DVOR Rationalisation
Removal of Enroute Dependencies
Barkway (BKY) Deployment

DVOR BKY Holds and STARs
CAP1616 Stage 2 Gateway

V1.1

NATS Unclassified

Action	Position	Date
Produced	**Airspace Change Specialist** NATS Airspace & Future Operations	June 2020
Approved	**ATC Lead – Airspace** NATS Swanwick ATM Development	June 2020
Approved	**Project Manager L5382 DVOR** Operations and Airspace Programme Delivery	June 2020

Publication history

Issue	Month/Year	Change Requests in this issue
1.0	June 2020	Submitted to the CAA
1.1	June 2020	Typing error in Section 3 (DP2 description) amended

Contents

1. Introduction

This document continues the CAP1616 process started with the Statement of Need (DAP1916) submitted in September 2019 (Ref 3). The intent of this document is to summarise and satisfy the requirements of CAP1616 Stage 2. The CAA reference is ACP-2019-19, the link to the CAA progress page is here.

This proposal is limited to removing the dependency of enroute instrument flight procedures in the UK AIP from the Barkway (BKY) DVOR. Hence this proposal is focused on Standard Terminal Arrival Routes (STARs) which refer to BKY as a conventional navaid in the enroute environment, where NATS is the primary Air Navigation Service Provider (ANSP). There are no changes to holding procedures or ATS routes which fall under this proposal.

This proposal contains the relevant changes to remove the dependency on BKY from these STARs. Design Principles have been developed (Ref 4) which are focused on best removing the enroute DVOR dependencies whilst ensuring the changes are safe and do not result in changes to flight behaviour. This document will identify:

- option concepts for replacing current connectivity relevant to BKY with RNAV procedures;
- an evaluation of those option concepts against the Design Principles;
- a full list of the specific changes.

2. Stage 2 Develop and Assess

Step 2A Options Development

2.1 CAA's PBN STAR Replication Policy (V2) was published in Mar 2018 and was used as the basis for this proposal. It defines PBN STAR Replication as a PBN redesign of an existing conventional STAR from the commencement of the STAR in the ATS enroute network to the termination point with the intention of retaining the existing route and track over the ground (para 5.4). Para 5.5 of the same policy makes assumptions that replication ensures procedures follow the same path over the ground as the existing conventional procedure, as closely as possible. This means that there would be no change to pilot or controller behaviour (apart from technical designation changes), and no change to lateral traffic position.

2.2 Airspace change design options

The design options considered to remove the enroute dependencies from the BKY DVOR, were limited to the following:

Option 0 – Do nothing. Retain all the STARs and Holds unchanged from today's AIP definition.
Option 1 – Using the CAA policies, replicate all relevant STARs and Holds using RNAV, exactly as defined in the AIP without considering any practicalities.
Option 2 – Examine the use of existing STARS and Holds from a practical point of view, re-evaluate how they are used and how the network may be improved by rationalising/truncating/replicating them in a considered manner.
Option 3 – Remove all existing STARs and Holds that refer to or use the BKY DVOR.

On-going engagement throughout the DVOR project - with relevant airfields and ATC procedure teams at the London Area Control Centre at Swanwick - has determined that NATS would replicate conventional STARs and Holds as closely as possible using PBN design criteria (using the RNAV5 specification). As these procedures are replications of current conventional procedures and there is no requirement for ensuring separation from other ATS Routes/STARs, RNAV5 is the preferred specification in order to ensure greatest accessibility to routes, rather than limiting to those aircraft with RNAV1 equipage.

In support of the eventual removal of the BKY DVOR, this proposal will replicate 1 STAR (serving Stansted). This replication will conform as closely as possible to the current conventional procedure, using RNAV5 design criteria.

As part of this proposal, two London City RNAV STARs will be re-designated as per their starting waypoint and destination airport.

This proposal will remove 8 STARs (6 serving Luton/ Stansted, 1 for Southend, and 1 for London City) which are conventional procedures for when specific DVORs are out of service or the connectivity will be replaced by the RNAV replication of other STARs; and hence will no longer be required.

3 STARs (1 serving Luton/ Stansted and 2 for Southend) will be RNAV replicated but also amended slightly to route via waypoints which are on the ATS route network. One of these three STARs will also be truncated to commence at a waypoint on the ATS route network. These changes provide flight plannable options alongside retaining important descent planning levels.

Finally, this proposal will also remove the ENR3.6 enroute conventional Hold at BKY. This was originally submitted under a separate SoN; however, NATS requested for this to be included under this proposal at the Assessment Meeting which the CAA accepted. This is covered in the Assessment Meeting Minutes (Ref 2).

There are no changes to holding procedures as part of this proposal. All of the above proposed changes are detailed fully in Annexes B-G.

London City, Luton, Southend and Stansted Airports have been engaged with regarding this proposal and the changes to the STARs and holds (evidence of engagement with the airports is detailed in Annex G). The proposed changes are supported by the airports.

2.3 Stakeholder Engagement

As part of Stage 2, CAP1616 requires change sponsors to develop a comprehensive list of Design Options, which are tested with the same group of stakeholders who were engaged with during Stage 1. However, as covered in the Stage 1B Design Principles document (Ref 4), the Design Principles for this submission were engaged upon with NATMAC in 2008; prior to the introduction of CAP1616 and the requirement to seek feedback on Design Principles.

Alongside the Design Principles, the Design Options have been developed to provide different methods in which the en-route dependencies can be removed from a DVOR, whilst ensuring no changes to flight behaviours. The Design Options have been used consistently across the numerous DVOR submissions as they achieve the same outcome; although they are always reviewed to ensure relevance. We therefore conclude that there is no need to re-consult with the NATMAC members, nor any additional stakeholders, as there will not be any impact upon them.

However, as part of this Airspace Change Proposal and as per previous submissions, NATS has been in contact with relevant airfields which use the STARs and associated Holds we plan to RNAV, specifically Luton, Southend and Stansted Airports. The aerodrome sections of the AIP for the affected airfields will need to be updated which this engagement has allowed us to inform them of. The proposed changes have been designed to be invisible from an airport's perspective so there are no other impacts anticipated. Annex G provides a summary of the engagement activity for these procedures.

Previous DVOR removal proposals have proposed three Design Options: in summary, to do nothing; to replicate all procedures; and lastly, to examine all procedures and improve where appropriate (rationalise/ truncate/ replicate). These Design Options were accepted by the CAA. NATS was later requested to add an additional option to all future submissions, whereby all procedures with a dependency are removed; thus, removing the DVOR dependency. The CAA acknowledged that this Design Option would not meet the Design Principles however; it is included for completeness.

The Design Options have therefore been developed so they can be applied to each of the individual DVOR submissions and have evolved following guidance from the CAA. As mentioned above, appropriate engagement has previously been completed with NATMAC members and the relevant airports; and airports will be fully briefed when their AIP pages are required to be updated.

3. Step 2A Options Development: Design Principle Evaluation

This section evaluates the performance of all 4 Design Options with respect to each of the seven Design Principles. The Design Principles developed during Stage 1B [Ref 4] are included in Annex A for reference.

The below assessment criteria have been used to determine whether each Design Option has met; partially met; or not meet each of the seven Design Principles.

Design Principle	Description	Assessment Criteria		
		Does not meet	Partially meets	Met
DP0 Safety	Airspace change must maintain or enhance the current level of safety	Unlikely to pass a safety case due to major safety issues from proposed changes	Issues identified that would require a robust safety case e.g. workload, IFP (flyability), new hazards	No significant safety issues identified
DP1 Flight behaviour	None of the proposed technical changes to definitions of STARs/ Holds would result in a change to actual flight behaviours – laterally, vertically or in dispersal	Proposed change(s) would result in a change to flight behaviour	N/A – either met or not met	None of the proposed changes would result in a change to flight behaviour
DP2 Admin	Remove unnecessary references to the BKY DVOR which are not material to the procedure	Procedures are not individually evaluated for potential application of this DP; therefore, no admin changes are made	Procedures are individually evaluated for potential application of this DP, but no appropriate admin changes are made	Procedures are individually evaluated for potential application of this DP and appropriate admin changes are made
DP3 Withdraw	Some STARs are rarely used, some do the same job, some have segments in common with other STARs	Procedures are not individually evaluated for potential application of this DP; therefore, none are withdrawn	Procedures are individually evaluated for potential application of this DP, but no appropriate withdrawals are made	Procedures are individually evaluated for potential application of this DP and appropriate withdrawals are made, with justification provided
DP4 Replicate	PBN Replication – replace conventional STARs/ Holds with RNAV STARs/ Holds	Conventional procedures are not replicated with RNAV versions	N/A – either met or not met	Conventional procedures are replaced with RNAV versions
DP5 Truncate	Assess the impact of truncating specific STARs, by applying the CAA STAR truncation policy	Procedures are not individually evaluated for potential application of this DP; therefore, none are truncated	Procedures are individually evaluated for potential application of this DP, but no appropriate truncations are made	Procedures are individually evaluated for potential application of this DP, and appropriate truncations are made, with justification provided
DP6 Technical Amendment	Minor changes to a STAR which currently cannot be flown as it is formally defined, for legacy reasons – these changes always reflect what would actually happen in practical terms	Procedures are not individually evaluated for potential application of this DP; therefore, no technical changes are made	Procedures are individually evaluated for potential application of this DP, but no appropriate technical changes are made	Procedures are individually evaluated for potential application of this DP, and minor changes are made, with justification provided

3.1 Option 0 – Do nothing. Retain all the STARs and Holds unchanged from today's AIP definition.

See the submitted Stage 1 Assessment Meeting slide pack [Ref 1] for the detail on the procedures which reference the BKY DVOR on their charts and which would remain as is for this option. The table below presents an evaluation of this option against the seven Design Principles:

Option 0			REJECT
Description of option			
This is the current scenario. No change to existing AIP definitions of STARs or Holds.			
Design Principle 0: Maintain or enhance the current level of safety			MET
Summary of qualitative assessment No change from today; the level of safety is maintained.			
Design Principle 1: No change to flight behaviours			MET
Summary of qualitative assessment No change to lateral/vertical track patterns.			
Design Principle 2: Administrative change	NOT MET		
Summary of qualitative assessment Procedures are not individually evaluated for potential application of this DP; therefore, no administrative changes would take place under this Design Option. Does not remove any enroute flight dependency from the BKY DVOR.			
Design Principle 3: Withdraw unnecessary STARs	NOT MET		
Summary of qualitative assessment Procedures are not individually evaluated for potential application of this DP; therefore, no withdrawals would take place under this Design Option. Does not remove any enroute flight dependency from the BKY DVOR.			
Design Principle 4: Replicate using RNAV Replication policies	NOT MET		
Summary of qualitative assessment No RNAV replication would take place under this Design Option. Does not remove any enroute flight dependency from the BKY DVOR.			
Design Principle 5: Truncation of STAR(s)	NOT MET		
STARs are not individually evaluated for potential application of this DP; therefore, no STAR truncations would take place under this Design Option. Does not remove any enroute flight dependencies from the BKY DVOR.			
Design Principle 6: Technical amendment	NOT MET		
Summary of qualitative assessment Procedures are not individually evaluated for potential application of this DP; therefore, no technical amendments would take place under this Design Option. Does not remove any enroute flight dependencies from the BKY DVOR.			

3.2 Option 1 - Using the CAA policies, replicate STARs/ Holds using RNAV, exactly as defined in the AIP without considering any practicalities.

This option would replace all dependant procedures identified in the Assessment Meeting slide pack [Ref 1] as RNAV procedures. This table evaluates this option against the seven Design Principles:

Option 1			REJECT
Description of option			
All IFPs would be replicated exactly as defined in the current AIP. No account would be taken of actual usage, route segment duplication, or other factors.			
Design Principle 0: Maintain or enhance the current level of safety			MET
Summary of qualitative assessment IFPs replicated as RNAV5 procedures. The level of safety is maintained or slightly improved due to increased precision. No potential safety issues identified.			
Design Principle 1: No change to flight behaviours			MET
Summary of qualitative assessment No practical change to connectivity therefore, no change to lateral/vertical track patterns.			
Design Principle 2: Administrative change	NOT MET		
Summary of qualitative assessment Procedures are not individually evaluated for potential application of this DP; therefore, no administrative changes would take place under this Design Option; including changes which would logically improve the ATS route network.			
Design Principle 3: Withdraw unnecessary STARs			MET
Summary of qualitative assessment This Design Option would remove the need for contingency conventional-navigation STARs/ Holds based on other navaids; therefore, such IFPs could be withdrawn.			
Design Principle 4: Replicate using RNAV replication policies			MET
Summary of qualitative assessment This Design Option would purely replicate procedures like for like, including route segment duplications etc. Therefore, this Design Principle would be satisfied.			
Design Principle 5: Truncation of STAR(s)	NOT MET		
STARs are not individually evaluated for potential application of this DP; therefore, no STAR truncations would take place under this Design Option.			
Design Principle 6: Technical amendment	NOT MET		
Summary of qualitative assessment Procedures are not individually evaluated for potential application of this DP; therefore, no technical amendments would take place under this Design Option.			

3.3 Option 2 - Examine the use of existing STARS and Holds from a practical point of view, re-evaluate how they are used and how the network may be improved by rationalising/truncating/replicating them in a considered manner.

This option evaluates the usage of each procedure individually and creates opportunity bespoke to specific procedures. See Annexes C – G below for the detailed proposed change for each of the procedures under this option. This table evaluates this option against the seven Design Principles:

Option 2			ACCEPT and PROGRESS
Description of option			
Examine the use of existing IFPs from a practical point of view, re-evaluate how they are used and how the network may be improved by rationalising/truncating/replicating them in a considered manner.			
Design Principle 0: Maintain or enhance the current level of safety			MET
Summary of qualitative assessment IFPs replicated as RNAV5 procedures. The level of safety is maintained or slightly improved due to increased precision. Procedures can be simplified depending on actual usage today. No potential safety issues identified.			
Design Principle 1: No change to flight behaviours			MET
Summary of qualitative assessment No practical change to connectivity, no change to lateral/vertical track patterns.			
Design Principle 2: Administrative change			MET
Summary of qualitative assessment Evaluate current IFPs and ATS routes and identify where this Design Principle applies. Rename STAR designations in line with the current ICAO policy. For example, this option will re-designate the Stansted ABBOT 1A STAR as BKY 1X; based on the starting waypoint BKY and the 'X' designator used to demonstrate an extraordinary STAR.			
Design Principle 3: Withdraw unnecessary STARs			MET
Summary of qualitative assessment Evaluate current IFPs and identify where this Design Principle applies. Several IFPs would satisfy this Design Principle. For example, the Luton/ Stansted ABBOT 5F STAR which is used when the BPK DVOR is out of service. This can be withdrawn as the equivalent LOREL 5F STAR is being RNAV replicated under this proposal.			
Design Principle 4: Replicate using RNAV Replication policies			MET
Summary of qualitative assessment Evaluate current IFPs and identify where this Design Principle applies. Several IFPs would satisfy this Design Principle. For example, this allows the Luton/ Stansted LOREL 5F STAR to be RNAV5 replicated.			
Design Principle 5: Truncation of STAR(s)			MET
Evaluate current STARs and identify where this Design Principle applies. For example, this enables the SPEAR 2H STAR to be truncated at FINMA which – unlike the previous waypoint – is on the ATS route network. This provides flight plannable options and retains the important descent planning level.			
Design Principle 6: Technical amendment			MET
Summary of qualitative assessment Evaluate current IFPs and ATS routes and identify where this Design Principle applies. For example, this proposal amends the Southend SPEAR 2L STAR to route via FINMA (instead of CLIPY) which is on the ATS route network.			

3.4 Option 3 – Remove all existing STARs and holds that refer to or use the BKY DVOR.

This option removes each STAR and Hold with a BKY dependency and replaces *BKY DVOR/DME* with *BKY DME*. This table evaluates this option against the seven Design Principles:

Option 3			REJECT
Description of option			
Remove all existing IFPs for which the BKY DVOR is materially important.			
Design Principle 0: Maintain or enhance the current level of safety	NOT MET		
Summary of qualitative assessment The removal of these procedures would create a gap in the network. This would require all aircraft currently using the existing IFPs to be channelled into other, potentially busy flows/ sectors, which could greatly increase controller workload in those areas. This could create significant safety issues from such substantial changes.			
Design Principle 1: No change to flight behaviours	NOT MET		
Summary of qualitative assessment Aircraft would not be able to use the current procedures, causing a significant change in flight behaviours to work around this.			
Design Principle 2: Administrative change	NOT MET		
Summary of qualitative assessment Procedures are not individually evaluated for potential application of this DP; therefore, no administrative changes would take place under this Design Option; including changes which would logically improve the ATS route network.			
Design Principle 3: Withdraw unnecessary STARs		PARTIAL	
Summary of qualitative assessment This Design Option would remove all STARs; both necessary and unnecessary.			
Design Principle 4: Replicate using RNAV Replication policies	NOT MET		
Summary of qualitative assessment Procedures are not individually evaluated for potential application of this DP; therefore, no replication would take place under this Design Option.			
Design Principle 5: Truncation of STAR(s)	NOT MET		
Procedures are not individually evaluated for potential application of this DP; therefore, no STAR truncations would take place under this Design Option.			
Design Principle 6: Technical amendment	NOT MET		
Summary of qualitative assessment Procedures are not individually evaluated for potential application of this DP; therefore, no technical amendments would take place under this Design Option.			

3.5 Summary – Options Development

Using the seven Design Principles, we have evaluated the four concept Design Options, as summarised above.

3.6 *Option 0: Do Nothing – Retain all the STARs and Holds unchanged from today's AIP definition.* This does not achieve the removal of dependencies from the BKY DVOR. **Rejected.**

3.7 *Option 1: Using the CAA policies, replicate STARs/ Holds using RNAV, exactly as defined in the AIP without considering any practicalities* – this achieves the removal of dependencies from the BKY DVOR. However, it does not improve network connectivity; it leaves route segment duplication in place and it does not account for current usage levels. **Rejected.**

3.8 *Option 2: Examine the use of existing STARS and Holds from a practical point of view, re-evaluate how they are used and how the network may be improved by rationalising/truncating/replicating them in a considered manner.* This achieves the removal of dependencies from the BKY DVOR; alongside improving the description of network procedures and reducing duplication. **Accepted and progressed.**

3.9 *Option 3: Remove all existing STAR and Holds that refer to or use the BKY DVOR.* This would technically remove the dependencies from the BKY DVOR; however, it removes STARs and Holds that are used and needed by aircraft today and going forward. **Rejected**

Conclusion: Design Option 2 concept best meets all of the Design Principles. The shortlist comprises the Option 2 concept only. The other three option concepts are therefore not progressed.

End of Step 2A

4. Step 2B Options Appraisal

4.1 The baseline (do nothing) option does not achieve the removal of dependencies from the BKY DVOR. The ratings for the baseline option against each of the Design Principles shows that whilst it maintains safety levels and creates no change to flight behaviours, it does not meet the remaining 5 Design Principles.

4.2 Following the Design Principle evaluation, we conclude that the following Design Option 2 could be used to remove the dependencies from the BKY DVOR in accordance with the Design Principles:

Examine the use of existing STARS and Holds from a practical point of view, re-evaluate how they are used and how the network may be improved by rationalising/truncating/replicating them in a considered manner.

2.15 There would be no change in fuel/ CO_2/ greenhouse gas emissions due to this proposal because there would be no change to lateral or vertical tracks. Fuel uplift changes are unlikely to occur. There are no costs or benefits which could be reasonably monetised due to this enroute proposal.

4.16 Safety Assessment: The Option 2 concept would take full account of existing usage and connectivity needs. It would ensure all IFPs are designed by an APD, as regulated by CAA SARG. There would be a qualitative improvement in safety because each remaining IFP would use improved navigation specifications and be defined in an official manner. Today's conventional IFPs are known to be flown using FMS overlays, which are not state regulated in the same way.

5. BKY Option 2 Cost/ Benefit Analysis

The CAP1616 Appendix E cost/ benefit analysis is given below.

Group	Impact	Level of Analysis	Evidence
Communities	Noise impact on health and quality of life	N/A	As there are no proposed changes to lateral or vertical tracks there will be no impact on noise or quality of life.
Communities	Air quality	N/A	No changes below 1,000ft
Wider society	Greenhouse gas impact	Monetise and quantify	No proposed changes to lateral or vertical tracks so no impact
Wider society	Capacity/ resilience	Qualitative	No changes
General Aviation	Access	N/A	No changes
General Aviation/ commercial airlines	Economic impact from increased effective capacity	Quantify	No changes
General Aviation/ commercial airlines	Fuel burn	Monetise	No proposed changes to lateral or vertical tracks so no impact.
Commercial airlines	Training cost	N/A	N/A – there is not expected to be any airline training or associated cost.
Commercial airlines	Other costs	N/A	Updates to FMS and flight planning systems will completed via the routine AIRAC updates. There are no other known costs which would be imposed on commercial aviation.
Airport/ Air navigation service provider	Infrastructure costs/benefit	Qualitative and quantitative	The cost of implementation of the change, adaptation of systems is estimated to be £65,000. Removal of the en-route dependency enables decommissioning of the DVOR (once airfields have removed their dependencies i.e. SIDs). This will yield an annual cost saving of circa £10,000 per DVOR (BKY).
Airport/ Air navigation service provider	Operational costs	N/A	N/A – this proposal would not lead to changes in operational costs.
Airport/ Air navigation service provider	Deployment costs	Qualitative and quantitative	N/A – this change would be introduced via briefings and bulletins for staff, with no additional training or simulation training/costs required.

5.1 Conclusion: There would be a positive impact on safety whilst also improving the overall network connectivity.

End of Step 2B

6. Summary

6.1 This document details the STARs and Holds where the BKY DVOR is material to the instrument flight procedure. It describes the current connectivity; the method used to progress the change; and the proposed connectivity.

6.2 Some minor administrative changes to STARS and a Hold are included, in order to improve the consistency of charts within the AIP and to follow CAA/ ICAO guidance on the naming of STARs.

6.3 This submission also includes 3 STARs with proposed technical amendments and a truncation. These changes will re-route/ truncate the STARs via waypoints which are on the ATS route network and include important descent planning level restrictions.

6.4 The proposed connectivity remains entirely unchanged due to RNAV5 replication, with or without appropriate truncation/ ATS route extensions:

- routes are unchanged
- connectivity is unchanged
- hence flight behaviours and traffic patterns over the ground are unchanged.

6.5 Annexes 10 - 14 below detail the IFP changes we are proposing to make in support of removing the BKY DVOR enroute dependencies and rationalisation of the network, as summarised in Table 1 below:

Ref	Airport	Type	Procedure	BKY DVOR	Proposed Changes
1	Luton/ Stansted	STAR	ASKEY 1K	Dependent on BKY	Withdrawn
2	Luton/ Stansted	STAR	ASKEY 2H	Dependent on BKY	Withdrawn
3	Luton/ Stansted	STAR	ASKEY 3G	Dependent on BKY	Withdrawn
4	Luton/ Stansted	STAR	ASKEY 5F	Dependent on BKY	Withdrawn
5	Luton/ Stansted	STAR	LOREL 2H	Dependent on BKY	Withdrawn
6	Luton/ Stansted	STAR	LOREL 3G	Dependent on BKY	Withdrawn
7	Luton/ Stansted	STAR	LOREL 5F	Dependent on BKY	RNAV5 replication and amended to route via FINMA
8	Stansted	STAR	ABBOT 1A	Dependent on BKY	RNAV5 replication
9	Southend	STAR	SPEAR 1M	Dependent on BKY	Withdrawn
10	Southend	STAR	SPEAR 2H	Dependent on BKY	RNAV5 replication, truncated at FINMA and amended to route onto SPEAR
11	Southend	STAR	SPEAR 2L	Dependent on BKY	RNAV5 replication and amended to route via FINMA
12	London City	STAR	JACKO 1H	Not dependent	Name change to HON 1C
13	London City	STAR	JACKO 1M	Not dependent	Withdrawn
14	London City	STAR	JACKO 2L	Not dependent	Name change to LISTO 1C
15	N/A	Hold	BKY	Dependent on BKY	Withdrawn

Table 1: Summary of proposed changes

7. Conclusion

7.1 We have assessed that there are no foreseen adverse impacts of making the proposed changes described in the tables below (Annexes 10 - 14) and conclude that making these technical changes to the procedures would not alter traffic patterns.

8. Annex A: Design Principles

Design Principle	Description
DP0 Safety	Airspace change must maintain or enhance the current level of safety
DP1 No change to flight behaviour	None of the proposed technical changes to definitions of STARs/ Holds would result in a change to actual flight behaviours – laterally, vertically or in dispersal
DP2 Admin	Remove unnecessary references to the BKY DVOR which are not material to the procedure
DP3 Withdraw	Some STARs are rarely used, some do the same job, some have segments in common with other STARs
DP4 Replicate	PBN Replication – replace conventional STARs/Holds with RNAV STARs/Holds
DP5 Truncate	Assess the impact of truncating specific STARs. Several STARs have common "heads" and/ or route segments in common with ATS routes – unnecessary duplication.
DP6 Technical amendment	Minor changes to a STAR which currently cannot be flown as it is formally defined, for legacy reasons – these changes always reflect what would actually happen in practical terms.

9. Annex B: Design Option 2: Procedure Detail

This section demonstrates the proposed changes for Design Option 2. The below screenshots show the current procedures and have been taken from the Assessment Meeting Slides [Ref 1].

Option 2: *Examine the use of existing STARS and holds from a practical point of view, re-evaluate how they are used and how the network may be improved by rationalising/truncating/replicating them in a considered manner.*

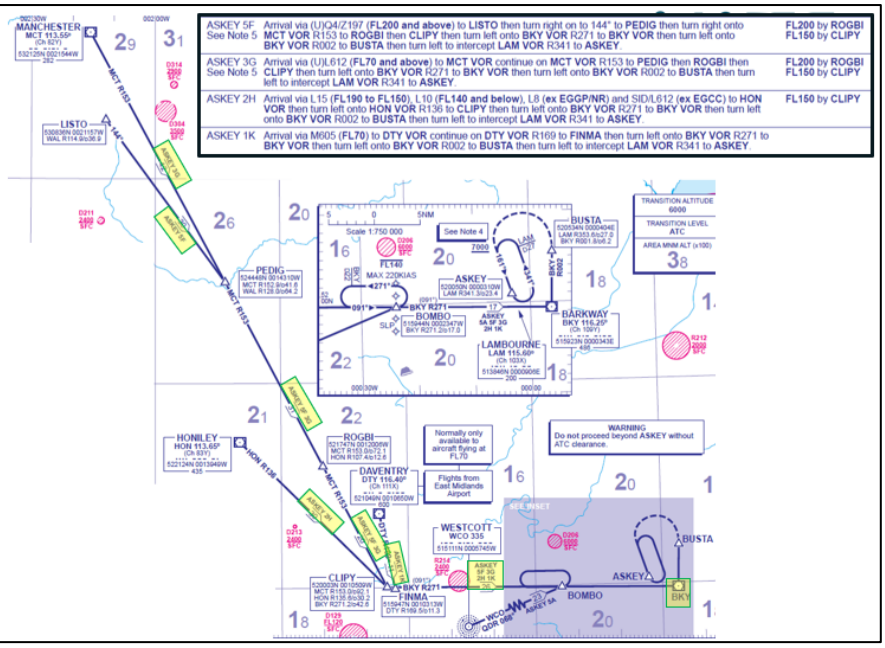
Luton/ Stansted ASKEY STARs

1) **ASKEY 1K STAR -** dependent on BKY DVOR
DTY - FINMA - BOMBO - BKY - BUSTA - ASKEY

2) **ASKEY 2H STAR -** dependent on BKY DVOR
HON - CLIPY - BOMBO - BKY - BUSTA - ASKEY

3) **ASKEY 3G STAR -** dependent on BKY DVOR
MCT - PEDIG - ROGBI - CLIPY - BOMBO - BKY - BUSTA - ASKEY

4) **ASKEY 5F STAR -** dependent on BKY DVOR
LISTO - PEDIG - ROGBI - CLIPY - BOMBO - BKY - BUSTA - ASKEY



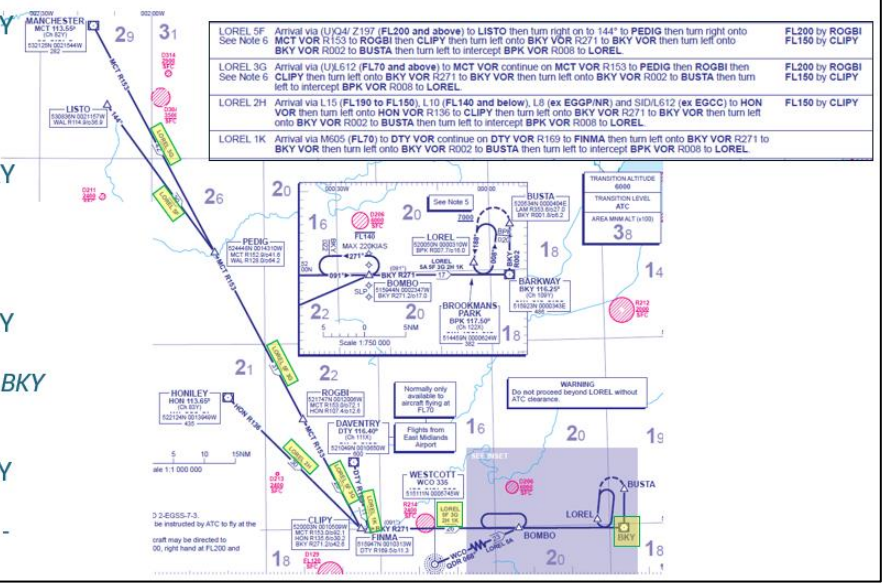
Luton/ Stansted LOREL STARs

5) **LOREL 1K STAR** - dependent on BKY DVOR
DTY - FINMA - BOMBO - BKY - BUSTA - LOREL

6) **LOREL 2H STAR** - dependent on BKY DVOR
HON - CLIPY - BOMBO - BKY - BUSTA - LOREL

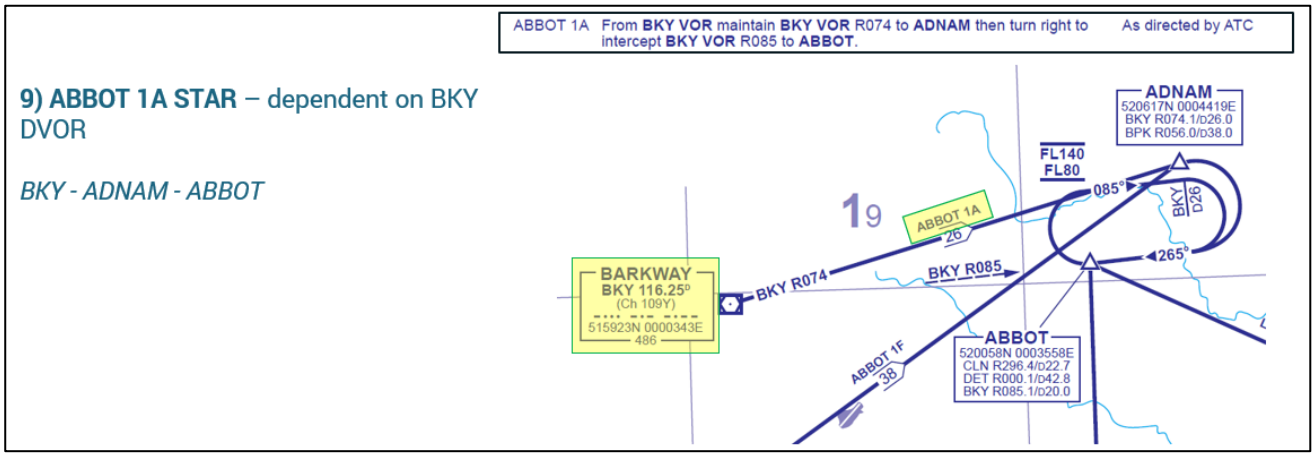
7) **LOREL 3G STAR** - dependent on BKY DVOR
MCT - PEDIG - ROGBI - CLIPY - BOMBO - BKY - BUSTA - LOREL

8) **LOREL 5F STAR** - dependent on BKY DVOR
LISTO - PEDIG - ROGBI - CLIPY - BOMBO - BKY - BUSTA - LOREL

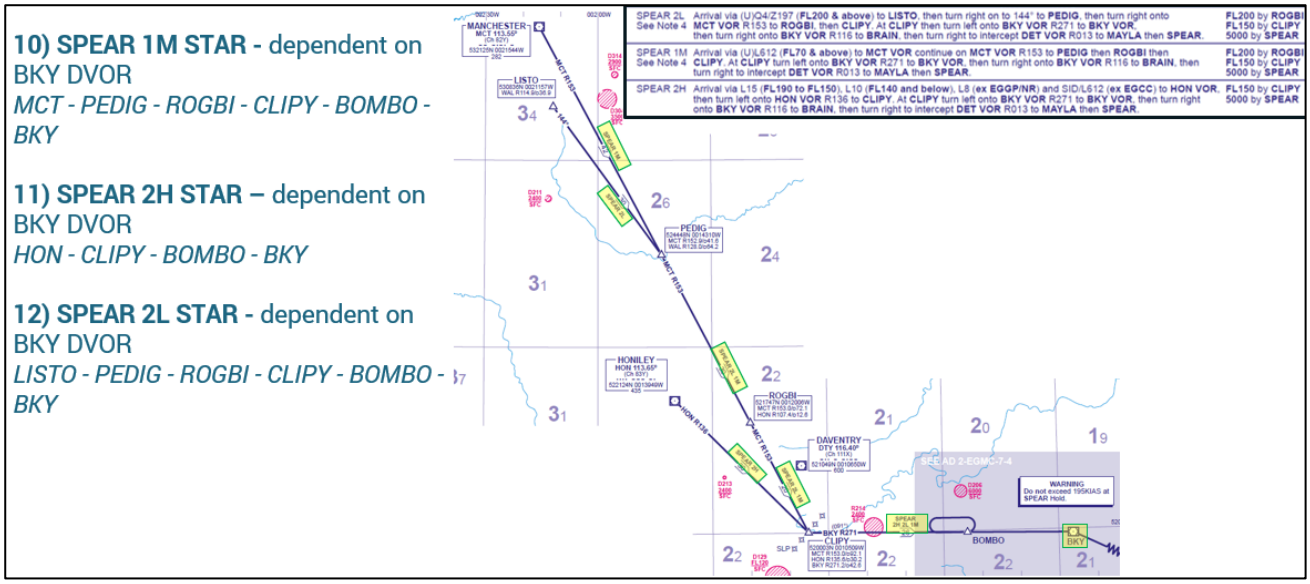


The Assessment Meeting slide pack included the Luton/ Stansted LOREL 1K STAR which is dependent on the BKY DVOR. It is worth noting that this will be truncated at FINMA and RNAV replicated, as part of the DTY DVOR Airspace Change Proposal (link to the portal page). Therefore, although linked, this is not covered under this proposal.

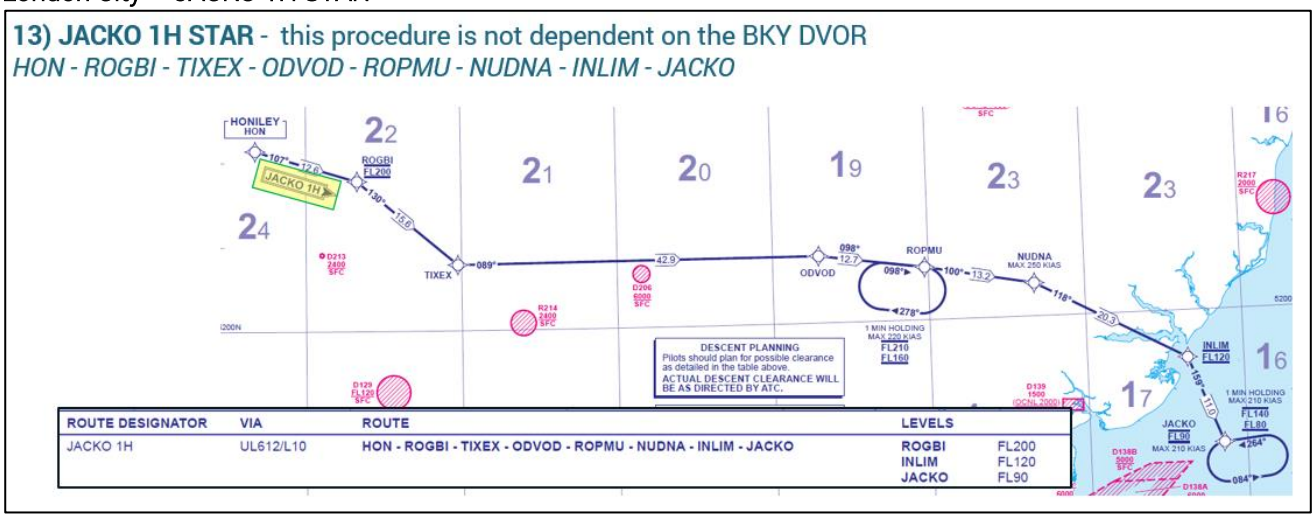
Stansted ABBOT 1A STAR



Southend SPEAR STARs



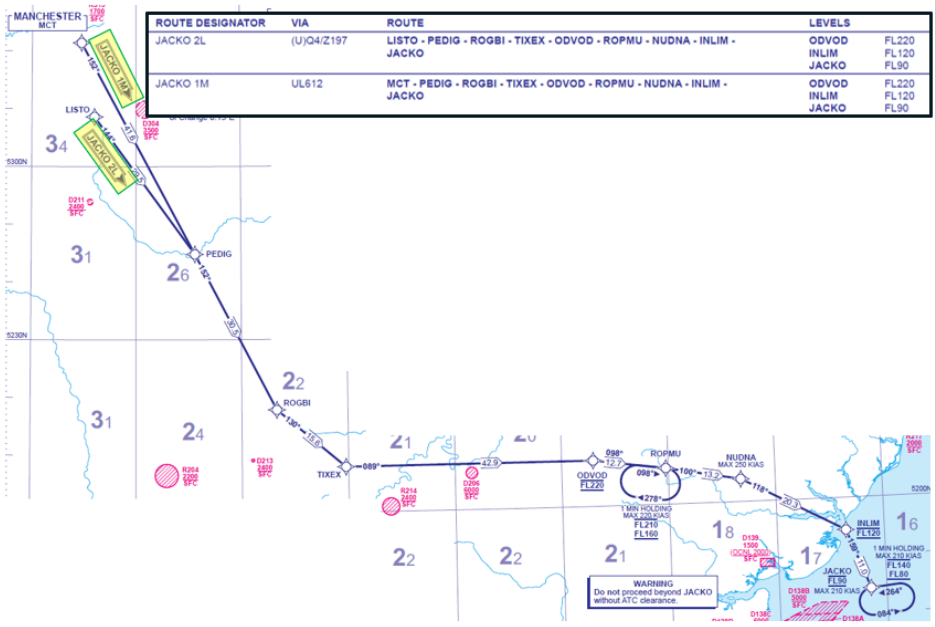
London City – JACKO 1H STAR



London City – JACKO STARs

14) JACKO 1M STAR - this procedure is not dependent on the BKY DVOR
MCT - PEDIG - ROGBI - TIXEX - ODVOD - ROPMU - NUDNA - INLIM - JACKO

15) JACKO 2L STAR - this procedure is not dependent on the BKY DVOR
LISTO - PEDIG - ROGBI - TIXEX - ODVOD - ROPMU - NUDNA - INLIM - JACKO



ROUTE DESIGNATOR	VIA	ROUTE	LEVELS	
JACKO 2L	(U)Q4/Z197	LISTO - PEDIG - ROGBI - TIXEX - ODVOD - ROPMU - NUDNA - INLIM - JACKO	ODVOD INLIM JACKO	FL220 FL120 FL90
JACKO 1M	UL612	MCT - PEDIG - ROGBI - TIXEX - ODVOD - ROPMU - NUDNA - INLIM - JACKO	ODVOD INLIM JACKO	FL220 FL120 FL90

ENR 3.6 – Conventional BKY Hold

- Removal of the ENR 3.6 En-Route Hold at BKY was originally submitted under a separate SoN (#3436)
- NATS request that this DAP1916 is removed and an updated SoN is submitted for this ACP, with this procedure change included

5. Statement of Need

Please provide a brief 'Statement of Need' expressing explicitly what airspace issue or opportunity you are seeking to address. Your Statement of Need should clearly articulate the current situation, the issue (and the cause of it) to be resolved or the opportunity to be addressed along with any other factors or requirements. *

The en-route Hold at Barkway DVOR (BKY) is very seldom used and given that it is a Conventional Hold dependent on BKY DVOR it will not be made RNAV by the DVOR Removal Project and can therefore be removed from ENR3.6

HLDG ID/ FIX/WPT Coordinates	INBD TR (° MAG)	Direction of PTN	MAX IAS (KT)	MNM/ MAX HLDG LVL	TIME or DIST OUBD	Controlling unit and Frequency	Remarks
BKY VOR 515923N 0000343E	206°	Left	220	- / FL140	1 MIN		Conventional Hold based upon VOR BKY R026. Aircraft joining the Airways System via Barkway VOR may be instructed to hold at Barkway to await onward clearance. At or below FL 140 1 min or BKY D8, whichever is shorter.

10. Annex C: Impact Assessment – Luton/ Stansted STARs

For charts and technical notes, see the Assessment Meeting slide pack [Ref 1] for the current IFPs. The Assessment Meeting slide pack included the Luton/ Stansted LOREL 1K STAR which is dependent on the BKY DVOR. It is worth noting that this will be truncated at FINMA and RNAV replicated, as part of the DTY DVOR Airspace Change Proposal (link to the portal page). Therefore, although linked, this is not covered under this proposal.

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
ASKEY 1K STAR	M605: *DTY - FINMA - BOMBO - BKY - BUSTA - ASKEY*	3 Withdraw	Not required	Not required	Used when BPK is out of service. Not required once the equivalent GW/ SS LOREL 1K STAR has been RNAV replicated under the DTY ACP (link). As noted above, the LOREL 1K STAR will be truncated at FINMA and re-designated as FINMA 1L.
ASKEY 2H STAR	L15: *HON - CLIPY - BOMBO - BKY - BUSTA - ASKEY*	3 Withdraw	Not required	Not required	Used when BPK is out of service. As covered below, the equivalent LOREL 2H STAR is being withdrawn as it will be replaced by the FINMA 1L STAR (covered under the DTY ACP – link).
ASKEY 3G STAR	(U)L612: *MCT - PEDIG - ROGBI - CLIPY - BOMBO - BKY - BUSTA - ASKEY*	3 Withdraw	Not required	Not required	Used when BPK is out of service. As covered below, the equivalent LOREL 3G STAR is being withdrawn after the 2017 PLAS airspace change truncated the LOREL 4F STAR to LISTO. This provides the required connectivity as LISTO is an established waypoint on ATS Route (U)L612.
ASKEY 5F STAR	(U)Q4, Z197: *LISTO - PEDIG - ROGBI - CLIPY - BOMBO - BKY - BUSTA - ASKEY*	3 Withdraw	Not required	Not required	Used when BPK is out of service. Not required once the equivalent GW/ SS LOREL 5F STAR has been RNAV replicated (covered below).

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
LOREL 2H STAR	L15: *HON - CLIPY - BOMBO - BKY - BUSTA - LOREL*	3 Withdraw	Not required	Not required	Under the DTY DVOR ACP (link) the LOREL 1K STAR was truncated at FINMA; and RNAV5 replicated/ re-designated as FINMA 1L. FINMA 1L routes from FINMA to LOREL. This BKY submission proposes to withdraw the LOREL 2H STAR. This will be replaced by the FINMA 1L STAR, which will be fed by ATS routes L15 and M605; thus, maintaining the same connectivity as today. The FINMA 1L STAR provides appropriate flight plannable options as FINMA is on the ATS network, whereas CLIPY is not. This change also removes CLIPY from the AIP, allowing the 5LNC to be returned to ICAO.
LOREL 3G STAR	(U)L612: *MCT - PEDIG - ROGBI - CLIPY - BOMBO - BKY - BUSTA - LOREL*	3 Withdraw	Not required	Not required	The PLAS Airspace Change of 2017 truncated the then LOREL 4F STAR to LISTO, an established waypoint on the ATS route network. Prior to this, the LOREL 3G STAR was used for traffic from the north/ north-east however this can now be withdrawn. Following the PLAS truncation to LISTO – an established waypoint on ATS Route (U)L612 – this provides the required connectivity. Additionally, feedback has been received from the NERL DP-ER programme that STARs should start in the last AC sector if not the first TC

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
					sector – otherwise, issues can be created for flight data processing software. Finally, removing all enroute dependencies from MCT will allow the DOC to be reduced; thus, helping to extend its longevity for use by Manchester Airport (most of their procedures depend on MCT).
LOREL 5F STAR	(U)Q4, Z197: *LISTO - PEDIG - ROGBI - CLIPY - BOMBO - BKY - BUSTA - LOREL*	2 Admin 4 Replicate 6 Technical Amendment	RNAV5 replication and slight amendment to route via FINMA	(U)Q4, Z197*: LISTO - PEDIG - ROGBI - FINMA - BOMBO - BKY - BUSTA - LOREL* Rename as LISTO 1L	The STAR will be amended to route via FINMA which is on the ATS network, whereas CLIPY is not. This provides appropriate flight plannable options. Waypoint FINMA retains the FL150 level restriction previously located at CLIPY. This also removes CLIPY from the AIP, allowing the 5LNC to be returned to ICAO. Created using RNAV design criteria to align as closely as possible with the existing conventional procedure. STAR re-designated based on its starting waypoint LISTO; and the 'L' designator used for the Route Indicator, after one of the destination airports (L – Luton).

11. Annex D: Impact Assessment – Stansted STAR

For charts and technical notes, see the Assessment Meeting slide pack [Ref 1] for the current IFPs.

Current IFP	Current route connectivity/STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
ABBOT 1A STAR	*BKY - ADNAM - ABBOT*	2 Admin 4 Replicate	RNAV5 replication and re-designation	*BKY – ADNAM - ABBOT* Rename as BKY 1X	Created using RNAV design criteria to align as closely as possible with the existing conventional procedure. STAR re-designated based on its starting waypoint BKY; and the 'X' designator used to demonstrate an extraordinary STAR (alongside 'Q, Y, Z') i.e. stack-swap or contingency STARs. No impact to connectivity and no predicted change to flight behaviour.

12. Annex E: Impact Assessment – Southend STARs

For charts and technical notes, see the Assessment Meeting slide pack (Ref 1) for the current IFPs.

Current IFP	Current route connectivity/STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
SPEAR 1M STAR	(U)L612: *MCT - PEDIG - ROGBI - CLIPY - BOMBO - BKY*	3 Withdraw	Not required	Not required	The PLAS Airspace Change of 2017 truncated the then SPEAR 1L STAR to LISTO, an established waypoint on the ATS route network. Prior to this, the SPEAR 1M STAR was used for traffic from the north/ north-east however this can now be withdrawn. Following the PLAS truncation to LISTO – an established waypoint on ATS Route (U)L612 – this provides the required connectivity. Additionally, feedback has been received from the NERL DP-ER programme that STARs should start in the last AC sector if not the first TC sector – otherwise, issues can be created for flight data processing software. Finally, removing all enroute dependencies from MCT will allow the DOC to be reduced; thus, helping to extend its longevity for use by Manchester Airport (most of their procedures depend on MCT).
SPEAR 2H STAR	L15, L10, L8, L612: *HON - CLIPY - BOMBO - BKY*	2 Admin 4 Replicate 5 Truncate 6 Technical Amendment	RNAV5 replication; truncated and re-aligned to commence at FINMA; amended to continue onto SPEAR; and re-designated as FINMA 1S	L15, M605: *FINMA - BOMBO - BKY - BRAIN - MAYLA - SPEAR* Rename as FINMA 1S	STAR truncated and re-aligned to commence at FINMA, instead of HON. FINMA is on the ATS route network, whereas CLIPY is not. This provides appropriate flight plannable options for traffic at FL190 and below. Waypoint FINMA retains the FL150 level restriction previously located at CLIPY. This also removes CLIPY from the AIP, allowing the 5LNC to be returned to ICAO. The new STAR delivers aircraft to SPEAR from FINMA. Created using RNAV design criteria to align as closely as possible with the conventional procedure.

Current IFP	Current route connectivity/STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
					STAR re-designated based on its starting waypoint FINMA; and the 'S' designator used for the Route Indicator, after the destination airport (S – Southend).
SPEAR 2L STAR	(U)Q4, Z197: *LISTO - PEDIG - ROGBI - CLIPY - BOMBO - BKY*	2 Admin 4 Replicate 6 Technical Amendment	RNAV 5 replication; re-aligned to route via FINMA and continue onto SPEAR; and re-designated as LISTO 1S	(U)Q4, Z197: *LISTO - PEDIG - ROGBI - FINMA - BOMBO - BKY - BRAIN - MAYLA - SPEAR* Re-designated as **LISTO 1S**	The DTY DVOR ACP (link) amended the LOREL arrivals to route via FINMA instead of CLIPY. FINMA is on the ATS route network, whereas CLIPY is not. This change also facilitated other STARs to commence at FINMA. The same rationale has been applied to Southend arrivals into SPEAR from the north, via the SPEAR 2L STAR. The proposed STAR is re-aligned to route via FINMA which is part of the ATS route network, instead of CLIPY. The proposed STAR (LISTO 1S) retains the FL150 level restriction at FINMA, previously located at CLIPY. STAR re-designated based on its starting waypoint LISTO; and the 'S' designator used for the Route Indicator, after the destination airport (S – Southend).

13. Annex F: Impact Assessment – London City STARs

For charts and technical notes, see the Assessment Meeting slide pack [Ref 1] for the current IFPs.

Current IFP	Current route connectivity/STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
JACKO 1H STAR	UL612, L10: *HON - ROGBI - TIXEX - ODVOD - ROPMU - NUDNA - INLIM - JACKO*	2 Admin	Re-designated as HON 1C	Unchanged from today Re-designated as **HON 1C**	This is an RNAV STAR serving London City, introduced as part of the LAMP 1A airspace change in 2016. Although it is not dependent on BKY, this STAR has a similar routing to other STARs in this proposal. STAR re-designated based on its starting waypoint HON; and the 'C' designator used for the Route Indicator, after the destination airport (C – London City).
JACKO 1M STAR	UL612: *MCT - PEDIG - ROGBI - TIXEX - ODVOD - ROPMU - NUDNA - INLIM - JACKO*	3 Withdraw	Not required	Not required	The PLAS Airspace Change of 2017 truncated the then SPEAR 1L/ LOREL 4F STARs to LISTO, an established waypoint on the ATS route network. Prior to this, the JACKO 1M STAR was used for traffic from the north/ north-east however this can now be withdrawn. Following the PLAS truncation to LISTO – an established waypoint on ATS Route (U)L612 – this provides the required connectivity. Feedback has been received from the NERL DP-ER programme that STARs should start in the last AC sector if not the first TC sector – otherwise, issues can be created for flight data processing software. Commencing a STAR at MCT does not meet this requirement.

Current IFP	Current route connectivity/STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
					Finally, removing all enroute dependencies from MCT will allow the DOC to be reduced; thus, helping to extend its longevity for use by Manchester Airport (most of their procedures depend on MCT).
JACKO 2L STAR	UQ4, Z197: *LISTO - PEDIG - ROGBI - TIXEX - ODVOD - ROPMU - NUDNA - INLIM - JACKO*	2 Admin	Re-designated as LISTO 1C	Unchanged from today Re-designated as **LISTO 1C**	This is an RNAV STAR serving London City, introduced as part of the LAMP 1A airspace change in 2016. Although it is not dependent on BKY, this STAR has a similar routing to other STARs in this proposal. STAR re-designated based on its starting waypoint LISTO; and the 'C' designator used for the Route Indicator, after the destination airport (C – London City).

14. Annex G: Impact Assessment – BKY Hold

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
BKY Hold	N/A – conventional Hold	3 Withdraw	Not required	Not required	Removal of the ENR3.6 enroute Hold at BKY was originally submitted under a separate SoN (#3436). NATS requested that it is included as part of this proposal where is logically fits. The BKY conventional Hold is very seldom used and – given that it is a conventional Hold dependent on the BKY DVOR – it will not be RNAV replicated. Therefore, it can be removed from ENR3.6.

11. Annex F: List of references

Reference	Name	Hyperlink
1	*BKY DVOR CAP1616 Stage 1 Assessment Meeting Slide pack*	Link
2	*BKY DVOR Assessment Meeting minutes (redacted)*	Link
3	*BKY DVOR Statement of Need*	Link
4	*BKY DVOR Stage 1B Design Principles*	Link
5	*BKY DVOR Removal Engagement Evidence (redacted)*	Link

12. Annex G: Engagement Evidence

This section summarises the engagement activities in support of this ACP.

Stakeholder	Type of engagement	Date	Notes
London City Airport	Email	05/06/2020	Email outlining proposed changes to STARs as part of the DVOR Rationalisation programme; seeking approval
Luton Airport	Email	02/06/2020	Email outlining proposed changes to STARs as part of the DVOR Rationalisation programme; seeking approval
Southend Airport	Email	02/06/2020	Email outlining proposed changes to STARs as part of the DVOR Rationalisation programme; seeking approval
Stansted Airport	Email	02/06/2020	Email outlining proposed changes to STARs as part of the DVOR Rationalisation programme; seeking approval

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