Introduction of PBN Approaches Airspace Change Proposal

CAP1616 Stage 4 Gateway Submission Document

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2. Introduction

2.1.1 This document forms part of the City of Derry Airport's (CoDA) formal airspace change submission for the introduction of satellite-based approach procedures which will utilise Performance Based Navigation (PBN). These procedures aim to meet the governments Airspace Modernisation Strategy (AMS) and provide a contingency for the existing ground based navigational aid infrastructure. As part of this ACP, CoDA is proposing the following:

- To introduce satellite-based (PBN) approaches to RWY 08 & RWY 26.
- To introduce satellite-based (PBN) direct arrival procedures (STARs) to compliment the above.
- To introduce satellite-based (PBN) Missed Approach Proceduresand holding procedures.

2.1.2 Our Final Option Appraisal has demonstrated that the design of these PBN procedures largely replicates the existing routes which would result in little or no noticeable change to stakeholders.

Where we are in the airspace change process

2.1.3 In December 2017 the Civil Aviation Authority (CAA) published CAP1616 Airspace Design: Guidance on the regulatory process for changing airspace design, including community engagement requirements. The guidance sets out the steps for the airspace change process, which a change sponsor of any permanent change to the published airspace design must follow. The airspace change process is split into 7 Stages.

2.1.4 The figure below displays the full ACP process as defined in CAP1616. We have completed Stage 1, 2 and 3 of the process and we are now at Stage 4: Update and Submit.

2.1.5 This document includes details of Stage 1, 2 and 3 of the process.

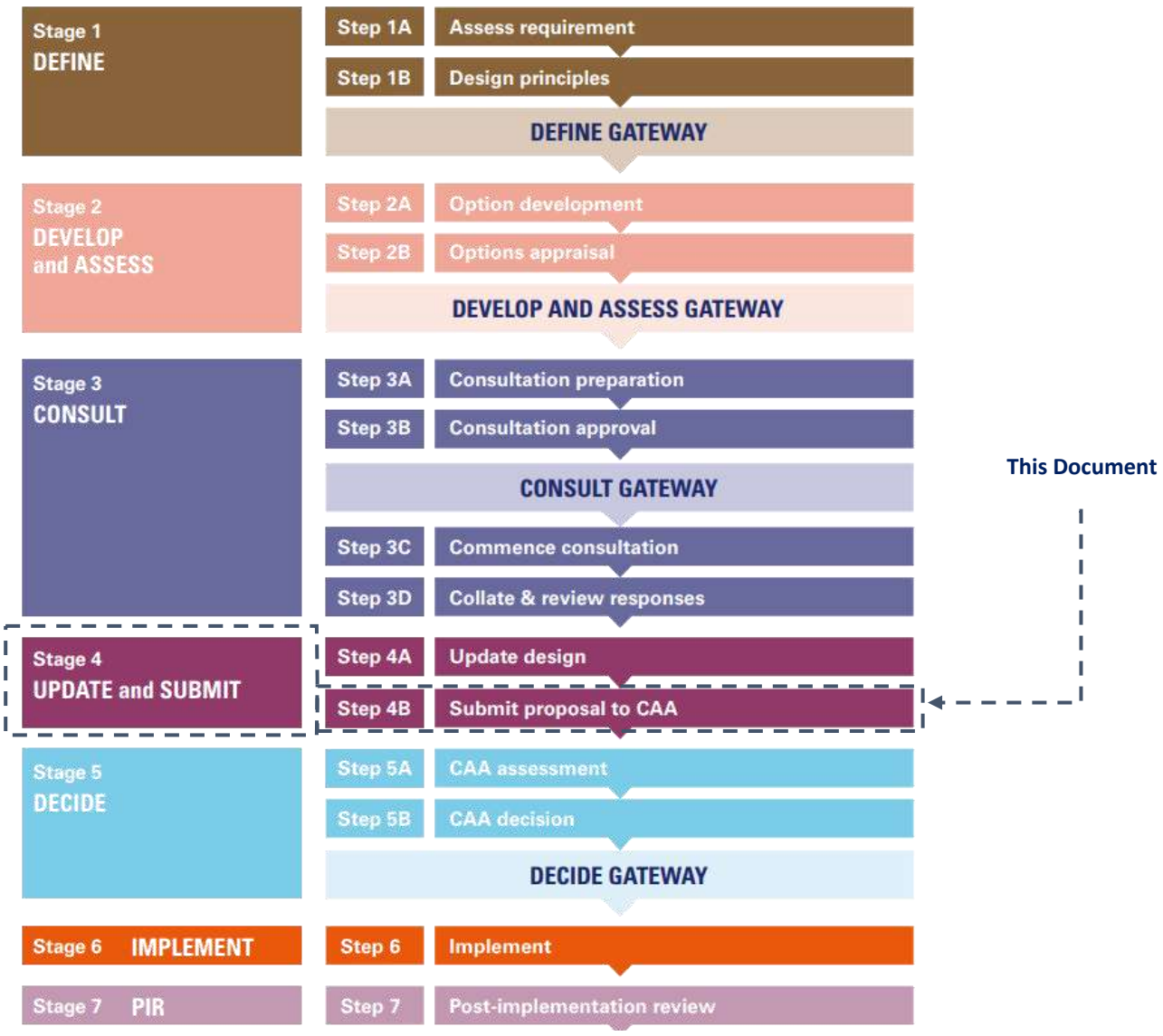

Figure 1 CAP1616 Process

This formal airspace change submission document

2.1.6 At Step 4B of the airspace change process, the change sponsor prepares and submits the formal airspace change proposal to the CAA. The change sponsor must structure its submission in accordance with a standard template that is required by CAP1616.

2.1.7 As per the CAP1616 structure, this document follows the following format:

Table 1 Formal ACP submission document structure

No	Section	Description
1	Contents	
2	Introduction	Gives an overview of this document within the context of the CAP1616 process
3	Executive Summary	Presents a summary of the activity undertaken as part of the Airspace Change process to date and includes reference to the Secretary of State's call-in criteria.
4	Current airspace description	Provides information about the current airspace design and operation
5	Statement of Need and Justification	Explains the statement of need submitted at Stage 1A of the process and the justification for the airspace change. This section also includes details of the Design Principles agreed with stakeholders at Stage 1B.
6	Proposed airspace description	Includes details of the objectives and requirements of this airspace change, our final proposal, and how we expect our final design to be used. We also include technical information about our airspace change proposal.
7	Engagement and Consultation overview	Within this section we outline the engagement and consultation that has taken place with stakeholders, and link this to the identified impacts of the airspace change.
8	Options Development and Analysis	Presents a summary of the options development work undertaken, and the evaluation and appraisal activity which has led to our final airspace change option.
9	Airspace description requirements	Presents a proforma, as required by CAP1616, with information about Airspace description requirements
10	Safety assessment	Provides details of the safety assessments undertaken
11	Operational impact	Presents a proforma, as required by CAP1616, with information about operational impacts.
12	Supporting infrastructure/resources	Presents a proforma, as required by CAP1616, with information about supporting infrastructure/resources.
13	Airspace and infrastructure requirements	Presents a proforma, as required by CAP1616, with information about Airspace and infrastructure requirements.
14	Environmental assessment	Describes at high level the outcome of the Final Options Appraisal in a proforma as required by CAP1616.
15	Annex A	Draft ATC Training Plan
16	Annex B	Draft Safety Case
17	Annex C	Draft Letters of Agreement
18	Annex D	Submission of Airspace Data
19	Annex E	Procedure Design Information and Coding
20	Annex F	Draft IFP Validation Plan
21	Annex G	Draft MATS Part 2 Supplementary Instruction

2.1.8 The following documents should also be referenced in support of this ACP submission:

Table 2 ACP Supporting Documents

ACP Stage	Document (Linked)
Stage 1A	Statement of Need
Stage 1B	Design Principle Submission
Stage 2A	Options Development and Design Principle Evaluation
Stage 2B	Initial Options Appraisal
Stage 2B	Post Gateway supplementary information
Stage 3B	Full Options Appraisal
Stage 3B	Consultation Strategy
Stage 3B	Consultation Document
Stage 3B	Consultation summary document
Stage 3D	Consultation categorisation document
Stage 4A	Consultation response document (See the CAA's Airspace Change Portal)
Stage 4A	Final Options Appraisal (See the CAA's Airspace Change Portal)

3. Executive summary

3.1.1 City of Derry Airport (CoDA) is proposing to implement satellite-based (PBN) arrival procedures which will provide a set of contingency procedures for the existing ground based navigational aid infrastructure, replicate existing arrival routes, and aim to meet the Government's Airspace Modernisation Strategy (AMS).

3.1.2 In September 2020, CoDA commenced Stage 1 of the airspace change process by submitting a statement of need to the CAA and then developing Design Principles through engagement with stakeholders.

3.1.3 Following CAA review and sign-off as part of the Define Gateway, we then progressed to Step 2A where we developed a Comprehensive List of Options that aimed to meet the Statement of Need and the Design Principles. This list was tested with stakeholders before we undertook a Design Principle Evaluation (DPE). This evaluation resulted in some component part options being discounted with the remining grouped together into two 'Airspace Design Options' to continue to the Initial Options Appraisal (Stage 2B). These two options, Airspace Option 1 and Airspace Option 2, each had two associated missed approach options.

3.1.4 Our Initial Options Appraisal demonstrated that there were very small differences between the two options in terms of the benefits and impacts, and concluded that further quantified analysis of the options, once they have been developed into detailed Flight Procedures (IFPs), would be valuable when comparing the two. We therefore took both options and all associated missed approach options forward to Stage 3A.

3.1.5 IFP development at the start of Stage 3A lead to refinement of the designs as some elements could not be developed to replicate current day and meet PANS-OPS IFP design criteria. Subsequently, Airspace Option 2 was evolved into the main option that would be taken forward to the Full Options Appraisal (FOA) alongside three associated missed approach options.

3.1.6 As part of the FOA, we undertook rigorous technical and environmental appraisal of the option and compared it against the 'do nothing' baseline. The FOA showed that Airspace Option 2 met the aims of the ACP, which were to replicate the existing routes[1] which would result in little or no noticeable change to stakeholders, provide a contingency for the existing ground based navigational aid infrastructure, and meet the governments Airspace Modernisation Strategy (AMS). Our preferred option was therefore to implement Airspace Option 2.

3.1.7 The analysis of the missed approach sub options showed that there were only very marginal differences between the options and they too met the overall aims of the ACP. For runway 26, missed approach option 1 was identified as the preferred as the FOA demonstrated that there were no significant impacts to stakeholders. Our preferred option for runway 08 was 08 Missed Approach Option 2 due to benefits in safety and track mileage. The FOA noted that due to operational considerations option 1 may be more suitable, and we would be guided by the outcome of the consultation together with IFP Validation activity.

3.1.8 We then commenced a full public consultation on our proposals. It was launched on Monday 18 October and closed on Friday 21 January 2022. The consultation was shared with all stakeholders previously engaged throughout the process and expanded to include the wider public. Previously engaged stakeholders were informed of the consultation via email and to target a wider public audience, information was place on the City of Derry Airport website, a selection of local newspapers and on City of Derry Airport social media platforms, Twitter, Facebook and LinkedIn.

3.1.9 As part of the consultation, we asked stakeholders whether they had any concerns or whether there are any further considerations we should take into account around Airspace Change Option 2, Runway 26 missed approach option 1 and our Runway 08 missed approach options. We also asked if stakeholders agreed with Option 2 as our preferred option for the runway 08 missed approach. We received 6 responses which were all in support of our proposal and agreed with our preferred option.

3.1.10 After collating, categorising and reviewing of all of the responses at Stage 3D we moved onto Stage 4A where we concluded that no alterations were required to the proposal as a result of the consultation.

3.1.11 At Stage 4A, final IFP development of the proposed procedures took place which resulted in some very minor amendments compared to those detailed in Stage 3. Our Final Options Appraisal first outlined these amendments before undertaking a final detailed appraisal of the proposals to understand the benefits and impacts. The Final Options Appraisal concluded that our proposals met the aims of the statement of need and we would therefore proceed to Stage 4B of the airspace change process.

3.1.12 We're now at Stage 4B of the CAP1616 process and this document presents the formal submission of an ACP for these satellite-based approach procedures which will utilise Performance Based Navigation (PBN). These procedures aim to meet the governments Airspace Modernisation Strategy (AMS) and provide a contingency for the existing ground based navigational aid infrastructure. They will be operated alongside the existing conventional approaches at CoDA.

3.1.13 We have considered the Secretary of State call in criteria and do not believe that the four conditions would apply to this ACP, table 3 provides further details.

Table 3 Secretary of State call in criteria

Call in criteria	Applicability to this ACP
Is of strategic national importance or,	This ACP offers CoDA the opportunity to add resilience whilst aiming to replicate the existing routes flown today as closely as possible. It is not anticipated that this ACP will increase movement numbers at CoDA. It is not considered of strategic national importance.
Could have a significant impact (positive or negative) on economic growth of the United Kingdom, or	This ACP does not impact capacity. CoDA are proposing to implement these procedures for resilience purposes.
Could both lead to a change in noise distribution resulting in a 10,000-net increase in the number of people subjected to a noise level of at least 54 dB LAeq 16hr and have an identified adverse impact on health and quality of life, or	Our Final Options Appraisal has demonstrated that there will be no change to the population exposed to a noise level of at least 54dB L_{Aeq}.
Could lead to any volume of airspace classified as Class G being reclassified as Class A, C, D or E.	This ACP does not propose to make any changes to CoDA's existing controlled airspace arrangements.

[1] Excluding the Missed Approaches

4. Current airspace description

4.1 Airspace structure and routes

4.1.1 This ACP aims to introduce Performance Based Navigation (PBN) arrival procedures which replicate the existing routes and/or profiles actually flown as closely as possible.

4.1.2 CoDA has one main runway for Instrument Flight Rules (IFR) arrivals which, depending on the direction of operations, is either called Runway 08 or Runway 26. In the summer of 2019[2], around 27% of arrivals operated on Runway 08 (landing from the west towards the east, known as 'Easterly operations'), and 73% of arrivals operated on Runway 26 (landing from the east towards the west, known as 'Westerly operations'). For safety and performance reasons, aircraft take-off and land into the wind and therefore the wind direction is the key reason for which direction is used for landing.

Figure 2 Summer 2019 average arrivals direction

[2] Please see Airspace Usage section for more information about the baseline year.

Flight Paths

4.1.3 The figures in the following sections illustrate the existing procedures that are published today for aircraft arriving at CoDA. These have been generated using procedure charts published on the eAIP (Electronic Aeronautical Information Publication).

4.1.4 Due to the way aircraft are directed by Air Traffic Control (ATC) when arriving at Derry, and the accuracy of the navigation infrastructure available, aircraft do not necessarily follow the exact procedure centreline as shown within the charts published in the eAIP. We have therefore also included a section of figures which show publicly available flight track data[3] overlaid over the existing published procedures.

Final Approach and Missed Approach

4.1.5 A final approach procedure instructs a pilot on how to align with the runway and descend for landing using the navigation aids associated with the procedure. There are currently 8[4] published final approach procedures at CoDA which utilise various ground based navigation aids, including the Instrument Landing System (ILS), Localiser (LOC), Distance Measuring Equipment (DME) and an Non-Directional Beacon (NDB).

4.1.6 Wherever possible, the final approach is aligned with the extended centreline of the runway. Due to the location of the localiser and NDB on the aerodrome, runway 08 has an offset ILS approach as well as an offset NDB approach; this means that the aircraft are initially slightly offset from the extended runway centreline when they fly an approach to runway 08. As aircraft descend towards the airport, once the pilot can see the runway, a small adjustment to the aircraft's course is made to align with the runway before landing.

4.1.7 A final approach procedure always has an associated missed approach procedure; this is flown when an aircraft is unable to land and the approach cannot be continued. It provides a procedure to reconnect to the final approach to perform another landing. As missed approaches are only operated on rare occasions where it is not possible to land, they are flown very infrequently (around 5 per month on average at the airport, the majority of which are planned and flown for training purposes).

[3] CoDA do not have radar or any track-keeping system
[4] eAIP Part 3 EGAE AD 2.24

4.1.8 On the below figures, the published intermediate and final approach procedures are shown in white and the missed approach procedures are green.

Figure 4 Runway 08 Final Approach and Missed Approach Procedures

Figure 3 Runway 26 Final Approach and Missed Approach Procedures

Holds

4.1.9 Aircraft are sometimes put into holding patterns (holds) whilst they are waiting to land. Holds are typically used when there is bad weather, or if there are multiple aircraft waiting to land and ATC need to delay an aircraft whilst another is landing.

4.1.10 CoDA has holds available at four locations shown in figure 5 below. The COLRE, DUNGV and LUNEX holds are linked to the final approach by 'direct arrival' procedures as shown in figure 6. There is more information about direct arrivals in the next section. These holds are defined by conventional navigation but are already mostly flown as area-navigation (RNAV) holds which is a type of performance-based navigation. Therefore, whilst this airspace change will formally define the same holds as RNAV hold, this will not change the tracks over the ground flown of holding aircraft.

4.1.11 ATC report that the most utilised holds are the overhead hold (above the aerodrome), COLRE and LUNEX holds.

Figure 5 Current Holds at CoDA

Figure 6 Current Holds at CoDA with connected procedures

Direct Arrivals

4.1.12 The published direct arrivals shown in figures 6 and 7 are used by ATC when there are multiple aircraft arriving around the same time, to accommodate some delay and ensure safe spacing between aircraft. Direct arrivals have three holds that aircraft can be directed to before being cleared to fly along an arc that is determined by the distance from navigation aid called a DME (Distance Measuring Equipment) before landing.

4.1.13 CoDA ATC report that aircraft are typically routed directly to LUNEX when on easterly operations (runway 08) or COLRE when on westerly (runway 26). ATC most often clear arrivals straight onto the final approach procedure however they may instruct aircraft to stay in the holds, in order to keep the required procedural separations (spacing between aircraft) before clearing them to land. The DME arc is also sometimes used as a way to delay arrivals and therefore ensure safe separation.

Figure 6 Direct Arrival Procedures

Figure 7 CoDA Holds, Direct arrivals and final approach procedures.

All Approach Procedures with Flight Track Data

4.1.14 The figures below show all of the arrival procedures (direct arrivals and final approach) for runway 08 and runway 26 overlaid with flight track information. Radar is not available at CoDA so we have used publicly available information from a website called Flightradar24 to generate a sample of tracks from commercial and business flights. It is important to note that Flightradar 24 is not as accurate as actual radar and doesn't track all aircraft, only those aircraft that carry certain equipment on board. Due to this, the sample used is taken between 2018 - 2020 in order to provide a more comprehensive overview of the typical tracks over the ground flown by aircraft in relation to the procedures that are published.

Figure 8 All Runway 08 arrival procedures overlaid with flight track data

Figure 9 All Runway 26 arrival procedures overlaid with flight track data

4.1.15 As outlined in the direct arrivals section above, CoDA ATC report that the full direct arrivals arc is rarely used and aircraft are typically directed straight to LUNEX and COLRE before either holding, or directly joining the final approach. The flight track information shown in the figures above supports the information provided by ATC, as it shows that most aircraft take a more direct course to the final approach, and very few aircraft are flying the full direct arrivals via the DME arc (especially for runway 26) or entering the holding patterns.

Airspace

4.1.16 The airspace around CoDA borders UK and Irish airspace. The majority of the procedures are within UK airspace, however parts of the approach procedures and the direct arrival for runway 08 are within the Shannon Flight Information Region (FIR).

4.1.17 The Irish Aviation Authority (IAA) requires instrument flight procedures to be contained within controlled airspace and therefore parts of the existing 08 procedures that fall within Irish Airspace are contained within Class C airspace as shown west of the airport on figure 8. The base of this airspace varies between CTA 1 (1500 – Flight Level (FL)75), CTA 2 (2000-FL75) and CTA 3 (3000 - FL75).

4.1.18 All parts of the procedures that are contained within UK airspace are within Class G airspace. CoDA's Aerodrome Traffic Zone (ATZ) is wholly contained within UK, Class G airspace.

4.1.19 Figure 8 takes the procedure centrelines from the figures shown in the previous sections and overlays them on a chart showing the airspace around CoDA. For full details of the controlled airspace around Derry, please refer to the published charts in Part 3 EGAE AD 2.24 of the eAIP.

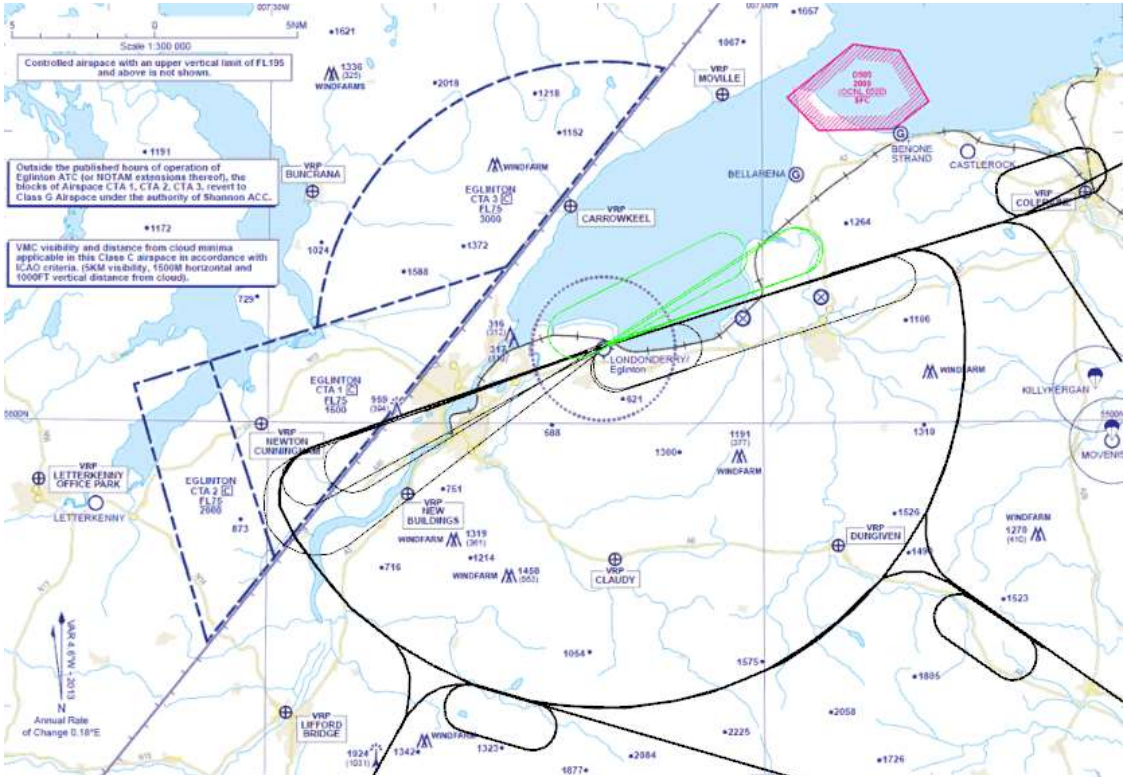

Figure 8 Airspace around CoDA with indicative arrival procedures

4.1.20 The eAIP (ENR 5.1) also contains further information about the Danger Area EG D505 shown in red in the north east corner of the figure. This operates from SFC to 2000 and occasionally up to 6500ft.

4.1.21 To the east of the aerodrome, there is a private airfield site at Movenis, with a parachute drop zone located overhead Movenis. A separate Drop Zone site is also located at Killykergan for the use of Movenis students.

4.1.22 Ulster Gliding Club operate out of Bellarena airfield to the north east of the aerodrome. Gliding activity also often occurs to the south of Bellarena in the vicinity of the high ground at Binevenagh adjacent to the CoDA Runway 26 ILS centreline. Ulster Gliding Club have a contingency operating site at Benone Strand, 3nm East of the Bellarena site.

4.1.23 Causeway Airfield is situated 20nm east of CODA. Causeway Airfield operates microlight aircraft for private flying and training.

4.1.24 The disused aerodrome of Ballykelly is 5 nm to the east-north-east of the aerodrome, under the runway 26 extended centerline.

4.1.25 In recent years, there has been significant increase in the number of wind farm developments surrounding CoDA. Although these developments are not a typical ‘airspace user’ they do have the potential to influence airspace design and they have therefore been considered throughout the process.

4.2 Airspace usage and proposed effect

4.2.1 As part of the Final Options Appraisal we reviewed the following movement data for a 92-day summer period in 2019[5] for the purposes of environmental analysis. We have therefore included this information again to illustrate the typical operation at CoDA.

4.2.2 Overall, there were 1498 arrival movements in the 92-day period; which is an average of just over 16 arrivals per day. Owing to the percentage of General Aviation and helicopter movements, many of the overall arrival movements are not within the scope of this ACP as they have operated visually rather than using Instrument Flight Procedures (IFPs) which use the airport's ground based navigational equipment.

Table 4 CoDA Summer 2019 Movement Data. Source CoDA ALDIS system

Aircraft Type	Flight Rules	Number of Arrivals 92 day summer period 2019
Fixed Wing	Instrument	690
	Visual	531
Rotary	Instrument	17
	Visual	260
Total		1498

4.2.3 Analysis of the data showed that in total 17 rotary aircraft (helicopters) operated during the 92-day period using the published IFPs, however only 6 of these actually landed on the main runway; the remaining 11 operated directly to the apron. Given the very small numbers, and that it is anticipated that only a very small number of suitably equipped rotary aircraft per year could operate RNP Approaches, we have focused the following information on Instrument Flight Rules (IFR) fixed wing arrival movements.

4.2.4 Based on the above, on average, IFR fixed wing movements account for approximately 7-8 arrivals per day to CoDA.

4.2.5 After analysing the IFR data we next reviewed the runway usage. CoDA has one main runway for Instrument Flight Rules (IFR) arrivals which, depending on the direction of operations, is either called Runway 08 or Runway 26. In the summer of 2019 around **27% of arrivals operated on Runway 08** (landing from the west towards the east, known as 'Easterly operations'), and **73% of arrivals operated on Runway 26** (landing from the east towards the west, known as 'Westerly operations'). For safety and performance reasons, aircraft take-off and land into the wind and therefore the wind direction is the key reason for which direction is used for landing.

[5] 2020 and 2021 are not considered representative baseline years due Covid-19

4.2.6 Next, we have reviewed the movement data and used this to determine the average number of IFR arrivals from each direction across the summer, as shown in Figure 9 below. Note that radar data is unavailable at the airport so the orange tracks shown are taken from Flight Radar 24. Owing to the limitation of that data, not all arrival tracks may be represented.

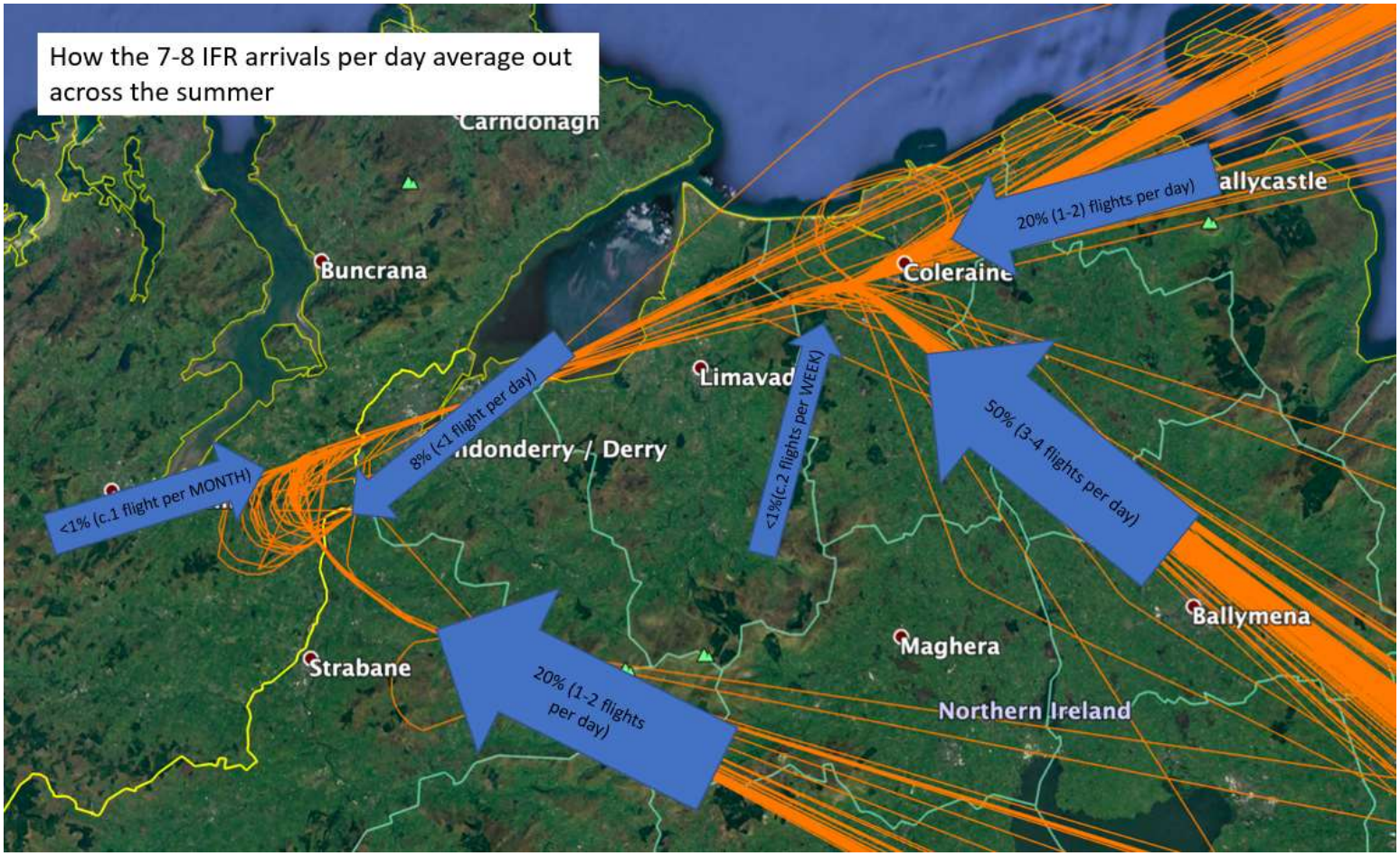

Figure 9 Average arrival directions across 2019 summer period

Expected PBN Route Usage

4.2.7 The proposed RNP approach procedures are intended to be published alongside the existing conventional IFPs used by IFR flights. Even with RNP approaches available, most arrivals will still elect to use the existing Instrument Landing System (ILS) procedures. As such, we currently ambitiously estimate that a **maximum 25% of IFR flights would use these RNP approaches**, which equates to around 1-2 flights per day (based on 2019 movement figures). In reality, it will most likely be a lower number than this. Figures 10 and 11 below show the average number of arrivals using RNP approaches from each direction if all aircraft were on either easterly or westerly operations and 25% of them operated RNP approaches in 2019.

Figure 11 Easterly Operations. 25% of all IFR arrivals choose RNP APCH (2 RNP APCH arrivals per day)

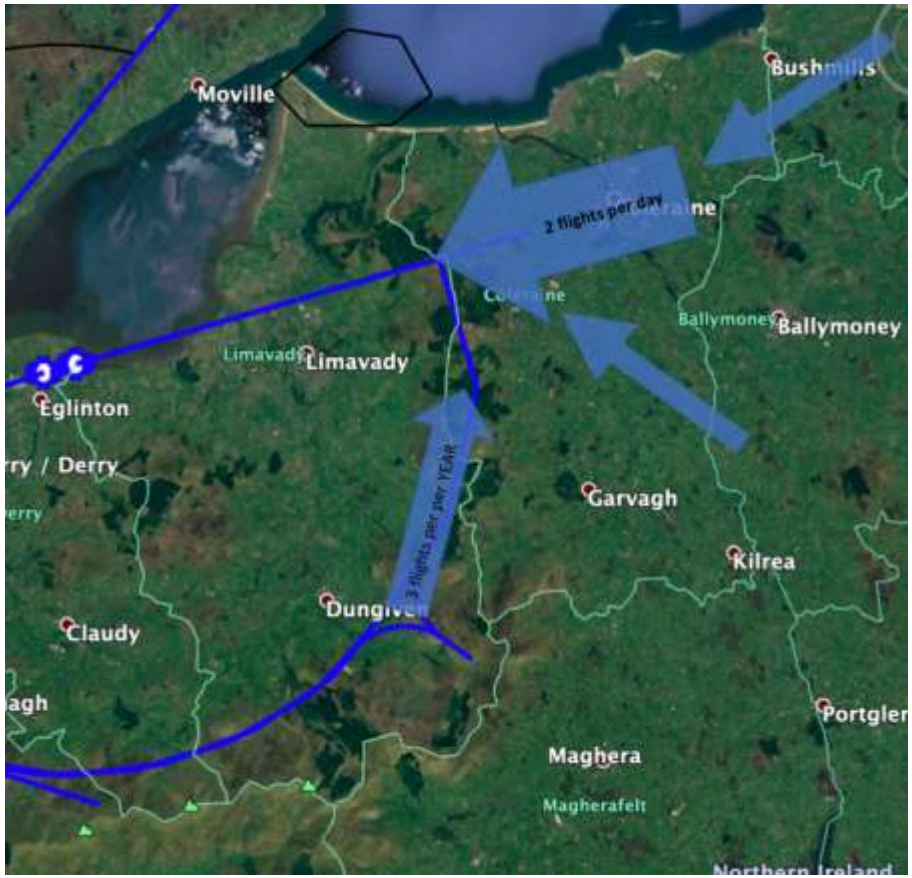

Figure 10 Westerly Operations. 25% of all IFR arrivals choose RNP APCH (2 RNP APCH arrivals per day)

Future Traffic Forecasts

4.2.8 As part of the requirements of CAP1616, Airspace Change Sponsors are required to provide data and analysis for the year of implementation, and a 10 year forecast following implementation. For the CoDA, if successful with this ACP, we would expect to implement in 2022 and therefore our 10-year forecast year would be 2032. The baseline 2019 information has therefore been developed to 2022 and 10 years after to be used as part of the modelling and metrics shown in the Final Options Appraisal.

4.2.9 The main focus of this ACP is to meet the governments Airspace Modernisation Strategy (AMS) and provide a contingency for the existing ground based navigational aid infrastructure. As it does not increase capacity or the number of movements at CoDA, the following forecasts apply to the scenario with or without this ACP implemented:

Table 5 Future Traffic Forecasts

Year	2022 Implement	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Forecast Total Movements (year)	3414	4114	5594	5906	5906	5906	6950	7054	7158	7158	7159
PBN (25% of total arrivals) (year)	427	514	699	738	738	738	869	882	895	895	895
Average PBN (day)	1-2	1-2	1-2	2	2	2	2-3	2-3	2-3	2-3	2-3
Total estimated missed approach (year)	66	78	108	114	114	114	138	138	138	138	138
Average PBN missed approach (year)	17	20	27	29	29	29	35	35	35	35	35

4.2.10 When considering modal split, in 2022, on average there would be less than 1 PBN arrival per day on runway 08 and less than 2 arrivals per day on runway 26. By 2032, this would average less than 1 arrival per day on runway 08 and less than 3 per day on runway 26. In terms of the missed approach modal split, in 2022 it is anticipated that there will be around 5 per year on runway 08 and around 12 per year on runway 26. By 2032, this would increase to around 9 per year on runway 08 and around 26 per year on runway 26.

4.2.11 The increase in forecast movements between 2022 and 2032 is based on CoDA's highest growth scenario from our long term business plan which is driven by forecast growth in charter flights and private business aviation. As stated above, **the ACP does not increase the number of arrival and departure movements at CoDA**.

4.2.12 As outlined in the sections above, the proposed PBN procedures are intended to be published alongside the existing conventional IFPs used by IFR flights. This is expected to remain in future and therefore we have continued to apply the percentage splits outlined in figure 9 above, and the estimate of a maximum of 25% of IFR flights using the RNP approaches, across all future forecast models.

4.3 Operational efficiency, complexity, delays and choke points

4.3.1 This ACP aims to replicate the existing arrival procedures at CoDA to provide resilience and meet the aims of the Governments Airspace Modernisation Strategy. It does not intend to increase capacity or efficiency within the existing airspace.

4.4 Safety issues

4.4.1 Today, all direct arrivals and Instrument Approach Procedures are currently safely in operation with no known safety concerns.

4.4.2 All CoDA IFPs that are within, or are partially within, the Irish FIR are wholly contained within CAS. This is a safety requirement of the Irish Aviation Authority (IAA). The UK CAA does not have such a requirement.

4.4.3 In the surrounding area, there is a danger area D505 to the east of the airport, and also a number of paradrop zones to the south east. To the north and north west of the airport there is a known area of high ground with wind turbines and to the north east as an area where gliders are known to frequently operate. CoDA have a letter of agreement with the Ulster Gliding Club.

4.5 Environmental issues

4.5.1 There are no specific environmental issues at CoDA. This Airspace Change Proposal aims to replicate the procedures operated today and does not increase the number of arrival and departure movements at CoDA. The baseline section of our Final Options Appraisal provides further information about the baseline 'do nothing' scenario and the Final Options Appraisal also contains further information around the environmental assessment.

5. Statement of Need/justification

5.1.1 The statement of need was submitted to the CAA and published on the Airspace Change portal as part of Stage1A of this ACP in April 2019. It states:

> *City of Derry Airport is owned by Derry City and Strabane District Council (DC&SDC) and operated on their behalf by CODA Operations Ltd (CoDA). The airport acts as a main gateway for the entire North West of Ireland and provides a vital air access link for the local community, performing a pivotal role in the economics of the region. In 2011 the airport transported 405,000 passengers to a range of destinations across the UK and Europe as well as being a popular inbound tourist destination.*
>
> *City of Derry Airport is situated in Class G airspace and the ATS unit is non-radar. The available FIS to participating aircraft are Procedural Service and Basic Service. Commencing 2008 DC&SDC replaced all of the airports existing ground based navigational equipment included CAT 1 ILS on Runway 26 and Runway 08 plus the NDB(L) and DME systems. These navigational systems act as the primary method for aircraft to be able to operate into the airport in all weather conditions.*
>
> *Due to the limitations of ground based navigational aids this equipment alone does not provide the robust contingency required to ensure that following a failure of critical elements of the ground based navigational equipment, operators would be able to continue to operate in all weather conditions.*
>
> *To ensure that the required contingencies are available, CoDA intends to introduce GNSS approach procedures to both Runway 26 and Runway 08 as follows:*
>
> *Introduction of PBN approaches to RWY 08 & RWY 26*
>
> *Introduction of PBN direct arrival procedures to compliment the above*
>
> *Introduction of PBN Missed Approach Procedures, Aircraft Holds and holding procedures.*
>
> *As EGAE is non-radar, the design of approaches and direct arrival procedures to as far as practicable replicate the existing procedures at EGAE.*

Note that the existing approach procedures to Runway 08 enters the Shannon FIR. Within the Shannon FIR the responsibility for the provision of ATS in accordance with the airspace classification has been delegated from Shannon ACC to Eglinton[6] during the aerodrome opening hours.

Airspace modernisation strategy

5.1.2 This ACP supports CoDA in meeting some of the aims of the CAP1711 Airspace Modernisation Strategy (AMS) by introducing satellite based PBN procedures. The purpose of this ACP is to provide contingency procedures in the event of ground based navigational equipment failures, and the procedures aim to replicate the existing procedures operated today. The proposal has been developed in accordance with the AMS, however, to achieve the overall objective of quicker, cleaner and quieter journeys could require a more significant change from today which is outside the scope of this ACP. The proposal does not conflict with the AMS.

5.2 Design principles

5.2.1 Following the submission of a statement of need and assessment meeting at Step 1A, at Step 1B change sponsors are required to develop a set of design principles which provide high-level criteria that the proposed airspace design options should meet. The design principles are drawn up through engagement between the change sponsor and affected stakeholders.

5.2.2 The list of design principles for the ACP are as follows:

[6] Londonderry/ Eglinton is the ICAO designated name of City of Derry Airport. Eglinton is also the RTF callsign.

Table 6 Final ACP Design Principles

#	Design Principle
1	The proposal must maintain a high level of safety for all airspace users
2	The proposal should avoid overflight of densely populated areas where possible[7]
3	The proposal must be in accordance with the Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it[8]
4	The proposal should replicate the current tracks over the ground as much as possible, to avoid placing new flightpaths over areas not currently overflown
5	Minimise impact on other airspace users and limit any requirement for additional Controlled Airspace (CAS)
6	Improve operational efficiency and resilience
7	Design options will investigate approach angles greater than 3.0˚, subject to Regulatory acceptance
8	Options should not increase and should aim to reduce the CO_2 emissions of aircraft operating at CoDA.

5.2.3 For more information please see our Stage1B Design Principle Document on the airspace change portal.

5.2.4 The options development and analysis section within this document describes how the Design Principles were then used when assessing the airspace change options developed.

[7]This is in line with the government's policy to limit and, where possible, reduce the number of people in the UK adversely affected by aircraft noise and the impacts on health and quality of life associated with it.

[8] This design principle is mandated by the CAA

6. Proposed airspace description

6.1 Objectives/requirements for the proposed design

6.1.1 There are three main objectives/ requirements of this ACP which are to:

- Provide a set of contingency procedures for the existing ground based navigational aid infrastructure,
- Design PBN approaches and arrival procedures to replicate the existing routes which would result in little or no noticeable change to stakeholders, and
- Meet the Government's Airspace Modernisation Strategy (AMS).

6.2 Proposed new airspace/route definition and usage

6.2.1 As part of this airspace change proposal, CoDA is intending to implement the following:

- Satellite-based (PBN) RNP approach procedures to RWY08 & RWY 26,
- Satellite-based (PBN) Missed Approach Procedures, and
- Satellite-based (PBN) RNAV 1 direct arrival procedures (STARs) with associated RNAV1 holding.

6.2.2 The proposed PBN approaches will be operated alongside the current published conventional approaches. The PBN approaches will be an elective procedure or used for resilience in the event of conventional navigation aid outages. The majority of aircraft arriving at CoDA will continue to land using the ILS approaches or land visually as they do today.

6.2.3 The approaches aim to replicate the existing approaches operated today as closely as PBN design criteria allows. We have detailed any small changes from current day within our Full Options Appraisal and Final Options Appraisal documents as the IFPs have been developed. Our Final Options Appraisal has demonstrated that there will be no significant impacts to stakeholders, or fundamental changes from the conventional procedures operated today.

6.2.4 The turns that form part of the missed approach options are different from current day however these have been developed as a result of engagement with airlines, local airspace users and CoDA's ATC team. The Final Options Appraisal and safety case have demonstrated that the change from current day does not impact safety and may provide a marginal improvement to safety and ensures the proposed Runway 26 Missed Approaches can be contained within existing CAS. The options development and analysis section of this document also provides details of the evolution of these missed approach options.

6.2.5 This proposal does not intend to make any changes to the existing CAS arrangements at CoDA. The Irish Aviation Authority (IAA), requires the primary protection areas of Instrument Flight Procedures (IFPs) to be safely contained within CAS. The proposed procedures that form part of this ACP, that are within or partially within the Irish FIR, are wholly contained within the existing CAS and there is no requirement for additional CAS.

6.2.6 This proposal does not seek any changes to the airspace usage or capacity of the airspace; the purpose of this ACP is to implement contingency procedures that also aim to meet the AMS.

6.2.7 Finally, this ACP does not propose to make any changes to the existing conventional approach procedures, nor does it change or impact departures at CoDA.

6.2.8 See Annex D for AIP entry for AIRAC publication and Annex E for Procedure Design Information and coding.

Implementation date and backup

6.2.9 The targeted AIRAC cycle is AIRAC 12/2022. This has an effective date of 01 Dec 22 and therefore this is our targeted implementation date.

6.2.10 The backup AIRAC cycle is AIRAC 01/2023 as AIRAC 13/2022 would fall over the Christmas/New Year period. AIRAC 01/2023 has an effective date of 26 Jan 23.

7. Engagement and consultation overview

7.1.1 Throughout the airspace change process we've engaged with Stakeholders. Table 7 summarises this activity:

Table 7 Summary of engagement and consultation activity

CAP1616 Stage	Summary of Activity	Links for more information
Stage 1B	Stakeholders were identified through the potentially impacted area map and those airspace users who operate in or around City of Derry Airport. • Local Authorities within the impacted area • CoDA Transport Consultative Committee • NATMAC • Airlines • Irish Aviation Authority • General Aviation – based at CoDA and local gliding/flying clubs • Ministry of Defence • Department of Agriculture, Environment & Rural Affairs (Northern Ireland) • Natural Environment Division, Countryside, Coast & Landscape Unit (Northern Ireland) Due to the nature of the proposal, CoDA engaged on the design principles online and presented stakeholders with background information on the proposed changes being made, the airspace change process, CAP1616 and explained the purpose of design principles. A list of 6 potential design principles was provided which stakeholders could make changes to or provide additional suggestions. Following stakeholder engagement one design principle was amended and 2 design principles were added. The final design principles are available in section 5.2. The ACP passed the Stage 1 Gateway in November 2020.	Stage 1 Main Document
Stage 2A	The stakeholders identified during Stage 1 were engaged with during the Stage 2A engagement. The stakeholders were engaged via on-line methods, due to the COVID-19 pandemic and the widespread location of many of the stakeholders. All stakeholders were provided with a presentation of the comprehensive list of options and were offered the option of an online meeting or briefing with CoDA if any further explanation was required. Online meetings and calls were held with several stakeholders: Ryanair, Loganair, IAA, Donegal Council and the Ulster Gliding Club. Stakeholders were given 3 weeks to provide feedback. Feedback provided during this stage did not lead to any further options being developed. The ACP passed the Stage 2 Gateway in March 2021.	Stage 2A Main Document
Stage 3	The formal consultation took place for 14 weeks between 18 October 2021 and 21 January 2022. In line with the approved Consultation Strategy, the consultation was held on-line with 2 on-line events programmed for stakeholders to ask any questions regarding the proposal. The previously engaged stakeholders from Stages 1 and 2 were emailed at the start of the consultation and provided with a link to the consultation website. These stakeholders were also sent email reminders at the consultation mid-point and 2 weeks prior to the consultation finish date. The consultation was open to the wider public and CoDA promoted the consultation on the airport website, social media platforms and through adverts in local newspapers. The consultation asked stakeholders to raise any concerns or further suggestions they may have regarding the core proposal and the missed approaches for runways 26 and 08. After analysis, the total number of responses to the consultation was 6, with respondents broadly being in support of the proposals and CoDA's preferred option for the missed approach for runway 08.	Consultation Strategy Main Consultation Document Consultation Categorisation Document
Stage 4	As part of Stage 4 we have reviewed the consultation responses and presented a Consultation Response Document. Within this document we have explained the outcomes of our consultation including how many responses we received and whether the information has impacted our final proposal.	Consultation Response Document (See the CAA's Airspace Change Portal)

7.2 Net impacts summary

7.2.1 The following table outlines the outcome of the Final Options Appraisal against the groups identified in CAP1616 Appendix E.

7.2.2 For further details, please see the environmental assessment section of this document.

Table 8 Net impact summary

Group	Impact	Airspace Option 2 (Our core proposal)	26 MA Option 1	08 MA Option 2
Communities	Noise impact on health and quality of life	Minor impacts and benefits	Minor impacts and benefits	Minor impacts and benefits
	Air Quality	Minor impacts and benefits	No impact	No impact
Wider Society	Greenhouse gas impact	Minor impacts and benefits	Minor benefits	Minor benefits
Wider Society	Capacity / resilience	Improves resilience	Improves resilience	Improves resilience
	Tranquillity	No impact	Minor impacts	Minor benefits
	Biodiversity	Minor impacts and benefits	No impact	Minor benefits and impacts
General Aviation	Access	No impact	No impact	Minor benefits
General Aviation/Commercial Airlines	Economic impact from increased effective capacity	No impact	No impact	No impact
	Fuel burn	Minor impacts and benefits	Minor benefits	Minor benefits
Commercial airlines	Training costs	No costs	No costs	No costs
	Other costs	No costs	No costs	No costs
Airport / Air Navigation Service Provider	Infrastructure costs	No costs	No costs	No costs
	Operational costs	Ongoing maintenance of the new procedures estimated £4-10k every five years.		
	Deployment costs	Business as usual – no additional costs		
All	Safety	Improves safety	Minor benefits	Minor benefits

7.3 Units affected by the proposal

7.3.1 CoDA ATC have been involved throughout the process and had direct involvement in the development and refinement of the airspace change options as well as their appraisal. NATS NERL have also been engaged throughout the process and as part of our Stage 3 Consultation confirmed that 'Following an Impact Assessment, NATS NERL plc has determined that the changes will have no impact on its operation'.

7.4 Military impact and consultation

7.4.1 As this proposal seeks to introduce PBN procedures which largely replicate current day, there are no expected impacts to Military aviation operations. The MOD responded to our Stage 3 consultation and confirmed that there would be 'negligible impact on MOD activity'.

7.5 General aviation airspace users impact and consultation

7.5.1 As this proposal seeks to introduce PBN procedures which largely replicate current day, there are no expected impacts to General aviation. Our final options appraisal highlighted how the change to the runway 08 missed approach may benefit GA users, however it's important to note that this is only expected to be operated around 9 times per year by 2032. The final options appraisal confirmed that there would be no impact to GA users as a result of our Airspace Option 2 (our core proposal) and runway 26 missed approach option 1.

7.5.2 Throughout the airspace change process, we engaged and consulted with General Aviation users. CoDA has GA based at the airport as well as a number who operate in the local area. We engaged with the wider GA community via the organisations within NATMAC (National Air Traffic Management Committee) such as, British Gliding Association, British Microlight Aircraft Association, General Aviation Alliance and Airspace4All. For local representatives, the airport has been engaging with CoDA-based GA and local flying and gliding clubs from the outset of this airspace change proposal.

7.5.3 We received detailed feedback from the Ulster Gliding Club (UGC) during Stage 2 and this was followed up by an online meeting between CoDA and the UGC representative, to ensure the suggestions and concerns were fully understood and accounted for as the proposal progressed.

7.5.4 Of the representatives who responded to our consultation, including the UGC representative, there were no concerns around the proposals and the qualitative feedback was broadly in support of our preferred options.

7.6 Commercial air transport impact and consultation

7.6.1 We've engaged and consulted with CoDA's airlines throughout the process to understand the benefits and impacts of our proposals. The Final Options Appraisal has shown that the introduction of PBN arrival procedures provides a benefit in terms of resilience for CoDA's airlines.

7.6.2 Engagement with airlines, as well as with CoDA ATC, has particularly influenced the design of the missed approach procedures. Some airlines commented on the workload involved in the Runway 26 conventional missed approach procedure, and there was a broader desire to redesign these to reduce pilot and ATC workload. Airlines also expressed a wish for the missed approaches to be designed to have a direct entry back into the overhead hold. Subsequently, the proposed PBN missed approaches are a change from current published procedures that aim to meet the requirements from airlines.

7.6.3 In terms of fuel burn, our Final Options Appraisal demonstrated that there will be some very minor variation in flight by flight track length associated with a change from an ILS approach compared to an RNP Approach, but averaged across the annual arrivals at Derry Airport this is will not significantly affect average track length (either by shortening or lengthening) and will therefore not affect fuel burn. The procedures that form Airspace Option 2 do not involve other changes that would affect aircraft thrust and therefore fuel burn.

7.6.4 Although the missed approach procedures turn differently from current day, they offer a more direct route back for another approach when holding is not required and therefore there may be an opportunity for improved fuel burn however owing to the number of missed approaches operated per year, any small improvements will be negligible.

7.7 CO_2 environmental analysis impact and consultation

7.7.1 Our Final Options Appraisal greenhouse gas impact analysis has shown that there will be no material changes to track length and fuel burn as a result of the proposals and therefore there is no significant impact to carbon emissions.

7.7.2 No specific consultation responses were received around track mileage, fuel burn and resulting CO_2 emissions.

7.8 Local environmental impacts and consultation

Air Quality

7.8.1 Our Final Options Appraisal demonstrated that there would be no significant impact to Air Quality due to the majority of the procedures replicating current day. The very small lateral change of the runway 08 approach may result in some impacts (both positive and negative) to pollutant concentrations however due to the number of aircraft expected to operate these approaches and the scale of the lateral change, these will be very small and will not lead to any significant effects.

7.8.2 As part of our Stage 3 consultation, we contacted Derry City & Strabane District Council (DC&SDC), Donegal County Council and the Northern Ireland Environment Agency (NIEA) who may have an interest in local air quality, DC & SDC did respond to the consultation, but no specific mentions of Air Quality were made, and no response was received from Donegal County Council. An email was received from the NIEA Department of Agriculture, Environment and Rural Affairs after the close of the consultation, but no mention of Air quality was made.

Noise

7.8.3 Our Final Options appraisal concluded that our core proposal and missed approaches will have no impact on population adversely affected by the impacts of aircraft noise. The FOA noted that there will be a very small change in distribution under the runway 08 final approach however any negative impacts of this are so marginal that they will not lead to any significant effects.

7.8.4 As part of our Stage 3 consultation, we contacted Derry City & Strabane District Council (DC&SDC) and Donegal County Council as well as placing adverts in newspapers and highlighting our airspace change on social media. Further information about our consultation can be found in the overview above. No concerns were raised regarding noise.

7.9 Economic impacts

7.9.1 It is not intended that this Airspace Change will facilitate any future growth for the airport or offer any increased capacity; the purpose of the change is to provide resilience and meet the requirements of the Airspace Modernisation Strategy. We therefore do not expect any economic impact as a result of the implementation of this ACP.

8. Options development and analysis

8.1 Options development

8.1.1 At Stage 2A of an ACP, the sponsor is required to develop a comprehensive list of options which address the statement of need and align with the design principles developed at Stage 1B. This comprehensive list of options is then shared with the same stakeholders engaged at Stage 1B to ensure they are satisfied that the design options are aligned with the design principles and that the change sponsor has properly understood and accounted for stakeholder concerns specifically related to the design options.

8.1.2 Our Stage 2A document details the options development process, which aimed to develop options which aligned with the design principles and the Statement of Need for the ACP. This kept in mind the overall aim of replicating the current procedures. For the purposes of the Comprehensive List of Options, we split the component parts of some of the final approaches into individual options. These options were then assessed as part of the Design Principle Evaluation and the proceeding options were then grouped into workable systems to be taken forward to the Initial Options Appraisal (Stage 2B).

8.1.3 At this stage, the options developed and presented in table 9 and 10 below were indicative directions of procedures that have been developed by applying the basic principles of PANS-OPS and informed using the current approach procedures and known traffic patterns. We noted as part of our Stage 2 documentation that options would be refined as we progress through the ACP process and will be further developed into Instrument Flight Procedures at Stage 3 of the ACP.

8.1.4 CAP1616 suggests that as part of options development, a change sponsor should develop and consider radical options. Given the Statement of Need and overall scope of this ACP, which is to replicate current day as closely as possible and add resilience to CoDA, radical changes were not considered as part of the options developed.

8.1.5 The tables below show the comprehensive list of options developed at Stage 2A:

Runway 08 Options

Table 9 Comprehensive List of Options: Runway 08

Procedure Segment	Option Name	Description	Image	Option Name	Description	Image
RNP APCH	**08TNO**	T BAR from the North, Off-set (Intended for aircraft arriving from the North and North West to directly position)		**08TNS**	Rwy 08, T BAR from the North, Straight-in (Intended for aircraft arriving from the North and North West to directly position)	
	08DWO	Direct arrival from the West, Off-set (Intended for aircraft arriving from the West and North West to directly position)		**08DWS**	Rwy 08, Direct arrival from the West, Straight-in (Intended for aircraft arriving from the West and North West to directly position)	
	08TSO	T BAR from the South, Off-set (Intended for aircraft arriving from the South West, South, South East and East and North East to directly position or via Direct Arrival)		**08TSS**	Rwy 08, T BAR from the South, Straight-in (Intended for aircraft arriving from the South West, South, South East and East and North East to directly position or via Direct Arrival)	
Direct Arrivals	**08DAR**	Direct Arrival Replication		**08DAD**	Direct Arrival Direct	
Missed Approach	**08MALNT**	Missed Approach, Left Turn to North T Bar		**08MALOH**	RWY 08, Missed Approach, Left Turn to Overhead hold	

Procedure Segment	Option Name	Description	Image	Option Name	Description	Image
	08MALST	RWY 08, Missed Approach, Left Turn to South T Bar		**08MARST**	RWY 08, Missed Approach, Right Turn to South T Bar	
	Do Nothing	Flights operate as they are today				

Runway 26 Options

Table 10 Comprehensive List of Options: Runway 26

Procedure Segment	Option Name	Description	Image	Option Name	Description	Image
RNP APCH	**26TNS**	T BAR from the North, short final (Intended for aircraft arriving from the North and North East to directly position)		**26DE**	Direct arrival from the East (Intended for aircraft arriving from the North East, East and South East to directly position)	
	26YN	Y BAR from the North, short final (Intended for aircraft arriving from the North and North East to directly position)		**26TSS**	T BAR from the South, short final (Intended for aircraft arriving via Direct Arrival or to directly position from the West)	
	26TNL	T BAR from the North, long final (Intended for aircraft arriving from the North and North East to directly position)				
Direct Arrival	**26DAR**	Direct Arrival Replication		**26DAD**	Direct Arrival Direct	
Missed Approach	**26MARNTS**	Missed Approach, Right Turn to North T Bar short final		**26MARNTL**	Missed Approach, Right Turn to North T Bar long final	
	26MARNYS	Missed Approach, Right Turn to North Y Bar short final		**26MARST**	Missed Approach, Right Turn to South T Bar	
	26MAROH	Missed Approach, Right Turn to Overhead hold		**26MALST**	Missed Approach, Left Turn to South T Bar	

Procedure Segment	Option Name	Description	Image	Option Name	Description	Image
	Do Nothing	Flights operate as they are today				

8.1.6 Further information around the development of our Comprehensive List can be found as part of our Stage 2 submission documents on the CAA's airspace change portal.

8.1.7 Our comprehensive list of options was presented to Stakeholders as part of our Stage 2 engagement activities. The feedback received throughout our engagement did not lead to any further options being developed, as generally stakeholders agreed that the options developed where comprehensive and feedback was based more around the benefit/impacts of certain options, rather than the need to create additional ones. There were no suggestions received for additional options.

8.2 Design principle evaluation

8.2.1 All options on the comprehensive list, as outlined in section 8.1 above, then proceeded to a Design Principle Evaluation. The Design Principle Evaluation involves taking all of the options developed and qualitatively evaluating them against the Design Principles to understand how they respond. This helps to determine which options best meet the design principles and therefore proceed to the next stage of the airspace change process.

8.2.2 The following two pages show the outcome of the Design Principle Evaluation. For full details, please see our Stage 2A submission documents on the CAA's Airspace Change Portal.

8.3 Runway 08

Key Met | Partially Met | Not Met

Table 11 Runway 08 Design Principle Evaluation

Procedure segment	Option name	Description	**DP1** Safety	**DP2** Avoid overflight of densely populated areas (1)	**DP3** Meet req of the Airspace Modernisation Strategy (CAP1711) (2)	**DP4** Replicate the current tracks over the ground. Avoid placing new flightpaths over areas not currently overflown	**DP5** Minimise impact on other airspace users and limit additional Controlled Airspace (CAS)	**DP6** Improve operational efficiency and resilience	**DP7** Investigate approach angles greater than 3.0˚, subject to Regulatory acceptance	**DP8** Options should not increase and should aim to reduce the CO_2 emissions	**Overall Score**	**Carried forward**	**Rationale**
			Score 8	**Score 7**	**Score 6**	**Score 5**	**Score 4**	**Score 3**	**Score 2**	**Score 1**			
RNP APCH	08TNO	Rwy 08, T BAR from the North, Off-set									20.5	No	Option 08TNO did not meet DP5, partially met DP1,2,4 and 6 and only met three out of the eight overall design principles (DP). When considered against the priority of the DPs this meant that this option did not score well when compared with other runway 08 approach options. Furthermore, although it is expected that very few aircraft will operate this option, it does not replicate what happens today and introduces flightpaths over new areas. 08TNO would also require additional CAS. When balancing these reasons against the expected very low usage of the option, it is not considered beneficial or justifiable of more CAS and therefore this option was discounted.
	08DWO	Rwy 08, Direct arrival from the West, Off-set									24.5	Yes	Option 08DWO performed well against the DPs meeting five out of eight and partially meeting two. When considered against the priority of the DPs, this option was the second best performing runway 08 approach option. 08DWO was carried forward as although it may require additional controlled airspace (CAS) in IAA airspace (to be determined in Stage 3), Atlantic arrivals from the West could use this option which would replicate what already happens with arrivals from the west today. The T Bar from the South (08TSO) would not be available to such flights as they arrive from a WNW direction and would therefore need to route to LUNEX to pick up the direct arrival which would increase track miles significantly.
	08TSO	Rwy 08, T BAR from the South, Off-set									30.5	Yes	Option 08TSO was the highest performing 08 approach option in the design principle evaluation meeting five out of eight DPs and partially meeting the remaining three DPs. This option very closely replicates what happens today which is the overall aim of the ACP. It was therefore carried forward.
	08TNS	Rwy 08, T BAR from the North, Straight-in									18	No	Option 08TNS was the second worst performing 08 approach option in the DP evaluation, not meeting two DPs, partially meeting three and meeting three DPs. Two out of the three the DPs that were met were the lowest priority and this contributed to an overall low score compared to options other runway 08 approach options that were taken forward. Furthermore, although it is expected that very few aircraft will operate this option, it does not replicate what happens today and introduces flightpaths over new areas. 08TNO would also require additional CAS. When balancing these reasons against the expected very low usage of the option, it is not considered beneficial or justifiable of more CAS and therefore this option was discounted.
	08DWS	Rwy 08, Direct arrival from the West, Straight-in									19.5	Yes	Currently, aircraft arriving onto runway 08 at CoDA fly an offset approach. The two options taken forward above, 08DWO and 08TSO, directly replicate this offset approach. In the case of the final approach for Runway 08, along with these offset arrivals from the west (08DWO) and the offset T Bar from the south (08TSO), we have taken forward the two accompanying straight in options (08DWS and 08TSS) despite them scoring lower than some of the other options. This is because the use of off-set or straight in approaches is complex, and at the Design Principle evaluation stage, we do not have sufficient information without detailed Instrument Flight Procedure (IFP) design for us to be able to accurately assess the advantages and disadvantages of a straight in vs off set approach. It is likely that a straight-in approach would provide better (lower) minima than an offset approach. We intend to explore these advantages and disadvantages within the Full Options Appraisal in Stage 3. Whilst the straight-in element would not be a direct replication, it could offer improved resilience (DP6) over the offset approach by providing lower minima. On average CoDA are on easterly operations for 27% of the year and the numbers of RNP APCH arrivals whilst on easterlies would be in the region of 2 per day, assuming 25% of IFR arrivals would elect to use it. Across this year, this averages out at less than 1 arrival per day. The most frequently used ILS arrival would still fly the offset approach. Although 08DWS may require additional CAS in IAA airspace (to be determined in Stage 3), Atlantic arrivals from the West could use this option. Routing direct to the T Bar from the South would not be available to such flights as they arrive from a WNW direction and would therefore need to route to LUNEX to pick up the direct arrival which would increase track miles significantly. The straight in T Bar from the south (08TSS) would initially replicate the tracks of aircraft as they operate today, however the straight in final approach would not be a direct replication. As explained above this could offer improved resilience and is anticipated to be operated by less than 1 arrival per day. Options 08DWS and 08TSS were therefore taken forward to the next stage of the process where detailed IFPs can be developed that allow us to access the advantages and disadvantages of a straight in approach compared to an offset.
	08TSS	Rwy 08, T BAR from the South, Straight-in									17.5	Yes	
Direct Arrival	08DAR	Rwy 08, Direct Arrival Replication							N/A		33.5	Yes	Option 08DAR met six out of the seven design principles and partially met the lowest priority DP, we have therefore taken this forward as it was the best performing runway 08 direct arrival option.
	08DAD	Rwy 08, Direct Arrival Direct							N/A		15	No	We did not carry Option 08DAD forward as it did not meet three of the Design Principles and therefore scored significantly less than the other Direct Arrival option (08DAR) which met six out of seven DPs. Furthermore, the option does not replicate what happens today and therefore does not meet one of the overall aims of the ACP which is to replicate today's aircraft tracks as closely as possible.
Missed Approach	08MALNT	RWY 08, Missed Approach, Left Turn to North T Bar							N/A		18	No	We have not taken missed approach option 08MALNT forward as it requires a Northerly T bar final approach option, and as explained above these have been discounted. Furthermore, in terms of the DP evaluation, this missed approach option did not meet three Design Principles (DP4, 5 & 6) and only partially met DP1. When considered against the priority of the DPs this meant that this option did not score well when compared with other runway 08 missed approach options.
	08MALST	RWY 08, Missed Approach, Left Turn to South T Bar							N/A		14.5	No	We have not taken missed approach option 08MALST forward as it did not meet 3 design principles (DP 2, 6 & 8), partially met 3 others and only met 1 out of the 7 applicable DPs. When considered against the priority of the DPs this meant that overall it was the worst scoring option compared with other missed approach options. Furthermore, this option does not replicate what happens today which is against the overall aim of the ACP and crossed the final approach which is non desirable, especially in a non-Radar ATC environment. Feedback from CoDA ATC suggested that this option would impact efficiency.
	08MALOH	RWY 08, Missed Approach, Left Turn to Overhead hold							N/A		24	Yes	We have taken option 08MALOH forward as it most closely replicates what happens today and it met three design principles and partially met two others. It did not meet two design principles however these are the lowest priority principles. Overall, in the design principle evaluation, this was the second best performing missed approach option for runway 08.
	08MARST	RWY 08, Missed Approach, Right Turn to South T Bar							N/A		29	Yes	We have taken forward option 08MARST as it was the best performing missed approach option for runway 08 in the design principle evaluation, meeting six out of the seven applicable Design Principles. It did not meet DP4 as it does not replicate what is operated today, however as the route avoids densely populated areas and due to the very low numbers of missed approach expected to be operated (around 4 per year), combined with its overall high performance meant that it was taken forward to the next stage.
Current day	Do nothing	Flights operating as they are today									21	No	We have discontinued the 'do nothing' options for each runway. This is because they do not meet the requirements of the AMS (DP3) and offer additional resilience (DP6); two of the main aims of this Airspace Change and the Statement of Need. Whilst the 'do nothing' options have been discontinued from the process, they were continued to Stage 2B as a means of testing the remaining options against a 'do nothing' scenario to understand the benefits and impacts.

8.4 Runway 26

Table 12 Runway 26 Design Principle Evaluation

Procedure segment	Option name	Description	DP1 Safety	DP2 Avoid overflight of densely populated areas (1)	DP3 Meet req of the Airspace Modernisation Strategy (CAP1711) (2)	DP4 Replicate the current tracks over the ground. Avoid placing new flightpaths over areas not currently overflown	DP5 Minimise impact on other airspace users and limit additional Controlled Airspace (CAS)	DP6 Improve operational efficiency and resilience	DP7 Investigate approach angles greater than 3.0˚, subject to Regulatory acceptance	DP8 Options should not increase and should aim to reduce the CO_2 emissions	Overall Score	Carried forward	Rationale
			Score 8	Score 7	Score 6	Score 5	Score 4	Score 3	Score 2	Score 1			
RNP APCH	26TNS	Rwy 26, T BAR from the North, short final									20	No	Option 26TNS did not meet DP1 (Safety) and DP6, and only partially met DP4, 5 and 8. Safety is always the top priority and given that this option did not meet the safety design principle, it was discounted. The safety impact was raised by the Gilder community who currently operate in this area which tends to have an absence of commercial arrivals into CoDA. Furthermore, although it is expected that very few aircraft will operate this option from the north, it does not replicate what happens today and introduces flightpaths over new areas. For these reasons combined, but predominately due to safety, this option was discounted.
	26YN	Rwy 26, Y BAR from the North, short final									18.5	No	Option 26YN did not meet DP1 (Safety – for the same reason as above) and only partially met DP2,4,5 and 6. When considered against the priority of the DPs, this meant that overall in terms of scores, this options was joint poorest performing alongside 26TNL. Safety is always the top priority and given that this option did not meet the safety design principle, it was discounted. Furthermore, although it is expected that very few aircraft will operate this option from the north, it does not replicate what happens today and introduces flightpaths over new areas. For these reasons combined, but predominately due to safety, this option was discounted.
	26TNL	Rwy 26, T BAR from the North, long final									18.5	No	Option 26TNL did not meet DP1 (Safety – for the same reason as above) and only partially met DP2,4,5 and 6. When considered against the priority of the DPs, this meant that overall in terms of scores, this option was joint poorest performing alongside 26YN. Safety is always the top priority and given that this option did not meet the safety design principle, it was discounted. Furthermore, although it is expected that very few aircraft will operate this option from the north, it does not replicate what happens today and introduces flightpaths over new areas. For these reasons combined, but predominately due to safety, this option was discounted.
	26DE	Rwy 26, Direct arrival from the East									30.5	Yes	Option 26DE performed well in the Design Principle Evaluation, meeting five out of the eight design principles and partially meeting the remaining three. When considered against the priority of the DPs, this meant that it scored highly when compared with other runway 26 approach options. Although it does fly over Coleraine which is why it only partially met DP2, arrivals already operate over this area today. This option will replicate how aircraft arrive from the east, north-east and south-east today and therefore meets the overall aim of this ACP. Given its high performance, and that it did not fail any of the Design Principles, 26DE was carried forward.
	26TSS	Rwy 26, T BAR from the South, short final									34	Yes	Option 26TSS was the highest performing 26 approach option in the design principle evaluation meeting six out of eight DPs and partially meeting the two other DPs. This option very closely replicates what happens and is published today which is the overall aim of the ACP. It was therefore carried forward.
Direct Arrival	26DAR	Rwy 26, Direct Arrival Replication							N/A		33.5	Yes	We have taken forward Option 26DAR as it met six out of the seven design principles and partially met the lowest priority DP, we have therefore taken this forward as it was the best performing runway 26 direct arrival option.
	26DAD	Rwy 26, Direct Arrival Direct							N/A		17.5	No	We did not carry Option 26DAD forward as it did not meet two of the Design Principles and therefore scored significantly less that the other Direct Arrival option (26DAR) which met six out of seven DPs and did not fail any. Furthermore, the option does not replicate what happens today and therefore does not meet one of the overall aims of the ACP which is to replicate today's aircraft tracks as closely as possible.
Missed Approach	26MARNTS	Rwy 26, Missed Approach, Right Turn to North T Bar short final							N/A		12.5	No	We have not taken Missed approach option 26MARNTS forward as it requires a Northerly T bar final approach option, and as explained above these have been discounted. Furthermore, it did not meet DP1 (Safety) which is always the top priority. The safety impact was raised by the Gilder community who currently operate in this area which tends to have an absence of commercial arrivals into CoDA or any Missed Approaches. In terms of the DP evaluation, this missed approach option did not meet three Design Principles (DP1, 4 & 6) and only partially met DP2 and 5. This meant that it performed very poorly compared to other missed approach options and overall did not meet the aims of this ACP.
	26MARNYS	Rwy 26, Missed Approach, Right Turn to North Y Bar short final							N/A		8	No	We have not taken Missed approach option 26MARNYS forward as it requires a Northerly Y bar final approach option, and as explained above these have been discounted. Furthermore, it did not meet DP1 (Safety - for the same reason as above) which is always the top priority. In terms of the DP evaluation, this missed approach option did not meet five Design Principles (DP1, 2, 4, 6 & 8). This meant that it performed very poorly compared to other missed approach options and overall did not meet the aims of this ACP.
	26MARNTL	Rwy 26, Missed Approach, Right Turn to North T Bar long final							N/A		8	No	We have not taken Missed approach option 26MARNTL forward as it requires a Northerly T bar final approach option, and as explained above these have been discounted. Furthermore, it did not meet DP1 (Safety - for the same reason as above) which is always the top priority. In terms of the DP evaluation, this Missed approach option did not meet five Design Principles (DP1, 2, 4, 6 & 8). This meant that it performed very poorly compared to other missed approach options and overall did not meet the aims of this ACP.
	26MARST	Rwy 26, Missed Approach, Right Turn to South T Bar							N/A		19	No	Missed approach option 26MARST met two out of seven design principles (DP 3 and 8) and partially met four (DP1, 2, 4 & 5). Due to the priority of the Design Principles this meant that overall it performed worse that the other two missed approach options outlined below (26MAROH and 26MALST) however it did perform far better than other two missed approach options above (26MARNYS and 26MARNTL). In addition to this, this option was not taken forward for two main reasons: 1. Replicating current day: This option does not replicate what happens today which is an overall aim of the ACP. The two other high performing missed approach options below which were taken forward replicate what is published and what is sometimes operated today. 2. This option crosses the final approach, which is non desirable, especially in a non-Radar ATC environment. Feedback from CoDA ATC suggested that this option would impact efficiency.
	26MAROH	Rwy 26, Missed Approach, Right Turn to Overhead hold							N/A		22	Yes	We have taken forward option 26MAROH as it was the second best performing runway 26 missed approach option and it most closely replicates the current published missed approach procedure. In terms of the DP evaluation, this missed approach option met two out of the seven DPs (DP 3 & 4) and partially met four (DP 1,2, 5 & 6). It did not meet DP8 however this is the lowest priority DP. Overall, this option was the second highest scoring 26 missed approach option, and given it also most closely replicates the published procedure from today which is an aim of the ACP, it was taken forward for further detailed appraisal.
	26MALST	Rwy 26, Missed Approach, Left Turn to South T Bar							N/A		28	Yes	We have taken forward option 26MALST as it was the best performing missed approach option for runway 26 in the design principle evaluation meeting five out of the seven applicable DPs and partially meeting the other two. This meant that it was the highest scoring missed approach option for runway 26. This option also most closely replicated how ATC sometimes tactically position missed approaches to turn left to the south today
Current day	Do nothing										21	No	We have discontinued the 'do nothing' options for each runway. This is because they do not meet the requirements of the AMS (DP3) and offer additional resilience (DP6); two of the main aims of this Airspace Change and the Statement of Need. Whilst the 'do nothing' options have been discontinued from the process, they were continued to Stage 2B as a means of testing the remaining options against a 'do nothing' scenario to understand the benefits and impacts.

(1) This is in line with the government's policy to limit and, where possible, reduce the number of people in the UK adversely affected by aircraft noise and the impacts on health and quality of life associated with it. (2) This design principle is mandated by the CAA

8.4.1 The next stage of the ACP process involved undertaking an Initial Options Appraisal (IOA) of the remaining options, to understand in further detail the benefits and impacts. In preparation for the IOA, we grouped the component parts that were taken forward from the DP evaluation into two airspace options shown the tables below. Within each airspace option, there is a subset of missed approach options (two for each runway) that were also taken forward to the initial options appraisal:

Airspace Option 1			
Description	08 Offset final approach, 26 Straight In		
Components	26DE 26TSS 08DWO 08TSO 26DAR 08 DAR 26MAROH 26MALST 08MALOH 08MARST	Rwy 26, Direct arrival from the East Rwy 26, T BAR from the South, short final Rwy 08, Direct arrival from the West, Off-set Rwy 08, T BAR from the South, Off-set Rwy 26, Direct Arrival Replication Rwy 08, Direct Arrival Replication **Missed Approach Sub Options** Rwy 26, Missed Approach, Right Turn to Overhead hold Rwy 26, Missed Approach, Left Turn to South T Bar RWY 08, Missed Approach, Left Turn to Overhead hold RWY 08, Missed Approach, Right Turn to South T Bar	

Airspace Option 2			
Description	08 Straight In 26 Straight In		
Components	26DE 26TSS 08DWS 08TSS 26DAR 08DAR 26MAROH 26MALST 08MALOH 08MARST	Rwy 26, Direct arrival from the East Rwy 26, T BAR from the South, short final Rwy 08, Direct arrival from the West, Straight-in Rwy 08, T BAR from the South, Straight-in Rwy 26, Direct Arrival Replication Rwy 08, Direct Arrival Replication **Missed Approach Sub Options** Rwy 26, Missed Approach, Right Turn to Overhead hold Rwy 26, Missed Approach, Left Turn to South T Bar RWY 08, Missed Approach, Left Turn to Overhead hold RWY 08, Missed Approach, Right Turn to South T Bar	

8.5 Initial options appraisal

8.5.1 As detailed in section 8.4 above, two main airspace change options progressed from Step 2A to the Initial Options Appraisal (IOA) at Step 2B. Within each airspace option, there is a subset of missed approach options (two for each runway) which were appraised; these options were applicable to either of the main Airspace Change Options.

8.5.2 Alongside the two airspace change options, there is a baseline ‘Do nothing’ scenario as required by CAP1616. The ‘do nothing’ option was discounted at the Design Principle Evaluation stage for the following reasons:

- It did not meet the requirements of the Airspace Modernisation Strategy;
- It did not offer CoDA resilience;
- It therefore did not address the Statement of Need;
- Overall it did not perform as well as other options against the metrics applied to each design principle.

8.5.3 Although the 'do nothing' option did not progress to Stage 2B, CAP1616 requires the baseline scenario to be appraised, as it provides a means of testing the options against the current day operations, to better understand and highlight the benefits and impacts of each new option.

8.5.4 The Initial Options Appraisal demonstrated that there were very small differences between the two options in terms of the benefits and impacts, and it would be valuable to analyse both in detail once the options have been developed into detailed IFPs. We therefore chose to take both options and all associated missed approach options forward to the full options appraisal (Stage 3a).

8.5.5 As part of CAP1616, CoDA was required to state our preferred option as part of the IOA. At this stage, our preferred option was Option 2; runway 08 straight in final approach, and runway 26 straight in final approach. Our preferred missed approach options were Runway 08, Missed Approach, Right Turn to South T Bar and Runway 26, Missed Approach, Left Turn to South T Bar.

8.5.6 For further details, please see our Initial Options Appraisal document.

8.6 Options development at Stage 3A

8.6.1 As part of our Initial Options Appraisal (IOA), we explained that we had chosen to progress both airspace change options through to Stage 3, as the IOA had demonstrated that that there were very small differences between the two options in terms of the benefits and impacts and it would be valuable to analyse both in detail once the options have been developed into detailed IFPs. We also noted in the IOA document that some areas, for example the requirement for new controlled airspace (CAS), would require detailed IFP development before they could be fully assessed.

8.6.2 When designing new procedures, Approved Procedure Designers (APDs) have to follow the International Civil Aviation Organisation (ICAO) rules used for designing instrument approach and departure routes, which are outlined in a document called PANS-OPS. The options developed at Stage 2 of the Airspace Change Process were indicative directions of procedures that have been developed only by applying the basic principles of PANS-OPS. This was considered proportionate at this stage of the ACP where there were many options initially developed in our comprehensive list and it would not have been feasible to design all of these to full PANS-OPS standards.

8.6.3 Following the successful completion of Stage 2B, we considered further the technical detail of the two options and their associated sub-set of missed approach options with regards to PANS-OPS. We also considered the requirements of the Irish Aviation Authority (IAA) to ensure that the primary protection area of a procedure is contained within Controlled Airspace. The outcomes of this technical analysis are outlined within the following diagrams which summarise the components of Airspace Option 1 and 2. Further details of the IFP assessment are provided within the Stage 3 Full Options Appraisal document.

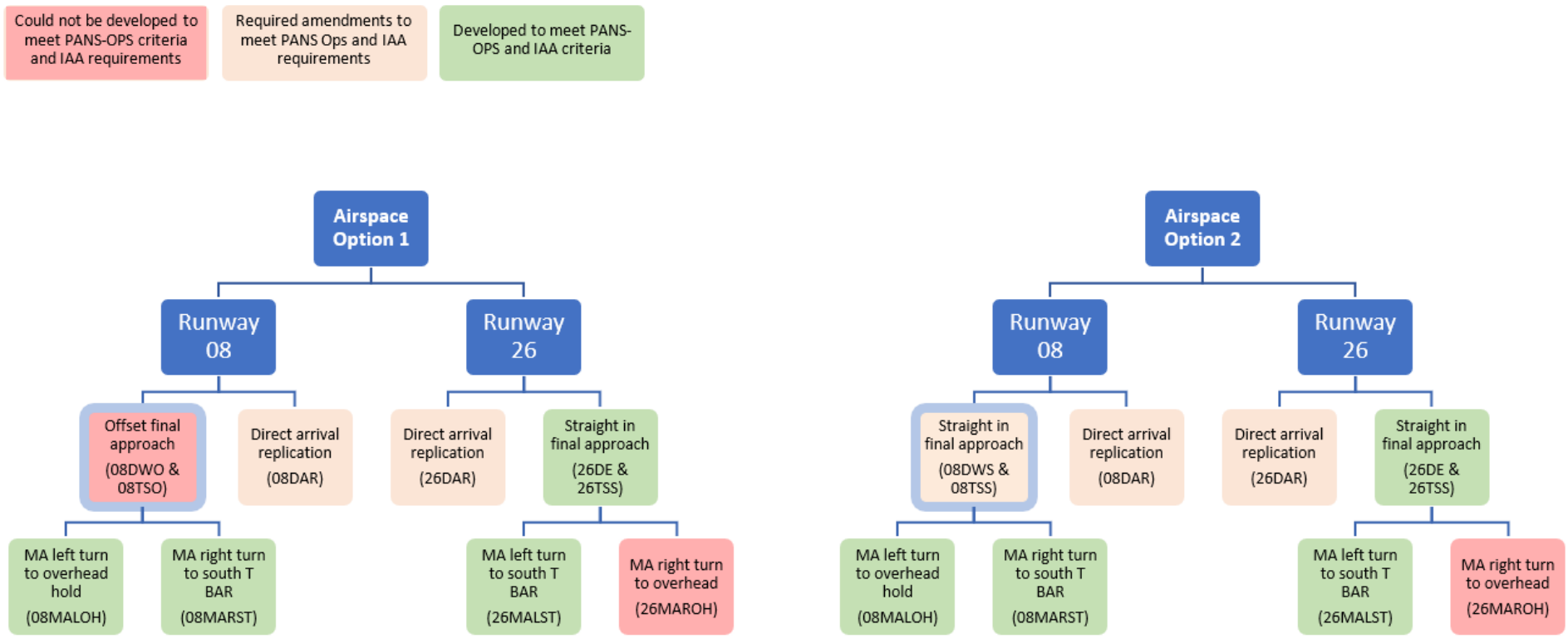

Figure 13 Stage 3A IFP Development

Approach angles greater than 3.0˚

8.6.4 At Stage 1B, an airspace Design Principle was developed that outlined 'Design options will investigate approach angles greater than 3.0˚, subject to Regulatory acceptance'. This was requested from stakeholders representing local gliding and microlight interests.

8.6.5 Based on precedent within the UK[9] we reviewed the possibility of increasing the approaches to 3.2˚ rather than the standard 3.0˚ approach angle. This results in a height difference of approximately 210ft when an aircraft is 10nm from touchdown between a 3.2˚ and a 3.0˚ approach.

8.6.6 We know from studies that there are some noise and environmental benefits when aircraft fly SSA however these benefits are very small and a large number of flights need to operate SSA in order for any the benefits to be materially realised.

8.6.7 In the case of the CoDA, a very low number of aircraft are anticipated to fly the RNP approaches. The estimates used within the appraisals are ambitious with an average 2-3 RNP approaches per day. Given that 78% of these flights will approach via runway 26 across the water, it results in less than one easterly arrival per day on average that could fly the slightly steeper approach angle. Any incremental noise advantages of this

[9] ACP-2017-49

would be so negligible that it is not considered beneficial compared against the costs that the project would incur in being able to demonstrate whether 3.2˚ approaches were operationally safe and acceptable.

8.6.8 Finally, due to the conventional 3.0˚ procedures remaining, there would also be no benefit to controlled airspace or airspace users under the final approach as other aircraft in Class G airspace would not be aware of which approach a particular aircraft was flying.

8.6.9 On balance, it was therefore concluded the possibility of increasing the approach angle from 3.0˚ would not be continued into Stage 3.

8.7 Full Options Appraisal

8.7.1 Following the IFP development and analysis, Airspace Change Option 2 was evolved into the main core proposal option that would be taken forward to the Full Options Appraisal alongside the three associated missed approach options:

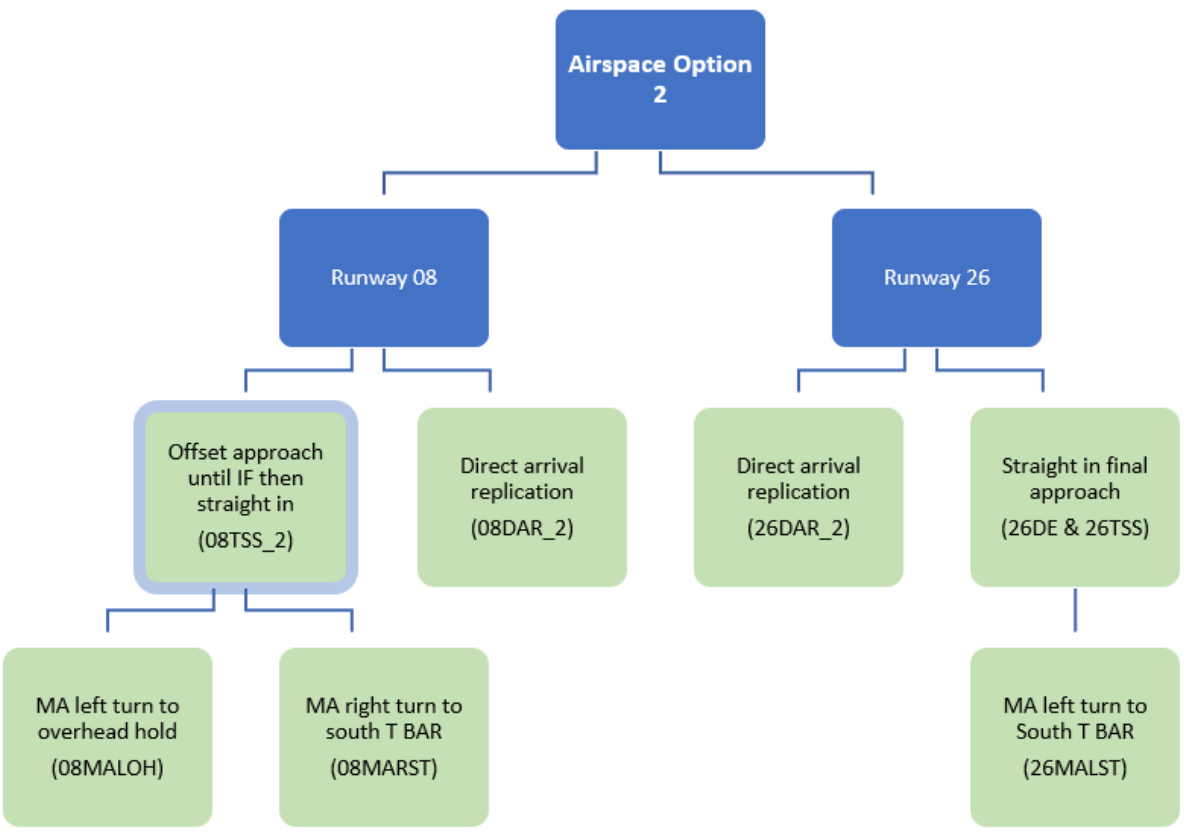

Figure 14 Core Proposal and Missed Approach Options progressed to the Full Options Appraisal

8.7.2 The Full Options Appraisal was a vigorous technical and environmental appraisal of the shortlisted options. Table 13 below shows the summary of the outcome of the Full Options Appraisal:

Table 13 Full Options Appraisal Summary

Group	Impact	Airspace Option 2	26 MA Option 1	08 MA Option 1	08 MA Option 2
Communities	Noise impact on health and quality of life	Minor impacts and benefits	Minor impacts and benefits	Minor impacts and benefits	Minor impacts and benefits
	Air Quality	Minor impacts and benefits	No impact	No impact	No impact
Wider Society	Greenhouse gas impact	Minor impacts and benefits	Minor benefits	Minor impacts or benefits	Minor benefits
	Capacity / resilience	Improves resilience	Improves resilience	Improves resilience	Improves resilience
	Tranquillity	No impact	Minor impacts	Minor benefits and impacts	Minor benefits
	Biodiversity	Minor impacts and benefits	No impact	No impact	Minor benefits and impacts
General Aviation	Access	No impact	No impact	No impact	Minor benefits
General Aviation/Commercial Airlines	Economic impact from increased effective capacity	No impact	No impact	No impact	No impact
	Fuel burn	Minor impacts and benefits	Minor benefits	Minor impacts or benefits	Minor benefits
Commercial airlines	Training costs	No costs	No costs	No costs	No costs
	Other costs	No costs	No costs	No costs	No costs
Airport / Air Navigation Service Provider	Infrastructure costs	No costs	No costs	No costs	No costs
	Operational costs	Ongoing maintenance of the new procedures estimated £4-10k every five years.			
	Deployment costs	Business as usual – no additional costs			
All	Safety	Improves safety	Minor benefits	No impact	Minor benefits

8.7.3 The Full Options Appraisal demonstrated that Airspace Option 2 met the aims of the ACP which are to:

- Design PBN approaches and arrival procedures to replicate the existing routes which would result in little or no noticeable change to stakeholders,
- Provide a contingency for the existing ground based navigational aid infrastructure, and
- Meet the governments Airspace Modernisation Strategy (AMS).

8.7.4 The Full Options Appraisal therefore concluded to proceed with our proposal to implement Airspace Option 2 at CoDA (to be operated alongside the existing conventional approaches), and this was our preferred option for this ACP.

8.7.5 The analysis of the Missed approach sub options showed that there are only very marginal differences between the options and they too meet the overall aims of the ACP. The preferred missed approach options were:

- 26 Missed Approach Option 1 as the full options appraisal demonstrated that there are no significant impacts to stakeholders and when combined with the runway 26 approach that forms part of Airspace Option 2, this improves resilience at CoDA.
- 08 Missed Approach Option 2 however due to operational considerations we noted that Option 1 may be more suitable, and we added that we would be guided by the outcome of the consultation together with IFP Validation activity. Option 2 was our preferred due to the small benefits in safety and track mileage as outlined in the full options appraisal. When combined with the runway 08 approach that forms part of Airspace Option 2, this would also improve resilience at CoDA.

8.8 Consultation

8.8.1 At Stage 3C we then commenced a consultation on our proposed airspace change options. The consultation was open to all stakeholders previously engaged, as well as the wider public. It was promoted on the airport website, social media platforms and through adverts in local newspapers.

8.8.2 As part of the consultation, we asked Stakeholders four main questions, as outlined in table 14 below:

Table 14 Stage 3 Consultation Questions

Stage 3 Option Name	Stage 3 Consultation Question
Airspace Option 2 (Our Core Proposal)	Do you have any concerns, or are there any further considerations we should take into account for Airspace Option 2?
26 MA Option 1	Do you have any concerns, or are there any further considerations we should take into account for runway 26 missed approach option 1?
08 MA Option 1	Our preferred Runway 08 missed approach is option 2 where the missed approach turns to the right (the south). Do you agree with this? Please provide more details if required.
08 MA Option 2	Do you have any concerns, or are there any further considerations we should take into account for the runway 08 missed approach options?

8.8.3 We received 6 responses to the consultation, with respondents either broadly being in support of the proposals or confirming there would be no impact. We therefore concluded that none of the proposed options would require amendment following the consultation. For further information, please see our Stage 4A Consultation response document on the CAA's Airspace Change Portal.

8.9 Our final Airspace Change Options

8.9.1 As part of the preparation for this submission of the Airspace Change the Instrument Flight Procedures (IFPs), which have been refined as the proposals have matured, required a final detailed design and review before this Final Options Appraisal and regulatory submission.

8.9.2 When designing new procedures, Approved Procedure Designers (APDs) have to follow the International Civil Aviation Organisation (ICAO) rules used for designing instrument approach and departure routes, which are outlined in a document called PANS-OPS.

8.9.3 Following the consultation outcome, Airspace Option 2 (our core proposal), runway 26 missed approach option 1 and 08 missed approach option 2 all progressed to full IFP design and validation. A number of small changes were made to the final designs, and these are detailed in our Final Options Appraisal document.

8.9.4 The aeronautical charts for the procedures can be found in Appendix E. Alongside the charts, the below sections show the final procedures in a similar style to the images within our Stage 3 consultation document.

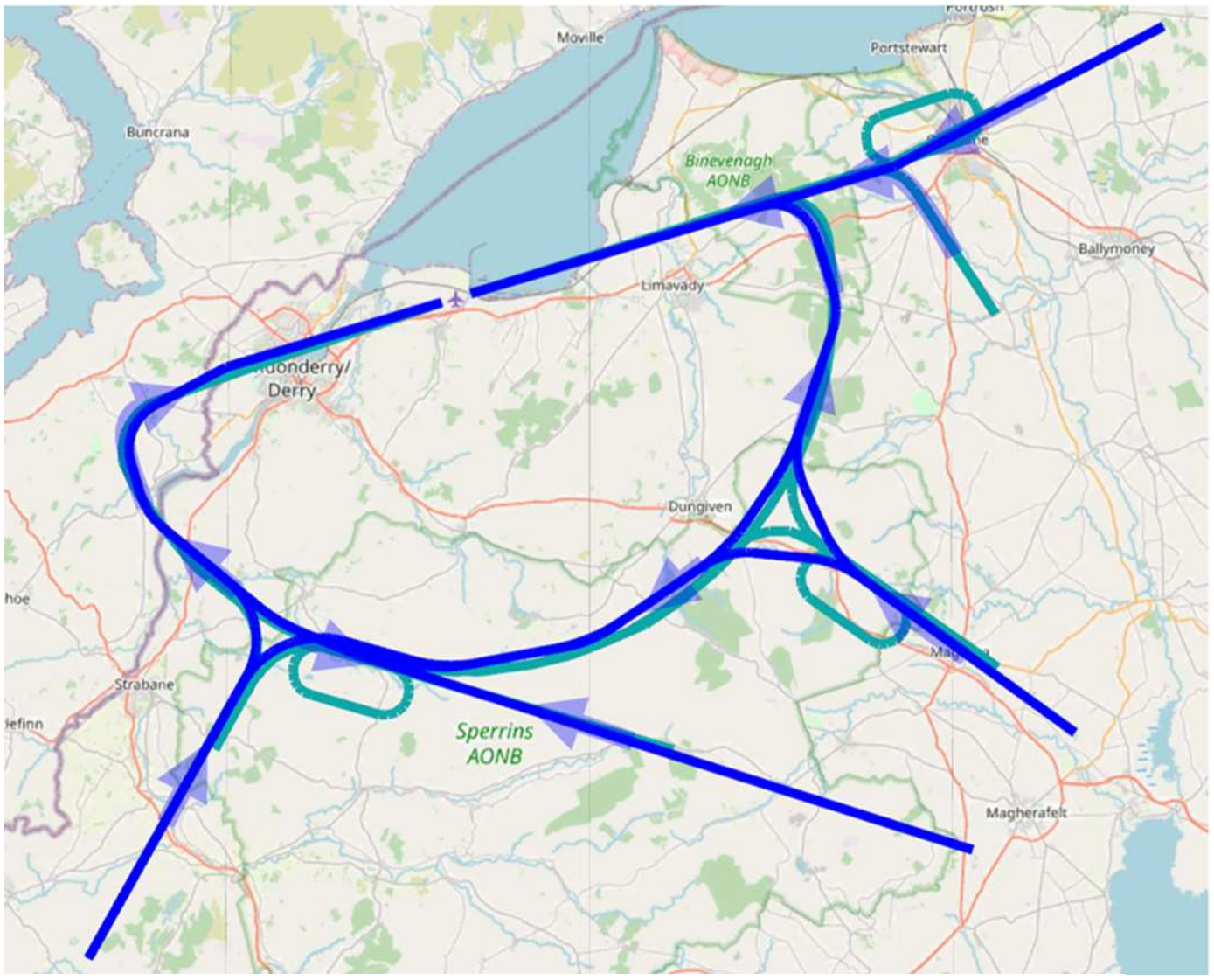

Figure 15 Our final core proposal. Blue: Our final proposal (25% of future operations) Green: Nominal tracks of existing procedures.

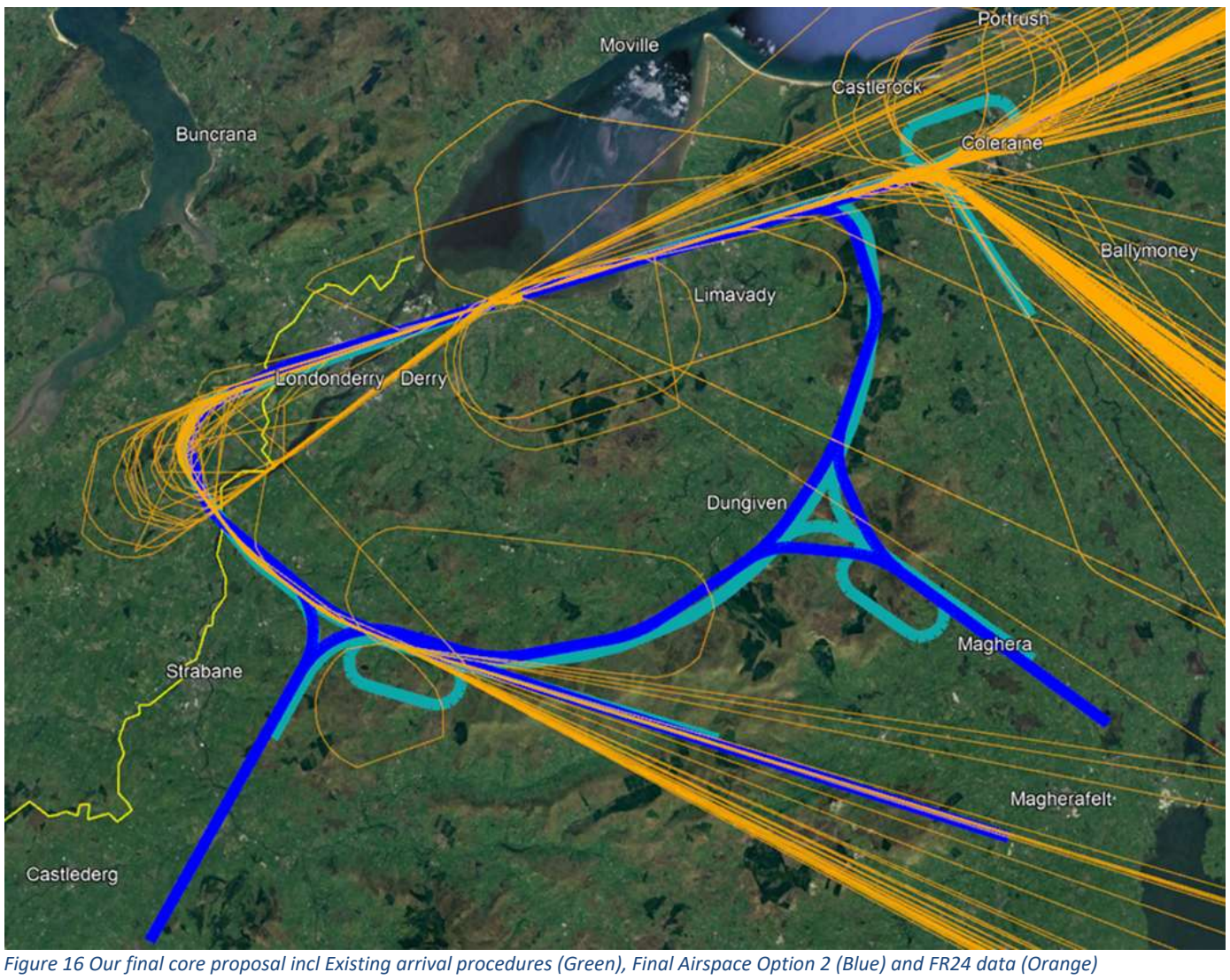

Figure 16 Our final core proposal incl Existing arrival procedures (Green), Final Airspace Option 2 (Blue) and FR24 data (Orange)

Runway 08 Missed Approach

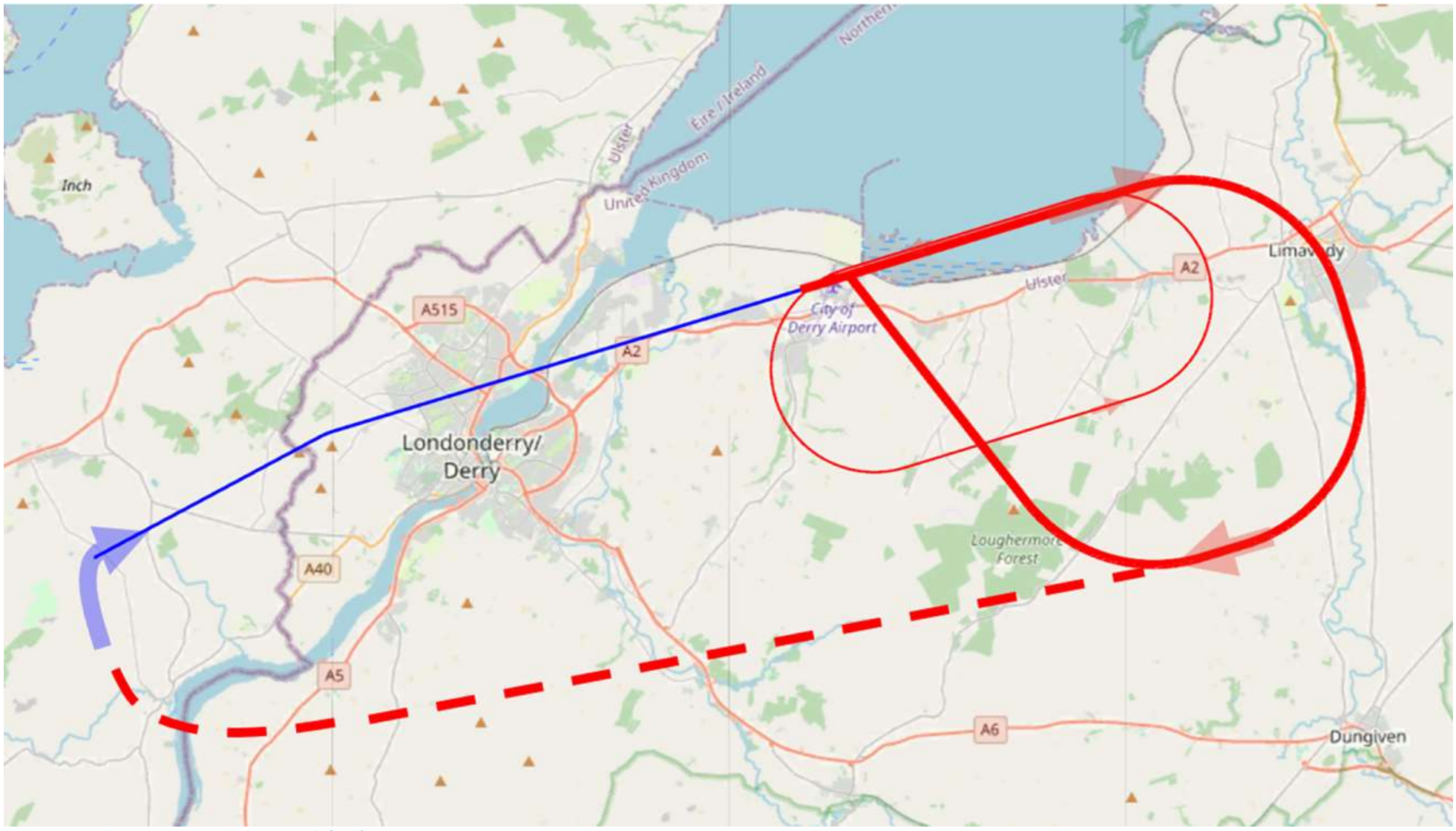

Figure 17 Final Runway 08 Missed Approach (Red)

Runway 26 Missed Approach

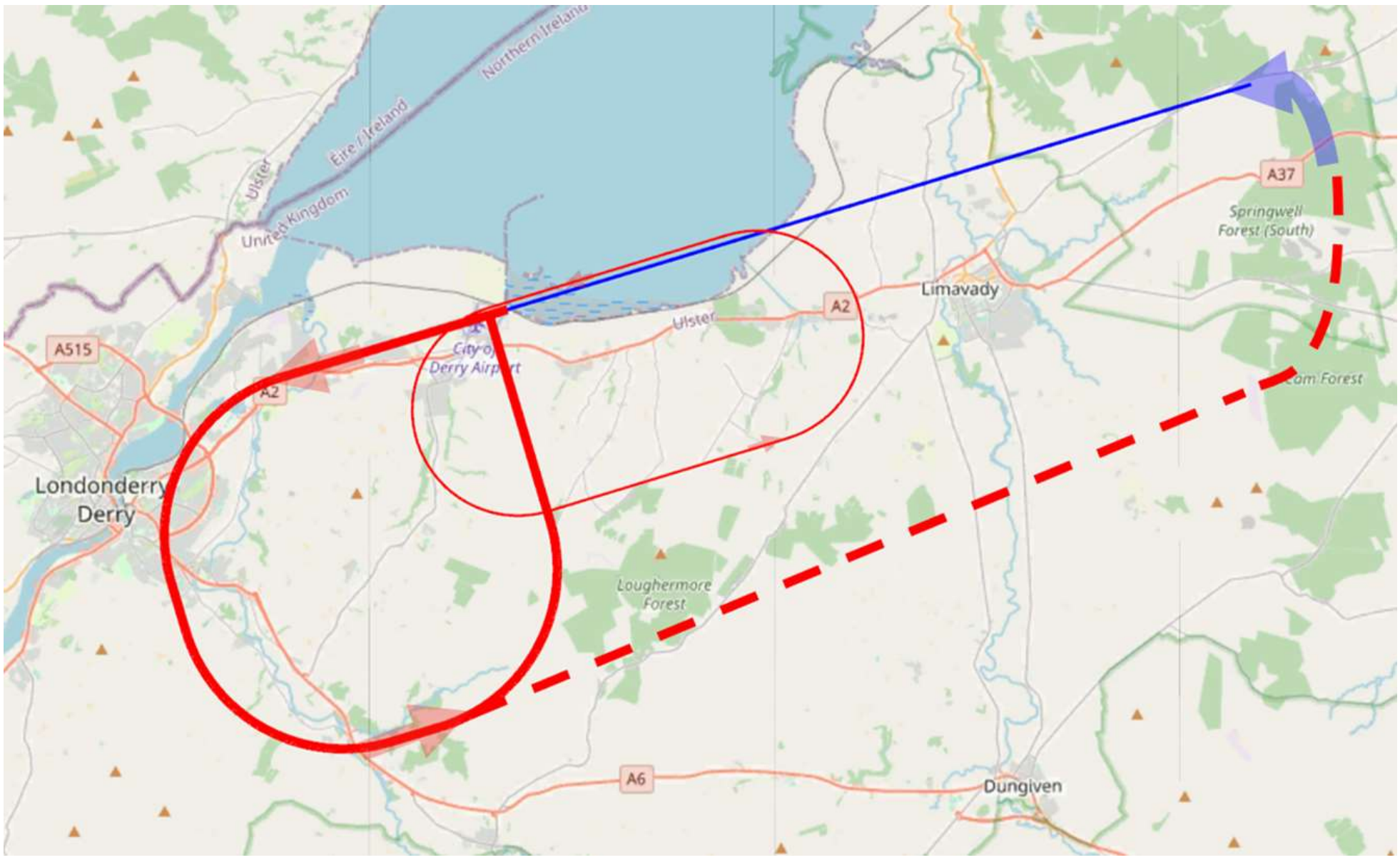

Figure 18 Final Runway 26 Missed Approach (Red)

How does our final design option perform against our design principles?

8.9.5 Table 15 shows how this final option performs against the Design Principles agreed at Stage 1B:

Table 15 Design Principle assessment of final design

#	Design Principle	Final Option DPE
1	The proposal must maintain a high level of safety for all airspace users	Our Final Options Appraisal has demonstrated that our final proposal is safe. Please see the safety section of the Final Options Appraisal, and Annex B of the is Airspace Change Submission for further information.
2	The proposal should avoid overflight of densely populated areas where possible[10]	Our Final Options Appraisal concluded that Airspace Option 2 will have no impact on population adversely affected by the impacts of aircraft noise. There will however be a very small change in distribution under the runway 08 final approach however any adverse impacts of this are so marginal that they will not lead to any significant effects. Please see our Final Options Appraisal for further details.
3	The proposal must be in accordance with the Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it[11]	This ACP supports CoDA in meeting the aims of the CAP1711 Airspace Modernisation Strategy (AMS) by introducing satellite based PBN procedures. The purpose of this ACP is to provide contingency procedures in the event of ground based navigational equipment failures, and the procedures aim to replicate the existing procedures operated today. The proposal has been developed in accordance with the AMS, however, to achieve the overall objective of quicker, cleaner and quieter journeys would require a change from today which is outside the scope of this ACP. The proposal does not conflict with the AMS and the Final Options Appraisal has demonstrated that there will be no significant impact to noise or track length.
4	The proposal should replicate the current tracks over the ground as much as possible, to avoid placing new flightpaths over areas not currently overflown	The final proposal largely replicates how aircraft arrive at CoDA today however due to PBN design criteria, there is a change to the runway 08 final approach of around 567m laterally at the furthest point. Our final options appraisal demonstrated that this small change does not result in any significant adverse impacts to noise. For more information, please see our Final Options Appraisal document. Based on ATC, airline stakeholder feedback, and PBN design criteria, the proposed runway 08 and runway 26 missed approaches turn differently to today. These missed approaches are expected to be operated 35 times per year by 2032. Our Final Options Appraisal demonstrated that there would be no significant impact on noise as a result of these missed approach options.
5	Minimise impact on other airspace users and limit any requirement for additional Controlled Airspace (CAS)	The final proposals largely replicate current day and the final options appraisal has demonstrated that there will be no adverse impacts to other airspace users. The proposed runway 08 missed approach will provide a marginal benefit to other airspace users however it's important to note that it is estimated to be operated around 9 times per year by 2032. No new CAS is required as part of this ACP.
6	Improve operational efficiency and resilience	Our Final Options Appraisal has demonstrated that the final proposals improve resilience at CoDA
7	Design options will investigate approach angles greater than 3.0˚, subject to Regulatory acceptance	Slightly steeper approach angles were investigated as part of this ACP however were discounted. For further information, please see section 8.6 of this document.
8	Options should not increase and should aim to reduce the CO2 emissions of aircraft operating at CoDA.	Our Final Options Appraisal has demonstrated that there will be no material changes to track length and fuel burn and therefore there is no significant impact to carbon emissions.

Doesn't meet the Design Principle	Partially meets the Design Principle	Meets the Design Principle

[10]This is in line with the government's policy to limit and, where possible, reduce the number of people in the UK adversely affected by aircraft noise and the impacts on health and quality of life associated with it.

[11] This design principle is mandated by the CAA

9. Airspace description requirements

9.1.1 CAP1616 requires the airspace change sponsor to complete the following proforma table regarding the airspace description requirements.

	The proposal should provide a full description of the proposed change including the following:	Description for this proposal
a	The type of route or structure; for example, airway, UAR, Conditional Route, Advisory Route, CTR, SIDs/STARs, holding patterns, etc.	This ACP proposes to implement: - RWY08 & RWY26 RNP Approach procedures - RWY08 & RWY26 RNP1 STARs See Annex D for AIP entry for AIRAC publication and Annex E for Procedure Design Information and coding.
b	The hours of operation of the airspace and any seasonal variations.	n/a – hours of operation will continue as per current day (see EGAE eAIP) and this ACP does not propose to make any changes to the hours of airspace operation.
c	Interaction with domestic and international en-route structures, TMAs or CTAs with an explanation of how connectivity is to be achieved. Connectivity to aerodromes not connected to CAS should be covered.	This proposal does not seek to make any changes to airspace structures. The proposed PBN procedures aim to replicate current day and connectivity will be achieved as it is today for arrivals to CoDA.
d	Airspace buffer requirements (if any). Where applicable describe how the CAA policy statement on 'Special Use Airspace – Safety Buffer Policy for Airspace Design Purposes' has been applied.	This proposal does not seek to make any changes to airspace structures. The Irish Aviation Authority (IAA), requires the primary protection areas of Instrument Flight Procedures (IFPs) to be safely contained within CAS. The proposed procedures that form part of this ACP, that are within or partially within the Irish FIR, are safely contained within the existing CAS and there is no requirement for additional CAS. The UK CAA does not have such a requirement.
e	Supporting information on traffic data including statistics and forecasts for the various categories of aircraft movements (passenger, freight, test and training, aero club, other) and terminal passenger numbers.	This ACP does not propose to make any changes to capacity or the number of aircraft arriving at CoDA. Please see the Final Options Appraisal for further information on traffic data.
f	Analysis of the impact of the traffic mix on complexity and workload of operations.	This proposal does not change the traffic mix of arriving aircraft at CoDA.
g	Evidence of relevant draft Letters of Agreement, including any arising out of consultation and/or airspace management requirements.	Updated draft LoAs are shown in Annex C
h	Evidence that the airspace design is compliant with ICAO Standards and Recommended Practices (SARPs) and any other UK policy or filed differences, and UK policy on the Flexible Use of Airspace (or evidence of mitigation where it is not).	All procedures have been designed by an APDO to meet PBN design criteria as per ICAO Document 8168, CAP 785 and UK AIP GEN 1.7 requirements. See Annex E for Procedure Design Information and coding.
i	The proposed airspace classification with justification for that classification.	This proposal does not seek to make any changes to airspace structures.
j	Demonstration of commitment to provide airspace users equitable access to the airspace as per the classification and where necessary indicate resources to be applied or a commitment to provide them in line with forecast traffic growth. 'Management by exclusion' would not be acceptable.	This proposal does not seek to make any changes to airspace structures or existing access arrangements. Annex C shows a draft updated LoA between CoDA and the local gliding club.
k	Details and justification for any delegation of ATS.	n/a

10. Safety assessment

10.1.1 The implementation of PBN RNP approaches will be new to CoDA, however the approaches have been designed to replicate the current conventional procedures as closely as possible and will be operated alongside the existing ILS and NDB approaches. However there are differences between the existing conventional Missed Approaches and the proposed RNP Missed Approaches.

10.1.2 The existing Missed Approaches both turn to the North of the airfield and back to the overhead (EGT) hold. RWY 26 turns immediate right at 600ft whereas RWY08 turns left at 2500ft. The conventional IAPs start at the EGT therefore commencing another approach from the overhead to both runways is catered for in the reversal base turns.

10.1.3 Taking each runway in turn, the reasons that the RNP Missed Approaches turn to the South of the airfield are:

RWY26

10.1.4 In a PBN design, if we wanted the Missed Approaches to turn right at 600ft (or the lowest altitude obstacles/terrain allow) we could have a CA direct back to EGT. However, in order to ensure that the aircraft always turns right in all wind conditions, we would have to design in a WP to the North to ensure the turn. This would force the initial part of the Missed Approach further west and the primary protected area would not be contained within CAS in the Shannon FIR as per the IAA requirement.

10.1.5 Pilots have long complained to CoDA that they don't like the immediate right turn in such a critical and high workload phase of flight and have requested a longer straight ahead portion. Again, CAS then becomes an issue.

10.1.6 There is a constant stream of planning applications for wind turbines on the high ground to the North. CoDA would like to future proof the RNP APCH from future applications to reduce impacts on their IFPs and to facilitate, not hinder, Wind Farm development.

10.1.7 There are no STARs or T-BARS from the North by which to re-commence another approach. These options were discounted during the ACP. Therefore with a right turn, all Missed Approaches would be required to fly back to the overhead and cross over the airfield to commence an approach from the South. In the event of flying back to the EGT and wanting to commence another approach, they would have to fly to the South anyway, whereas the existing conventional IAPs commence from the overhead itself.

10.1.8 By turning South with the Missed Approach:

- Aircraft that don't need to hold at the EGT can be very simply directed to NUFRO on the STAR to commence another approach from BEHUG. The majority of Missed Approaches do not need to hold before commencing another approach,
- The Missed Approach Primary protection Areas can be contained within existing CAS,
- Pilots can climb straight ahead for longer, as requested, and the primary protected areas can be contained within existing CAS,
- The design can guarantee a left turn ensuring predictability and planning by ATC,
- The impact of developments to the North of the aerodrome on the RNP APCHs and vice-versa can be minimised.

10.1.9 Following a Missed RNP Approach where holding at EGT is required, aircraft need to be able to position back for another approach in the event of ILS unserviceability. For this scenario, ATC propose to instruct aircraft to route to IFWON on the STAR as to route direct to NUFRU from EGT would be too acute an angle.

RWY08

10.1.10 The issue of CAS containment and Wind Turbine developments to the North are not an issue for the Runway 08 Missed Approach. However, today most Missed Approaches reach 2500ft very soon after the DER due to most Missed Approaches being initiated before the MAPt combined with high rates of climb so they do not routinely track as far East as the existing ILS chart suggests before turn left back to the EGT hold.

10.1.11 There is regular gliding activity from Bellarena Gliding Site with activity largely condensed to the ENE of the aerodrome. For the reasons articulated above, to design a PBN Missed Approach with a guaranteed left turn would force all Missed Approaches to track much further east than today and into the Class G airspace busy with Gliding Activity.

10.1.12 As pointed out to us in our Stage 2 stakeholder engagement and also in our Stage 3 consultation, implementing a design which puts CoDA's RNP Missed Approach traffic into the area of Class G airspace known to have busy gliding operations is considered to generate a safety risk.

10.1.13 By turning South with the Missed Approach:

- Aircraft that don't need to hold at the EGT can be very simply directed to MUTZU on the STAR to commence another approach from UPFEB. The majority of Missed Approaches do not need to hold before commencing another approach

- The design can guarantee a right turn away from the area of known Gliding Activity ensuring predictability and planning by ATC.

10.1.14 Following a Missed RNP Approach where holding at EGT is required, aircraft need to be able to position back for another approach in the event of ILS unserviceability. For this scenario, ATC propose to instruct aircraft to route to IFHIM on the STAR as to route direct to MUTZU from EGT would be too acute an angle.

10.1.15 Our proposed option is for both the RNP Missed Approaches to turn to the South as it maintains a standard 'Missed Approach to the South' for RNP operations on both runway ends which are most likely to be frequently utilised when the ILS is not available. Therefore a mixture of left and right Conventional/PBN approaches would be a relatively rare occurrence. The differences between the Conventional and RNP Missed Approaches is addressed in CoDA's ACP Safety Assessment and Training Plan as part of the ACP submission.

10.1.16 These various options for the Missed Approaches were consulted on in Stage 3 and Stakeholder feedback supported the Sponsor's preferred option of Missed Approaches to the South.

10.1.17 Implementation of RNP Approach procedures can be expected to enhance safety in the event of ILS unserviceability where operators would otherwise be reliant on Non-Precision Approaches (NPA). PBN approaches are widely claimed to enhance safety over NPAs by reducing the risk of Controlled Flight Into Terrain (CFIT).

10.1.18 CoDA Operations Ltd have conducted a risk analysis session which reviewed all of the proposed procedures in order to generate the draft safety case detailed in Annex B.

10.1.19 The draft safety case has been developed in accordance with CAP760 Guidance on the Conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases: For Aerodrome Operators and Air Traffic Service Providers. The safety management activities described in the safety case document have been carried out in accordance with the procedures and guidance contained in the City of Derry Airport ATS Safety Management System (SMS).

10.1.20 The draft safety case provides the argument to show that the risks associated with the introduction of the RNP1 STARs and RNP LNAV and LNAV/VNAV approaches to Runways 08 and 26 at City of Derry Airport have been reduced to a level that is acceptable to both the airport and the regulatory authority.

10.1.21 Following the regulatory decision on this ACP, together with IFP validation activity, CoDA will work with our CAA ATS Inspector to refine and finalise the Safety Case documentation, training plan and MATS 2 Instructions.

11. Operational impact

11.1.1 CAP1616 requires the airspace change sponsor to complete the following proforma table regarding the operational impacts.

	An analysis of the impact of the change on all airspace users, airfields and traffic levels must be provided, and include an outline concept of operations within the new airspace will be managed. Specifically, consideration should be given to:	**Evidence of compliance/ proposed mitigation**
a	Impact on IFR general air traffic and operational air traffic on VFR General Aviation (GA) traffic flow in or through the area.	There is no expected impact. The proposed procedures aim to closely replicate current operations. No changes to CAS are proposed as part of this ACP. Engagement and consultation with local airspace users has not suggested there would be any impacts to operations with the Ulster Gliding Centre (located north-east of the aerodrome adjacent to the Runway 26 ILS centreline) being supportive of CoDA's proposal.
b	Impact on VFR operations (including VFR routes where applicable).	There is no expected impact, as above, the proposed procedures aim to closely replicate current operations. No changes to CAS are proposed as part of this ACP. Engagement and consultation with local airspace users has not suggested there would be any impacts to operations with the Ulster Gliding Centre (located north-east of the aerodrome adjacent to the Runway 26 ILS centreline) being supportive of CoDA's proposal and preferred option.
c	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds.	This proposal does not seek to increase capacity at CoDA or result in greater traffic movements. The purpose of the ACP is to provide contingency arrangements via PBN procedures which replicate current day as closely as possible. CoDA ATC's MATS Part 2 will be updated with procedures for the operation of the RNP IFPs and the draft SI is available in Annex G.
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace.	Annex C details Letters of Agreement with local gliding sites. Local airspace operators have been engaged throughout the process and no impacts are expected.
e	Any flight planning restrictions and/or route requirements.	None expected. CoDA ATC will be the ANSP responsible for issuing any clearances for STARs and RNP APCHs, there is no anticipated change to the NATS en-route operation as a result of the new IFPs.

12. Supporting infrastructure/resources

12.1.1 CAP1616 requires the airspace change sponsor to complete the following proforma table regarding the supporting infrastructure and resources:

	General Requirements	Evidence of compliance/ proposed mitigation
A	Evidence to support RNAV and conventional navigation as appropriate with details of planned availability and contingency procedures.	The proposed PBN procedures will offer resilience to IFR arrivals at CoDA. They are an elective procedure and the majority of aircraft will continue to fly an ILS approach when arriving at CoDA. The proposed procedures are RNP relying solely on GNSS. In the event of GNSS outage, which would lead to the PBN approaches being unavailable the existing conventional approaches will continue to be available for aircraft.
B	Evidence to support primary and secondary surveillance radar (SSR) with details of planned availability and contingency procedures.	No change. CoDA does not have radar.
C	Evidence of communications infrastructure including R/T coverage, with availability and contingency procedures.	No change. DOC to remain at 25 NM/10000 FT with the STARs commencing from a 25nm range. ATS/ATM contingency procedures: Following a RAIM alert notified to ATC by pilots, ATC will offer an alternative conventional approach, if available, to aircrew. Controllers will notify subsequent aircrews of the RAIM alert specifying, where known, applicability in terms of type of operation, location, geographical boundaries and times.
D	The effects of failure of equipment, procedures and/or personnel with respect to the overall management of the airspace must be considered.	Existing contingencies and SMS procedures in place; no change from current day.
E	Effective responses to the failure modes that will enable the functions associated with airspace to be carried out including details of navigation aid coverage, unit personnel levels, separation standards and the design of the airspace in respect of existing international standards or guidance material.	No change.
f	A clear statement on SSR code assignment requirements.	No change; CoDA does not have radar facilities.
g	Evidence of sufficient numbers of suitably qualified staff required to provide air traffic services following the implementation of a change.	No change to ATS provision. Specific ATC training will take place prior to the planned implementation date. Annex A details the draft ATC training plan for the proposed procedures and Annex G details the draft MATS Part 2 supplementary instruction.

13. Airspace and infrastructure requirements

13.1.1 The change sponsor must complete the following proforma to demonstrate that the airspace change complies with the airspace infrastructure requirement set out in UK/European law and policy, ICAO standards and recommended practices, and Eurocontrol standards.

	General Requirements	Evidence of compliance/ proposed mitigation
a	The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and non-radar environments.	This proposal does not seek to make any changes to airspace structures. The PBN procedures aim to closely replicate the conventional procedures safely operated today. The Irish Aviation Authority (IAA), requires the primary protection areas of Instrument Flight Procedures (IFPs) to be safely contained within CAS. The proposed procedures that form part of this ACP, that are within or partially within the Irish FIR, are wholly contained within the existing CAS and there is no requirement for additional CAS. The UK CAA does not have such a requirement.
b	Where an additional airspace structure is required for radar control purposes, the dimensions shall be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer. This safety buffer shall be in accordance with agreed parameters as set down in CAA policy statement 'Safety Buffer Policy for Airspace Design Purposes Segregated Airspace'. Describe how the safety buffer is applied, show how the safety buffer is portrayed to the relevant parties, and provide the required agreements between the relevant ANSPs/ airspace users detailing procedures on how the airspace will be used. This may be in the form of Letters of Agreement with the appropriate level of diagrammatic explanatory detail.	n/a. CoDA does not have radar facilities.
c	The Air Traffic Management system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures.	Annex G details the draft MATS Part 2 supplementary instruction.
d	Air traffic control procedures are to ensure required separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures.	No changes to airspace structure proposed.

e	Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable.	There are no changes to existing airspace structure or access arrangements.
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation.	There are no changes to existing Controlled Airspace structure and classifications. Promulgation of the proposed procedures will take place via the normal AIRAC cycle.
g	Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified.	The proposed PBN procedures are intended to offer contingency for the existing conventional approaches. In the event of loss of GNSS, the pilot will be notified by onboard equipment on the aircraft. Aircraft crews undertaken an assessment of RAIM outages as part of the preflight planning requirements. The existing conventional ILS and NDB procedures will be available in the event of an unplanned GNSS outage.
h	The notification of the implementation of new airspace structures or withdrawal of redundant airspace structures shall be adequate to allow interested parties sufficient time to comply with user requirements. This is normally done through the AIRAC cycle.	The AIP will be updated with the new procedures via AIRAC cycle (Planned for AIRAC 12/2022) (Procedure charts are shown in Annex E).
i	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace.	No change from current day. The proposed procedures aim to replicate the current arrival procedures at CoDA.
j	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered.	This ACP does not propose to make any changes to the airspace structure. The proposed PBN procedures aim to provide contingency arrangements and closely replicate the conventional procedures operated safely today.
k	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests.	This ACP does not propose to make any changes to the airspace structure. The proposed PBN procedures aim to provide contingency arrangements and closely replicate the conventional procedures operated safely alongside other aviation activity today. Throughout the process, CoDA have engaged with local airspace users including: • The private airfield of Movenis to the east aerodrome, which operates parachute drop zones overhead Movenis and at Killykergan. • Ulster Gliding Club at Ballarena airfield to the north east of the aerodrome. Gliding activity often occurs to the south of Bellarena in the vicinity of the high ground at Binevenagh adjacent to the CoDA Runway 26 ILS centreline. Ulster Gliding Club have a contingency operating site at Benone Strand, 3nm East of the Bellarena site. • Causeway Airfield located 20nm east of CoDA, which operates microlight aircraft for private flying and training. The PBN procedures that form this Airspace Change Proposal aim to replicate current day, with no changes to forecast movements, capacity, or CAS. The new procedures are not expected to result in any changes or impact to aviation activity surrounding CoDA. The proposal for the Runway 08 PBN MAP to the south, which is a change from current day, offers benefit to local airspace users and enhance safety although this is only applies to an estimated 9 flights per year by 2032; further details are shown within the Final Options Appraisal. Draft LoAs, where required, can be found in Annex C.

	ATS route requirements	**Evidence of compliance/ proposed mitigation**
a	There must be sufficient accurate navigational guidance based on in-line VOR/DME or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/Eurocontrol standards.	There will be no change to ATS routes. New IFPs are all RNP relying solely of GNSS.
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task.	There will be no changes to existing ATS routes; the proposed PBN procedures replicate current day and aircraft will continue to arrive at CoDA through the existing ATS routes as they do today. There is no airways connectivity available to the STARs, this is the same as with the existing Direct Arrivals which are within Class G airspace.
c	All new routes should be designed to accommodate P-RNAV navigational requirements.	There will be no change to ATS routes. However the new IFPs have been designed to the RNP PBN specification.

	Terminal airspace requirements	**Evidence of compliance/ proposed mitigation**
a	The airspace structure shall be of sufficient dimensions to contain appropriate procedures, holding patterns and their associated protected areas.	This proposal does not seek to make any changes to airspace structures. The PBN procedures aim to closely replicate the conventional procedures safely operated today. The Irish Aviation Authority (IAA), requires the primary protection areas of Instrument Flight Procedures (IFPs) to be safely contained within CAS. The proposed procedures that form part of this ACP that are within or partially within the Irish FIR, are wholly contained within the existing CAS and there is no requirement for additional CAS. The UK CAA does not have such a requirement.
b	There shall be effective integration of departure and arrival routes associated with the airspace structure and linking to designated runways and published instrument approach procedures (IAPs).	No change. This proposal aims to introduce PBN contingency procedures that replicate the existing conventional arrival procedures; aircraft will continue to integrate as they do today. There is no airways connectivity available to the STARs, this is the same as with the existing Direct Arrivals which are within Class G airspace. However the STARs link to the proposed RNP APCH IAPs. CoDA does not have defined departure routes.

c	Where possible, there shall be suitable linking routes between the proposed terminal airspace and existing en-route airspace structure.	No terminal airspace is proposed.
d	The airspace structure shall be designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace.	All CoDA IFPs designed in accordance with PANS OPS 8168 using aerodrome survey data. Please see Annex E Procedure Design information for further details.
e	Suitable arrangements for the control of all classes of aircraft (including transits) operating within or adjacent to the airspace in question, in all meteorological conditions and under all flight rules, shall be in place or will be put into effect by the change sponsor upon implementation of the change in question (if these do not already exist).	This ACP does not propose to make any changes to existing CAS arrangements or ATS routes. The arrangements currently at CoDA will continue to be in place. Annex C contains further information around LoAs between CoDA and local operators.
f	The change sponsor shall ensure that sufficient visual reference points are established within or adjacent to the subject airspace to facilitate the effective integration of VFR arrivals, departures and transits of the airspace with IFR traffic.	This ACP does not propose to make any changes to existing VRPs.
g	There shall be suitable availability of radar control facilities.	No change; CoDA does not have radar facilities.
h	The change sponsor shall, upon implementation of any airspace change, devise the means of gathering (if these do not already exist) and of maintaining statistics on the number of aircraft transiting the airspace in question. Similarly, the change sponsor shall maintain records on the numbers of aircraft refused permission to transit the airspace in question, and the reasons why. The change sponsor should note that such records would enable ATS managers to plan staffing requirements necessary to effectively manage the airspace under their control.	n/a. This ACP does not propose to make any changes to controlled airspace. We do not expect an increase in movements as a result of this ACP, which aims to add resilience and replicate current procedures, and therefore do not expect any impacts to aircraft transits through the airspace. CoDA do track a/c movements for a/c arriving and departing from the airport and will continue to do so following ACP implementation.
i	All new procedures should, wherever possible, incorporate Continuous Descent Approach (CDA) profiles after aircraft leave the holding facility associated with that procedure.	The arrival procedures that form part of this ACP aim to replicate current day. The proposed STARs that replicate today's direct arrivals cater for all aircraft arriving at CoDA which can vary as much as an aircraft at FL100+ or a freecall at 3500ft, using 'at or above' waypoints. Subsequently there is no CDA built into the design however there is nothing that prevents an aircraft from flying a CDA approach if ATC can accommodate this. The design of the STARs using an 'at or above' altitude is subject to regulatory approval. Following regulatory review, if hard altitudes are required, then the STARs will be amended to change the altitude constraints to reflect a 4% CDA. Please see Annex E Procedure Design and Information for further details.

	Off-route airspace requirements	**Evidence of compliance/ proposed mitigation**
a	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered.	There will be no changes to the existing airspace structure. Updated draft LoAs are detailed in Annex C. *Within the Shannon FIR the responsibility for the provision of ATS in accordance with the airspace classification has been delegated from Shannon ACC to Eglinton during the aerodrome opening hours and no changes to this delegation is required.*
b	Should there be any other aviation activity (military low flying, gliding, parachuting, microlight site etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests.	This ACP does not propose to make any changes to the airspace structure. The proposed PBN procedures aim to provide contingency arrangements and closely replicate the conventional procedures operated safely alongside other aviation activity today. Throughout the process, CoDA have engaged with local airspace users including: • The private airfield of Movenis to the east aerodrome, which operates parachute drop zones overhead Movenis and at Killykergan. • Ulster Gliding Club at Ballarena airfield to the north east of the aerodrome. Gliding activity often occurs to the south of Bellarena in the vicinity of the high ground at Binevenagh adjacent to the CoDA Runway 26 ILS centreline. Ulster Gliding Club have a contingency operating site at Benone Strand, 3nm East of the Bellarena site. • Causeway Airfield located 20nm east of CoDA, which operates microlight aircraft for private flying and training. • The Ministry of Defense (MOD) The PBN procedures that form this Airspace Change Proposal aim to replicate current day, with no changes to forecast movements, capacity, or CAS. The new procedures are not expected to result in any changes or impact to aviation activity surrounding CoDA. The proposal for the Runway 08 PBN MAP to the south, which is a change from current day, offers benefit to local airspace users and enhance safety although this is only applies to an estimated 9 flights per year by 2032; further details are shown within the Final Options Appraisal. Draft LoAs, where required, can be found in Annex C.

14. Environmental assessment

14.1.1 CAP1616 requires the change sponsor to complete the following proforma. The following table provides a summary of the conclusions made within our Final Options Appraisal.

	Theme	Content	Evidence of compliance/ proposed mitigation
a	WebTAG analysis	Output and conclusions of the analysis (if not already provided elsewhere in the proposal)	As part of the CAP1616 requirements, airspace change sponsors are required to undertake an assessment using WebTAG, the Department for Transport's appraisal guidance, for health impacts associated with noise, and potentially for other impacts, where possible. For aviation, WebTAG's main objective is to evaluate airspace changes where flight paths may change. With regards to noise, the webTAG workbook uses the annual value of the impact of a 1dB change in aircraft noise levels from 45 to 81 dB LAeq, 16hr and LAeq, 8hr to monetise the health impacts/benefits of an airspace change. The formulae and calculations that form this workbook are defined by the government. In the case of this CoDA ACP, where we are looking to replicate as closely as possible the existing routes, there is very little, almost immeasurable, difference between what happens today, and Airspace Option 2 and furthermore, as only 25% of flights would fly the PBN option, the majority of aircraft will continue to operate as they do today. The outcome of the L_{Aeq} 16hr and 8hr analysis has therefore shown that there are no changes in the number of dwellings or population within the L_{Aeq} contours between the baseline and our final proposal. It is therefore not possible to use WebTAG to monetise this Airspace Change. As part of larger airspace changes, where there are substantial differences between the options and current day, it is typical to also to provide Cost Benefit analysis of the options. This looks at other areas as well as noise which may be impacted. In the case of this CoDA ACP, where the procedures are replicated as closely as possible and a very small number of aircraft will use the PBN routes, any impacts or benefits are so marginal that it is not considered proportionate to try to quantify and monetise.
b	Assessment of noise impacts (Level 1/M1 proposals only)	Consideration of noise impacts, and where appropriate the related qualitative and/or quantitative analysis, including whether the anticipated noise impact meets the criteria for a proposal to be called-in by the Secretary of State (paragraph 5(c) of Direction 6 of the Air Navigation Directions 2017) If the change sponsor expects that there will be no noise impacts, the rationale must be explained	The proposed procedures largely replicate current day however the approach to runway 08 does vary slightly to enable an optimum OCA(H). The noise analysis of this demonstrated that there will be no impact to the L_{Aeq} 16hr or 8hr contours. As changes to population within the L_{Aeq} contours are primary measure of noise impact for ACPs, and there is no change, we can conclude that implementation of this option will not change the number of people adversely affected by the impacts from aircraft noise. The data from the L_{Aeq} metrics is also the main input into WebTAG, the Department for Transport's appraisal guidance for health impacts associated with noise, and therefore there is also no monetary difference between our final proposals and the 'do nothing' scenario. As part of our noise analysis we have also reviewed secondary metrics presented as overflight contours and N65 contours and data tables. Secondary metrics are those that are not being used to determine significant impacts but which are still able to convey noise effects. Our analysis of the N65 and overflight contours showed that the small change in approach to runway 08 would result in a change in the distribution of aircraft noise, however owing to the scale of the change and the number of aircraft expected to fly the runway 08 PBN approach, this would lead to very marginal adverse impacts. There will be no change in noise to the runway 26 approach, or either direct arrival as a result of implementing Airspace Option 2. In terms of the missed approaches, although the PBN approaches are a change from current day, our Final Options Appraisal explained that the options are anticipated to have some small benefits and negative impacts in terms of the populations exposed to noise when aircraft operate a missed approach however as this change only applies to approximately 35 flights per year by 2032, any marginal benefits or impacts are considered negligible. Our Final Options Appraisal therefore concluded that the proposals would have no impact on population adversely affected by the impacts of aircraft noise. There will however be a very small change in distribution under the runway 08 final approach however any negative impacts of this are so marginal that they will not lead to any significant effects.
c	Assessment of CO_2 emissions	Consideration of the impacts on CO_2 emissions, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no impact on CO_2 emissions impacts, the rationale must be explained	Our Final Options Appraisal greenhouse gas impact analysis has shown that there will be no material changes to track length and fuel burn as a result of the proposals and therefore there is no significant impact to carbon emissions. For further information, please see our Final Options Appraisal.
d	Assessment of local air quality (Level 1/M1 proposals only)	Consideration of the impacts on local air quality, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no impact on local air quality, the rationale must be explained	Our Final Options Appraisal demonstrated that there would be no significant impact to Air Quality due to the majority of the procedures replicating current day. The very small lateral change of the runway 08 approach may result in some impacts (both positive and negative) to pollutant concentrations however due to the number of aircraft expected to operate these approaches and the scale of the lateral change, these will be very small and will not lead to any significant effects.
e	Assessment of impacts upon tranquillity (Level 1/M1	Consideration of any impact upon tranquillity, notably on Areas of Outstanding Natural Beauty or National Parks, and where appropriate the related	Our final proposal aims to replicate the existing conventional procedures as closely as possible. Westerly approaches onto runway 26 currently overfly Binevanagh AONB and as the PBN procedure replicates this, there will be no change to current day. Similarly, the direct arrival (STAR) element of

	proposals only)	qualitative and/or quantitative analysis If the change sponsor expects that there will be no tranquillity impacts, the rationale must be explained	the runway 08 arrival replicates current day and therefore there will be no changes in overflight to Sperrin AONB. The changes in overflight which occur as a result of the RNP approach into runway 08 lie outside of the Sperrin and Binevanagh AONB. Other than the 08 final approach, this option replicates current day and therefore aircraft will continue to fly over Sperrin and Binevenagh AONB, as they do today. Overall, our core proposal will not impact the number of movements, and will not change flight paths overflying AONBs, and therefore there is no impact anticipated on tranquillity. The change in runway 08 missed approach would remove overflight of Binevenagh and the runway 26 missed approach introduces some overflight to Binevenagh AONB however due to the very low number of flights per year (overall estimated at 35 missed approaches per year by 2032), there is no significant impact expected to tranquillity as a result of the missed approach options.
f	Operational diagrams	Any operational diagrams that have been used in the consultation to illustrate and aid understanding of environmental impacts must be provided	Please see the Final Options Appraisal and section 8.9 of this document.
g	Traffic forecasts	10-year traffic forecasts, from the anticipated date of implementation, must be provided (if not already provided elsewhere in the proposal)	Please see the Final Options Appraisal document.
h	Summary of environmental impacts and conclusions	A summary of all the environmental impacts detailed above plus the change sponsor's conclusions on those impacts	Please see the Final Options Appraisal document.

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