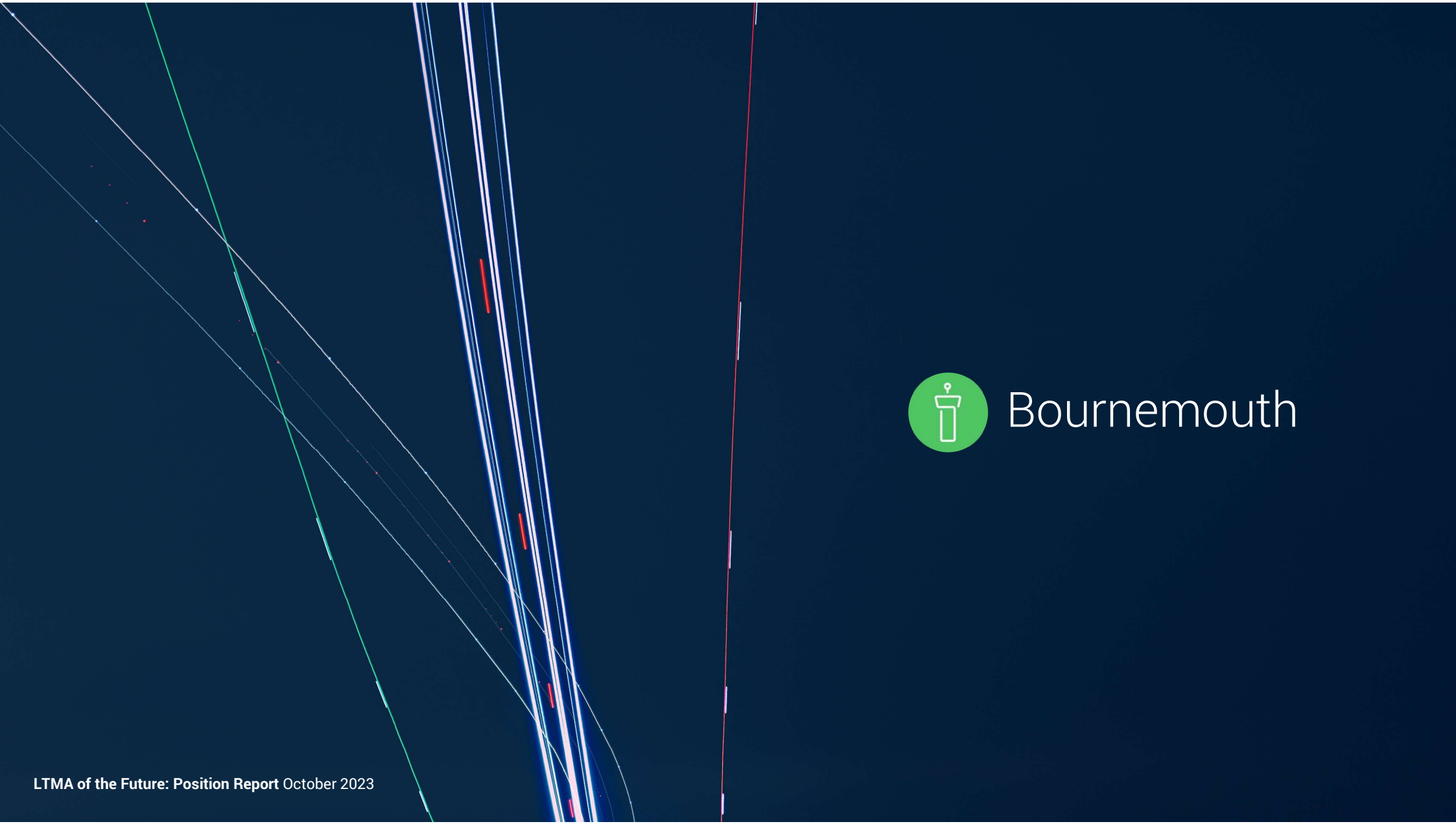


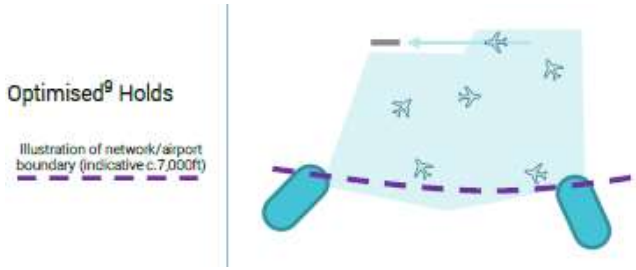
Bournemouth

LTMA of the Future: Position Report October 2023

Stage 2 Recap Bournemouth

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Bournemouth:

Bournemouth Design Options progressed to Stage 3
Inner Holds – Northeast (Maybe shared)
Inner Holds – East (Do Minimum) (Maybe shared)
Inner Holds – Southeast (Maybe shared)
Inner Holds – South (Maybe shared)



NERL also assessed that based on the required traffic loading Bournemouth would require proprietary or shared access to at least **one** holding facility within the network, either attached to an RMA or attached to a systemised arrival structure.

Bournemouth currently has shared access to **one** holding facility within the network, but it is rarely used.

To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Bournemouth arrival connectivity options.

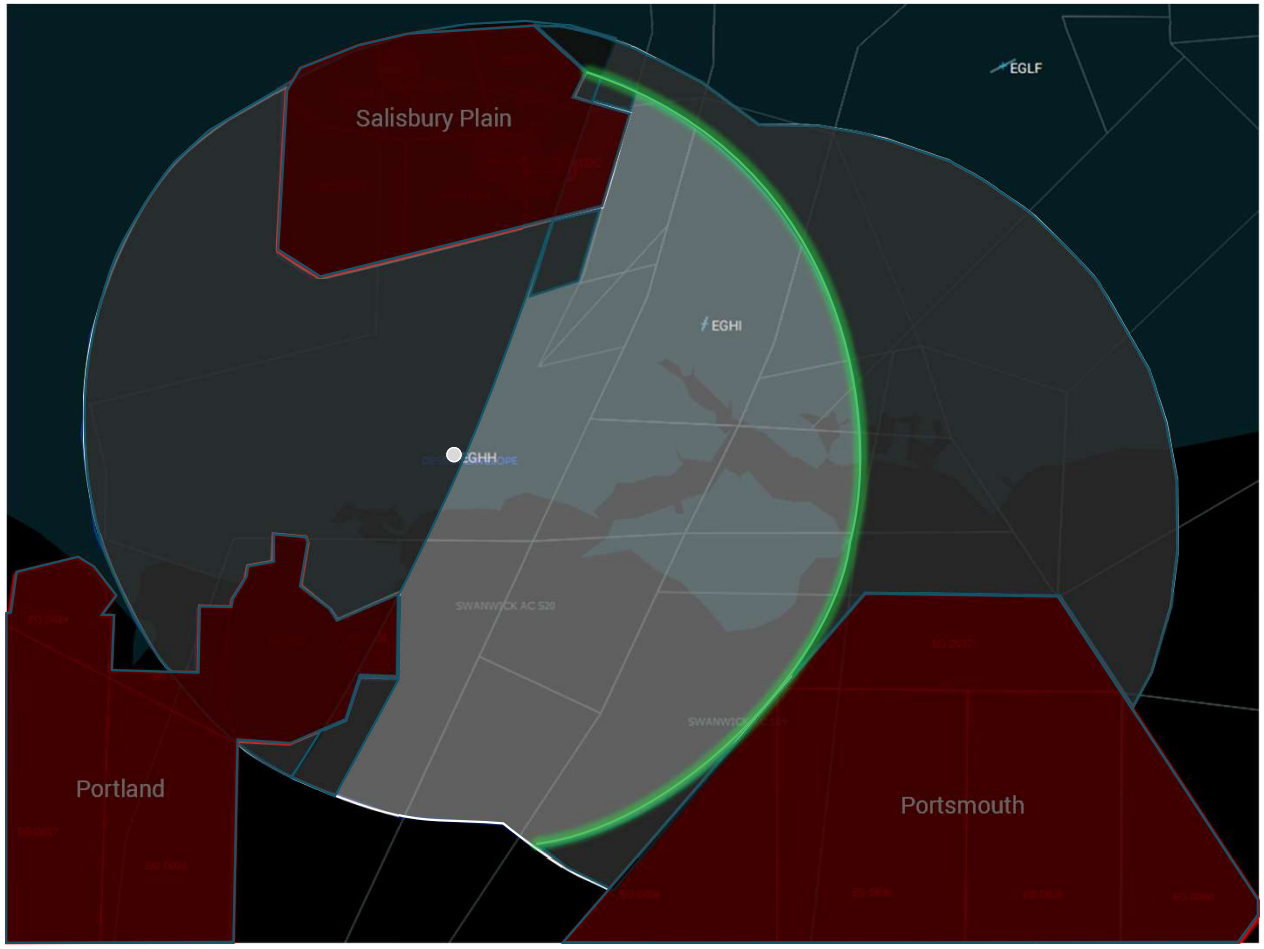
Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

Refining the Design Envelope Bournemouth

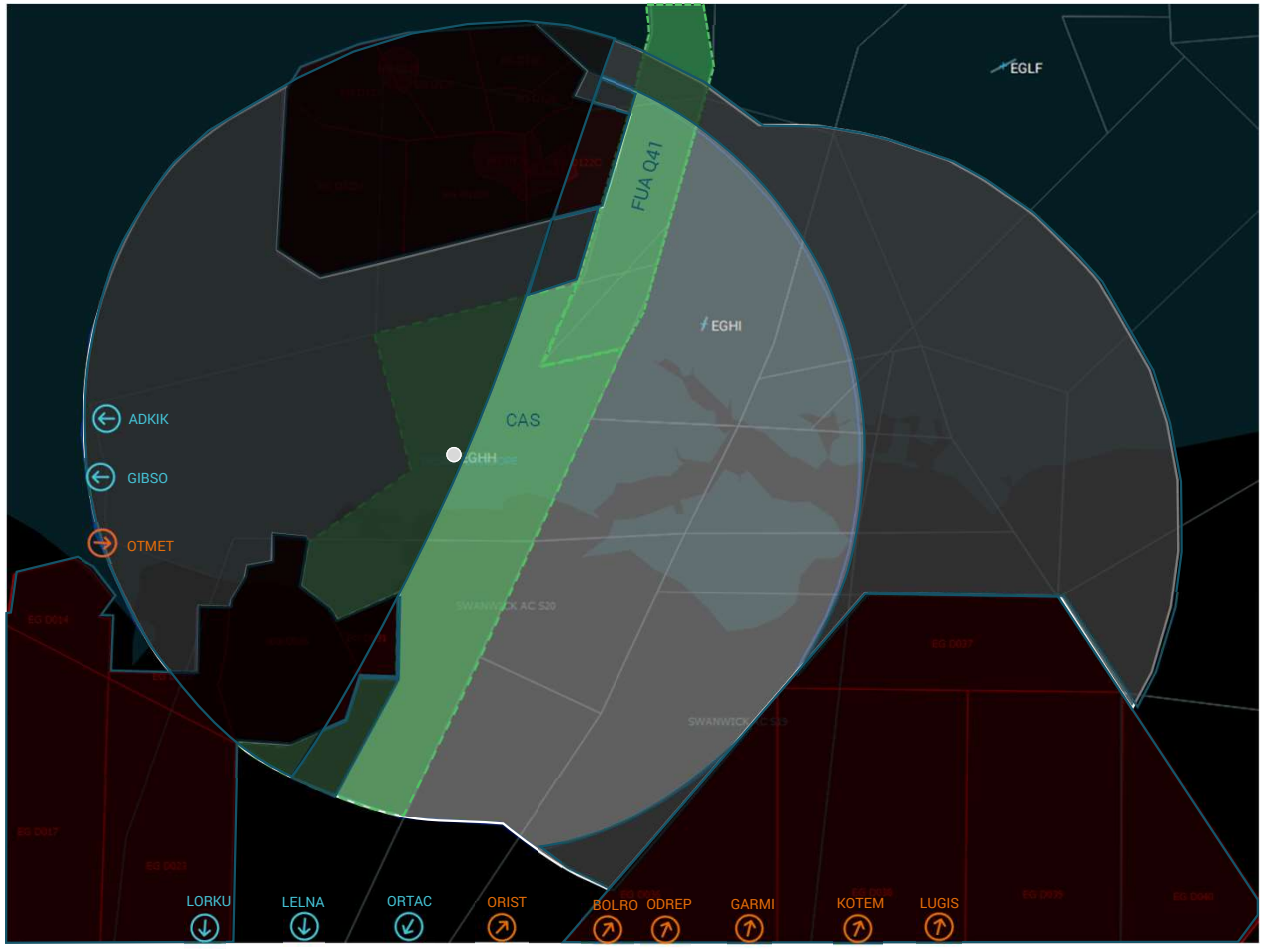
Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Original Design Envelope extended beyond 30nm from the airfield. 'Holds Further Out' and 'Point Merge' were not progressed at Stage 2. • 'Inner Holds' must be within 30nm, so the design envelope is reduced to reflect this. Inner holds were progressed for **northeast, east**, **southeast,** and **south**. • Areas within 30nm not progressed from Stage 2 removed from design envelope.
Danger Area	**Salisbury Plain, Portsmouth and Portland DA Complexes:** • Due to the frequency of activations, it is not appropriate to place an arrival structure in these. • These areas are excluded from the Design Envelope.



Graphics for illustrative purposes

Refining the Design Envelope Bournemouth

Constraint / Design Element	Considerations / Rationale
Flexible Use Airspace	Q41 – current parameters restrict the use of this airspace. • NERL would like to explore the feasibility of changing the current FUA airspace to become flight plannable / permanently available. • This could allow the portion contained within the Design Envelope to be considered for arrival structures.
Controlled Airspace	Current airspace restrictions around EGHH do not allow for efficient arrival and departure routes which would always keep aircraft inside CAS. • NERL would like to explore the feasibility of providing contiguous airspace to enhance safety in this region. • This could allow the portion contained within the Design Envelope to be considered for arrival structures.
Network Routes	Routes that cross the FIR boundary / connect west will likely remain consistent with today. • Any arrival structure should not obstruct these traffic flows.



Graphics for illustrative purposes

Options Summary Bournemouth

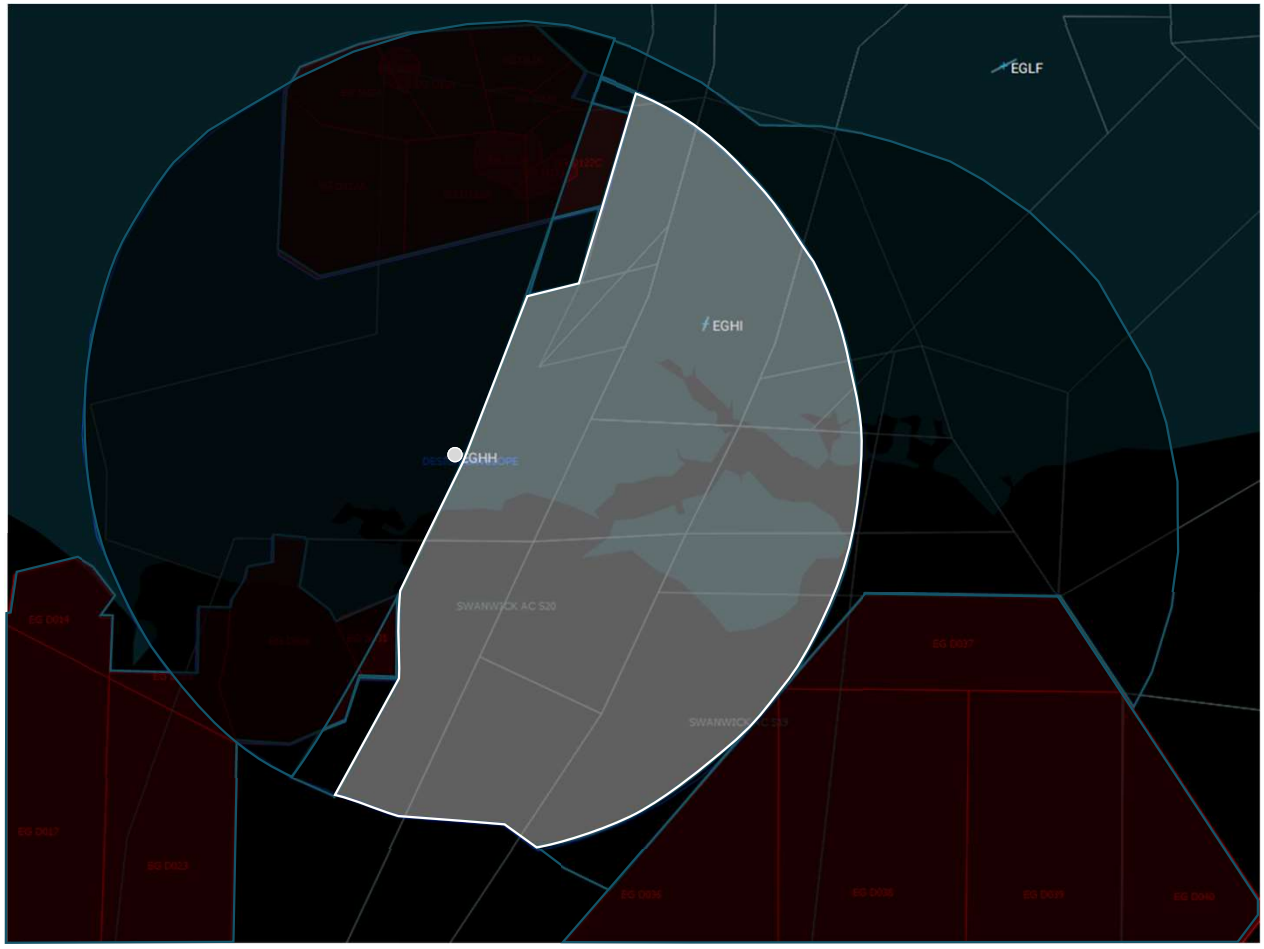
NERL proposes to progress an Inner Hold within the refined Design Envelope (indicated in white).

This hold could be shared with another airport.

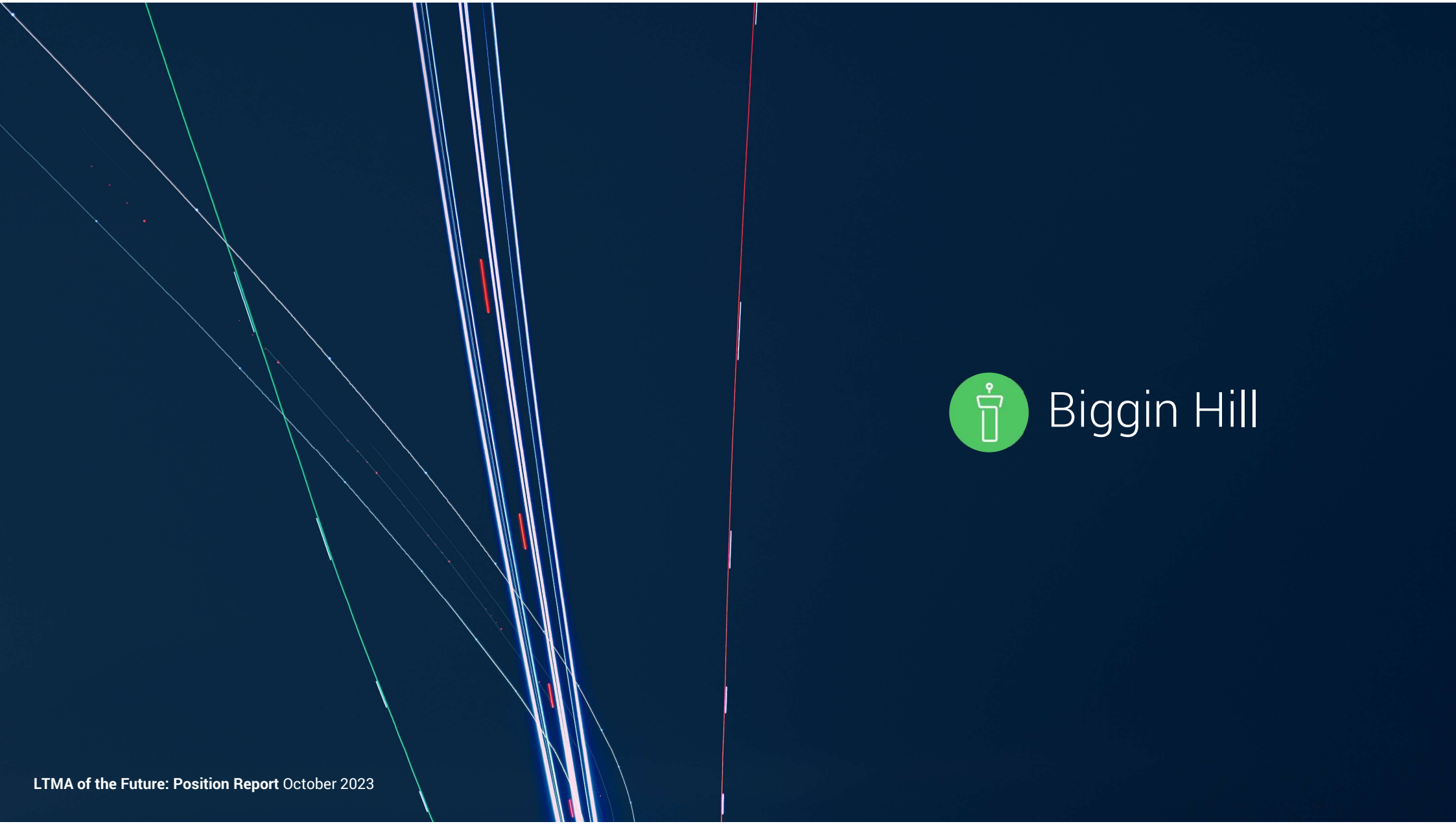
NERL recognises that further constraints may apply to this Design Envelope, in particular the departing and arriving flows for Southampton and Farnborough. NERL would like to work closely with the stakeholders to explore a workable option or combination of options in this area that benefits all parties.

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.



Graphics for illustrative purposes



Biggin Hill

LTMA of the Future: Position Report October 2023

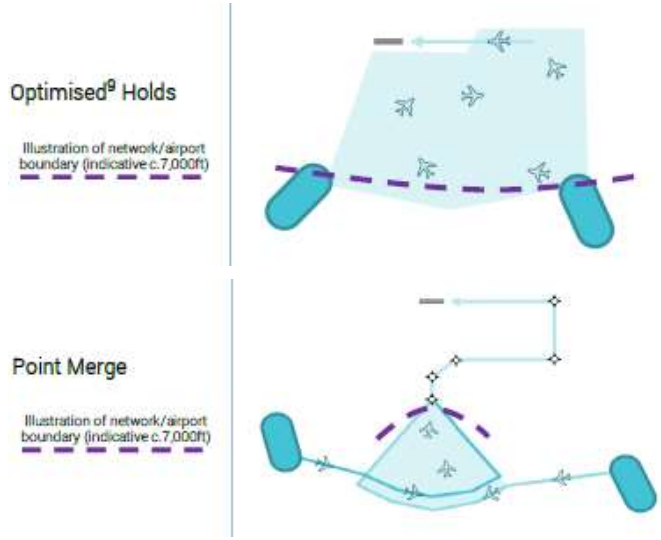
Stage 2 Recap Biggin Hill

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Biggin Hill:

Biggin Hill Design Options progressed to Stage 3
Inner Holds – Northeast
Inner Holds – East
Inner Holds – Southeast
Inner Holds – Southwest (Shared)
Inner Holds – West (Shared)
Point Merge – Northeast (Maybe shared)
Point Merge – East (Do Minimum) (Maybe shared)

NERL also assessed that based on the required traffic loading Biggin Hill would require proprietary or shared access to at least **one** holding facility within the network, either attached to an RMA or attached to a systemised arrival structure.

Biggin Hill currently has shared access to a Point Merge structure and the associated holds within the network.



To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Biggin Hill arrival connectivity options.

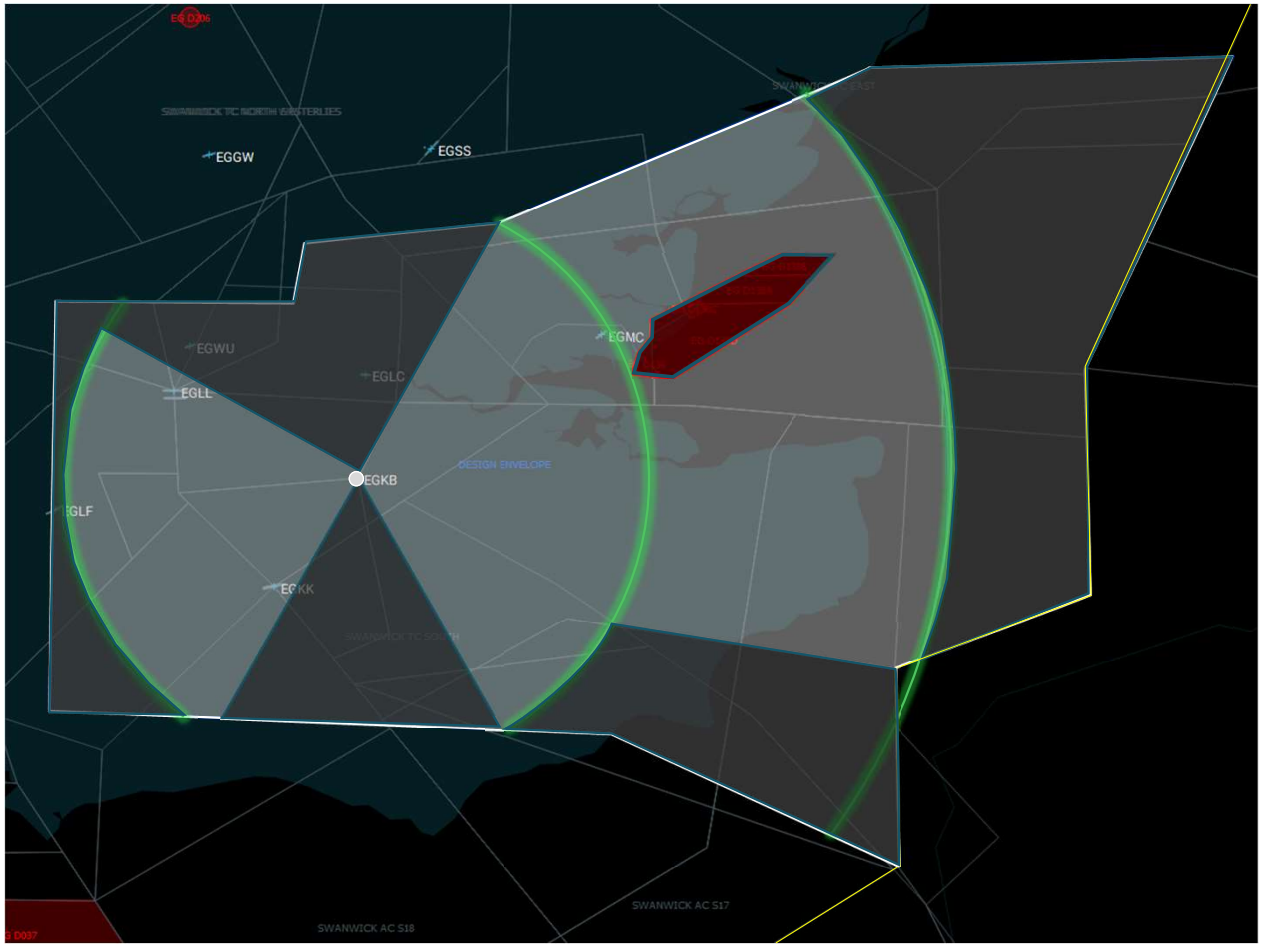
Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

Refining the Design Envelope Biggin Hill

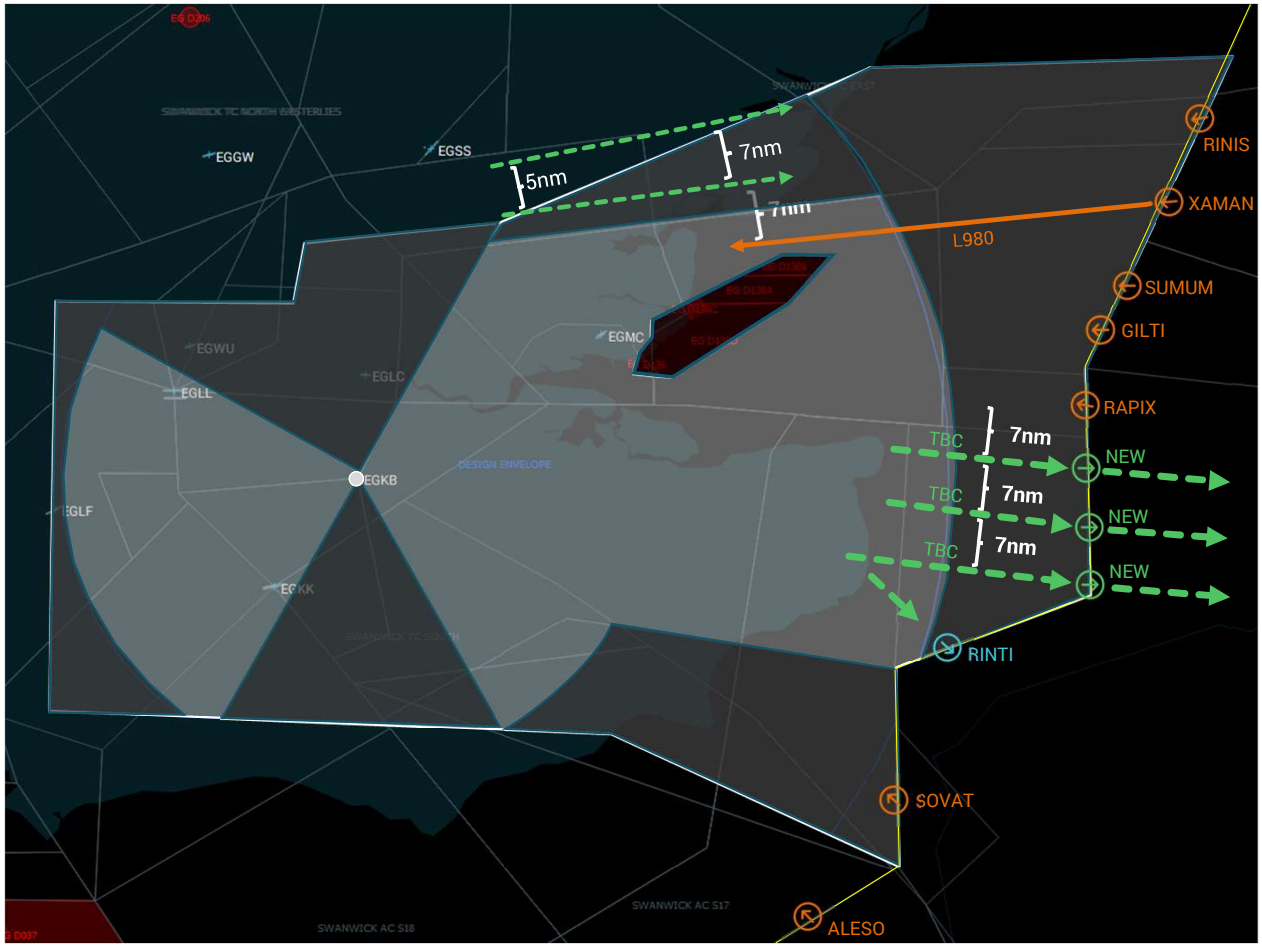
Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Inner holds were progressed for **northeast, east, southeast, southwest** and **west**. • Areas within 30nm not progressed from Stage 2 removed from design envelope. • The airspace to the west of the airport will only be viable for an inner hold; any hold here would be shared with another airport, for traffic from the west only and in addition to a structure to the east. Point Merge in the **northeast** or **east** was progressed from Stage 2. The current Point Merge is within 60nm of the airfield. NERL considers that any development or optimisation of a Point Merge would unlikely result in the structure being located beyond this. • Design envelope is reduced to reflect this.
Danger Areas	**Shoeburyness Complex:** Generally active up to 6,000ft / 13,000ft. Occasionally active to 60,000ft. • Due to the nature and frequency of those activities taking place, this area will be excluded from the design envelope. Other danger areas shown are out of the vertical or lateral scope of the design envelope.



Graphics for illustrative purposes

Refining the Design Envelope Biggin Hill

Constraint / Design Element	Considerations / Rationale
Network Routes / Flows	**Departure Flows:** Proposed network departure flow to the southeast: • Network design proposes 3 systemised routes. • Connectivity for EGKB departures would be provided. • These routes would not prohibit an arrival structure within this area as levels could be deconflicted. Proposed network departure flow to the northeast: • Network design proposes 2 systemised routes. • It would not be suitable to place a structure here due to level conflictions. • This area is removed from the design envelope. **Arrival Flows:** Network inbound flow from the east via current COPs. • Proposed to retain L980 inbound route as today. • No current limitation on design envelope whilst network is in development. • Any arrival structure should not obstruct these traffic flows to reduce complexity.



Graphics for illustrative purposes

Options Summary Biggin Hill

NERL proposes to progress an Inner Hold or a Point Merge within the refined Design Envelope (indicated in white).

These facilities could be shared with another airport.

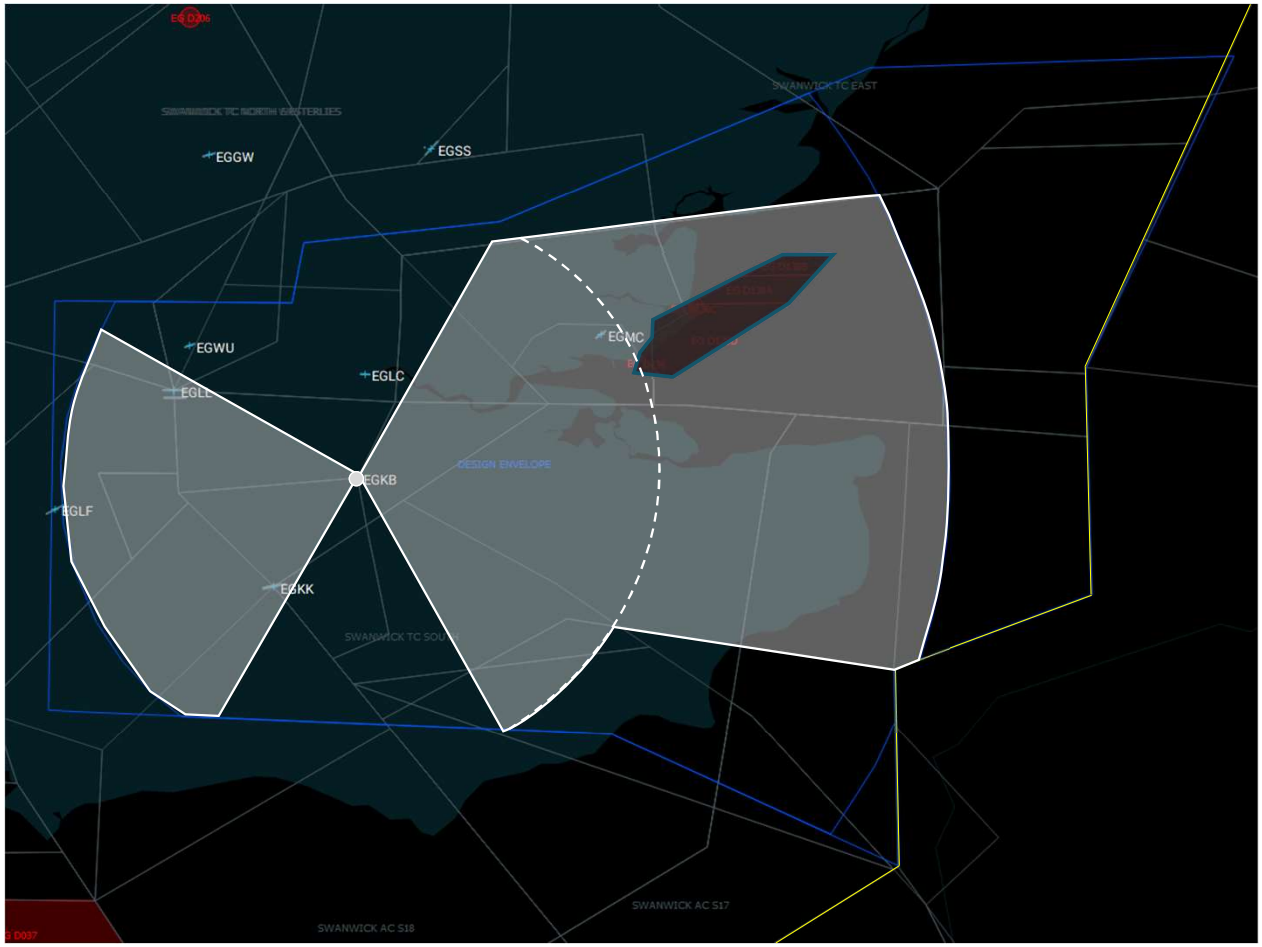
NERL understands the aspirations of Biggin Hill for an arrival route from the west and is committed to exploring the feasibility of this at levels within the network as the holistic designs mature.

Further constraints may apply to this Design Envelope, in particular the departing and arriving flows for London City and Southend. NERL would like to work closely with the stakeholders to explore a workable option or combination of options that benefits all parties in this area.

NERL also recognises that the arrival flows to the current Point Merge structure were designed to cross the departure flows in locations suitable for the current network. NERL will adapt or change these to better meet the demands of the future network and Biggin Hill's arrival structure as the holistic designs mature.

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.



Graphics for illustrative purposes

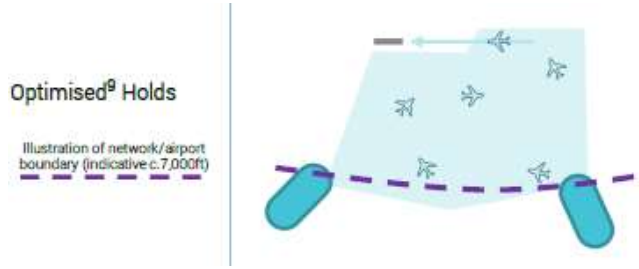
Farnborough

LTMA of the Future: Position Report October 2023

Stage 2 Recap Farnborough

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Farnborough:

Farnborough Design Options progressed to Stage 3
Inner Holds – South (Do Minimum)
Inner Holds – Northwest



NERL also assessed that based on the required traffic loading Farnborough would require proprietary access to at least **one** holding facility within the network, either attached to an RMA or attached to a systemised arrival structure.

Farnborough currently has access to **two** holding facilities within the network, but they are rarely used.

To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Farnborough arrival connectivity options.

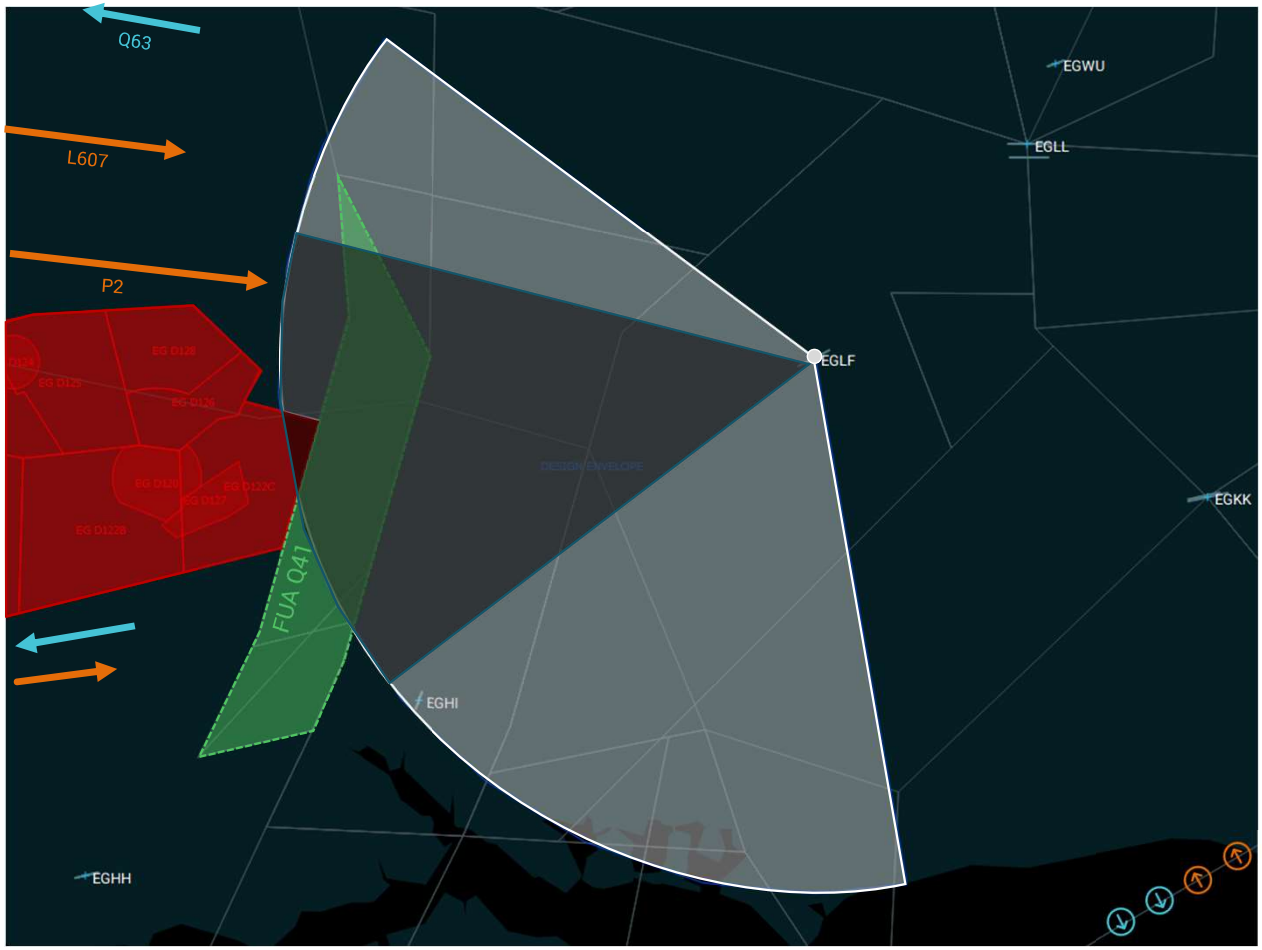
Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

Refining the Design Envelope Farnborough

Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Farnborough's Design Envelope was already contained within 30nm of the airfield. Inner holds were progressed for **south** and **northwest**. • Areas within 30nm not progressed from Stage 2 removed from design envelope.
Flexible Use Airspace	Q41 – current parameters restrict the use of this airspace. • NERL would like to explore the feasibility of changing the current FUA airspace to become flight plannable. • This could allow the portion contained within the Design Envelope to be considered for arrival structures.
Network Routes	Routes that cross the FIR boundary / connect with west systemised routes will likely remain consistent with today. • No current limitation on design envelope whilst network is in development. • Any arrival structure should not obstruct these traffic flows.



Graphics for illustrative purposes

Options Summary Farnborough

NERL proposes to progress an Inner Hold within the remaining Design Envelope (indicated in white).

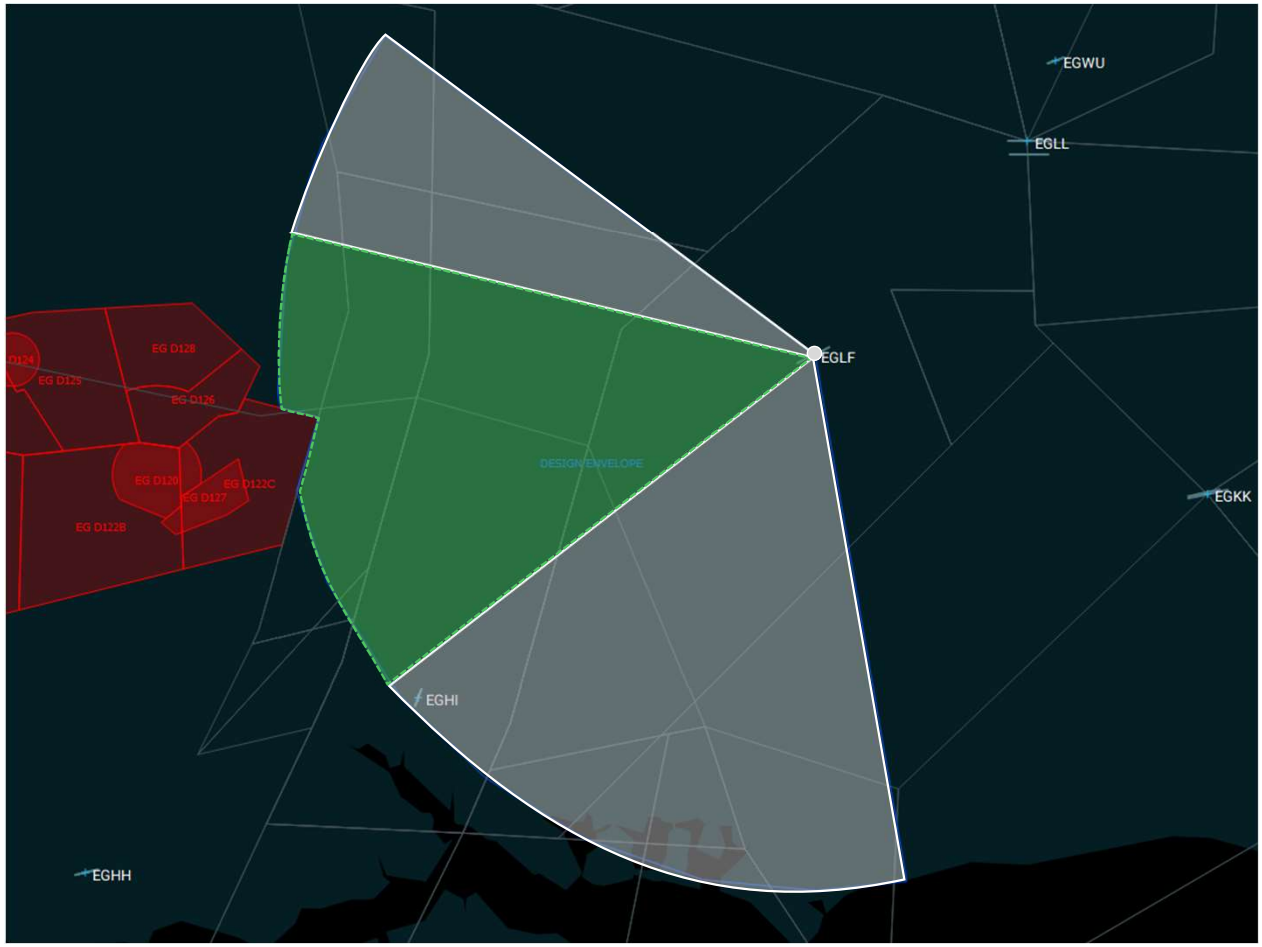
NERL recognises that further constraints may apply to this Design Envelope, in particular the departing and arriving flows for Southampton and Bournemouth.

Should Q41 become flight plannable, there is an option for a hold to be located in the previously excluded airspace, therefore the west could be reintroduced to the design envelope.

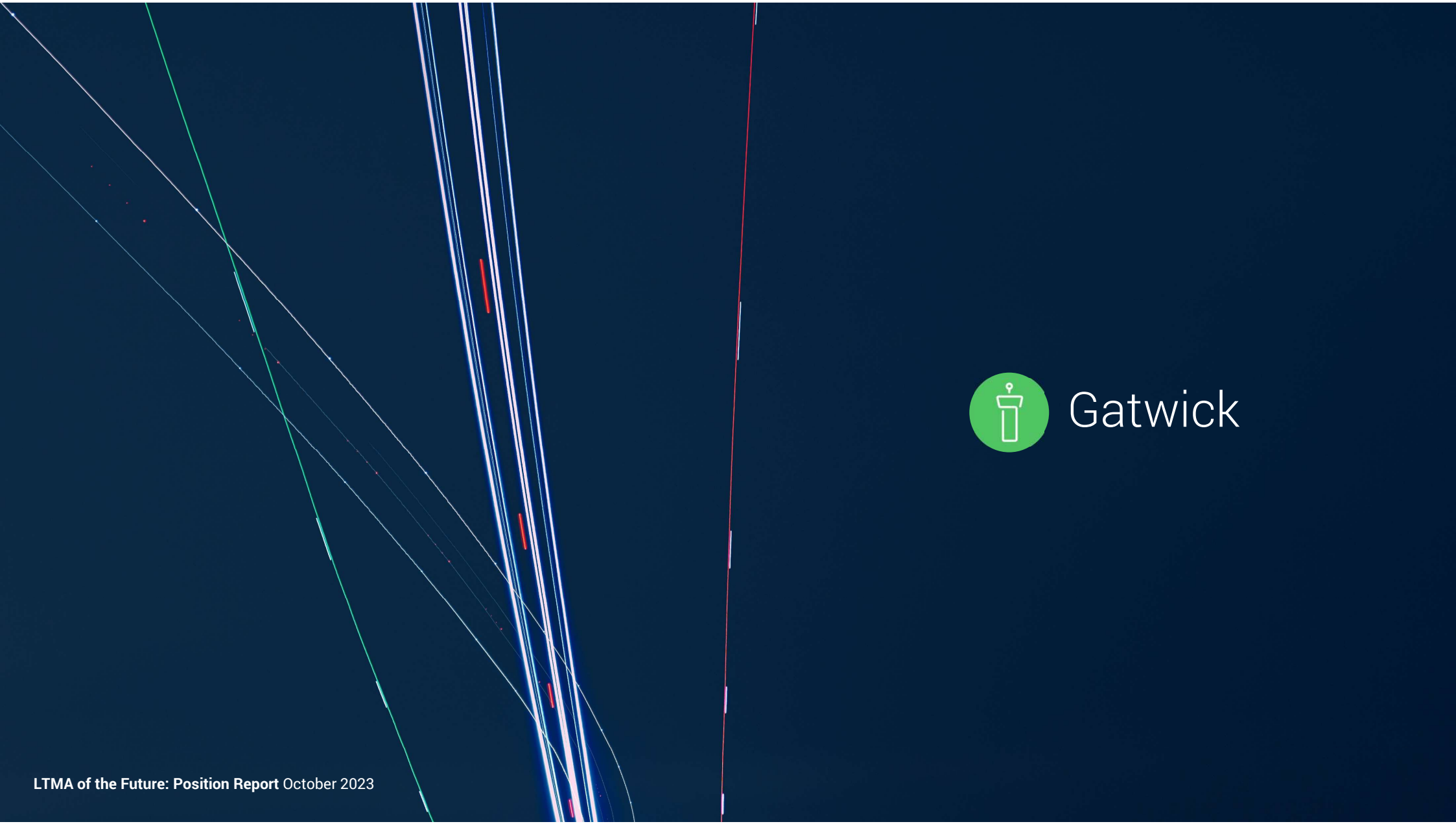
NERL would like to work closely with the stakeholders to explore a workable option or combination of options in this area that benefits all parties.

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.



Graphics for illustrative purposes



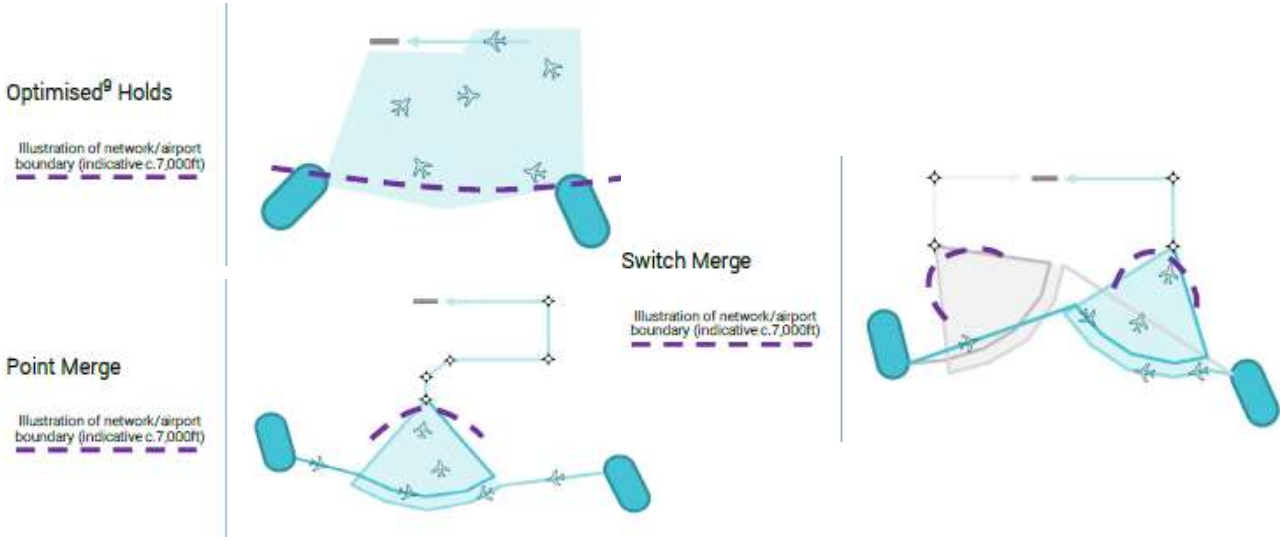
Gatwick

LTMA of the Future: Position Report October 2023

Stage 2 Recap Gatwick

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Gatwick:

Gatwick Design Options progressed to Stage 3
Inner Holds – Southeast (Do Minimum)
Inner Holds – South (Do Minimum) (Maybe shared)
Inner Holds – Southwest
Point Merge – Southeast
Point Merge – South
Switch Merge – Southeast
Switch Merge – South



NERL also assessed that based on the required traffic loading Gatwick would require proprietary or shared access to at least **two** holding facilities within the network, either attached to an RMA or attached to a systemised arrival structure.

Gatwick currently has access to **two** holding facilities within the network.

To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Gatwick arrival connectivity options.

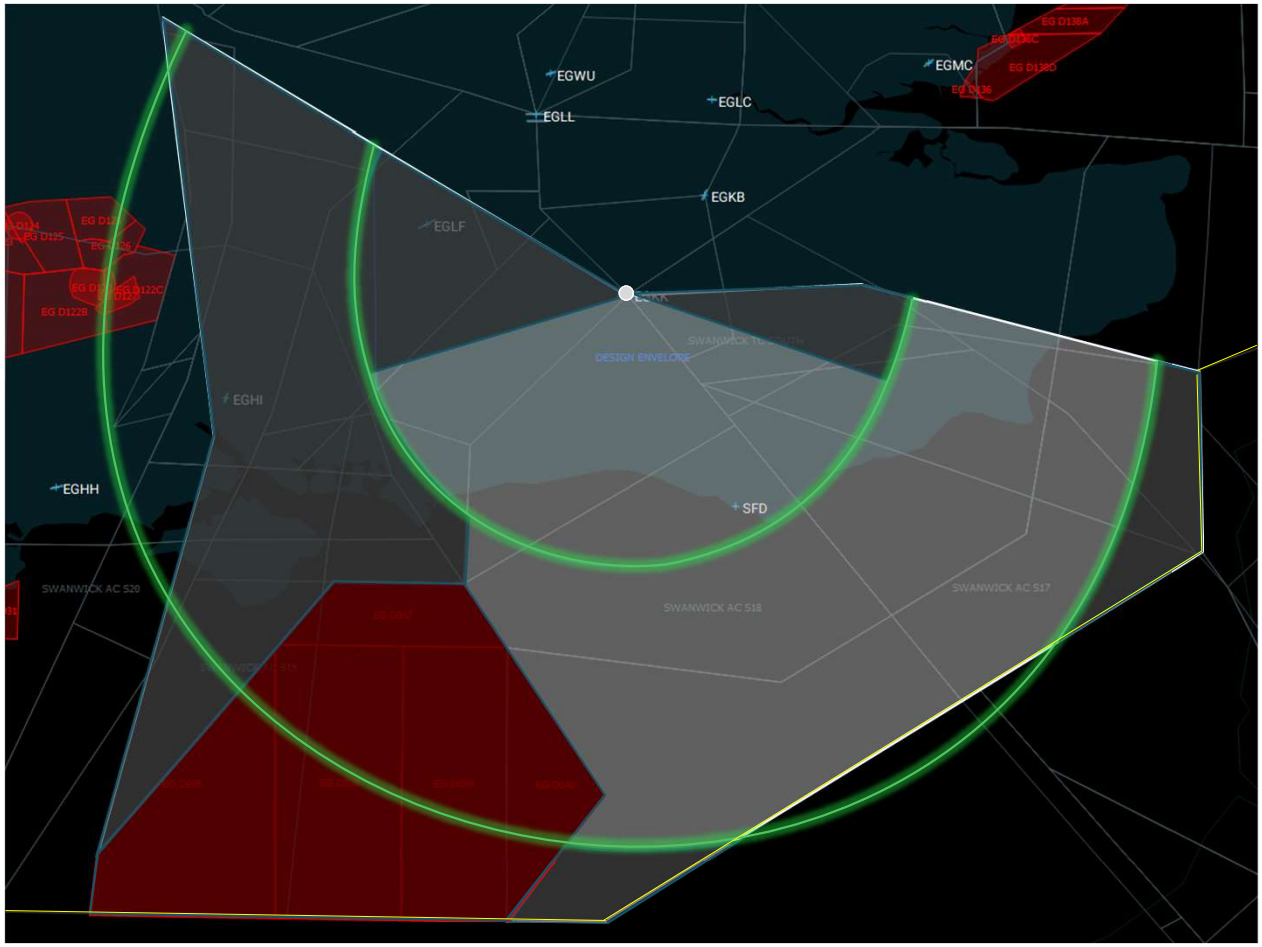
Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

Refining the Design Envelope Gatwick

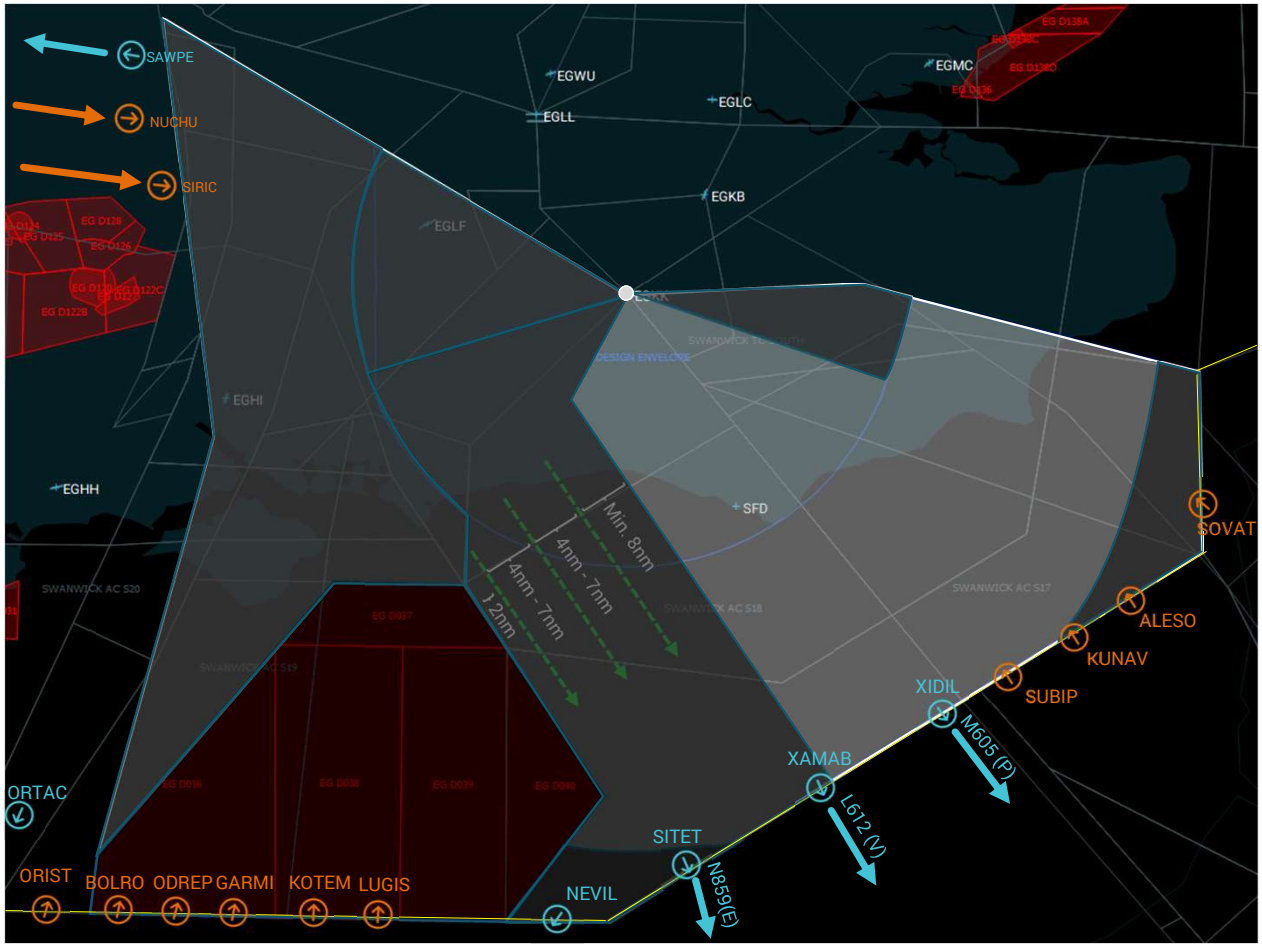
Constraint / Design Element	Considerations / Rationale
Progressed Design Options	The Design Envelope originally extended to the FIR boundary to encompass all possible arrival concepts. Inner holds were progressed for **southeast, south**, and **southwest**. • Areas within 30nm not progressed from Stage 2 therefore removed from design envelope. Point Merge & Switch Merge in the **southeast** or **east** was progressed from Stage 2. • Design envelope is reduced to reflect this. Any Point Merge option is likely to be within 60nm airfield. NERL considers that any development or optimisation of a Point Merge would unlikely result in the structure being located beyond this. • Design envelope is reduced to within 60nm to reflect this.
Danger Area	**Portsmouth Complex:** Due to the level and frequency of activations, it is not appropriate to place an arrival structure here. • This area is excluded from the design envelope. Other danger areas shown are out of the vertical or lateral scope of the design envelope.



Graphics for illustrative purposes

Refining the Design Envelope Gatwick

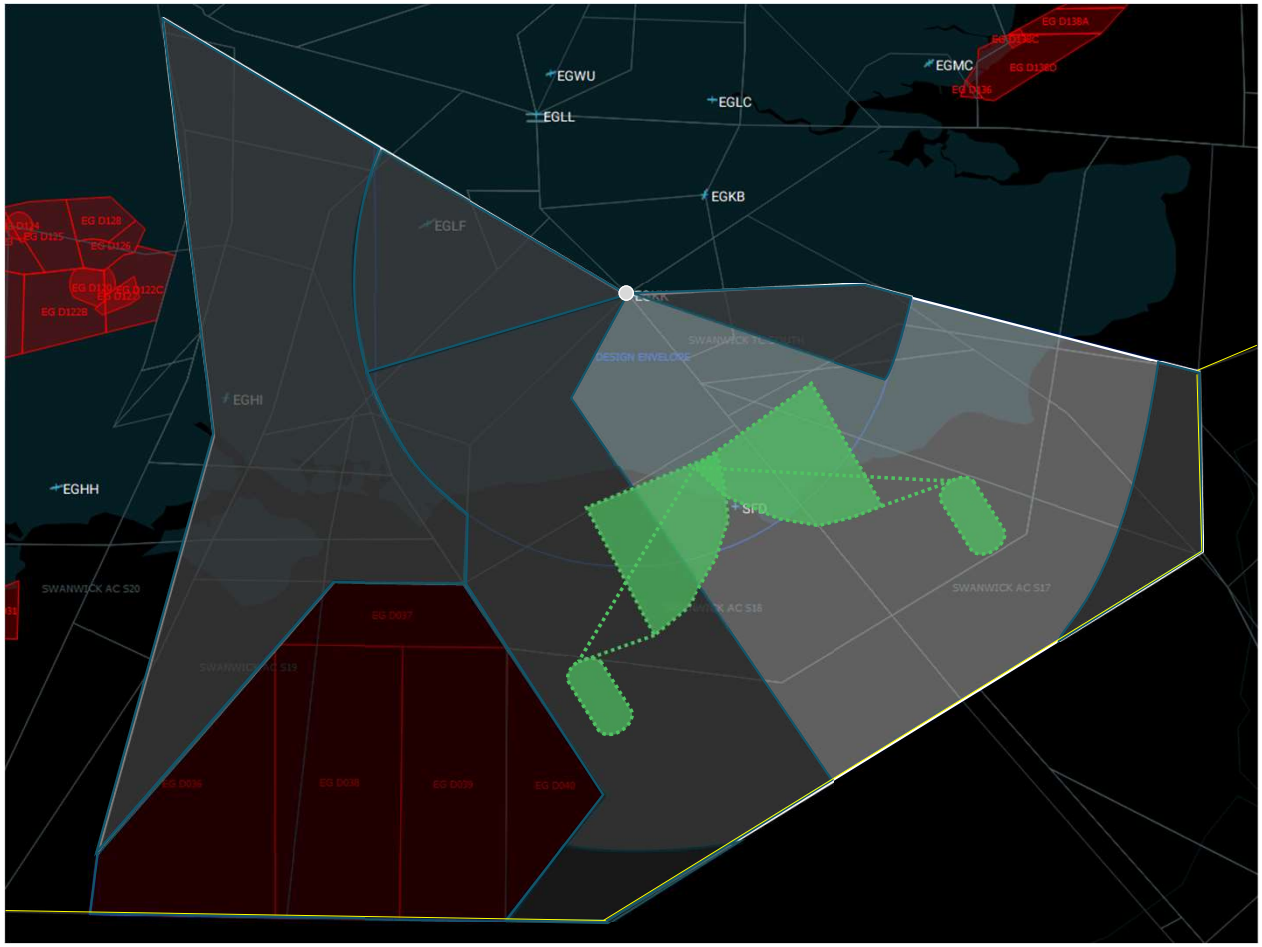
Constraint / Design Element	Considerations / Rationale
Network Routes / Flows	**Departure Flows:** Southbound: Requirement for traffic routing south to be orientated by destination (ETRAT, VEULE & DPE) by the FIR boundary. • Network design proposes 3 systemised routes; traffic switchover is in design development. • Connectivity for EGKK departures would be provided. • It would not be suitable to place a structure here due to level conflictions and complexity. • This area is removed from the design envelope. **Arrival Flows** Network inbound flow from the southeast via current COPs. • No current limitation on design envelope whilst network is in development. • Any arrival structure should not obstruct these traffic flows to reduce complexity.



Graphics for illustrative purposes

Refining the Design Envelope Gatwick

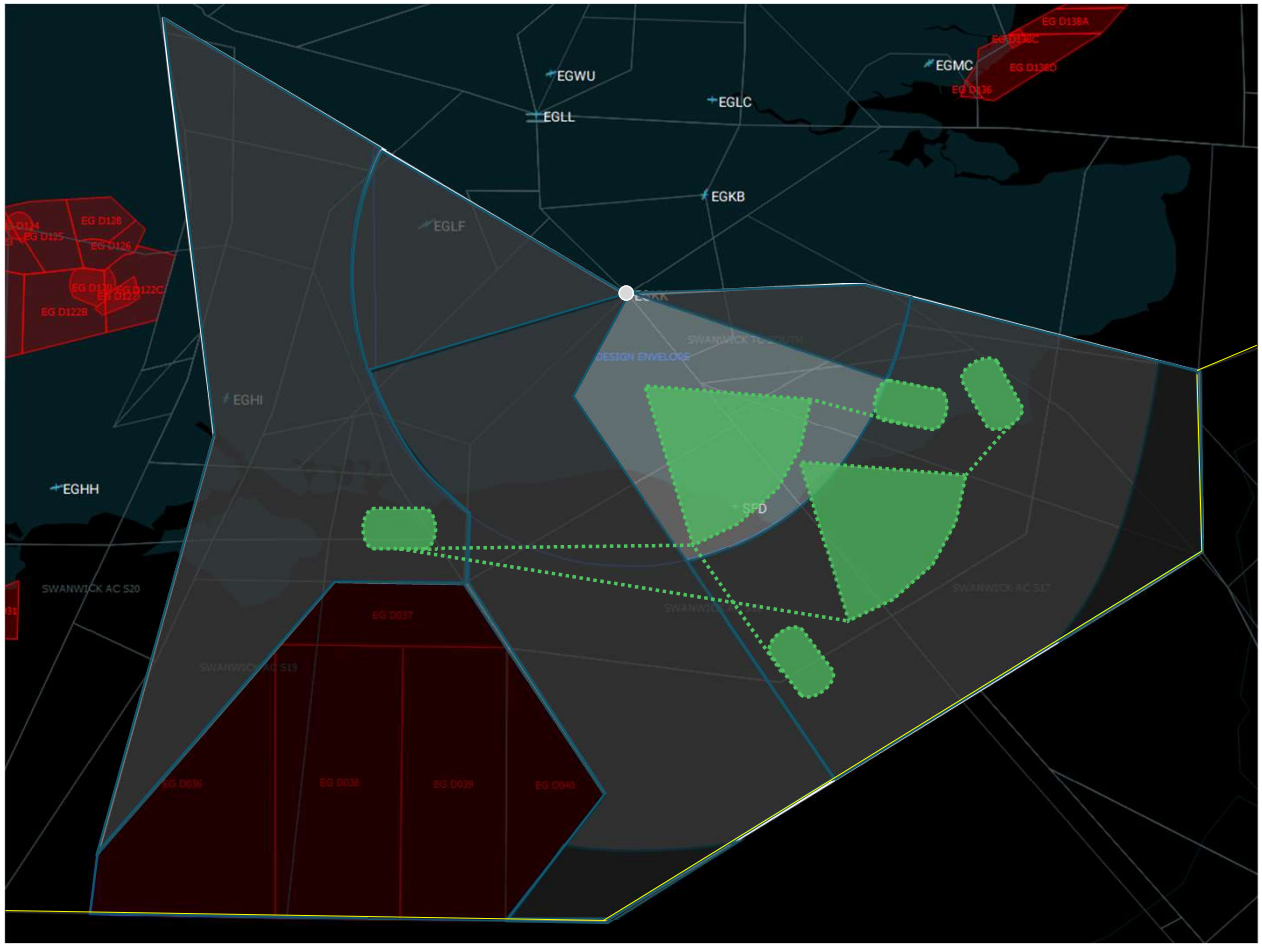
Constraint / Design Element	Considerations / Rationale
Switch Merge	Switch Merge to the **south** or **southeast** was progressed from Stage 2. NERL has scoped the Switch Merge concept: For efficiency, the merge points would both need to align with the runway ends. The merge points need to be at FL90 (determined from previous engagement with EGKK). For fuel / CO_2 efficiency the merge point would need to be circa 30 track miles from touchdown. The only viable position for this structure is outside of the remaining design envelope The airspace required for the switch merge would prohibit efficient LTMA network flows • NERL therefore proposes to no longer progress the Switch Merge concept for Gatwick.
Point Merge Concept	NERL has scoped two Point Merge concepts. (Continued on the next slide…)



Graphics for illustrative purposes

Refining the Design Envelope Gatwick

Constraint / Design Element	Considerations / Rationale
Inner Point Merge	The merge point would need to be at minimum FL90 (determined from previous engagement with EGKK). • This determines the approximate location of the PM from the runway end. Network traffic flows and Portsmouth Danger Area to the west conflict with the optimal hold location. • Hold would either be outside the design envelope or south of the Point Merge. • Initial scoping indicates a Point Merge here could create an increase in procedural track miles and CO_2 disbenefit.
Point Merge over the Sea	Point Merge over the sea (considered from previous engagement with EGKK). Option is in close proximity to the FIR boundary. • This increases complexity in this airspace. • Network flows would constrain the available levels for the arrival structure. Increased distance from merge point to runway. • Creates operational resilience issues in event of runway closure. This option would create an increase in procedural track miles and CO_2 disbenefit.
Point Merge Concept	NERL therefore proposes to no longer progress the Point Merge concept for Gatwick. • The design envelope is reduced to 30nm for 'Inner Holds'.



Graphics for illustrative purposes

Options Summary Gatwick

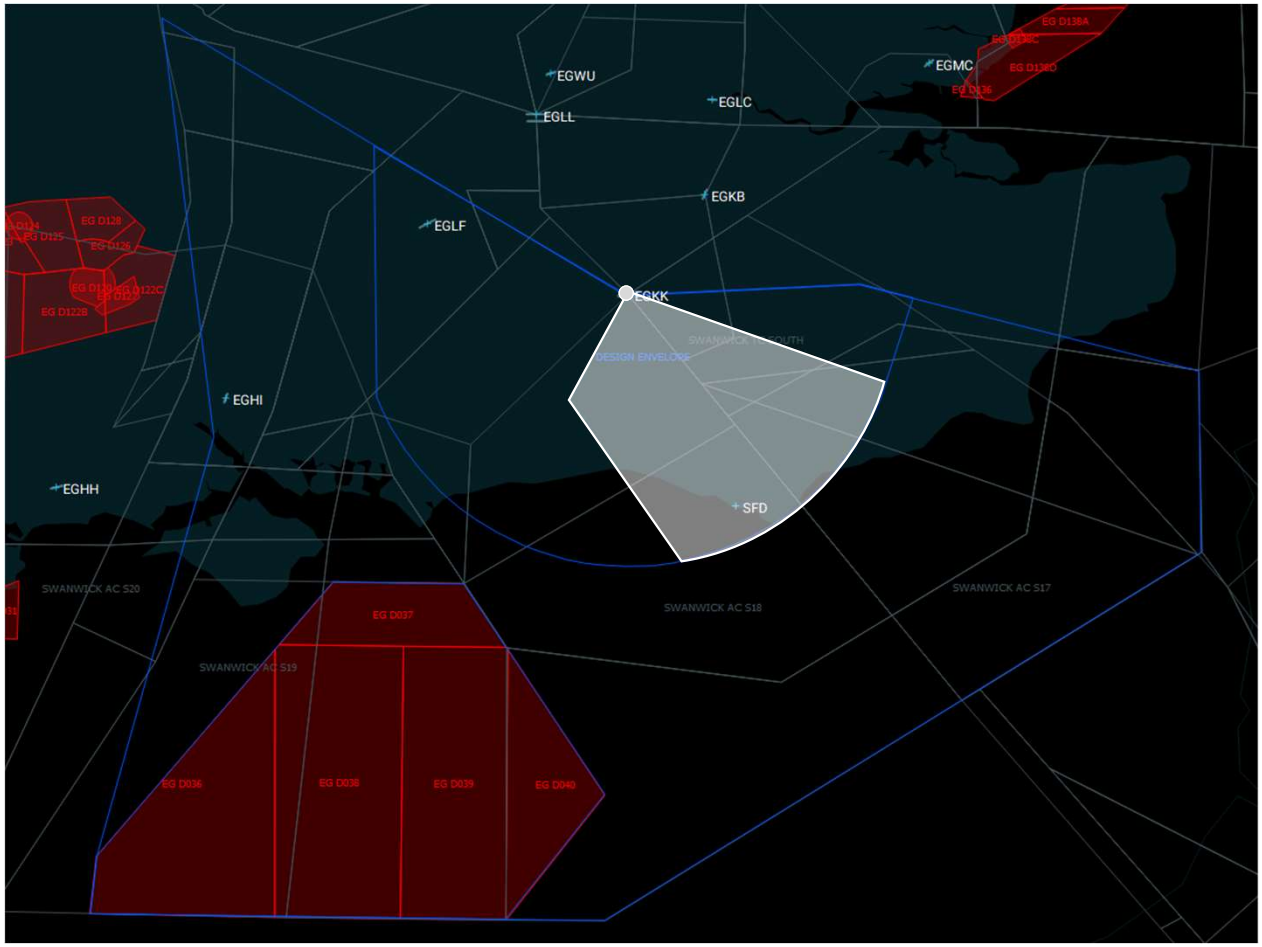
NERL proposes to progress two Inner Holds within the remaining Design Envelope (indicated in white).

These holds could be shared with another airport.

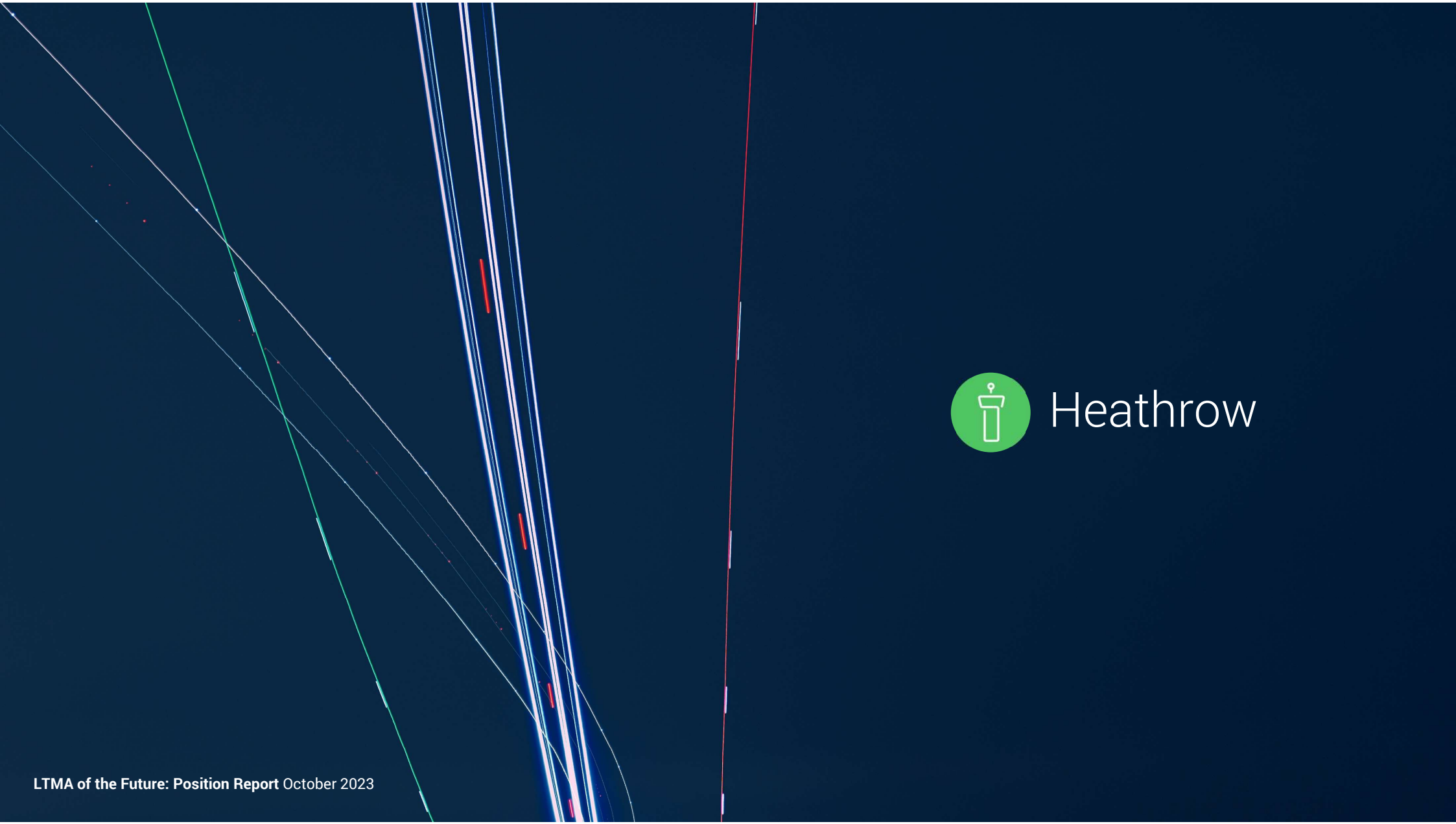
The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.

The Design Envelope may also be refined at the next stage, where combination of options are considered and where overlaps of Design Envelopes exist.



Graphics for illustrative purposes



Heathrow

LTMA of the Future: Position Report October 2023

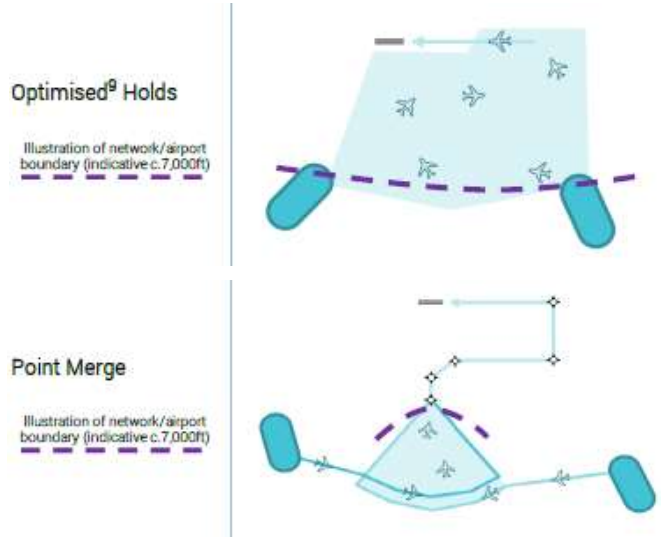
Stage 2 Recap Heathrow

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Heathrow:

Heathrow Design Options progressed to Stage 3
Inner Holds – North (Do Minimum) (Maybe shared)
Inner Holds – Northeast (Do Minimum) (Maybe shared)
Inner Holds – East (Maybe shared)
Inner Holds – Southeast (Do Minimum) (Maybe shared)
Inner Holds – South (Do Minimum) (Maybe shared)
Inner Holds – Southwest (Maybe shared)
Inner Holds – Northwest (Maybe shared)
Point Merge – North (Maybe shared)
Point Merge – South (Maybe shared)

NERL also assessed that based on the required traffic loading Heathrow would require proprietary or shared access to at least **four** holding facilities within the network, either attached to an RMA or attached to a systemised arrival structure.

Heathrow currently has access to **four** shared holding facilities within the network.



To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Heathrow arrival connectivity options.

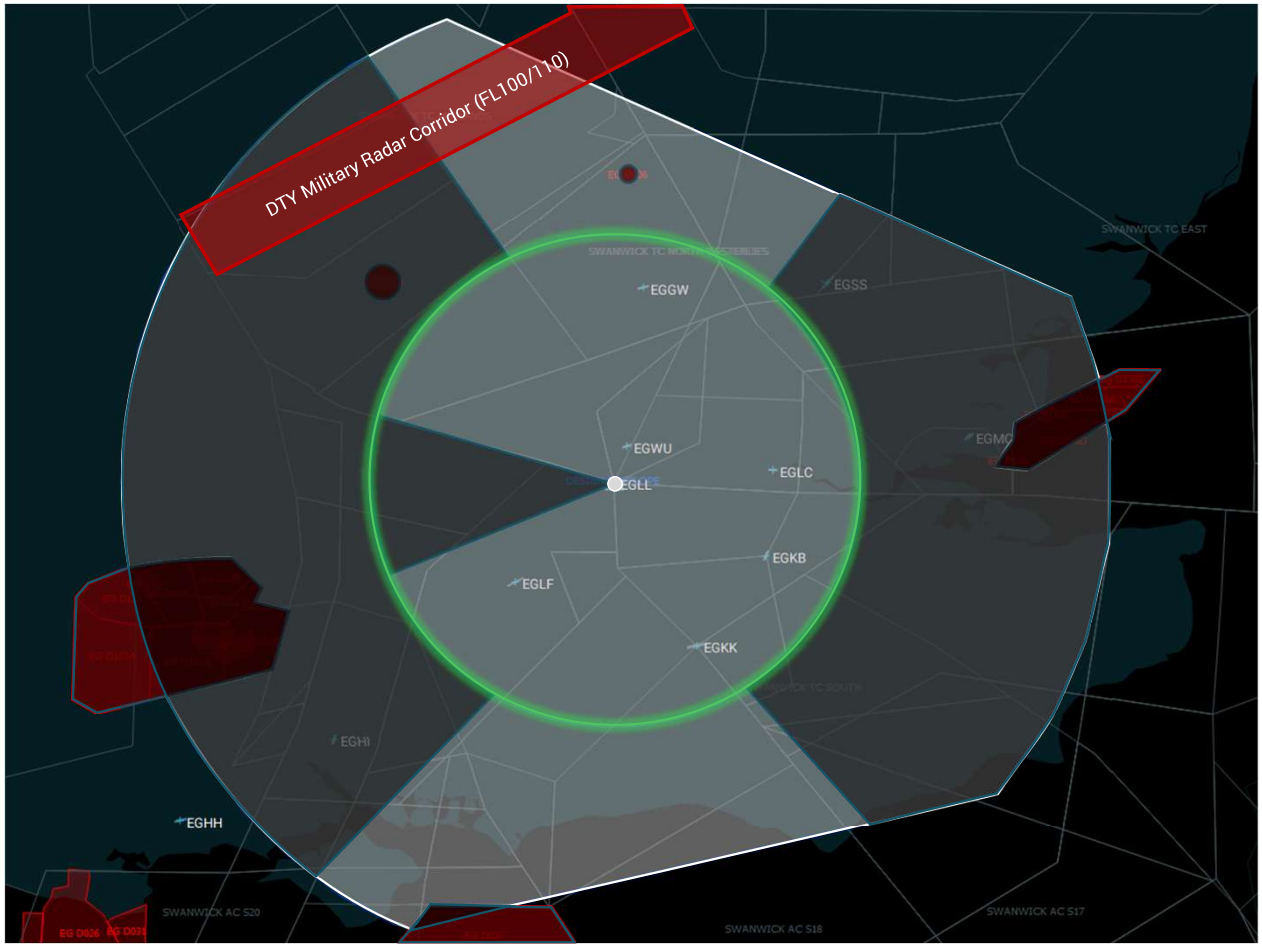
Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

Refining the Design Envelope Heathrow

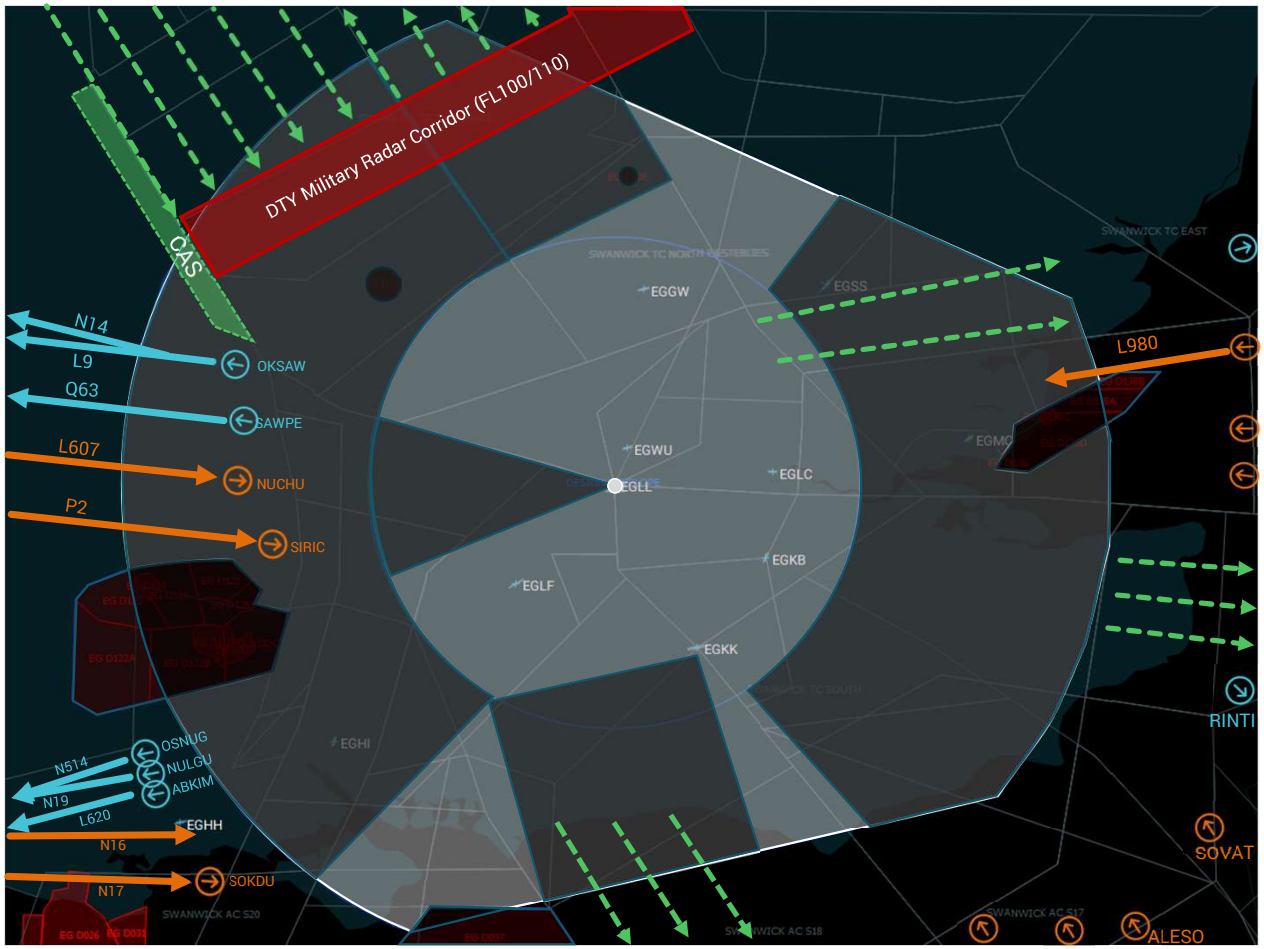
Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Inner holds were progressed for **northwest, north, northeast**, **southeast, south**, **southwest and east**. • Design envelope is reduced to reflect this. Point Merge in the **north** and **south** was progressed from Stage 2. • Design envelope is reduced to reflect this.
Danger Area	**Portsmouth Complex:** Due to the level and frequency of activations, it is not appropriate to place an arrival structure here. • This area is excluded from the design envelope. Other danger areas shown are out of the vertical or lateral scope of the design envelope.
Military Corridor	**DTY Military Radar Crossing Corridor:** Established at FL100 / FL110. • No current limitation on design envelope as traffic would be above this in this region.



Graphics for illustrative purposes

Refining the Design Envelope Heathrow

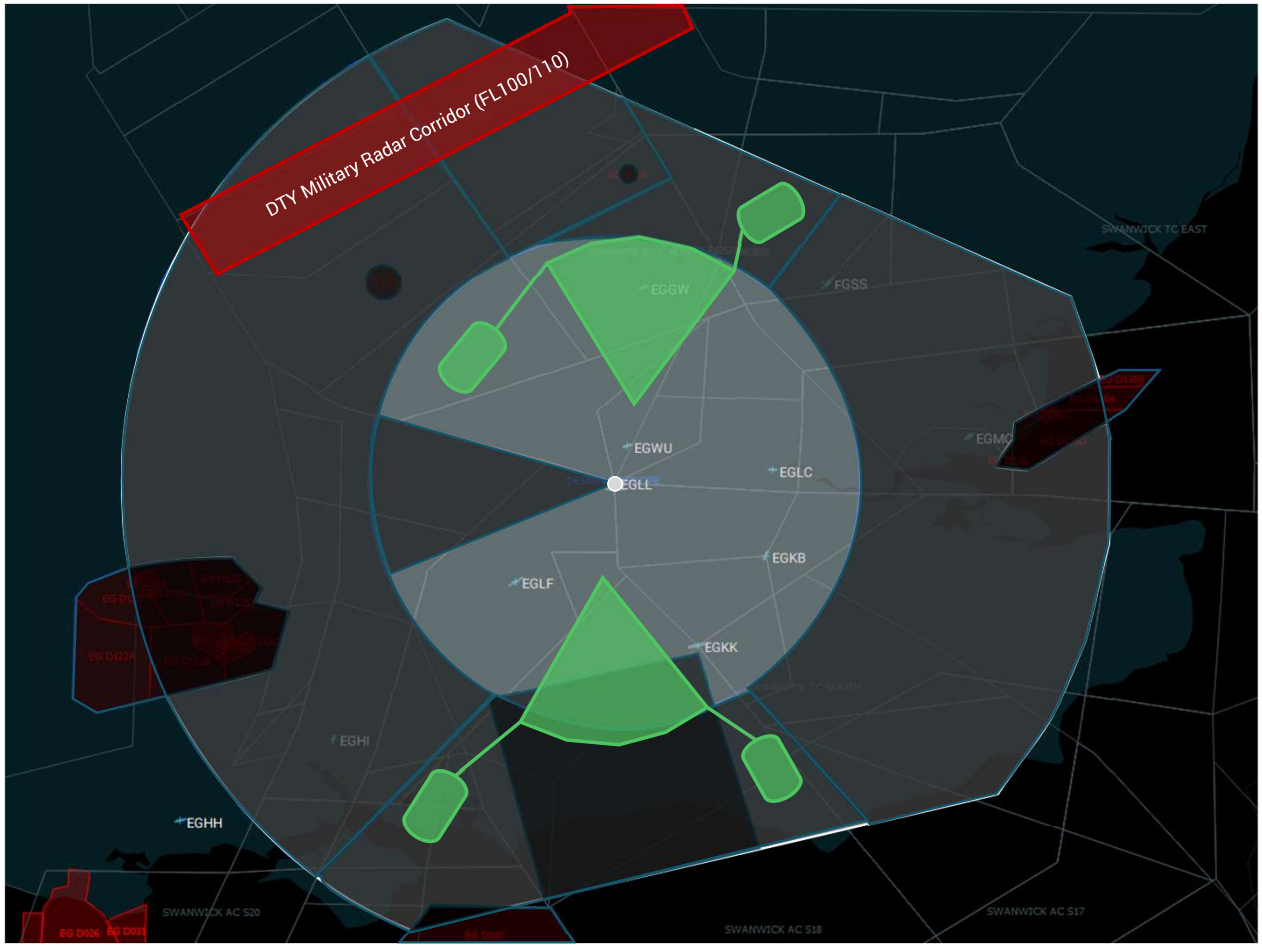
Constraint / Design Element	Considerations / Rationale
Network Routes	**Midlands**: Network design proposes 10 systemised routes. • It would not be suitable to place a structure here due to level conflictions. • This area is removed from the design envelope. **West:** Connectivity is required with west systemised routes. • No impact on design envelope. **South:** Network design proposes 3 systemised routes. • It would not be suitable to place a structure here due to level conflictions and complexity. • This area is removed from the design envelope. **East:** Network design proposes systemised route structures for departures to the east. • No impact on design envelope.



Graphics for illustrative purposes

Refining the Design Envelope Heathrow

Constraint / Design Element	Considerations / Rationale
Point Merge Concept	NERL has scoped the Point Merge concept: It is assessed that the arrival structures for EGLL needs to comprise either four holds or two Point Merges. A combination of these concepts (i.e., Point Merge to the south; holds to the north) would not be viable given the complexity of this airspace. For fuel / CO_2 efficiency the merge point would need to be circa 30 track miles from touchdown. The complexity of this airspace significantly constrains the opportunity for a Point Merge structure. • Network constraints have refined the design envelope, leaving insufficient airspace for a Point Merge either to the north or the south. NERL therefore proposes to no longer progress the Point Merge concept for Heathrow • Design envelope is reduced to 30nm for 'Inner Holds'.



Graphics for illustrative purposes

Options Summary Heathrow

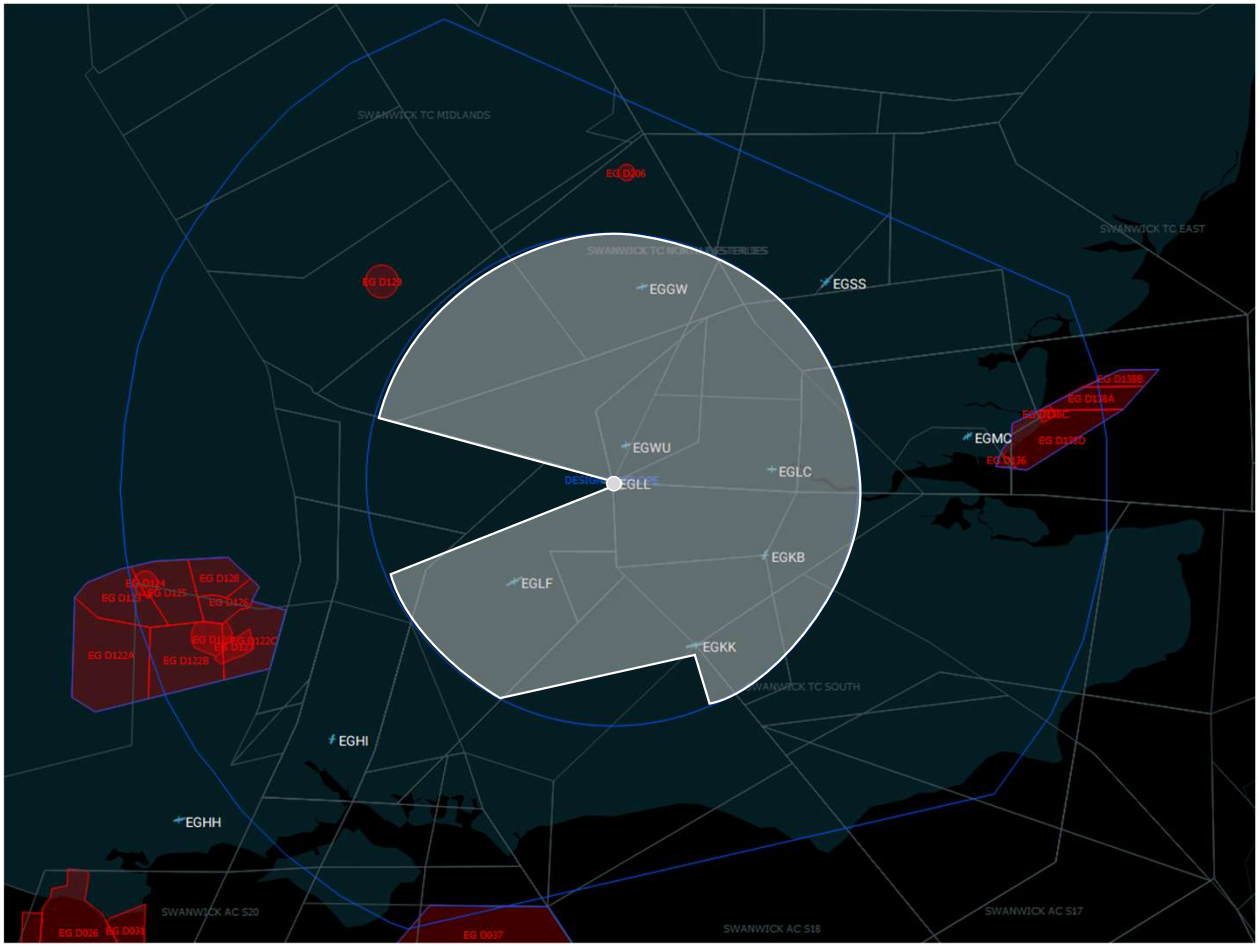
NERL proposes to progress four Inner Holds within the remaining Design Envelope (indicated in white).

These holds could be shared with another airport.

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.

The Design Envelope may also be refined at the next stage, where combination of options are considered and where overlaps of Design Envelopes exist.



Graphics for illustrative purposes

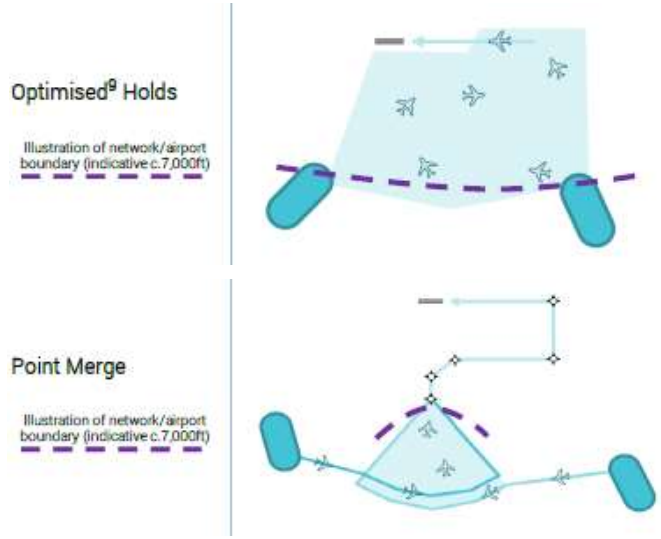
London City

LTMA of the Future: Position Report October 2023

Stage 2 Recap London City

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for London City:

London City Design Options progressed to Stage 3
Inner Holds – Northeast
Inner Holds – East
Inner Holds – Southeast
Point Merge – Northeast (Maybe shared)
Point Merge – East (Do Minimum) (Maybe shared)



NERL also assessed that based on the required traffic loading London City would require proprietary or shared access to at least **one** holding facility within the network, either attached to an RMA or attached to a systemised arrival structure.

London City currently has shared access to a Point Merge structure and the associated holds within the network.

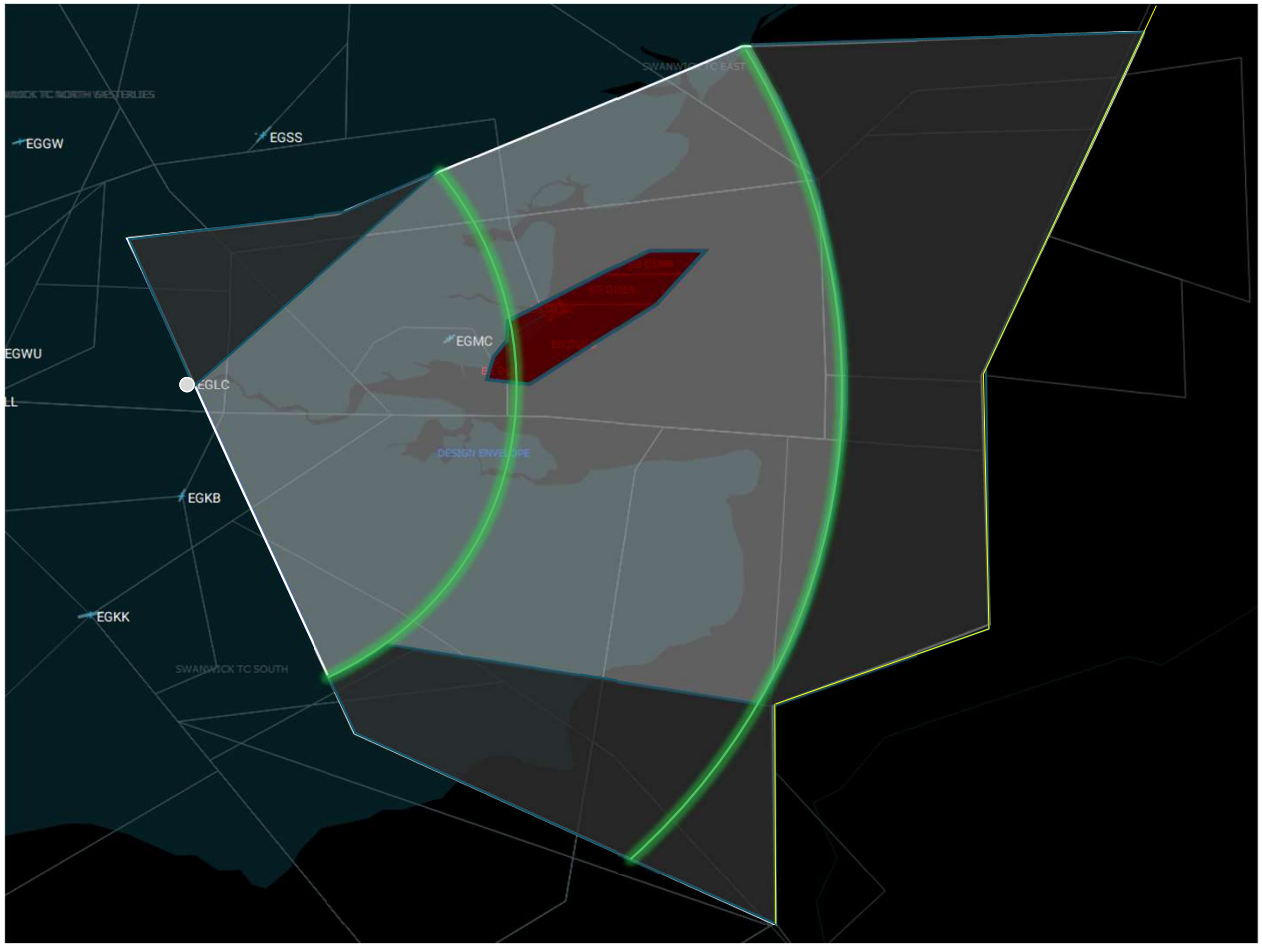
To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the London City arrival connectivity options.

Then, considering the network holistically, NERL will conduct appropriate quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Refining the Design Envelope London City

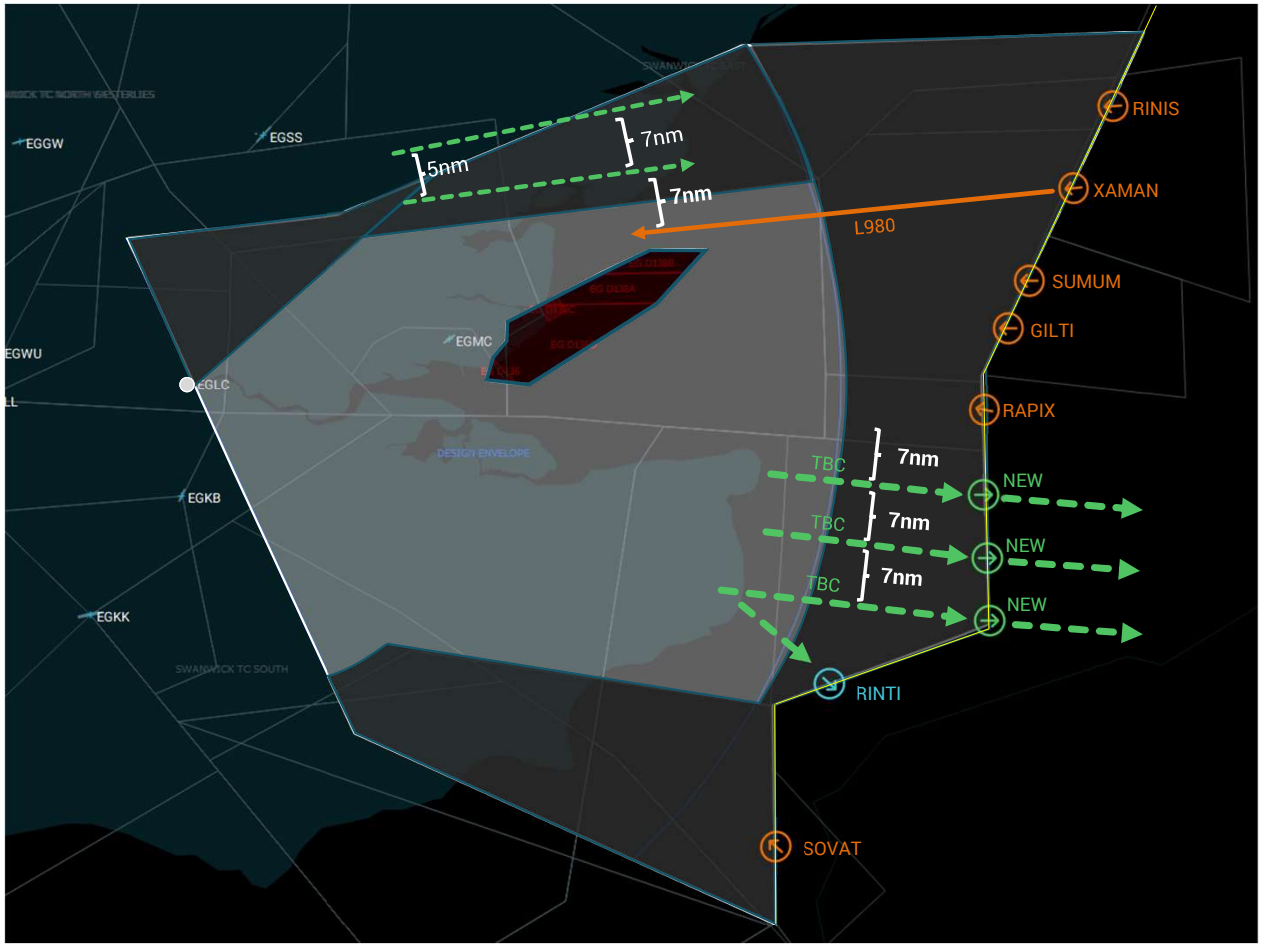
Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Inner holds were progressed for **northeast, east and southeast**. • Areas within 30nm not progressed from Stage 2 removed from design envelope. Point Merge in the **northeast** or **east** was progressed from Stage 2. The current Point Merge is within 60nm of the airfield. NERL considers that any development or optimisation of a Point Merge would unlikely result in the structure being located beyond this. • Design envelope is reduced to reflect this.
Danger Area	**Shoeburyness Complex:** Generally active up to 6,000ft / 13,000ft. Occasionally active to 60,000ft. • Due to the nature and frequency of those activities taking place, this area will be excluded from the design envelope.



Graphics for illustrative purposes

Refining the Design Envelope London City

Constraint / Design Element	Considerations / Rationale
Network Routes / Flows	**Departure Flows:** Proposed network departure flow to the southeast: • Network design proposes 3 systemised routes. • Connectivity for EGLC departures would be provided. • These routes would not prohibit an arrival structure within this area as levels could be deconflicted. Proposed network departure flow to the northeast: • Network design proposes 2 systemised routes. • It would not be suitable to place a structure here due to level conflictions and complexity. • This area is removed from the design envelope. **Arrival Flows:** Network inbound flow from the east via current COPs. • Proposed to retain L980 inbound route as today. • No current limitation on design envelope whilst network is in development. • Any arrival structure should not obstruct these traffic flows to reduce complexity.



Graphics for illustrative purposes

Refining the Design Envelope London City

NERL proposes to progress an Inner Hold or a Point Merge within the refined Design Envelope (indicated in white).

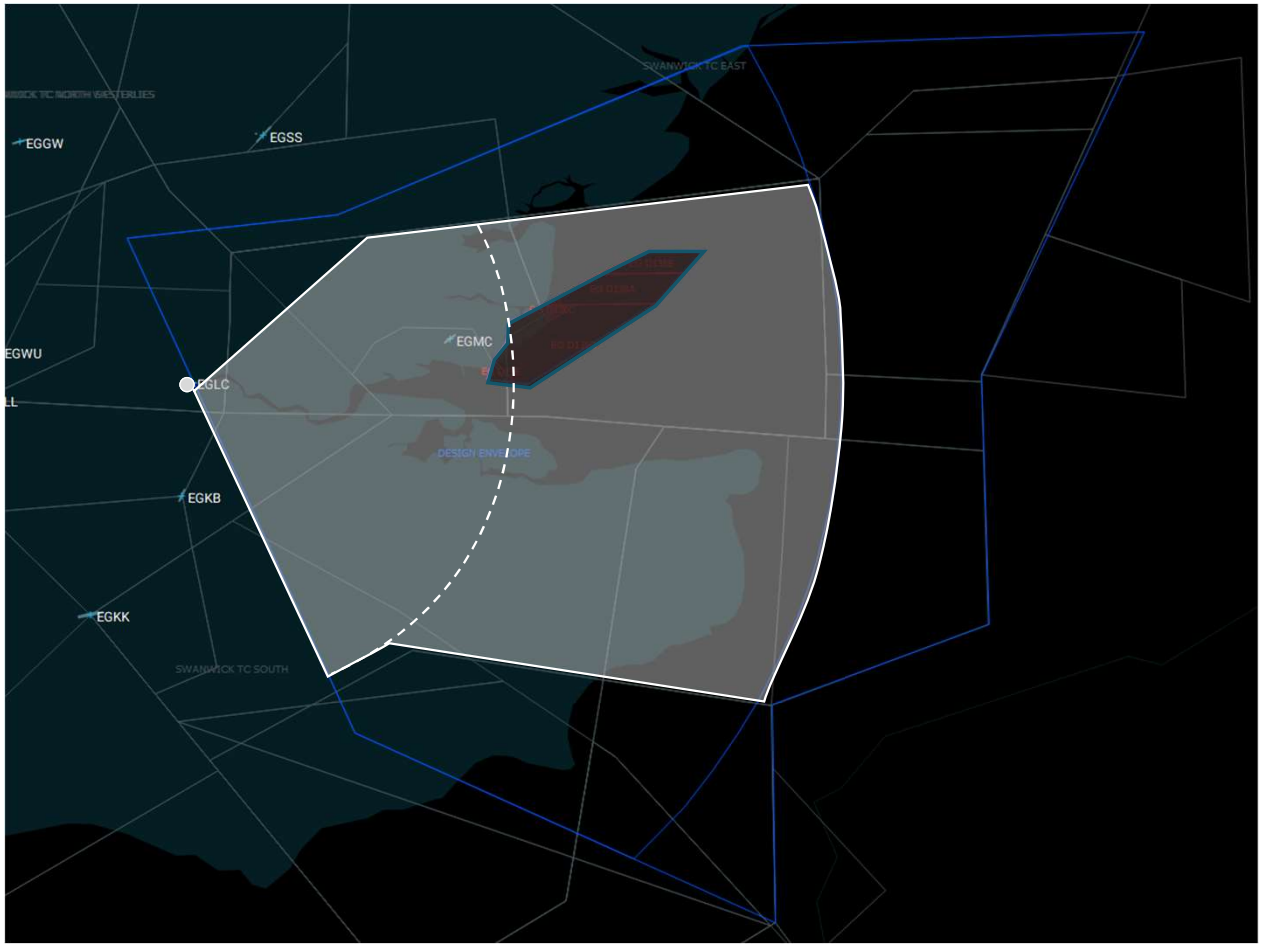
This facilities could be shared with another airport.

Further constraints may apply to this Design Envelope, in particular the departing and arriving flows for Biggin Hill and Southend. NERL would like to work closely with the stakeholders to explore a workable option or combination of options that benefits all parties in this area.

NERL also recognises that the arrival flows to the current Point Merge structure were designed to cross the departure flows in locations suitable for the current network. NERL will adapt or change these to better meet the demands of the future network and London City's arrival structure as the holistic designs mature.

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.



Graphics for illustrative purposes

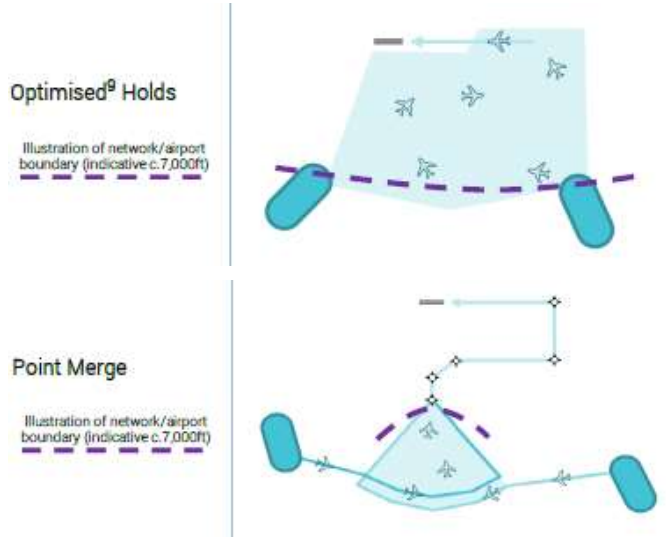
Luton

LTMA of the Future: Position Report October 2023

Stage 2 Recap Luton

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Luton:

Luton Design Options progressed to Stage 3
Inner Holds – North (Do Minimum)
Inner Holds – Northeast
Point Merge – Northeast



No assessment of hold requirement was given at Stage 2, but NERL has since assessed that based on the required traffic loading Luton would require proprietary access to at least **one** holding facility within the network, either attached to an RMA or attached to a systemised arrival structure.

Luton currently has access to **one** holding facility within the network.

To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Luton arrival connectivity options.

Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

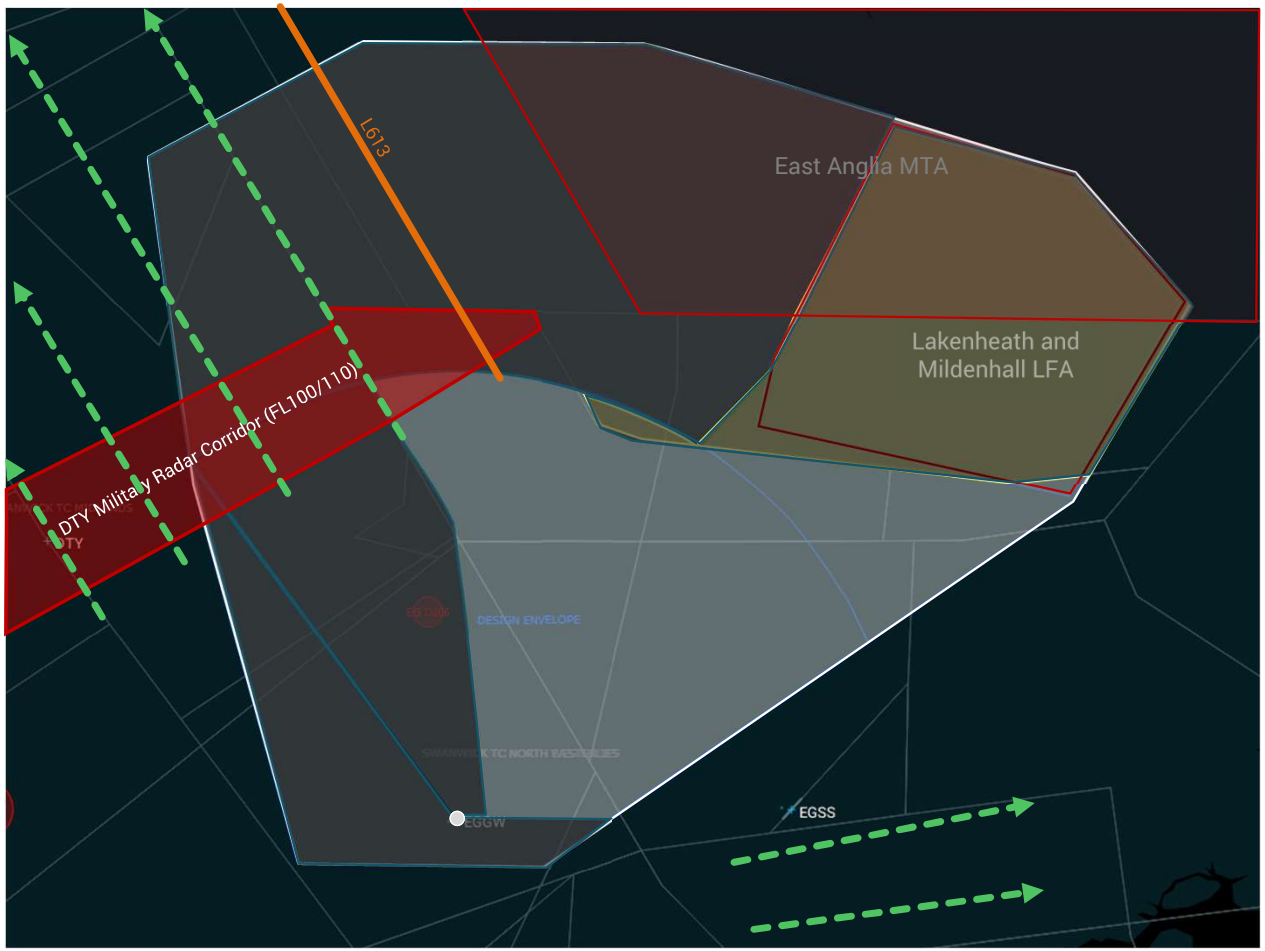
Refining the Design Envelope Luton

Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Inner holds were progressed for **north** and **northeast**. • Design envelope is reduced to reflect this. Point Merge in the **northeast** was progressed from Stage 2. • Design envelope is reduced to reflect excluded areas
Military Training Area	**East Anglia Military Training Area (MTA):** Active FL245 to FL660. No limitation on design envelope given levels.
Local Flying Area	**Lakenheath and Mildenhall Local Flying Area (LFA):** Active up to FL110. • It would be possible to place an arrival structure in this airspace above FL120.
Danger Areas	Other danger areas shown are out of the vertical or lateral scope of the design envelope.

Graphics for illustrative purposes

Refining the Design Envelope Luton

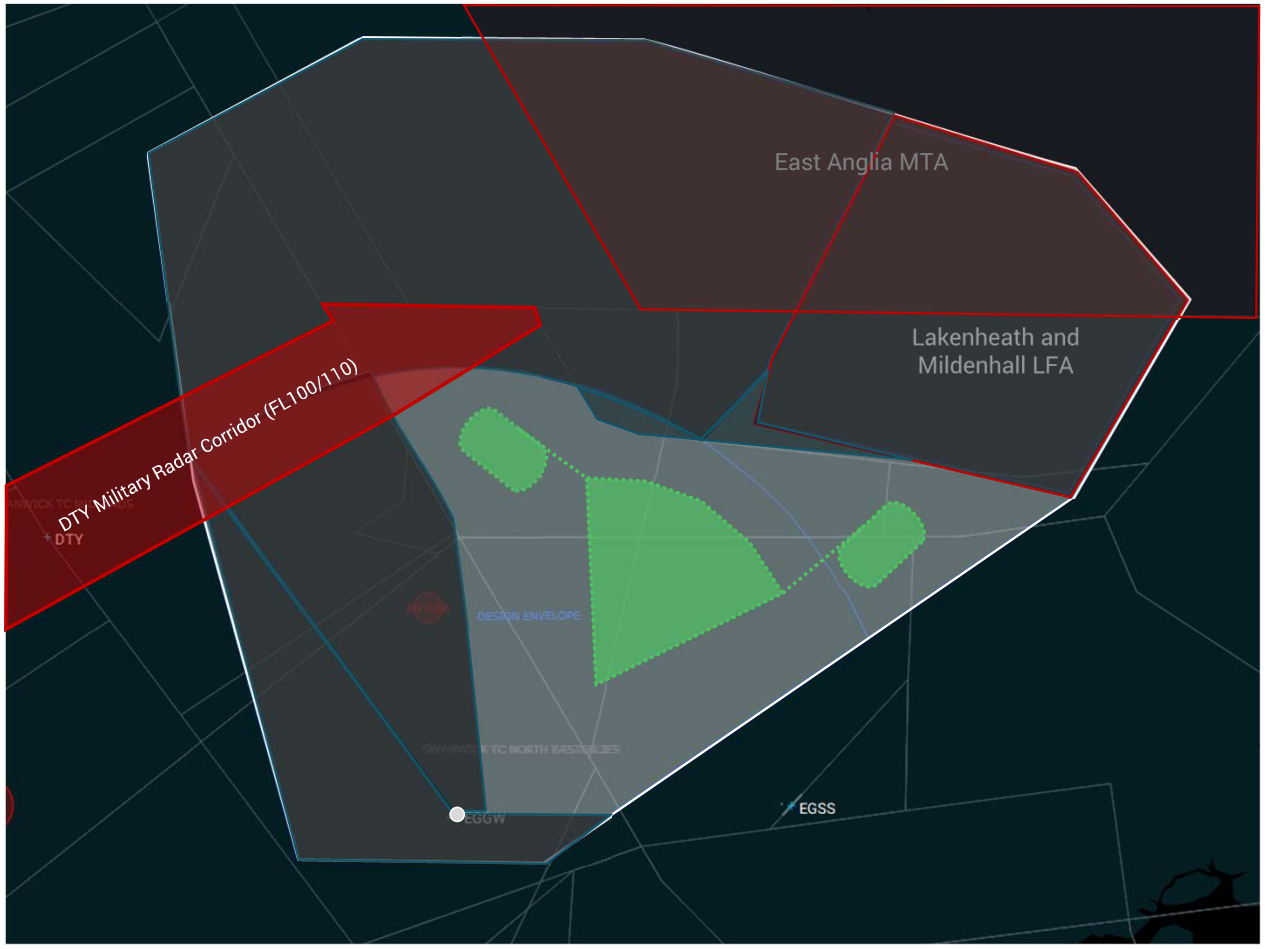
Constraint / Design Element	Considerations / Rationale
Military Corridor	**DTY Military Radar Crossing Corridor:** Current arrival procedures interact with the corridor, with levels kept free if required. • No current limitation on design envelope
Controlled Airspace	A large portion of this airspace is outside of current controlled airspace up to FL195. A significant portion of additional CAS would be required to locate a structure in this area. • This area is excluded from the design envelope.
Network Connectivity / Routes	**Northwest Connectivity** A systemised spine of routes is proposed to connect with the northwest. • Connectivity for EGGW traffic would be provided. • It would not be suitable to place a structure here due to level conflictions and complexity. • This area is removed from the design envelope. **Departure Flows** Two eastbound departure routes are proposed south of Luton. • These routes would not prohibit an arrival structure within this area



Graphics for illustrative purposes

Refining the Design Envelope Luton

Constraint / Design Element	Considerations / Rationale
Point Merge Concept	NERL has scoped the Point Merge concept: The volume of controlled airspace significantly constrains the opportunity for a Point Merge structure, within limited lateral airspace. These factors are not proven significant enough to preclude a Point Merge in this location, and it is still a viable option at this stage. NERL therefore proposes to progress the Point Merge concept for Luton.



Graphics for illustrative purposes

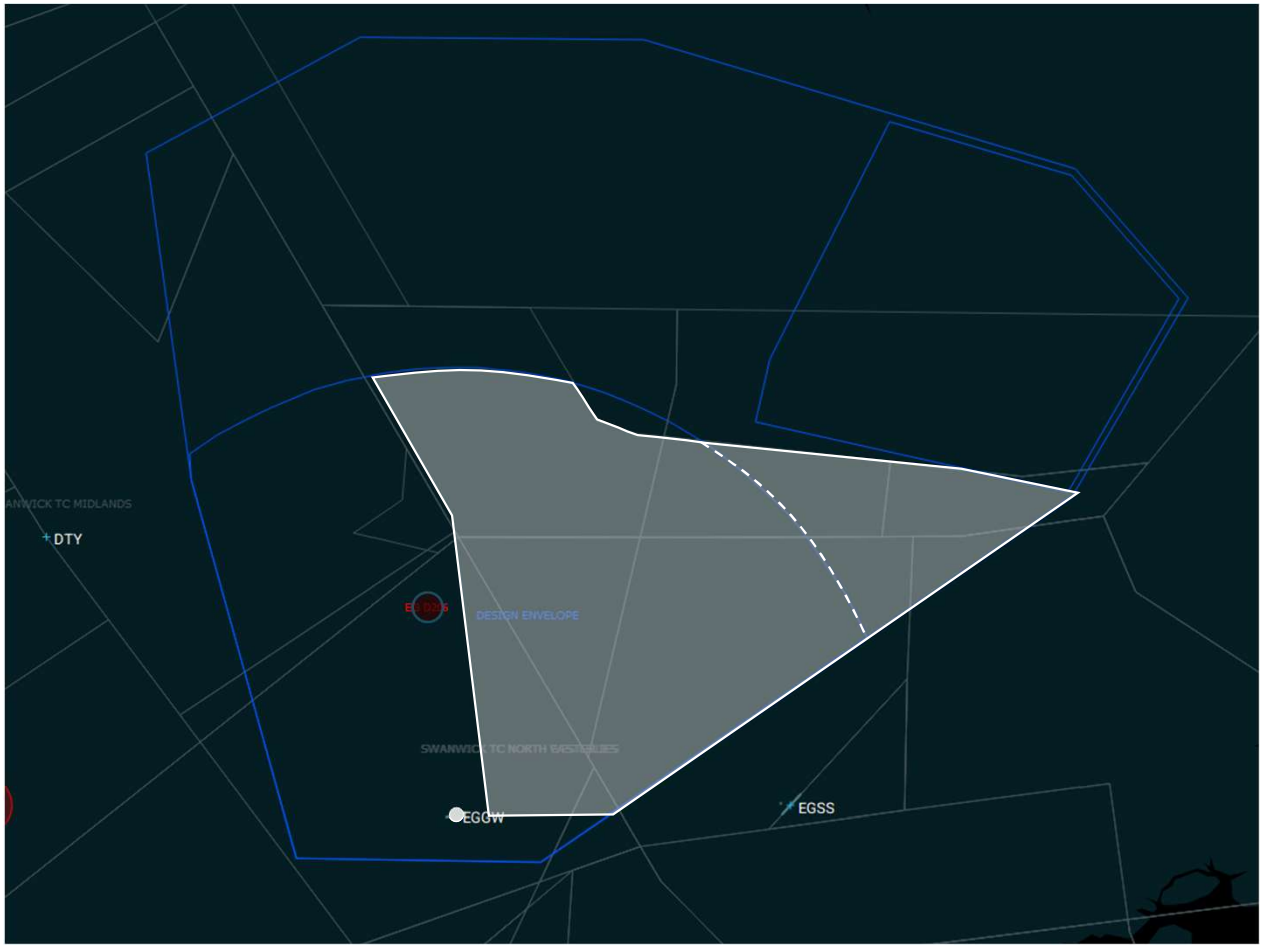
Options Summary Luton

NERL proposes to progress an Inner Hold or a Point Merge within the refined Design Envelope (indicated in white).

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.

The Design Envelope may also be refined at the next stage, where combination of options are considered and where overlaps of Design Envelopes exist.



Graphics for illustrative purposes

Manston

LTMA of the Future: Position Report October 2023

Stage 2 Recap Manston

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Manston:

Manston Design Options progressed to Stage 3
'Do Nothing'
'Do Minimum'

Manston Airport has been closed since 2014 and is currently progressing an ACP to become operational again in 2025, before the FASI programme begins implementation.

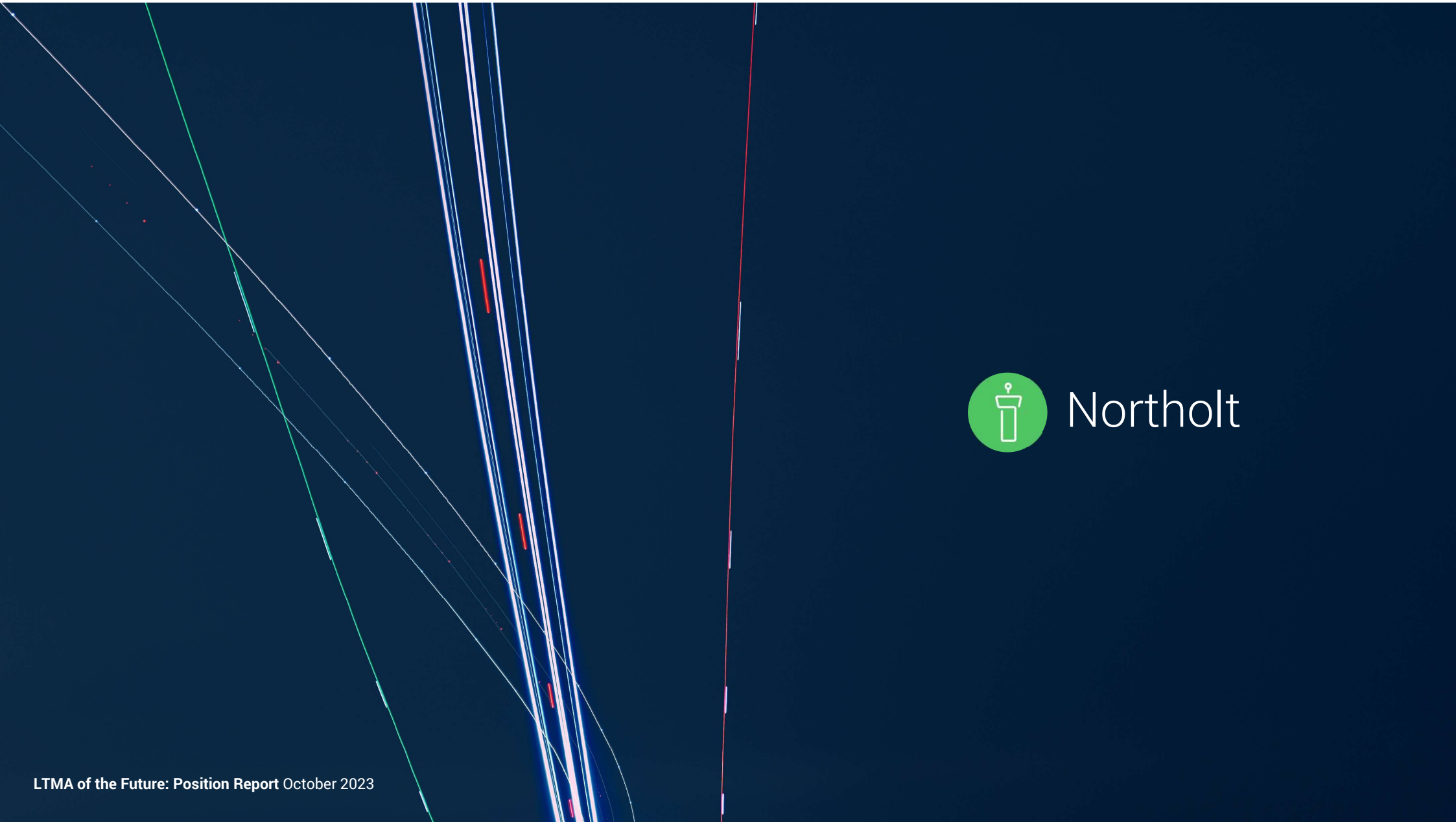
If this is the case, Manston traffic will utilise the current airspace network. It is assumed that connectivity will involve delay absorption and disruption recovery occurring outside of the network. This connectivity would become the baseline 'Do Nothing' option.

A 'Do Minimum' option would be to implement the minimum changes required to integrate the airport operations within the future airspace structure implemented by NERL as part of FASI.

Based on forecasted traffic information provided by the airport, SMEs determined that holding facilities outside of CAS[2], as provided in the 'Do Nothing' and 'Do Minimum' options, would be sufficient for the traffic volumes forecast at Manston.

It was therefore determined that no other network level arrival structure is required for Manston, and therefore no Design Envelope or arrival concepts were progressed to Stage 3.

[2] This will include access to existing network contingency holds in case of runway closure or extreme weather events etc.



Northolt

LTMA of the Future: Position Report October 2023

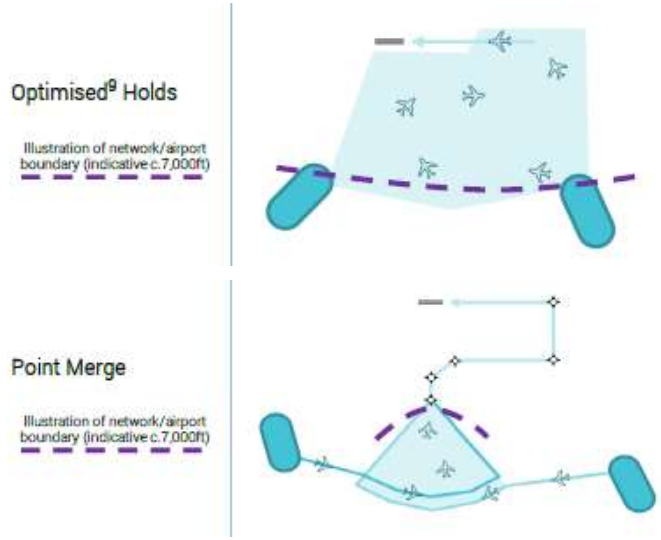
Stage 2 Recap Northolt

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Northolt:

Northolt Design Options progressed to Stage 3
Inner Holds – North (Maybe shared)
Inner Holds – Northeast (Maybe shared)
Inner Holds – East (Do Minimum) (Maybe shared)
Inner Holds – Southeast (Do Minimum) (Maybe shared)
Inner Holds – South (Do Minimum) (Maybe shared)
Inner Holds – Southwest (Maybe shared)
Inner Holds – Northwest (Do Minimum) (Maybe shared)
Point Merge – North (Shared)
Point Merge – South (Shared)

NERL also assessed that based on the required traffic loading Northolt would require proprietary or shared access to at least **one** holding facility within the network, either attached to an RMA or attached to a systemised arrival structure.

Northolt currently has shared access to **four** holding facilities within the network.



To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Northolt arrival connectivity options.

Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

Stage 2 Recap Northolt

Northolt currently has shared access to **four** holding facilities within the network, which are the Heathrow proprietary holds.

It is yet to be determined whether Northolt will continue to operate with a shared access to the Heathrow holds or have an independent hold solely for Northolt traffic. This is subject to the design process for the low level airspace.

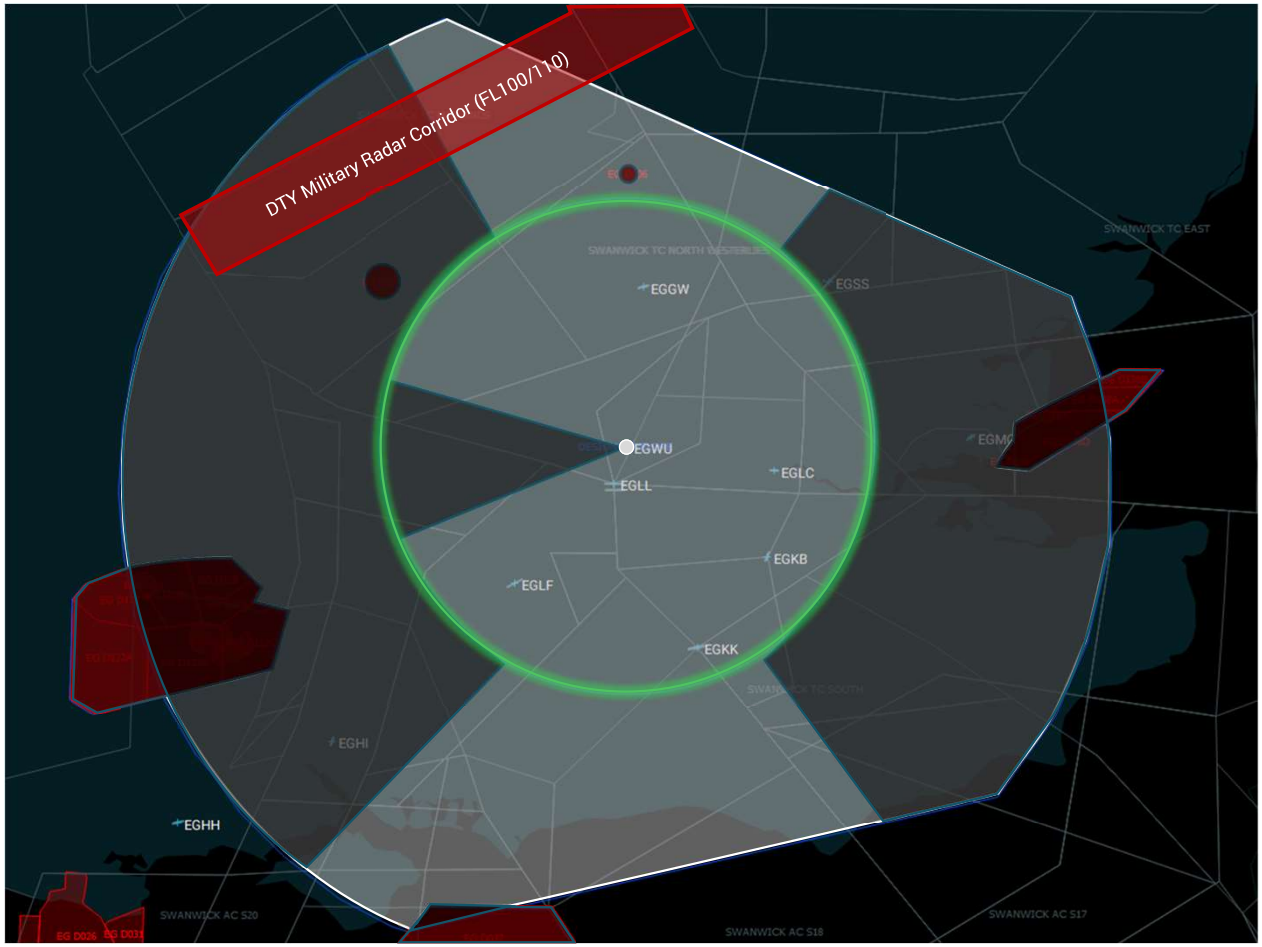
NERL acknowledges this and has developed 2 options for Northolt to reflect these potential options:

1) Shared holds - would utilise Heathrow's holds and therefore share the EGLL design envelope and design rationale.
2) Independent hold – based on airport traffic flows and assuming independence from Heathrow, a design envelope for EGWU only is provided.

Graphics for illustrative purposes

Refining the Design Envelope Northolt

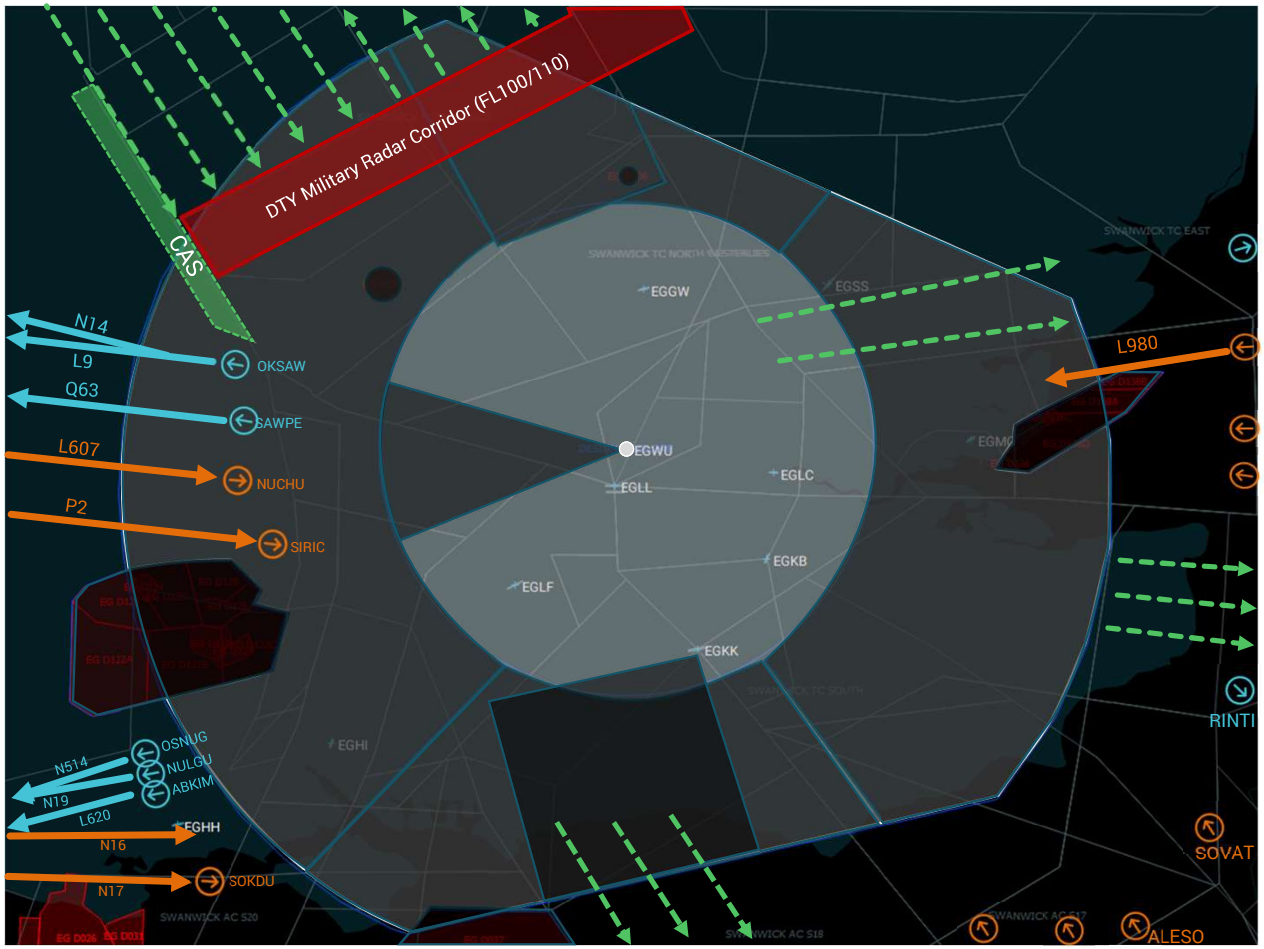
Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Inner holds were progressed for **northwest, north, northeast**, **southeast, south**, **southwest and east**. • Design envelope is reduced to reflect this. Point Merge in the **north** and **south** was progressed from Stage 2. • Design envelope is reduced to reflect this.
Danger Areas	**Portsmouth Complex:** Due to the level and frequency of activations, it is not appropriate to place an arrival structure here. • This area is excluded from the design envelope. Other danger areas shown are out of the vertical or lateral scope of the design envelope.
Military Corridor	**DTY Military Radar Crossing Corridor:** Established at FL100 / FL110. • No current limitation on design envelope as traffic would be above this in this region.



Graphics for illustrative purposes

Refining the Design Envelope Northolt

Constraint / Design Element	Considerations / Rationale
Network Routes	**Midlands**: Network design proposes 10 systemised routes. • It would not be suitable to place a structure here due to level conflictions. • This area is removed from the design envelope. **West:** Connectivity is required with west systemised routes. • No impact on design envelope. **South:** Network design proposes 3 systemised routes. • It would not be suitable to place a structure here due to level conflictions and complexity. • This area is removed from the design envelope. **East:** Network design proposes systemised route structures for departures to the east. • No impact on design envelope.
Point Merge Concept	A Point Merge for Northolt is only viable if shared with Heathrow. This has been scoped by NERL and is not progressed as a design option due to insufficient airspace. This is therefore no longer an option for Northolt and the design envelope is reduced to 30nm.



Graphics for illustrative purposes

Options Summary Northolt

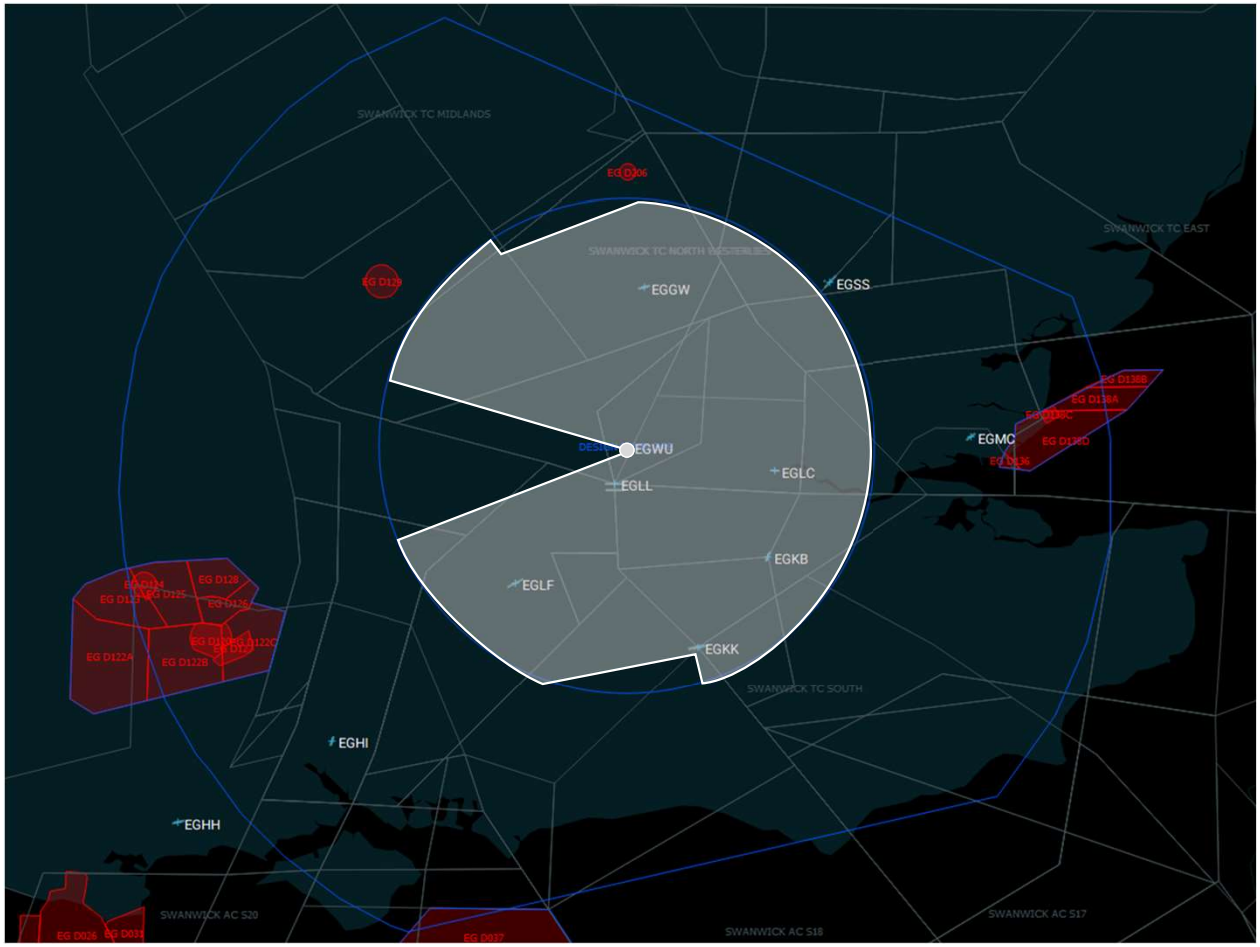
NERL proposes to progress an Inner Hold within the remaining Design Envelope (indicated in white).

This design envelope would be used for a single proprietary hold for Northolt. Should further development work determine that Northolt will share a hold with Heathrow, this design envelope would become obsolete.

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.

The Design Envelope may also be refined at the next stage, where combination of options are considered and where overlaps of Design Envelopes exist.



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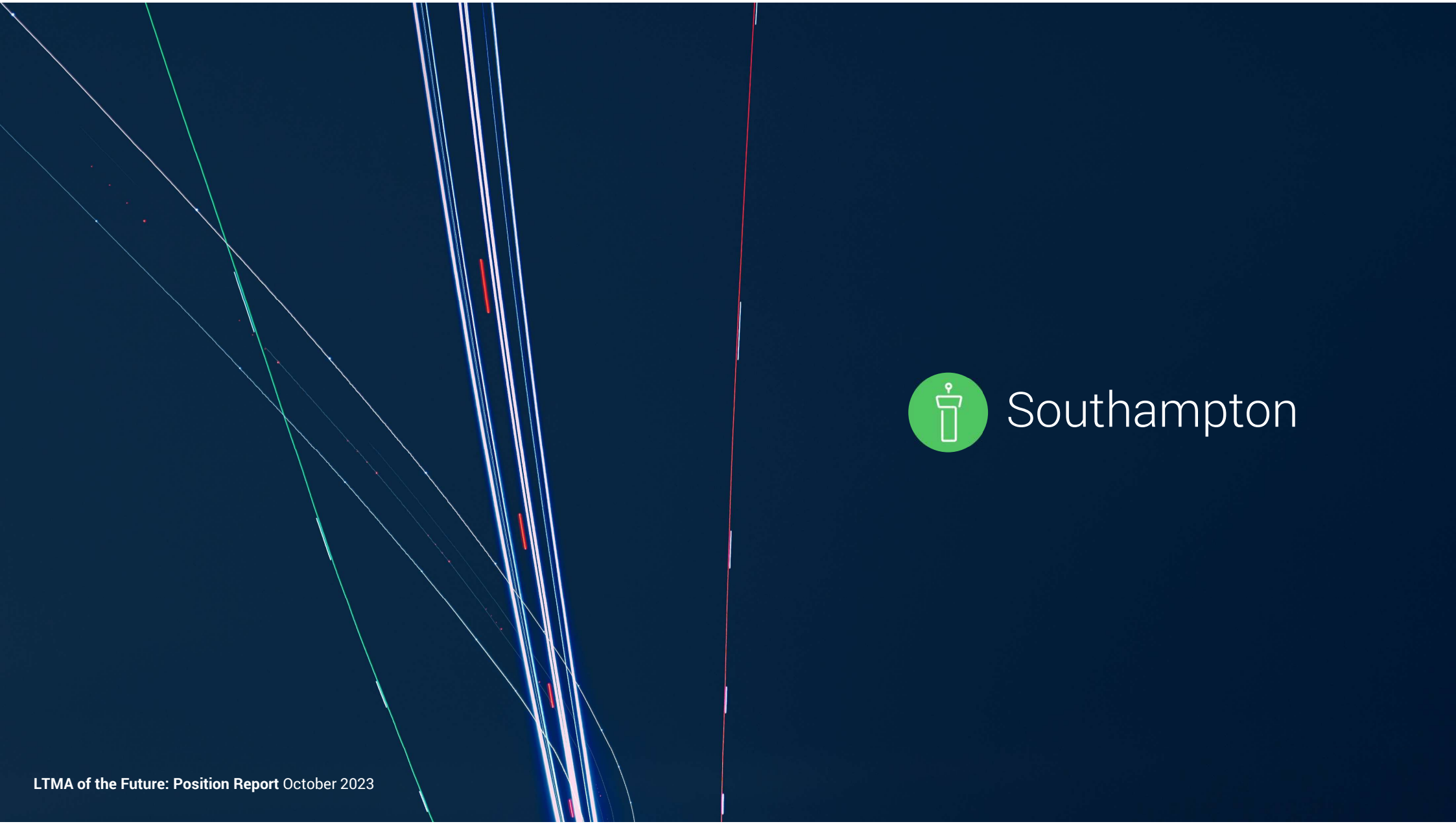


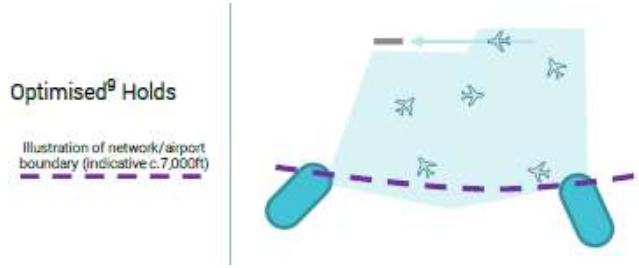
Southampton

LTMA of the Future: Position Report October 2023

Stage 2 Recap Southampton

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Southampton:

Southampton Design Options progressed to Stage 3
Inner Holds – North (Maybe shared)
Inner Holds – Southeast (Maybe shared)
Inner Holds – South (Maybe shared)
Inner Holds – Southwest (Maybe shared)
Inner Holds – Overhead (Do Minimum) (Maybe shared)



NERL also assessed that based on the required traffic loading Southampton would require proprietary or shared access to at least **one** holding facility within the network, either attached to an RMA or attached to a systemised arrival structure.

Southampton currently has shared access to **one** holding facility within the network.

To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Southampton arrival connectivity options.

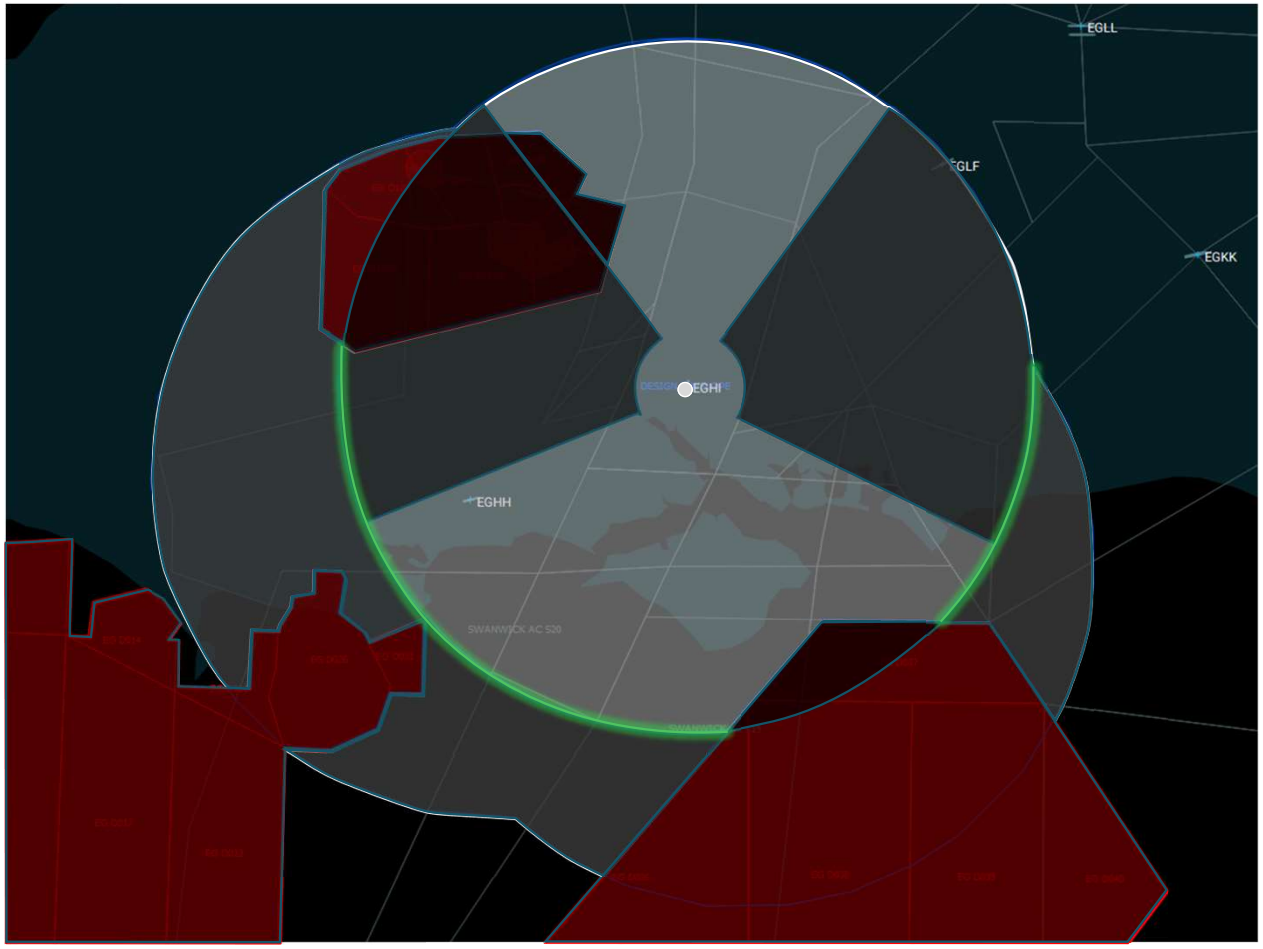
Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

Refining the Design Envelope Southampton

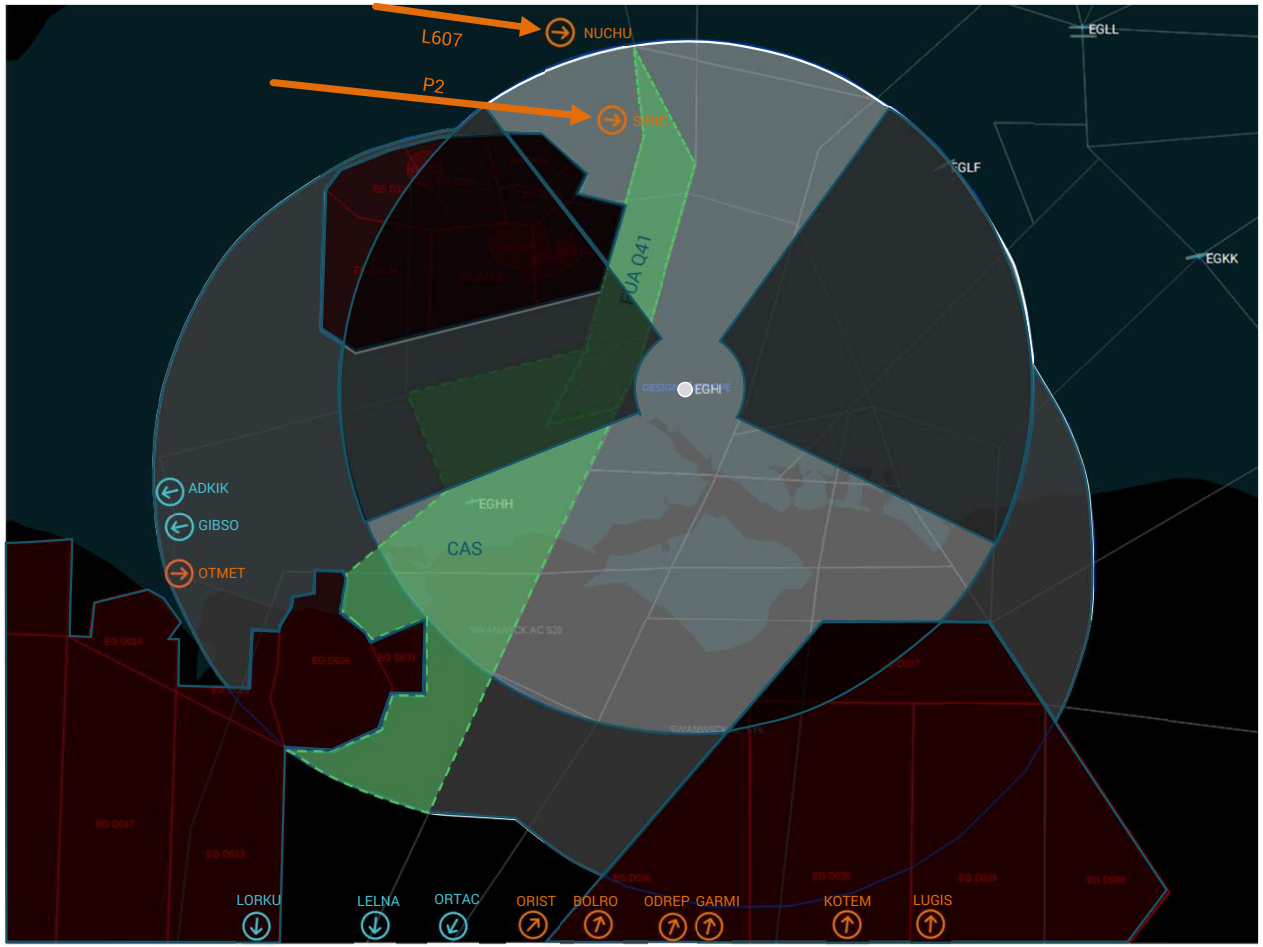
Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Original Design Envelope extended beyond 30nm from the airfield. 'Holds Further Out' and 'Point Merge' were not progressed at Stage 2. • 'Inner Holds' should be within 30nm, so the design envelope is reduced to reflect this. Inner holds were progressed for **north, southeast, south, southwest** and **the overhead**. • Areas within 30nm not progressed from Stage 2 removed from design envelope.
Danger Areas	**Salisbury Plain, Portsmouth and Portland DA Complexes:** • Due to the frequency of activations, it is not appropriate to place an arrival structure in these. • These areas are excluded from the Design Envelope.



Graphics for illustrative purposes

Refining the Design Envelope Southampton

Constraint / Design Element	Considerations / Rationale
Flexible Use Airspace	Q41 – current parameters restrict the use of this airspace. • NERL would like to explore the feasibility of changing the current FUA airspace to become flight plannable. • This could allow the portion contained within the Design Envelope to be considered for arrival structures.
Controlled Airspace	Current airspace restrictions around EGHH do not allow for efficient arrival and departure routes which would always keep aircraft inside CAS. • NERL would like to explore the feasibility of providing contiguous airspace to enhance safety in this region. • This could allow the portion contained within the Design Envelope to be considered for arrival structures.
Network Routes	Project scope does not include revising current COPs / connectivity from the LTMA to the wider UK network. • Routes that cross the FIR boundary / connect west will likely remain consistent with today. • Any arrival structure should not obstruct these traffic flows.



Graphics for illustrative purposes

Options Summary Southampton

NERL proposes to progress an Inner Hold within the refined Design Envelope (indicated in white).

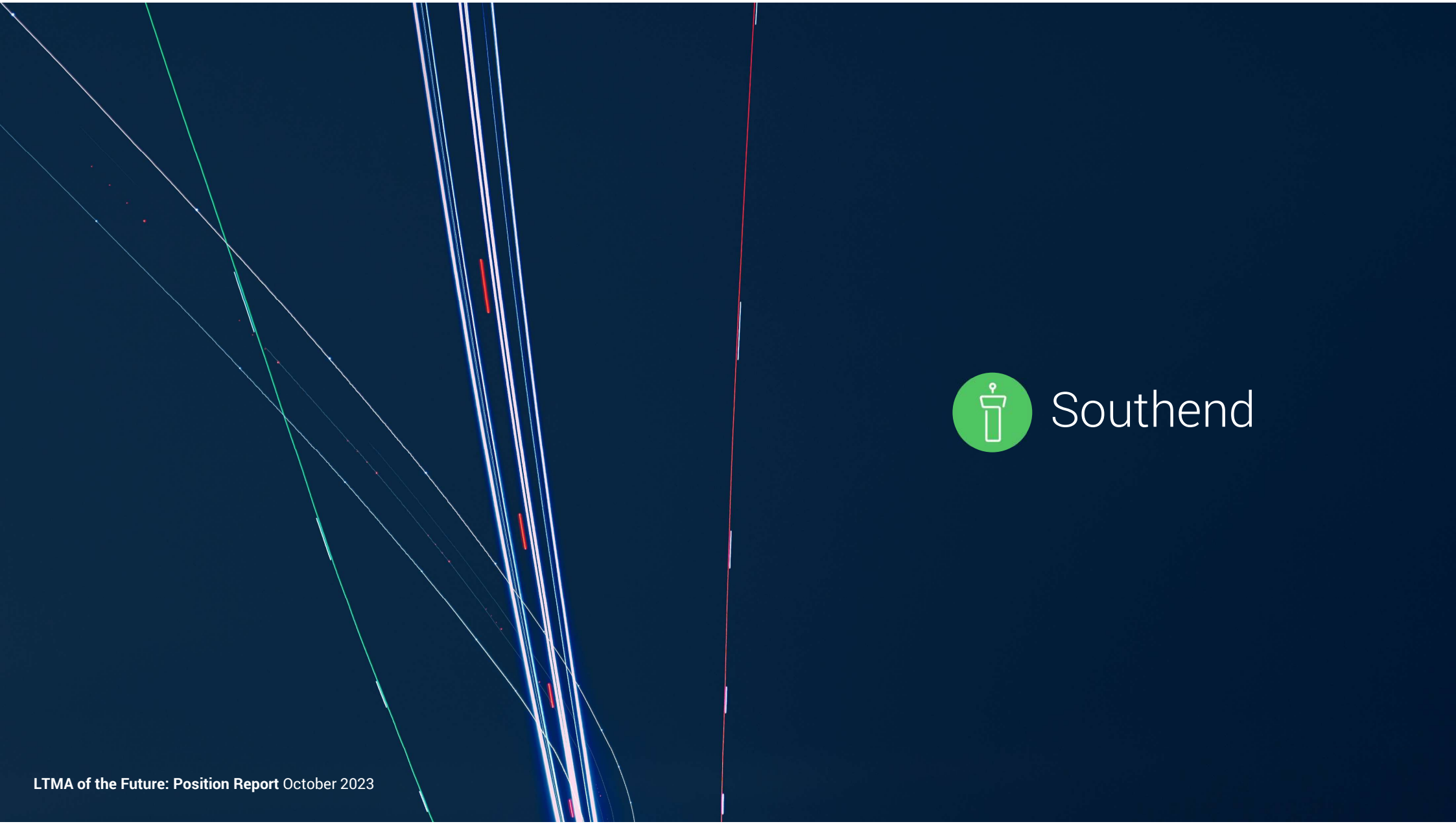
This hold could be shared with another airport.

NERL recognises that further constraints may apply to this Design Envelope, in particular the departing and arriving flows for Bournemouth and Farnborough. NERL would like to work closely with the stakeholders to explore a workable option or combination of options in this area that benefits all parties.

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.

Graphics for illustrative purposes



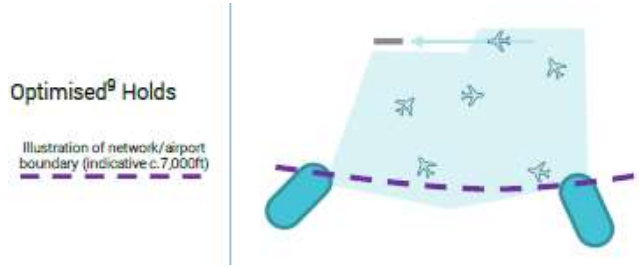
Southend

LTMA of the Future: Position Report October 2023

Stage 2 Recap Southend

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Southend:

Southend Design Options progressed to Stage 3
'Do Nothing'
Inner Holds – Northeast
Inner Holds – East
Inner Holds – Southeast



NERL also assessed that based on the required traffic loading Southend would require proprietary to at least **one** holding facility, either attached to an RMA or attached to a systemised arrival structure.

Southend currently has access to **one** holding facility outside of the network (and below 7,000ft).

To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Southend arrival connectivity options.

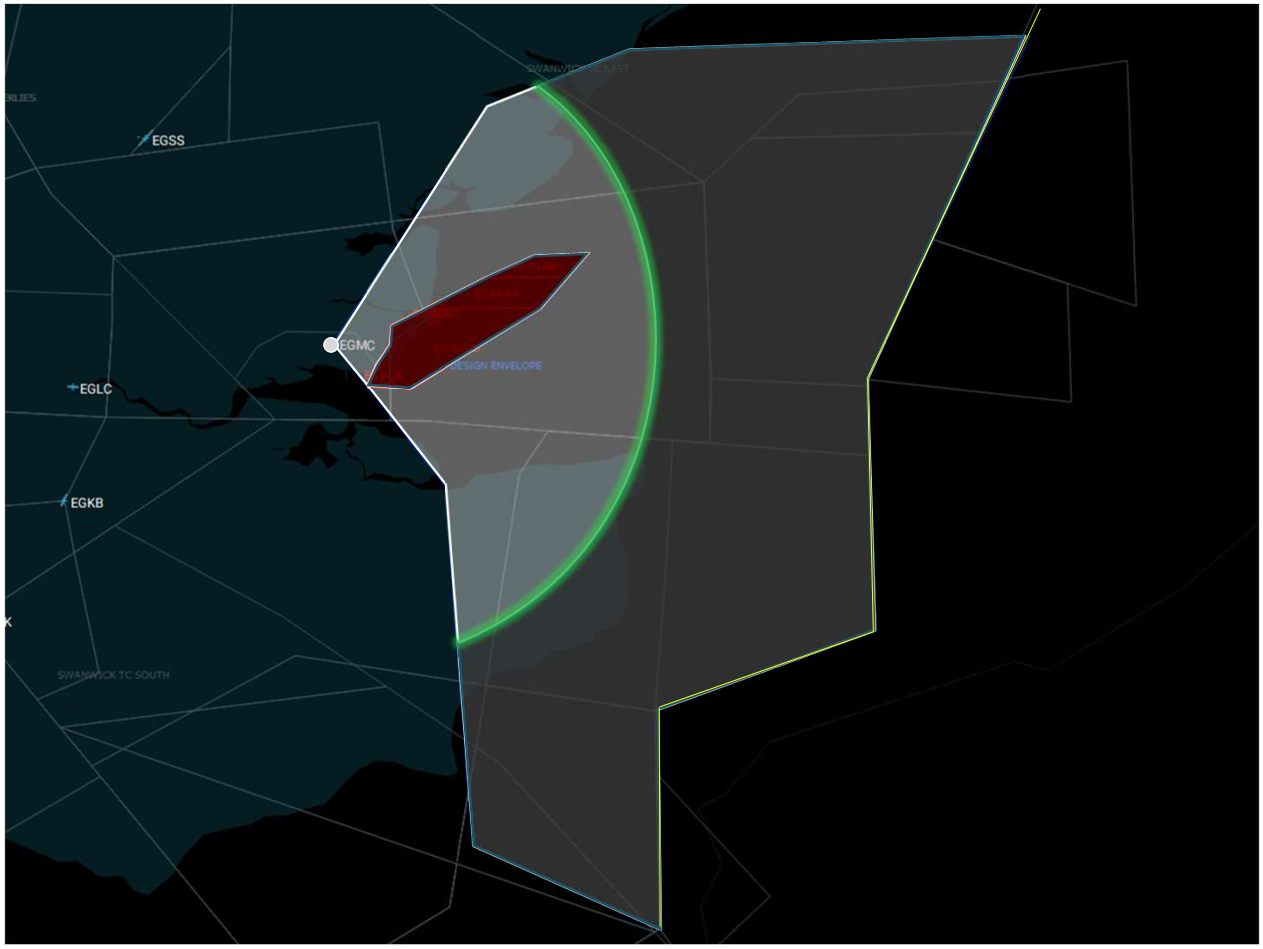
Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

Refining the Design Envelope Southend

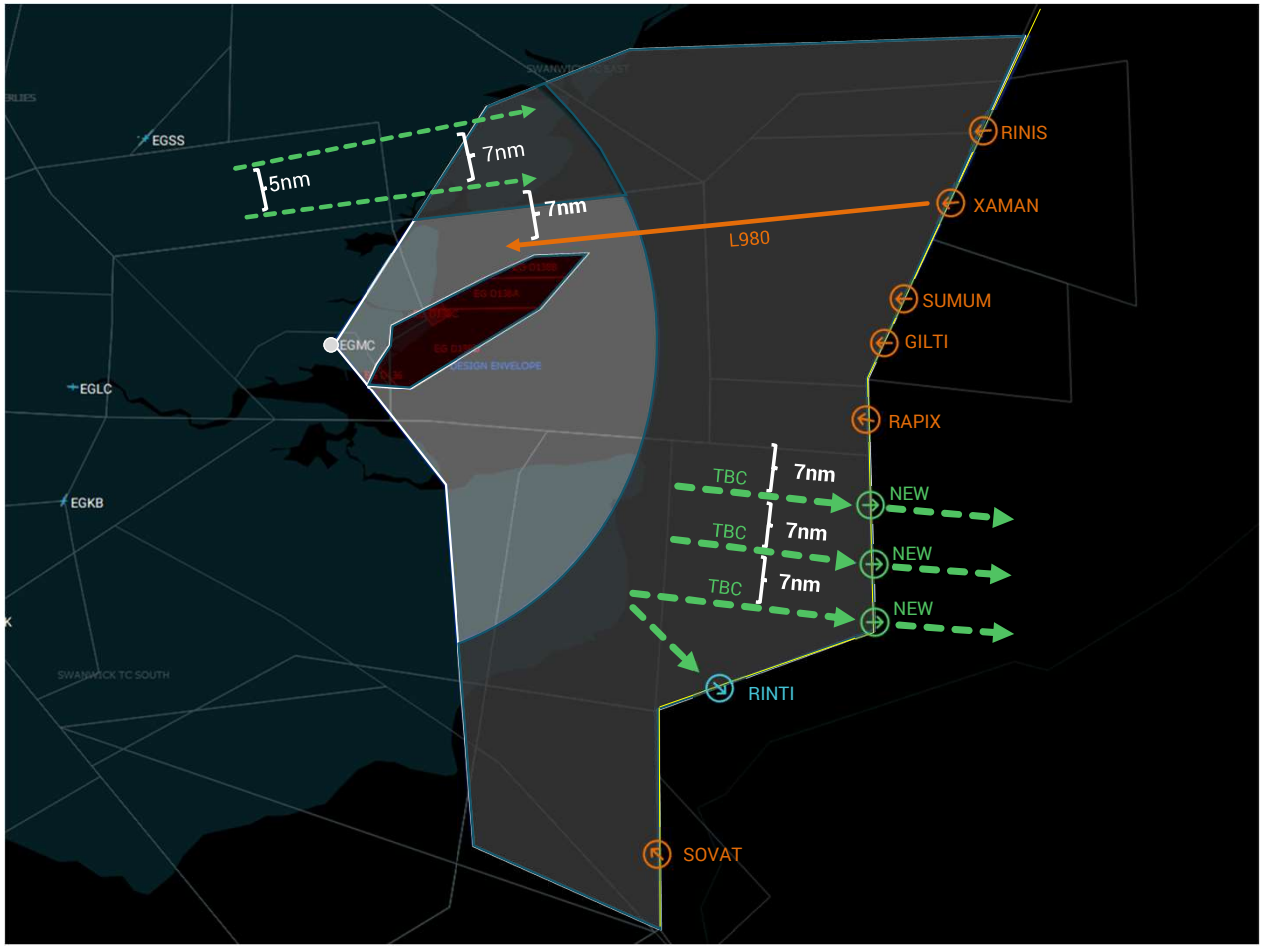
Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Original Design Envelope extended beyond 30nm from the airfield. 'Holds Further Out' and 'Point Merge' were not progressed at Stage 2. Inner holds were progressed for **northeast, east** and **southeast,** • 'Inner Holds' should be within 30nm, so the design envelope is reduced to reflect this. **'Do nothing'** was also progressed as an option. This involves arrival structures remaining below 7,000ft so network connectivity is all that is required and NERL's geographic constraints do not apply.
Danger Area	**Shoeburyness Complex:** Generally active up to 6,000ft / 13,000ft. Occasionally active to 60,000ft. • Due to the nature and frequency of those activities taking place, this area will be excluded from the design envelope.



Graphics for illustrative purposes

Refining the Design Envelope Southend

Constraint / Design Element	Considerations / Rationale
Network Routes / Flows	**Departure Flows:** Proposed network departure flow to the southeast: • Network design proposes 3 systemised routes. • Connectivity for EGMC departures would be provided. • These routes would not prohibit an arrival structure within this area as levels could be deconflicted. Proposed network departure flow to the northeast: • Network design proposes 2 systemised routes. • It would not be suitable to place a structure here due to level conflictions. • This area is removed from the design envelope. **Arrival Flows:** Network inbound flow from the east via current COPs. • Proposed to retain L980 inbound route as today. • No current limitation on design envelope whilst network is in development. • Any arrival structure should not obstruct these traffic flows to reduce complexity.



Graphics for illustrative purposes

Options Summary Southend

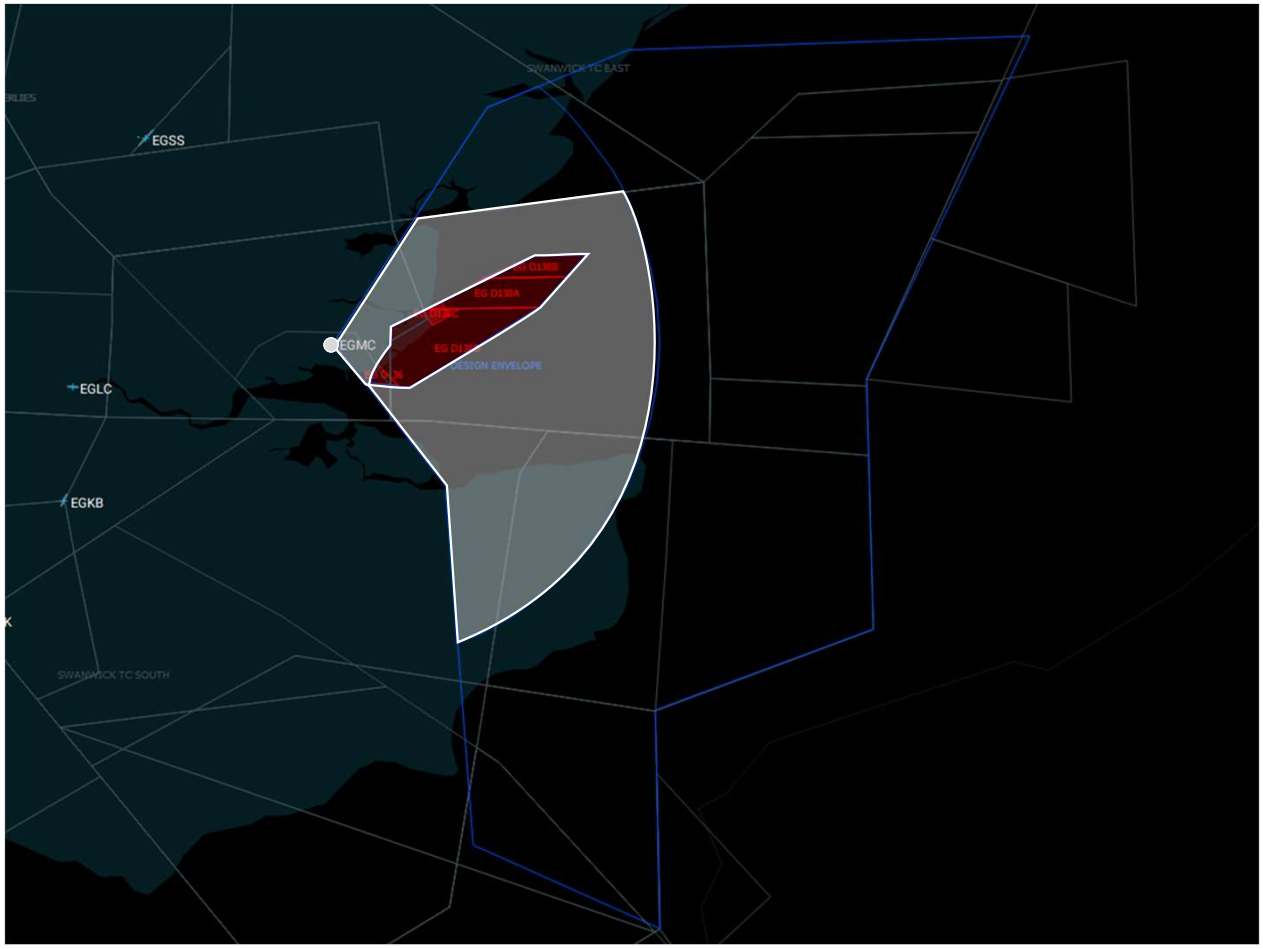
NERL proposes to progress an Inner Hold within the refined Design Envelope (indicated in white) or Do Nothing.

This design envelope would be used for a hold above 7,000ft for Southend. Should further development work determine that Southend will utilise a hold below 7,000ft as current, this design envelope would become obsolete.

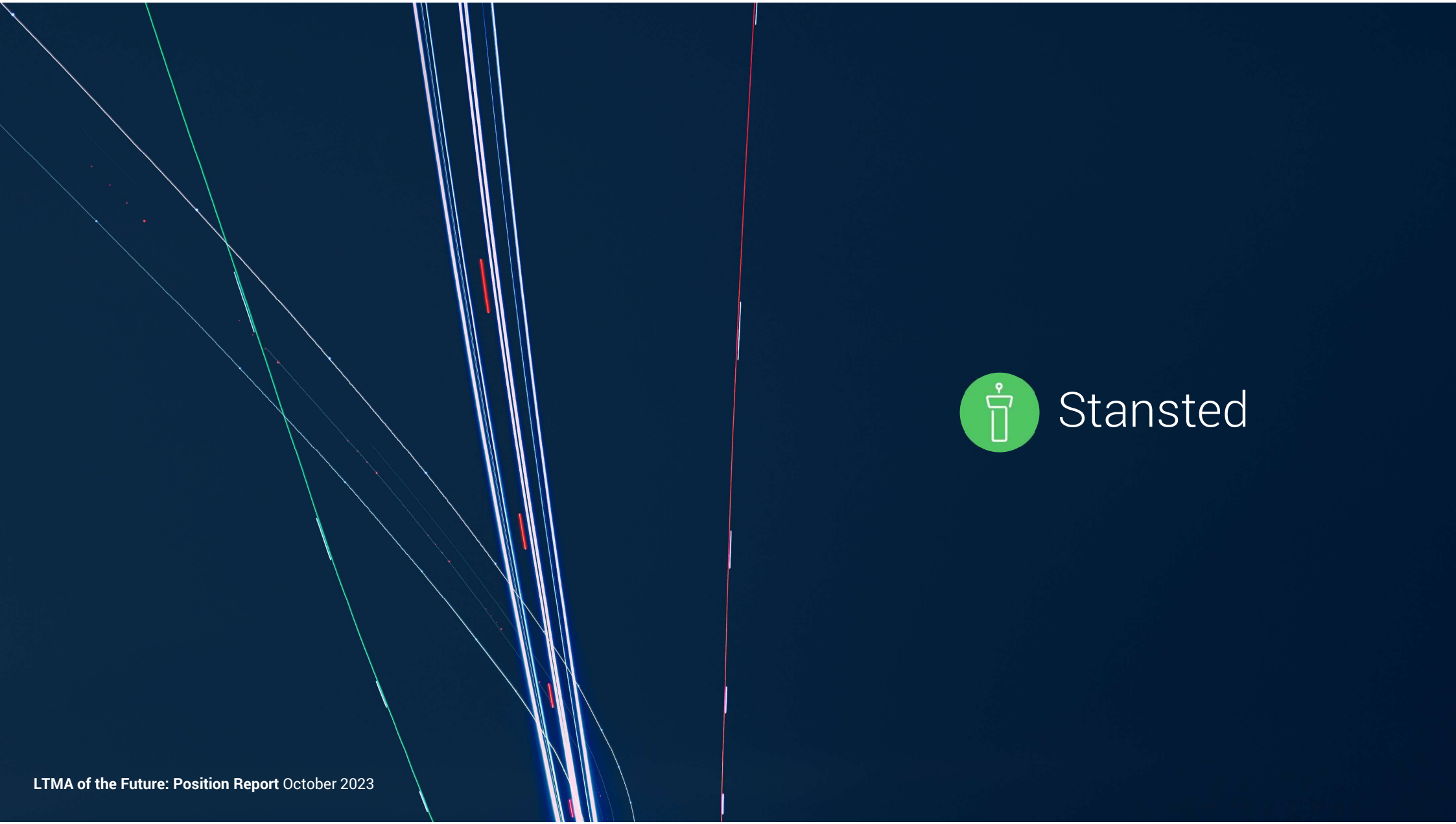
NERL recognises that further constraints may apply to this Design Envelope, in particular the departing and arriving flows for London City and Biggin Hill. NERL would like to work closely with the stakeholders to explore a workable option or combination of options that benefits all parties in this area.

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.



Graphics for illustrative purposes



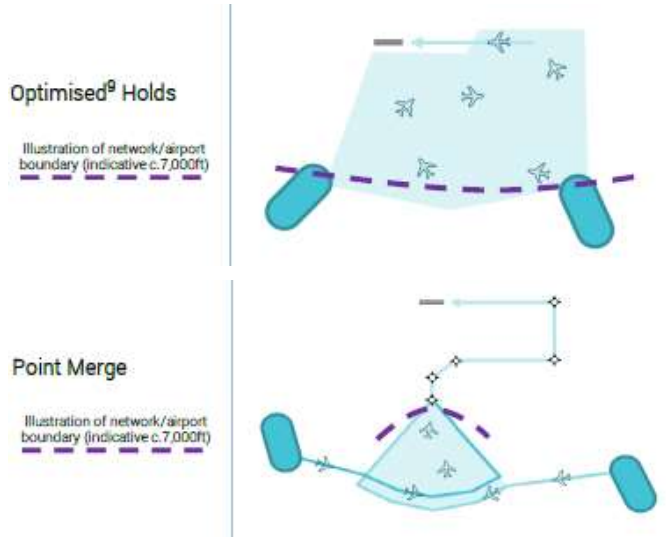
Stansted

LTMA of the Future: Position Report October 2023

Stage 2 Recap Stansted

NERL concluded Stage 2 with the following shortlisted viable arrival connectivity options for Stansted:

Stansted Design Options progressed to Stage 3
Inner Holds – North
Inner Holds – Northeast (Do Minimum)
Inner Holds – Northwest (Do Minimum)
Point Merge – North
Point Merge – Northeast



NERL also assessed that based on the required traffic loading Stansted would require proprietary access to at least **two** holding facilities within the network, either attached to an RMA or attached to a systemised arrival structure.

Stansted currently has access to **two** holding facilities within the network.

To determine a preferred option prior to consultation, it is necessary to narrow down the shortlisted options wherever possible. NERL will achieve this by refining the original Design Envelope created for the Stansted arrival connectivity options.

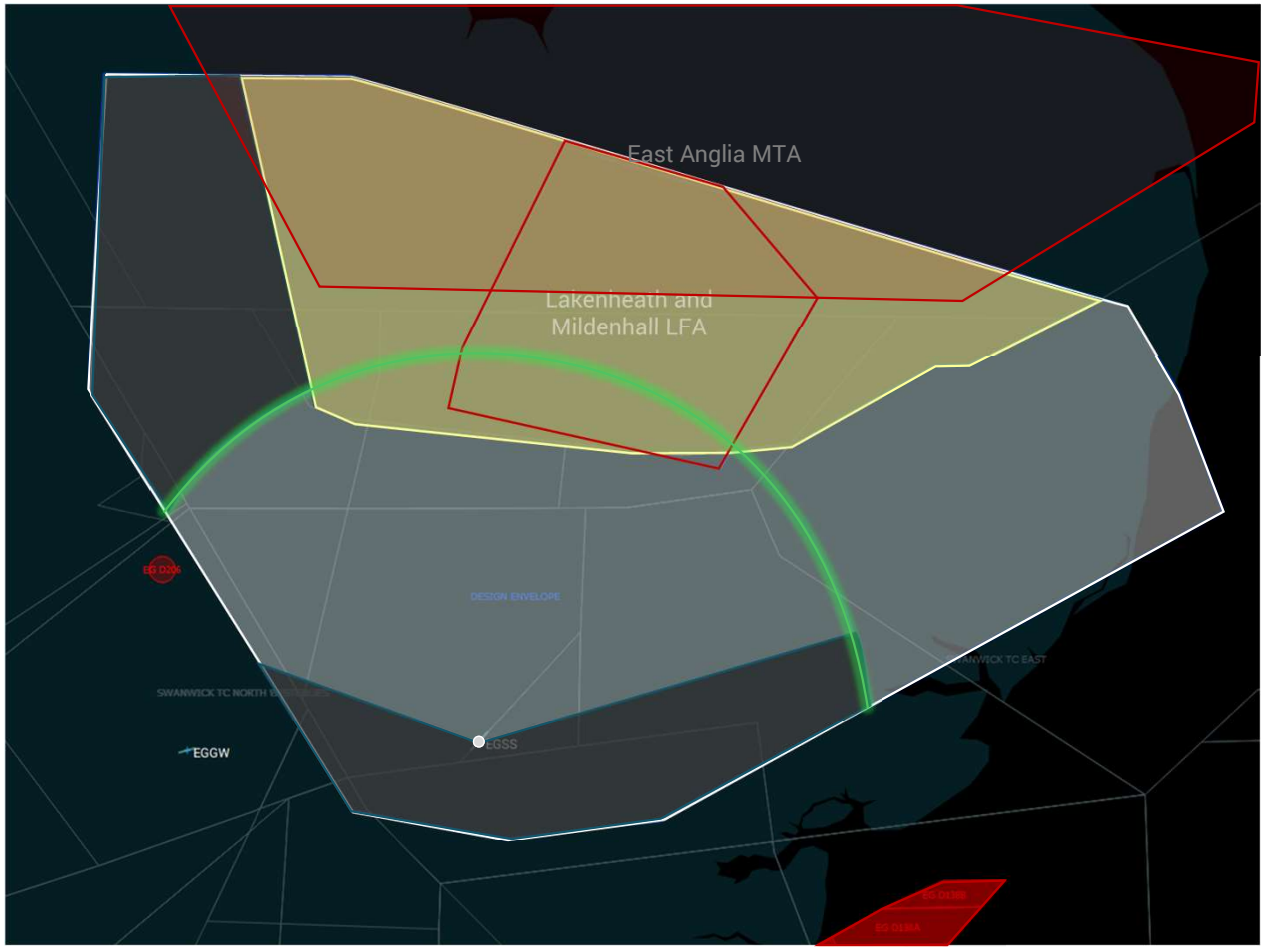
Then, considering the network holistically, NERL will conduct appropriate qualitative and, where appropriate, quantitative assessments and comparisons among the remaining choices.

[9] For a structure to be considered 'optimised' it would be relocated, reoriented, and set at better altitudes / flight levels to provide the best balance between capacity and fuel-efficient routings for both airport and network.

Graphics for illustrative purposes

Refining the Design Envelope Stansted

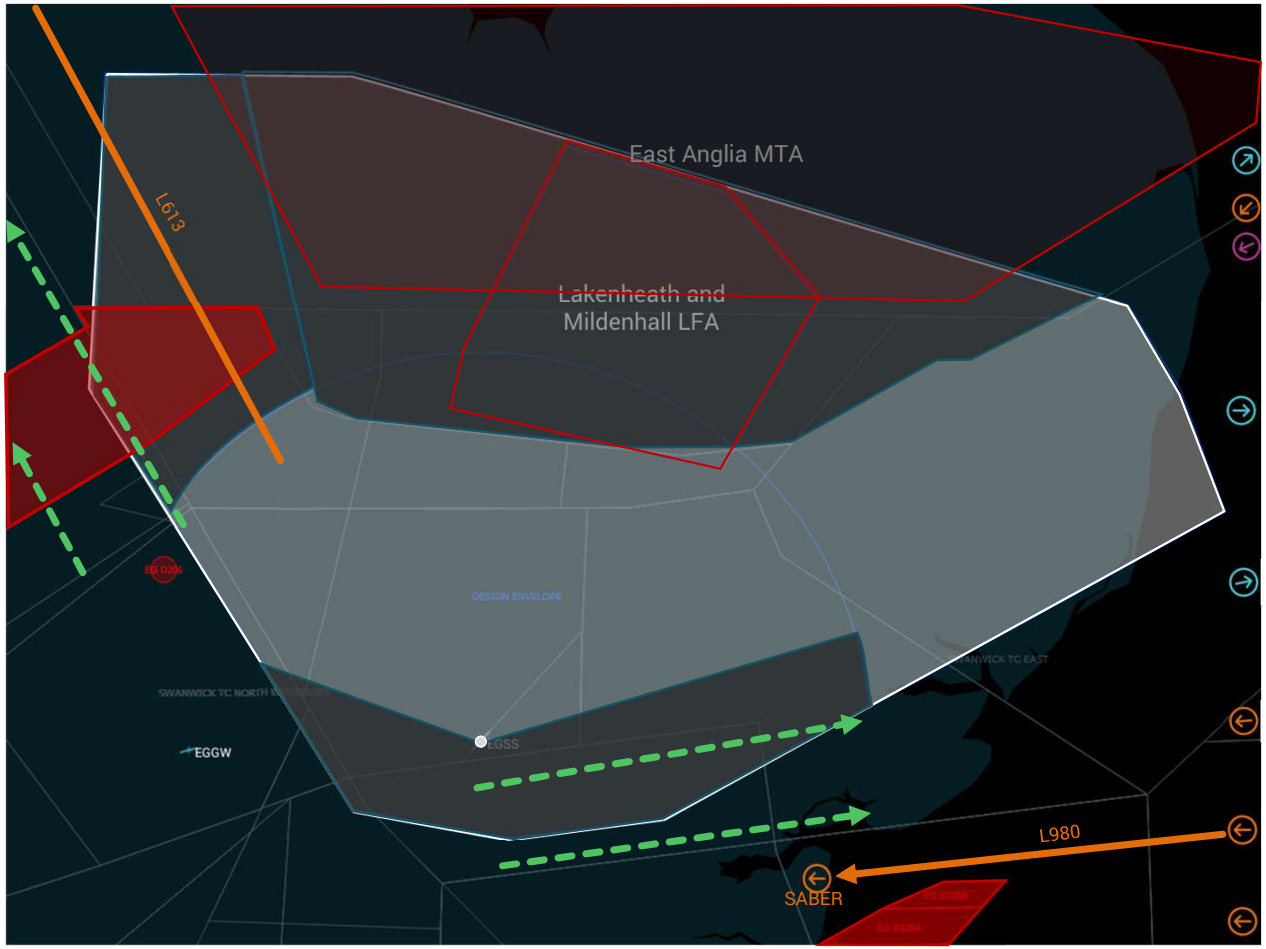
Constraint / Design Element	Considerations / Rationale
Progressed Design Options	Inner holds were progressed for **northwest, north and northeast**. • Design envelope is reduced to reflect this. Point Merge in the **north** or **northeast** was progressed from Stage 2. • Design envelope is reduced to reflect this.
Military Training Area	**East Anglia Military Training Area (MTA):** Active FL245 to FL660. No limitation on design envelope given levels.
Local Flying Area	**Lakenheath and Mildenhall Local Flying Area (LFA):** Active up to FL110. • It would be possible to place an arrival structure in this airspace above FL120.
Danger Areas	Other danger areas shown are out of the vertical or lateral scope of the design envelope.
Controlled Airspace	A large portion of this airspace is outside of current controlled airspace up to FL195. A significant portion of additional CAS would be required to locate a structure in this area. • This area is excluded from the design envelope.



Graphics for illustrative purposes

Refining the Design Envelope Stansted

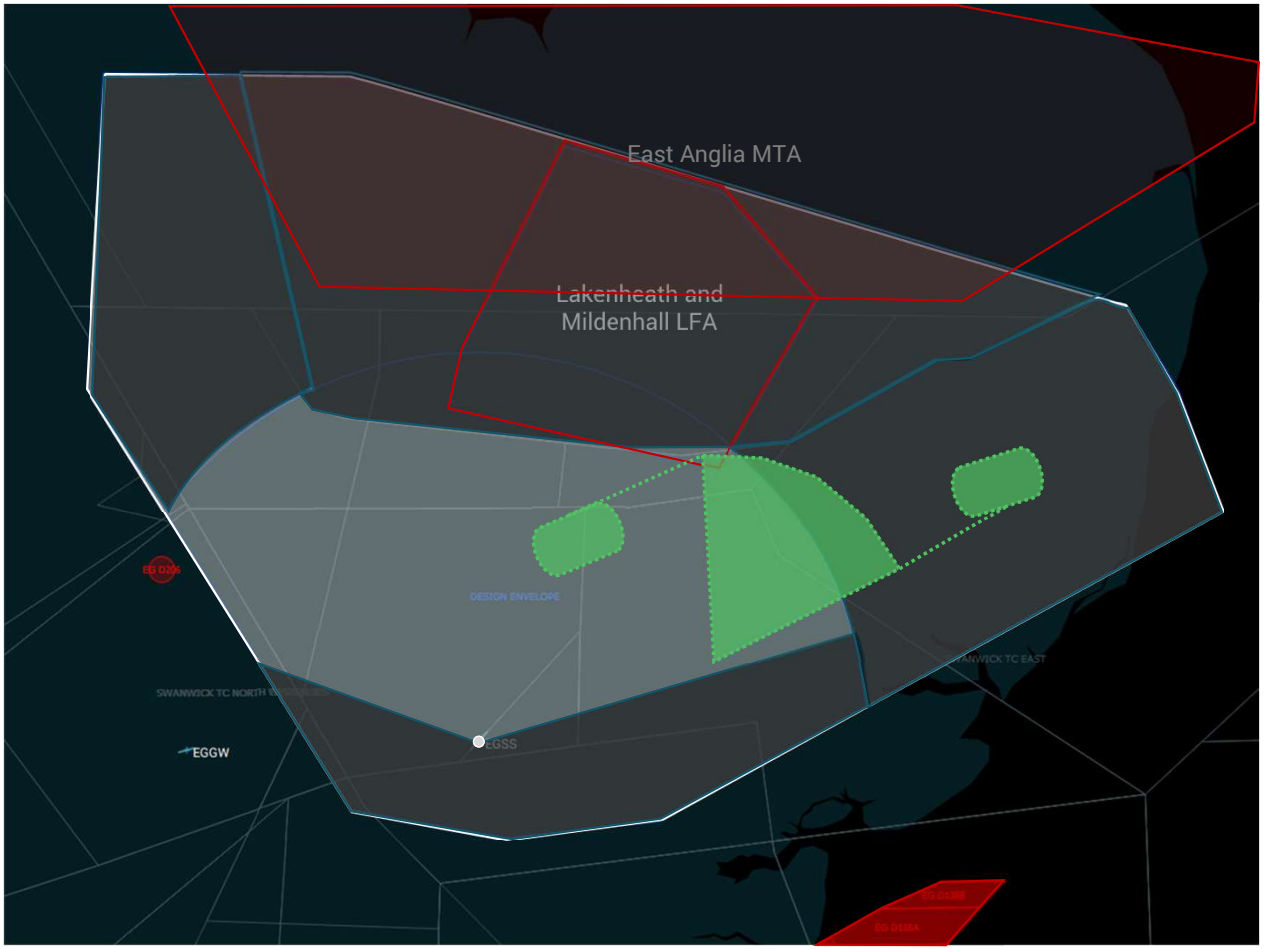
Constraint / Design Element	Considerations / Rationale
Military Corridor	**DTY Military Radar Crossing Corridor:** • No current limitation on design envelope.
Network Connectivity / Routes	**Departure Flows** Network outbound flows to connect with current COPs on FIR boundary. • No current limitation on design envelope whilst network is in development. Two eastbound departure routes are proposed south of Stansted. • These routes would not prohibit an arrival structure within this area **Arrival Flows** Network inbound flow from the east to connect with current COPs on FIR boundary. • No current limitation on design envelope whilst network is in development. **Northwest Connectivity** A systemised spine of routes is proposed to connect with the northwest. • These routes would not prohibit an arrival structure within this area Any arrival structure should not obstruct these traffic flows to reduce complexity.



Graphics for illustrative purposes

Refining the Design Envelope Stansted

Constraint / Design Element	Considerations / Rationale
Point Merge	NERL has scoped the Point Merge to the **northeast** concept. A Point Merge in this location could conflict with network flows in an already complex area. Current CAS in this airspace is across varying levels which would limit the available levels for a Point Merge structure. There is limited lateral airspace for this structure. A Point Merge structure may be feasible however will require some slight overlap of the refined design envelope. Early development work indicates this option would create an increase in procedural track miles and CO_2 disbenefit. NERL therefore proposes to no longer progress the Point Merge concept for Stansted. • The design envelope is reduced to 30nm for 'Inner Holds'



Graphics for illustrative purposes

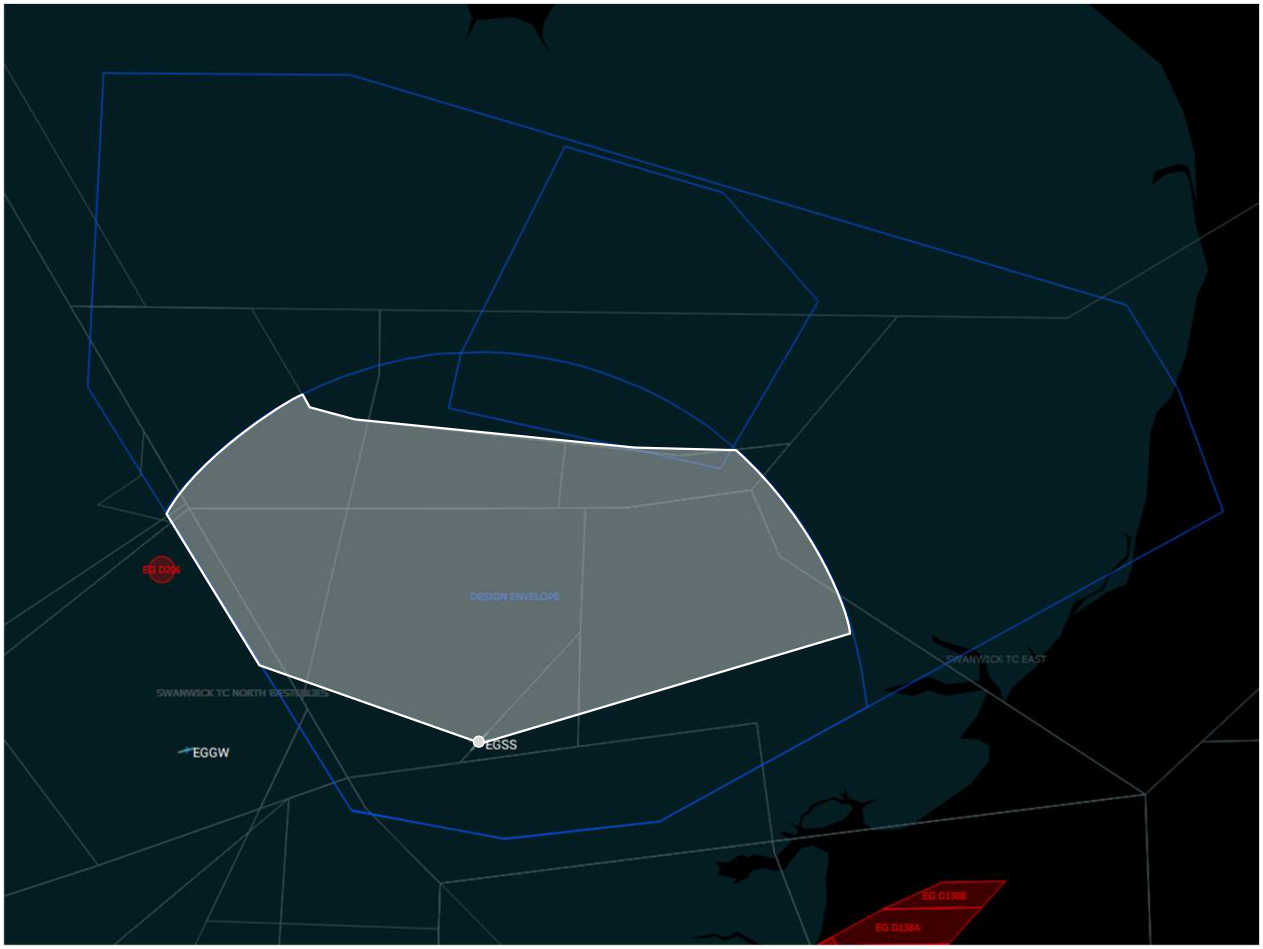
Options Summary Stansted

NERL proposes to progress two Inner Holds within the refined Design Envelope (indicated in white).

The refined Design Envelope gives NERL a basis for detailed option development in collaboration with airport sponsors.

The constraints and design elements outlined however, shall not prevent NERL from adapting or amending the refined Design Envelope or proposed options if required, as a result of further development or stakeholder feedback.

The Design Envelope may also be refined at the next stage, where combination of options are considered and where overlaps of Design Envelopes exist.



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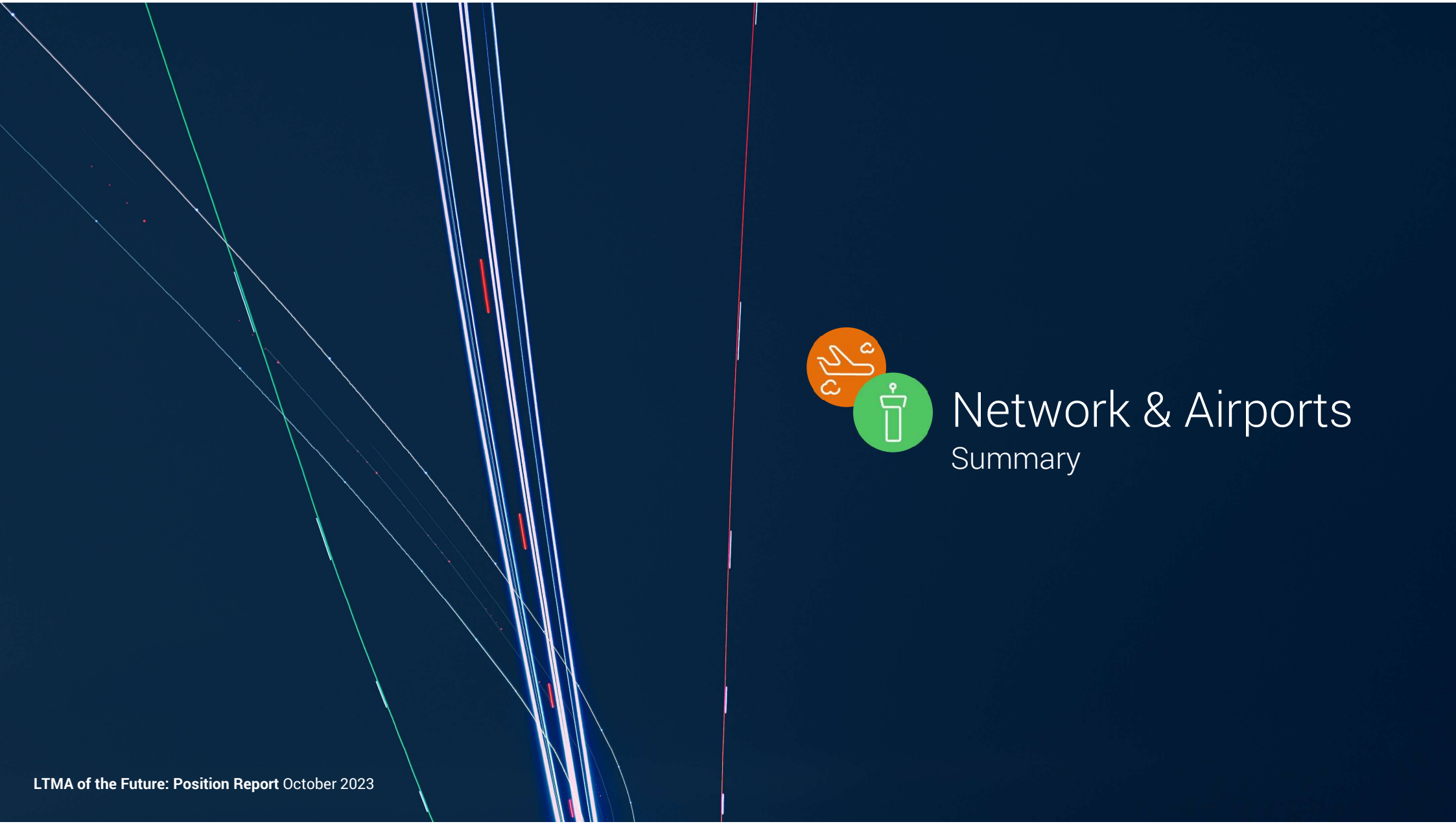


Network & Airports

Summary

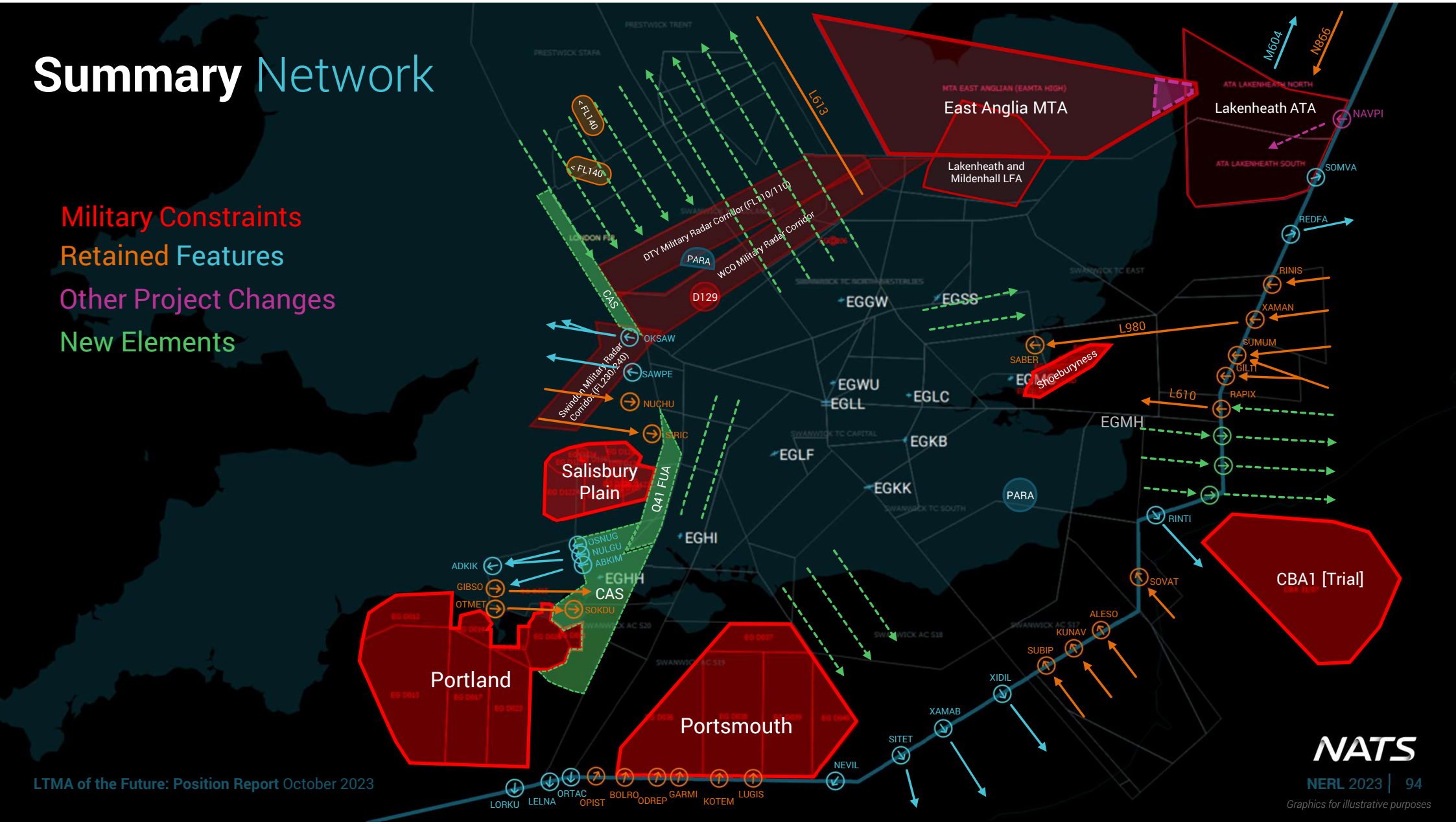
Summary Network

Military Constraints

Retained Features

Other Project Changes

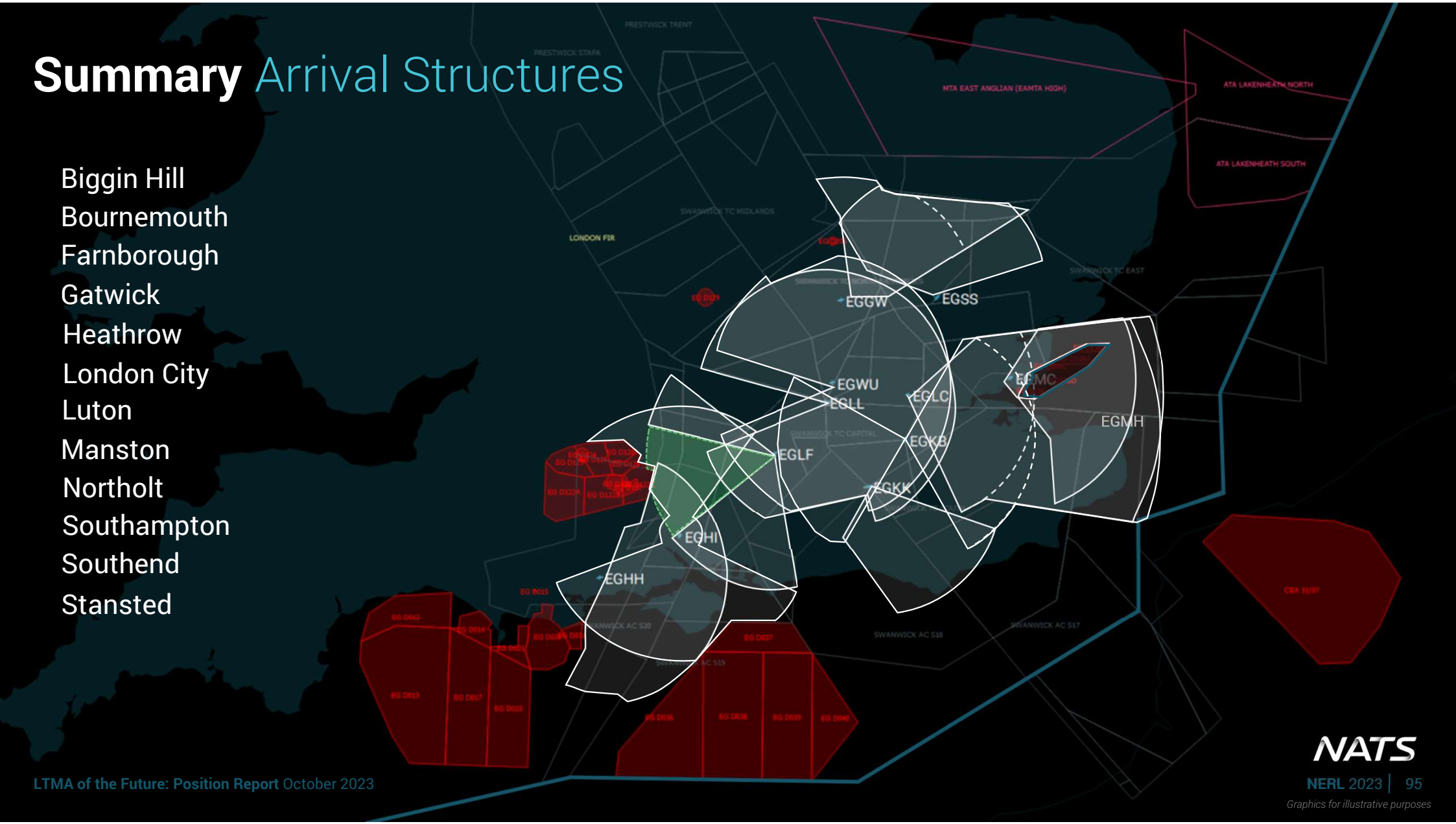
New Elements



Graphics for illustrative purposes

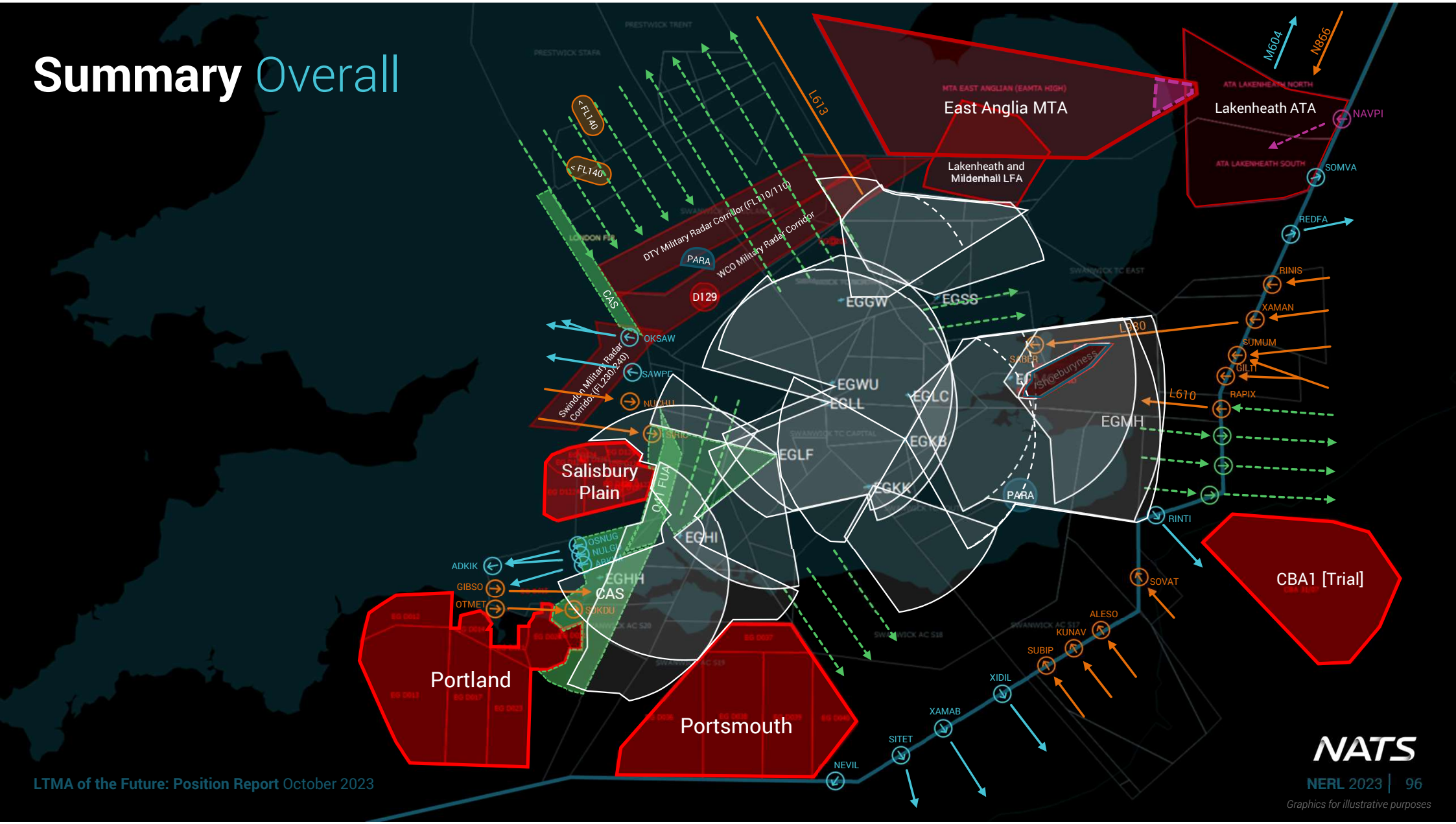
Summary Arrival Structures

- Biggin Hill
- Bournemouth
- Farnborough
- Gatwick
- Heathrow
- London City
- Luton
- Manston
- Northolt
- Southampton
- Southend
- Stansted



Graphics for illustrative purposes

Summary Overall



Graphics for illustrative purposes

Summary What next?

As described in our introduction, the complexity of this airspace requires an informed, staged approach.

At this early stage of our network design, we wish to understand your views on the proposed network features, and the refinements we have made to airport design envelopes and design options.

We will be sending you a feedback form, alongside a copy of this presentation.

Please review the presentation and complete the online form so we can capture your views on this stage of the design.

We will consider all feedback received as we develop our design and apply as appropriate to our network features.

We intend to publish the feedback and our response in line with CAP1616.


Thank you.
NATS