Design Principle Evaluation

CAP1616 Stage 2 Develop and Assess

MAG Manchester Airport

Document Details

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Table of Contents

1 Introduction

1.1 Background

The Manchester Airport (MAN) Airspace Change Proposal (ACP) is currently at Stage 2 – Develop and Assess - of the CAA's CAP1616 Airspace Design process. Step 2A requires the sponsor to develop a comprehensive list of design options that address the Statement of Need (SoN) and align with the design principles that were developed at Stage 1.

This **Design Principle Evaluation (DPE)** sets out MAN's response to that requirement, by presenting the assessment of the design options identified in the Design Options Report (DOR) against the design principles. This DPE forms part of the suite of documents submitted to the Civil Aviation Authority (CAA) at Gateway 2 of the CAP1616 process and is intended to be read alongside these documents.

The full suite of Stage 2 submission documents is:

- Stage 2 Summary Document, which draws together the key points from the Stage 2 submission and provides an overview of the Government's national programme of airspace change, the CAP1616 process and the progress to date of the Manchester Airport Future Airspace project. This information is not repeated in this report.
- Design Options Evolution (DOE), Appendix A to the Stage 2 Summary Document, shows the evolution of the design options through Steps 2A and 2B of the CAP1616 process. The resulting shortlist of design options will be considered in the Full Options Appraisal (FOA) at Stage 3.
- The Design Options Report (DOR), which sets out the change sponsor's approach to the design process and the output of that process in the form of design options for both departures and arrivals at the airport. It presents the design options identified and describes how those options were refined to provide a comprehensive list of design options to be progressed to the Design Principle Evaluation.
- This report, the Design Principle Evaluation (DPE), which assesses how the design options have responded to the design principles, which were established at Stage 1 of the CAP1616 process and identifies those that warrant further analysis at the next stage.
- Initial Options Appraisal (IOA), building on the results of the DPE, the IOA is the first iteration of three option appraisals, required as part of the CAP1616 process. The purpose of the IOA is to provide, at a minimum, a qualitative assessment of each design option providing stakeholders and the CAA with the relative differences between impacts, both positive and negative.
- The Stakeholder Engagement Report (SER), which explains how engagement has been used in the processes described in the other Stage 2 documents and records its outputs.

The full suite of reports, together with their supporting appendices, will be published on the CAA Airspace Change Portal www.airspacechange.caa.co.uk.

1.2 Step 2A

At Step 2A, a list of design options was developed which included options that challenged how we currently operate and sought to explore how we might improve our operations at MAN, taking into account the feedback received during the engagement with stakeholders when establishing our design principles at Stage 1. As part of this process, the options were tested with stakeholders, as detailed in the SER. As part of the options development process, the initial list of design options was assessed to identify options which did not perform well against the 'must have' design principles of Safety, Policy and Capacity.

The initial assessment is described in the DOR as the 'viability filter' and resulted in a Comprehensive List of viable options, which have been analysed further within this DPE. In addition, this DPE also re-iterates the analysis of the 'viable but poor fit' design options against the three 'must have' design principles that was conducted during the DOR phase. However, as described in Section 5 of the DOR, these design options were not progressed to the full DPE. It should be noted that the criteria that inform the colour coding associated with the 'viable but poor fit' options within the DOR are different to the criteria for the analysis of the options within the DPE. The criteria for 'viable but poor fit' have been described within section 5.14 of the DOR.

Sections 5 to 25 of this DPE describe how each of the design options have been individually assessed against the design principles and how the design options have responded to each of those design principles. During the stakeholder engagement undertaken as part of Stage 2, stakeholders provided feedback on the application of the design principles. In doing so, they emphasised the importance of considering certain features or areas, including areas of planned property developments. These have been taken into account in the criteria used to assess the design options against the design principles in this DPE. For full details on Stage 2 engagement please refer to the SER and accompanying appendices or Sections 12 and 17 of the Stage 2 Summary Document.

In assessing the design options, we have borne in mind that the options that are eventually chosen must also be compliant with the relevant technical criteria, as detailed in Appendix F to CAP1616. Sections 5 to 25 of this DPE also present an initial evaluation of how each design option responds to the technical criteria, identifying where plans will need to be established to resolve any compliance issues that may otherwise arise during Stage 4.

1.3 Purpose of the Design Principle Evaluation Process

The purpose of the DPE is to assess how the design options have responded to the design principles and identify those design options that warrant further analysis at the next step: the IOA at Step 2B. The DPE process also identifies design options that should be rejected at this stage due to a lack of alignment with the design principles; the process of evaluating the design principles, is detailed in Section 3. The evaluation assessment criteria and accept/reject criteria are detailed in Section 4.

1.4 List of Design Principles

The work undertaken during Stage 1 established a set of design principles. These design principles provide a framework against which design options have been evaluated. The list of design principles is shown in Table 1 below, while the Design Principles Report submitted to the CAA at the 'Define' Gateway can be found here Design Principles Report.

Design Principle Designation	Design Principle Description
S	**Safety** Our routes must be safe and must comply with industry standards and regulations.
P	**Policy** Any changes must accord with the Civil Aviation Authority's Airspace Modernisation Strategy. Any airspace change must also allow connection to the wider UK en route network and be aligned with the Future Airspace Strategy Implementation for the North programme and take into consideration the needs of other airports.
C	**Capacity** Our future airspace must enable best use of the capacity of our existing runways, in line with Government policy.
E	**Emissions** We will minimise and where possible, reduce emissions when we design routes. This may be achieved by selecting the most direct routes.
N1	**Noise 1** Our route designs should seek to minimise, and where possible, reduce the number of people affected by noise from our flights.
N2	**Noise 2** Where practical, noise effects should be shared. The use of dispersion and/or respite, especially at night, will be considered to achieve this.
N3	**Noise 3** Where practical, our route designs should avoid, or limit effects upon, noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education.
A	**Airspace** Our route designs should minimise the impacts on other airspace users by limiting Controlled Airspace (CAS).
T	**Technology** Our route designs should be based on the latest aircraft navigational technology widely available.

Table 1 - List of Agreed Design Principles

1.5 Manchester Current Operations

In order to follow both how the design options have been developed and evaluated it is necessary to have an understanding of the current operational arrangements at MAN. This section gives an overview of these arrangements.

MAN has two runways running from a north-easterly direction to a south-westerly direction. Runways 23L and 23R are used in westerly operations, and the reciprocal Runways 05L and 05R in easterly operations. It has a mixed fleet of passenger aircraft serving destinations around the globe. MAN also supports an air freight operation.

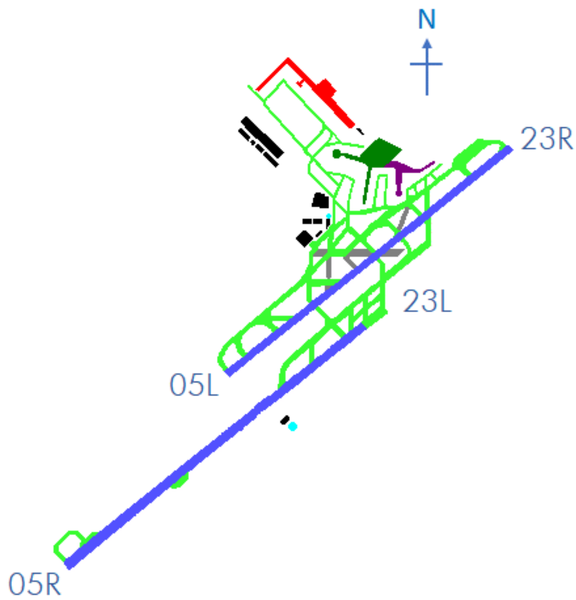


Figure 1: MAN runway orientation

The number of aircraft arrivals and departures in 2020 and 2021 was significantly affected by the pandemic with a greatly reduced number of movements, no dual runway operations, and a distorted mix of short/long-haul operations/destinations. The calendar year and summer of 2019 represent the last experience of (pre-pandemic) normal operations and has therefore been used as the most appropriate illustration of current operations.

The current operation at MAN can be summarised as follows:

- Runways 23R/05L are open 24 hours a day and both are certified for CATIIIB operations.
- The use of Runways 23L/05R is governed by a planning condition which allows their use between 06.00 to 22.00. They can only be used at night in cases of emergency or if there is planned maintenance which make Runways 23R/05L unavailable.
- Runway 23L has no ILS facility. Runway 05R has an ILS but is only certified for CATI operations.
- In practice, the use of Runways 23L/05R is driven by a mix of demand, weather, fire cover and ATC staffing.
- Winter operating hours for Runways 23L/05R are[1]:
  - Mon - Fri 06.30 to10.30 and 16.00 to 20.00,
  - Sat 06.30 to 10.30
  - Sun 16.00 to 20.00

[1] Hours of operation Winter 2022/23 (October 2022 to March 2023) as stated in Operational Advice Note 058/2022.

- Summer operating hours for Runways 23L/05R are[2]:
    - Mon - Fri 06.15 to 20.00
    - Sat 06.15 to 16.00
    - Sun 06.15 to 09.30 and 13.00 to 20.00.

- Westerly operations from Runways 23R/23L are predominant, and over the last 20 years the split between Runways 23R/23L and Runways 05L/05R operations has been approximately 80%/20%. When operating in dual runway mode there is a need for aircraft to cross an active runway. During easterly (Runways 05L/05R) operations this has limited impact, but during westerly (Runways 23R/23L) operations, the location of the crossing points for departures results in an adverse impact on arrival spacing.
- Instrument Flight Rules (IFR) departing traffic utilise Standard Instrument Departures (SIDs) but these are all based upon ground-based navaids, in particular the MCT DVOR. Departing aircraft are generally transferred to Prestwick Centre after passing 2,500ft, up to 5,000ft.
- Arrivals are routed towards one of three airborne holds, by NATS Prestwick Centre. Once transferred to MAN, aircraft are vectored by ATC onto final approach, normally for ILS or VOR/DME. One PBN arrival exists for Runway 23L.
- Below 7,000ft, management of the airspace relies heavily on Air Traffic Control (ATC) tactical intervention with very little systemisation employed.
- Continuous descent arrivals (CDA) are measured from 5,000ft (because of the base of the holding level, which is aligned to the transition altitude), but design of the arrival routes and the lack of systemised airspace means these cannot be consistently delivered. In financial year 2020, which was the last year of pre-pandemic traffic levels, 92% of arrivals achieved a CDA.

[2] Hours of operation Summer 2022 (April to September) as stated in Operational Advice Note 032/2022.

2 Comprehensive List of Viable Options

2.1 Procedure Options

In accordance with the SoN, MAN is seeking to modernise its airspace arrangements for aircraft operating to and from the Airport at altitudes of 7,000ft and below. The SoN can be found here Statement of Need.

MAN is considering new departure and arrival routes as part of a coordinated plan for airspace modernisation along with other airports in the north of England. This will ensure that the airport can make use of new technologies so that the operational efficiency and environmental benefits that modern aircraft offer can be realised. In doing so, the airport seeks to introduce optimised procedures that will integrate fully with other airports and the wider airspace system.

Currently, the airport relies on conventional ground-based Doppler Very High Frequency Omni Range Radio Beacons (DVOR) navigational aids that are reaching the end of their life. In accordance with international obligations to transfer to Performance Based Navigation (PBN), there is a UK wide plan for these aging navigational aids to be withdrawn. This plan also forms part of CAP1711 the UK Government Airspace Modernisation Strategy (AMS).

The current departure procedures use a system of navigational beacons or points, each with a unique name, such as EKLAD, ASMIM, LISTO or Pole Hill (POL). If new routes are introduced, some new navigational points will have to be established, and each will have a new name assigned, and these will not be associated with beacons.

Table 2 below contains a summary of the existing procedures in use at MAN, together with the list of options under assessment within this DPE.

NOTE: In some instances, the term "replication" is used. This refers to a route design that has been developed to match an existing route, which is already in use, as far as is practicable. This provides a 'do minimum' option, as described in further detail in Section 4.4 in the DOR. Most of the current route tracks can vary due to a number of factors including aircraft type, speed that the procedure is being flown, weather conditions and the type of Flight Management System (FMS) on board a given aircraft. Routes designed using satellite navigation are designed to a different set of criteria and are normally flown more consistently. As a result, it is impossible to exactly replicate a conventional procedure and its effects using a satellite-based procedure.

2.2 Design Options Development

Step 2A requires the sponsor to develop a comprehensive list of options that address the SoN and that align with the design principles that were developed at Stage 1. The DOR details the design process at MAN and lists the design options developed for both departures and arrivals.

As the sponsor of the ACP, MAN tested these options with the stakeholders that contributed to the development of the design principles. The engagement carried out during Step 2A is detailed in the SER.

A summary of the design options described in the DOR and assessed in this DPE is provided in Table 2, below. This sets out the number of options assessed for each of the design envelopes, along with a basic description of those options. The options presented below are those which were assessed as 'viable and good fit' or 'viable but poor fit' in the DOR.

Each design option has been built and described in the DOR as a matching 'pair' that covers both runways in that particular direction. For example, option 2 for westerly operations covers the routes from both Runway 23L and Runway 23R. This has been done to provide a common termination point at 7,000ft for each pair of route designs, which is a feature of all current SIDs. It has also been done to provide a clear and understandable set of options for stakeholders to review and comment upon.

However, because of the slightly different track taken by each option, the assessment of the designs within this DPE and the IOA has been conducted using the individual routes for each runway. This has allowed a more accurate evaluation of the routes to be undertaken.

Procedure	Number of Options	Basic Description
SID Runways 05L/05R North	7	These design options have been created for traffic routing to the north from Runway 05L and Runway 05R. The options are based around the existing POL 4S/1Z SID and after departure, the design options turn left and route north towards POL, terminating at 7,000ft.
SID Runways 05L/05R East	12	These design options are based around current operations where aircraft routing to the east via a DESIG departure are vectored off the SID by ATC once they are above 4,000ft. These options then take a more direct track to either join the network to reduce fuel burn, or to resolve interactions with other traffic.
SID Runways 05L/05R South Right Turn	11	These options have been created for traffic routing to the south from Runway 05L and Runway 05R. These design options align to current operational practice by ATC where aircraft are taken off the LISTO 2S/2Z SID above 4,000ft and vectored on a track that allows them to gain height and be safely and efficiently separated from MAN arriving aircraft.
SID Runways 05L/05R South Left Turn	8	These design options are all new design options. They have been created as options to create additional capacity and to provide options for noise respite in line with the Design Principle Noise N2 when operated in conjunction with the 05 South Right Turn design options.
SID Runways 05L/05R West	12	These design options are based on the ASMIM 1S/1Z SID which currently serves two purposes, one is for traffic to the west and the other is the south-west. The design options seek to align with current operational practice and bilateral discussions with LVP.

SID Runways 05L/05R South-west	11	These design options have been created in line with the design principles Policy and Emissions by creating a shorter route for flights to the south-west when compared to the current ASMIM 1S/1Z SID. As with the West design options, these design options seek to align with current operational practice and bilateral discussions with LVP.
SID Runways 23R/23L North	15	These design options have been created for traffic routing to the north from Runways 23R/23L and are based around the existing POL 5R/1Y SID. After departure, these design options turn right and route north towards POL, terminating at 7,000ft.
SID Runways 23R/23L East Right Turn	11	These design options have been created to align to current operational practice by ATC where aircraft are taken off the SONEX 1R/1Y SID above 4,000ft to provide a more direct and fuel-efficient track or to separate them safely and efficiently from MAN arriving aircraft from the north.
SID Runways 23R/23L East Left Turn	10	These design options have been created to provide additional capacity and as options for noise respite in line with the Design Principle Noise N2 when operated in conjunction with the 23 East Right Turn Design Envelope.
SID Runways 23R/23L South	17	These design options have been created for traffic routing to the south from Runways 23R/23L. The options are based around the existing LISTO 2R/2Y and SANBA 1R/1Y SIDs.
SID Runways 23R/23L South-west	23	These design options are based around the current KUXEM 1R/1Y, EKLAD 1R/1Y and MONTY 1R/1Y SIDs. These design options also seek to align with feedback received within Stage 2 engagement, including the ACOG facilitated collaborative design review with technical experts from LPL, MAN and NERL.

SID Runways 23R/23L West	15	These design options are new options based around current operations where aircraft routing to the west via an EKLAD departure are vectored off the SID once they are above 3,000ft. This takes them on a more direct track to the west towards the Wallasey DVOR (WAL) which is done to reduce fuel burn. These design options also seek to align with feedback received within Stage 2 engagement, including the ACOG facilitated collaborative design review with technical experts from LPL, MAN and NERL.
Transitions Runways 05L/05R North 3,000ft FAF	10	These design options have been created for traffic routing to the RNP approach for Runway 05L/05R. It covers the transitions from the IAF at 7,000ft and the design of the final approach using a 3,000ft FAF. In current operations for arrivals from the north, ATC radar vector aircraft onto the Final Approach from either the MIRSI or ROSUN holds and route traffic downwind to the north and west of the airfield to a base leg to the north of Northwich.
Transitions Runways 05L/05R North 2,500ft FAF	11	These design options have been created for traffic routing to the RNP approach for Runway 05L/05R. It covers the transitions from the IAF at 7,000ft and the design of the final approach using a 2,500ft FAF. In current operations for arrivals from the north, ATC radar vector aircraft onto the Final Approach from either the MIRSI or ROSUN holds and route traffic downwind to the north and west of the airfield to a base leg to the north of Northwich.
Transitions Runways 05L/05R South 3,000ft FAF	9	These design options have been created for traffic routing to the RNP approach for Runway 05L/05R. It covers the transitions from the IAF at 7,000ft and the design of the final approach using a 3,000ft FAF. In current operations for arrivals from the south, ATC radar vector aircraft from the DAYNE hold to a base leg position to the north of Crewe.
Transitions Runways 05L/05R South 2,500ft FAF	9	These design options have been created for traffic routing to the RNP approach for Runway 05L/05R. It covers the transitions from the IAF at 7,000ft and the design of the final approach using a 2,500ft FAF. In current operations for arrivals from the south, ATC radar vector aircraft

		from the DAYNE hold to a base leg position to the north of Crewe.
Transitions Runways 05L/05R South 2,000ft FAF	3	These design options have been created for traffic routing to the RNP approach for Runway 05L/05R. It covers the transitions from the IAF at 7,000ft and the design of the final approach using a 2,000ft FAF. In current operations for arrivals from the south, ATC radar vector aircraft from the DAYNE hold to a base leg position to the north of Crewe. These design options seek to align with feedback received within Stage 2 engagement, including the ACOG facilitated collaborative design review with technical experts from LPL, MAN and NERL.
Transitions Runways 23R/23L North 3,500ft FAF	12	These design options have been created for traffic routing to the RNP approach for Runways 23R/23L. It covers transitions from the IAF at 7,000ft and the design of the final approach using a 3,500ft FAF. In current operations for arrivals from the north, ATC radar vector aircraft onto the Final Approach from either the MIRSI or ROSUN holds, and typically route aircraft downwind to the north and east of the city centre of Manchester to a base leg in the vicinity of Mossley.
Transitions Runways 23R/23L North 3,000ft FAF	12	These design options have been created for traffic routing to the RNP approach for Runways 23R/23L. It covers transitions from the IAF at 7,000ft and the design of the final approach using a 3,000ft FAF. In current operations for arrivals from the north, ATC radar vector aircraft onto the Final Approach from either the MIRSI or ROSUN holds, and typically route aircraft downwind to the north and east of the city centre of Manchester to a base leg in the vicinity of Mossley.
Transitions Runways 23R/23L South 3,500ft FAF	8	These design options have been created for traffic routing to the RNP approach for Runways 05L/05R. It covers transitions from the IAF at 7,000ft and the design of the final approach using a 3,500ft FAF. In current operations for arrivals from the south, ATC radar vector aircraft from the DAYNE hold and route to the east of

		Macclesfield to a base leg in the vicinity of Glossop.
Transitions Runways 23R/23L South 3,000ft FAF	7	These design options have been created for traffic routing to the RNP approach for Runways 05L/05R. It covers transitions from the IAF at 7,000ft and the design of the final approach using a 3,000ft FAF. In current operations for arrivals from the south, ATC radar vector aircraft from the DAYNE hold and route to the east of Macclesfield to a base leg in the vicinity of Glossop.

Table 2 – Summary of Existing Procedures and Numbers of Options Being Considered

3 Design Principle Evaluation

3.1 Evaluation of the Options against the Design Principles

Each option has been assessed against the list of design principles shown in Table 1 in Section 1.4 above.

The design principles have been examined to identify a process of evaluating each design option against a set of criteria which assesses the option's alignment with the design principles. The resulting evaluation matrices are shown below together with a full description of how the routes have been measured against the design principle. Where it has not been possible to fully evaluate each option at this stage, we have made this clear within the assessment. As described in further detail in section 30 Next Steps, of this DPE, further analysis will be undertaken if required.

Sections 4.4 to 4.12 below give an overview of the evaluation carried out for each design principle. Each table relates to a single design principle and shows a summary of the analysis conducted for each option against that design principle, together with a high-level assessment of whether the design principle is either not met, partially met, or fully met, as follows:

- A green box indicates that the design principle has been **met** by the specified option.
- An orange box means that the design principle has been **partially met** by the specified option.
- A red box indicates that the design principle has **not been met** by the specified option.
- Further detail on the criteria for the evaluation of each option is shown within sections 5 and 25. What constitutes 'not met', 'partially met' and 'fully met' for each design principle is explained in turn in relation to that principle. Sections 5 to then provide an analysis of each option against those criteria.

3.2 Description of Do Nothing and Do Minimum

The CAP1616 process requires a 'do nothing' scenario to be considered and, as is the case for MAN, where 'do nothing' is not a feasible option a 'do minimum' scenario too.

The 'do nothing' scenario is then used as the baseline for comparison in the Options Appraisals, including the IOA. The 'do minimum' option(s) describe the minimum changes required to address the issues identified in the SoN and are listed as design options for assessment in this DPE. As the 'do nothing' scenario fails to comply with the requirements of the AMS and does not align with the 'must have' design principles, it was not assessed as an option in this DPE.

However, the nature of the design principles, Emissions, Noise 1 and Noise 3 means that a baseline is required to inform the comparative nature of the evaluation. As such, for the evaluation of design options against these design principles, 'do nothing' has been used for comparative purposes. The way in which the 'do nothing' has been considered as part of the evaluation against each of these design principles is detailed in sections 4.2, 4.3, 4.7, 4.8 and 4.10. A description of and rationale for the 'do nothing' scenario and the 'do minimum' options for both arrivals and departures is provided in section 4.4 of the DOR and is not repeated here.

3.3 Overflight Assessment

When considering the number of people 'overflown', the definition of overflight provided in the CAA's definition of overflight (CAP1498) has been used. CAP1498 recognises that an aircraft does not have to pass directly overhead, to be considered an overflight. Instead, overflight should be defined to include aircraft that pass over and to the side of an observer (see section 4.8).

The geometry of this definition dictates that, the higher the aircraft, the broader the overflight footprint. It therefore follows that a shallower climb gradient will result in a longer, thinner footprint than a steeper climb gradient. A consequence of this can be that, despite there being little difference between the lateral tracks of design options, the population etc. overflown may, in some instances, differ markedly.

To estimate the size of the population affected by noise from current departures operations, a modal average path[3] has been created for each of the existing SIDs and it has been assessed against the above overflight definition both to a height of 4,000ft, reflecting the point at which an aircraft flying the route is likely to result in noise exposure above the LOAELs, and to 7,000ft, the height up to which MAN are responsible for the route design. Further, to ensure that the impact of aircraft that have been vectored away from the SID has been captured, the actual spread of tracks (to a height of 7,000ft) has been mapped. This was used to estimate the area and affected population beneath those tracks. This known as the 'do nothing' scenario, for comparisons in this DPE and the Initial Options Appraisal (IOA).

[3] Traffic data for the 92-day summer period (16/06/2019 to 15/09/2019), except Runway 05R departures and Runway 23L arrivals, where (due to low runway use) the period 01/01/2010 to 31/12/2019 was used.

4 Acceptance/Rejection Criteria

4.1 Introduction

In order to ensure consistent application of each design principle, a set of underlying criteria were developed. These are explained in this chapter. The criteria for each design principle are set out in sections 4.4 – 4.12, below. In applying these criteria to the departure design options, the acceptance and rejection criteria set out in section 4.2 were considered. The acceptance and rejection criteria for the arrival design options are set out in section 4.3.

4.2 Acceptance/Rejection Criteria for Departures Options

The nine-design principle RAG (red, amber, green) statuses for each design option were totalled. In order to qualify for further consideration, i.e., to be accepted, departure design options were taken forward if they were the 'best-performing' option or equal to the 'best-performing' option within each design envelope. To determine this, the following professional judgement was applied:

- As a minimum, accepted options must partially meet the 'must have' design principles of Safety, Policy, and Capacity.
- Within each design envelope the option with the greatest number of 'greens' was deemed to be 'best-performing' and was accepted. Where multiple options had the same number of 'greens', then the number of 'ambers' was also considered. To illustrate, of the options below, option 'X' would be 'best-performing'.

	Green	Amber	Red
Option X	7	2	0
Option Y	7	1	1
Option Z	7	0	2

- Any other options evaluated as equal to the 'best-performing' option were also accepted.
- All 'do minimum' departure options were accepted, to enable their continued consideration.
- Any option not evaluated as equal to the 'best-performing' option(s) was rejected.
- Where options were accepted, these progressed to the IOA at Step 2B. The assessment of rejected options was not progressed.

This process provides the change sponsor with sufficient flexible and variable design options within each design envelope to undertake the IOA. This is because the options allow appropriate balance between need and the design principles to allow comparison between the design options.

CAP1616 provides guidance on the appropriate baseline for the options appraisal process, which has been closely followed by MAN at Step 2B as reported in the IOA. However, the DPE is not part of the options appraisal process. Rather, it forms part of Step 2A. As such, CAP1616 does not specify the appropriate baseline to inform the DPE where one is required. This is logical, given the extent to which a baseline is required for comparative purposes during the DPE will depend on the nature of the design principles selected by a particular sponsor. By way of an example at MAN, Design Principle Safety represents an absolute, such that it does not require comparison – a proposal will either be safe or not. In contrast, the design principles Noise N1, Noise N3 and Emissions all require a comparator in order to provide a meaningful evaluation of design options against the design principles. This allows design principles that reflect a degree of change to be understood. As the DPE is required to evaluate how the identified design options have responded to a sponsor's particular design principles, the choice of the baseline for the DPE is necessarily guided by those design principles.

The departures design options were evaluated in the following design envelopes:

- Runway 23:
  - East was compared against SONEX 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - North was compared against POL 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - South was compared against LISTO 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - South was compared against SANBA 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - South-west was compared against EKLAD 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - South-west was compared against KUXEM 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - West was compared against EKLAD 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
- Runway 05:
  - East was compared against DESIG 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - North was compared against POL 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - South was compared against LISTO 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - South-west was compared against ASMIM 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - West was compared against ASMIM 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.

The 'do nothing' scenarios are set out in section 3.3 of the Initial Options Appraisal.

To ensure that the ACP at MAN continues to offer the potential to respond to the proposals from other change sponsors and ensure design options that may offer benefits as part of a network that are not fully apparent at this early stage are not prematurely discounted, a further qualitative professional judgement was applied, by a Subject Matter Expert (SME), to determine if there was sufficient justification to accept any further options for assessment at Step 2B. These options include those that may offer capacity benefits, but which can only be fully assessed once the individual design options have been consolidated into networks. This is further explained in section 18 and the options to which this applies, listed in Appendix 1.

These additionally qualified options are also driven by the design principle Policy which requires alignment to the AMS and the creation of a change that aligns with the NERL upper airspace network. However, the MAN ACP is currently more advanced than the NERL network ACP and although the change sponsor has worked with NERL to develop their design options, the NERL process has not yet fully developed a comprehensive list of options. As a result, we do not have full visibility of the NERL design options in relation to:

- Route design option connectivity for departures within the MTMA, which may change as a result of the design work within NERL and at other airports, in particular LPL.

- The type and number of arrival structures envisaged for MAN operations above 7,000ft, or the options for where such an arrival structure or structures could be positioned.

In order to address this, the change sponsor has collaborated closely with colleagues in NERL to help create a comprehensive list of options that provide flexibility and have the ability to integrate with a new MTMA network. Discussions with NERL took account of;

- the current network traffic flows;
- the proposed routes to and from LPL;
- the requirement to safely deconflict MAN departures and arrivals from each other.

The output from these sessions has been captured in an Airspace Design Workshop Record (ADWR). This is a NERL document which details the design assumptions used by both parties long list of potential network concepts which the group considered and discussed. The ADWR document tells the story of how concepts, options and designs have been developed by NERL, and is the formal NERL record of the output from the meetings and will be used to support the ACP submissions for NERL for the airspace above 7,000ft.

We have also tested our designs with NERL and other change sponsors during the stakeholder engagement process.

As the NERL designs progress, it is possible that some of our design options will either be misaligned or conflict with their designs (or those of other airports). This may mean that some design options will not be progressed and that some design options will need to be further refined or modified in response to the progress of this work.

We will continue to engage in discussions across the MTMA and in partnership with NERL and other airports to respond to any such interactions in line with the developing national airspace masterplan.

Our proposed approach to address any such further information becoming available is described as part of the Next Steps in section 30.

4.3 Acceptance/Rejection Criteria for Arrivals Options

The nine design principle RAG statuses for each design option were totalled. In order to qualify for further consideration, i.e., to be accepted, arrivals design options were taken forward if they were the 'best-performing' option or equal to the 'best-performing' option within each design envelope. To determine this, the following professional judgement was applied.

- As a minimum, accepted options must partially meet the 'must have' design principles of Safety, Policy, and Capacity.
- The option with the greatest number of 'greens' was deemed to be 'best-performing' and was shortlisted for acceptance. Where multiple options had the same number of 'greens', then the number of 'ambers' was also considered. To illustrate, of the options below, option 'X' would be 'best performing'.

	Green	Amber	Red
Option X	7	2	0
Option Y	7	1	1
Option Z	7	0	2

- Within each design envelope any other options evaluated as equal to the 'best-performing' option were also shortlisted for acceptance.
- Any option not evaluated as equal to the 'best-performing' option(s) was rejected.

- The shortlist of 'best-performing' options were then grouped against their respective Initial Approach Fix (IAFs), as detailed in section 20 of the DOR. In order to progress to the IOA an IAF must consist of a design option to each Runways 23R, 23L, 05L and 05R. If an IAF is not complimented by each of these four options and a further qualitative professional judgement could not be applied, the shortlisted accepted option(s) will be subsequently rejected. Options which are evaluated as 'best-performing' or have been professional adjudged for acceptance and also form part of a complete set within an IAF will be progressed to the IOA at Step 2B. The assessment of rejected options was not progressed.

This process provides the change sponsor with sufficient flexible and variable design options within each Final Approach Fix (FAF) altitude group to undertake the IOA. This is because the options allow appropriate balance between need and the design principles to allow comparison between the design options.

Where the relevant design principle required a comparator, the arrivals design options were grouped and evaluated in the FAF altitude groups as follows:

- Runways 23R/23L:
  - North L 3,500ft and 3,000ft was compared against MIRSI and ROSUN 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - North R 3,500ft and 3,000ft was compared against MIRSI and ROSUN 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - South L 3,500ft and 3,000ft was compared against DAYNE 'do nothing' scenario for design principles Emissions, Noise N1 and Noise N3.
  - South R 3,5000ft and 3,000ft was compared against DAYNE 'do nothing' scenario for design principles Emissions, Noise N1 and Noise N3.

- Runways 05L/05R:
  - North L 3,000ft, 2,500ft and 2,000ft was compared against MIRSI and ROSUN 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - North R 3,000ft, 2,500ft and 2,000ft was compared against MIRSI and ROSUN 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3.
  - South L 3,000ft and 2,500ft was compared against DAYNE 'do nothing' scenario for design principles Emissions, Noise N1 and Noise N3.
  - South R 3,000ft and 2,500ft was compared against DAYNE 'do nothing' scenario for design principles Emissions, Noise N1 and Noise N3.

For the evaluation in the DPE, arrivals from the North were compared against both the MIRSI and ROSUN 'do nothing' scenarios to reflect that traffic could flight plan via either hold.

The 'do nothing' scenarios are set out in section 3.3 of the Initial Options Appraisal.

As with departure design options, to ensure that the ACP at MAN continues to offer the potential to respond to the proposals from other change sponsors, and to ensure that design options that may offer benefits that have not been fully apparent at this early stage are not prematurely discounted, a further qualitative professional judgement, by an SME, was applied to determine if there was sufficient justification to accept any further options for assessment at Step 2B. This is further explained in section 29 and the options to which this applies, listed in Appendix 2.

See section 29 for the IAF Grouping Process and further qualitative professional judgement. The full DOE can be found in Appendix A of the Stage 2 Summary Document.

4.4 Design Principle Criteria - Safety

<table>
<tr><td rowspan="2">Design Principle
S</td><td colspan="3">Safety

Our routes must be safe and must comply with industry standards and regulations.</td></tr>
<tr><td>Not met

When assessed in isolation, this option does not meet the requirement of being considered safe, designable and does not comply with industry standards and regulations.</td><td>Partial

When assessed in isolation, this option may be considered as safe; however, additional safety mitigations or processes would be required.</td><td>Met

When assessed in isolation, this option is considered safe, designable and meets with industry standards and regulations.

Or

The route is not compliant with PANS-OPS but there is sufficient evidence to demonstrate that it can be flown safely.</td></tr>
<tr><td>Evaluation assessment summary</td><td colspan="3">In order to deliver a high level of safety, all of the design options have been developed by UK CAA approved Instrument Flight Procedure designers. All our new or amended options have been designed to ICAO PANS-OPS criteria and therefore fulfil the regulatory requirements. As a result, each design option has initially been assumed to be safe, although as the process moves forward and further safety analysis is carried out (at Stage 3), some will present a better or poorer fit against this design principle. These options may require additional procedures or processes to be implemented to ensure that they fulfil the criteria of being ‘safe’.

For the purposes of this DPE, each option has been assessed in isolation. As part of Stage 3, Consult, the CAP1616 process requires route design options to be grouped together - for example, a suite of arrivals with a suite of departures. This may identify other hazards not considered at this stage, that may lead to options being rejected, or other mitigations being introduced. Our proposal to consider any such scenario is set out in section 30, Next Steps, of this DPE.

The primary means to provide safety assurance evidence, to support the introduction of the new procedures is a Safety Case. The Safety Case will be developed in accordance with the guidance provided in the CAA’s Guidance on the Conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases (CAP760) as mandated in the Manchester Airport Safety Management Process and aligned to the CAP1616 process.

The first step in the development of the Safety Case was a Hazard Identification (HazID) held with relevant aviation stakeholders, including local and enroute ATC and airlines. This identified the safety requirements at an early stage of the design process, and it has been used to support early qualitative analysis of the design options. As the process moves forwards, a more quantitative methodology will be adopted using the Safety Case approach. This will initially evaluate routes in isolation but ultimately will evaluate combinations (families) of routes as a system.</td></tr>
</table>

Summary of evaluation	Each option has been assessed to ensure that it satisfies the Design Principle Safety. There will be further assessments conducted at a later stage of the ACP, see section 30, Next Steps, when we will consider whether combinations of routes still satisfy this design principle.

4.5 Design Principle Criteria - Policy

<table>
<tr><td rowspan="2">Design Principle
P</td><td colspan="3">Policy

Any change must accord with the CAA's AMS. Any airspace change must also allow connection to the wider UK en route network and be aligned with the Future Airspace Strategy Implementation for the North (FASI-N) programme and take into consideration the needs of other airports.</td></tr>
<tr><td>Not met

Assessed in isolation, this option:
does not meet with the AMS; or
is not expected to connect with the wider en route structure; or
does not align with FASI-N; or
does not take into consideration other airports' needs.</td><td>Partial

Assessed in isolation, the option is considered likely to be consistent with the AMS and the FASI-N programme. However, further work with other sponsors and airspace users may be necessary to ensure that it represents a practicable solution.</td><td>Met

Assessed in isolation, this option accords with the AMS and is expected to connect with the wider en route structure. It also aligns with FASI-N and takes into consideration other airport needs. These will be further assessed in Stage 3</td></tr>
<tr><td>Evaluation assessment summary</td><td colspan="3">The CAA's AMS (CAP1711) sets out detailed initiatives that the aviation industry must deliver to achieve the Government's objectives in relation to airspace modernisation. CAP1711 details the outcomes that airspace modernisation must bring, under six broad headings, of which MAN notes the following.
Safety: maintaining a high standard of safety has priority over all other ends to be achieved by airspace modernisation. This is achieved by reducing the complexity of airspace structures, the introduction of new technologies to help manage any residual risk, reduced controller workload through the introduction of new routes that are separated by design and the introduction of new technologies that automate controller tasks.
Efficiency: consistent with the safe operation of aircraft, airspace modernisation should secure the most efficient use of airspace and the expeditious flow of traffic. This includes the removal of dependence upon ground-based DVOR navigation beacons.
Integration: airspace modernisation should satisfy the requirements of operators and owners of all classes of aircraft across the commercial, General Aviation and military sectors. It should facilitate the greatest possible access to all users. This includes the use of the minimum volume of controlled airspace consistent with safe and efficient air traffic operations.
Environmental performance: the interests of all stakeholders affected by the use of airspace should be taken into account when it is modernised, in line with guidance provided by the Government on environmental objectives, the Air Navigation Guidance</td></tr>
</table>

	2017, which sets out how carbon emissions, air quality and noise should be considered. More efficient, shorter and cost-effective flightpaths should be considered, as well as enabling CCO and CDA, the re-design of arrival and departure routes, allowing for noise impacts to be redistributed away from more noise sensitive areas and the introduction of respite (routes). • Defence and security: airspace modernisation should facilitate the integrated operation of air traffic services provided by or on behalf of the armed forces and take account of the interests of national security. • International alignment: airspace modernisation should take account of any international recommended practices or obligations related to the UK's air navigation functions, such as those from ICAO and the EU. In summary, CAP1711 states that modernisation in airspace at lower altitudes (up to 7,000ft), must deliver: • Safety - precision routes, separated by design - Performance Based Navigation (PBN). • Efficiency - greater runway throughput by deploying dedicated routes for each airport to secure more efficient use of airspace and strengthened resilience. • Environment - shorter track miles and continuous climbs/descents to reduce emissions per flight. • Noise - opportunities to better manage noise impacts. FASI-N is an initiative to deliver the requirements of the AMS, through the re-design of airspace in the north of the UK. As such, FASI-N requires coordination between various airspace change sponsors. This coordination will be delivered through a masterplan of airspace changes prepared and delivered by the Airspace Change Organising Group (ACOG). Other airspace users/considerations will be covered through regular bilateral (or if required, trilateral) meetings with airports and NATS. These meetings may also be attended by ACOG to align the airport work with the airspace masterplan, and within these meetings, discussion points will include: • The operating concepts being applied, such as climb gradients, PBN standard and the use of systemisation. • An analysis of the design options that have been developed, and where conflicts may occur. These conflicts may be related to any of the design principles or local operating practices and restrictions but will be primarily driven by the Design Principle Safety. • Agreement on options to resolve conflicts. These conflict resolution discussions and decisions will be formally recorded by both the airports and ACOG and will be used to support final submissions to CAA to demonstrate where concessions have been made. Where a conflict cannot be resolved, the ACOG resolution process will be triggered. • The potential for cumulative impact issues to arise from the routes, and how these should be addressed in engagement material. In addition, ACOG have created the Technical Coordination Group which will meet regularly to discuss and resolve policy and technical issues affecting airspace design across all airports. These Group meetings focus on:

	• Programme wide technical topics • Technical deployment issues • Safety assurance • Benefits management The output of the Technical Coordination Group meetings will help inform other deployment groups and the masterplan.
Summary of evaluation	Each design option has been assessed against the Design Principle Policy to ensure that it satisfies our requirement for all new or existing PBN design options to meet the requirements of the AMS. It is not possible to assess all CAS demands based upon individual design options at this present time. These assessments will be conducted at Stage 3 of the ACP process when further consideration will be given to what extent combinations of routes as part of a system satisfy this design principle. See section 30 for Next Steps.

4.6 Design Principle Criteria - Capacity

<table>
<tr><td rowspan="2">Design Principle
C</td><td colspan="3">Capacity

Our future airspace must enable best use of the capacity of our existing runways, in line with government policy.</td></tr>
<tr><td>Not met

Assessed in isolation, this design option could be used operationally in conjunction with another runway, or as a single runway operation, but will not enable the best use of the capacity of our existing runways.</td><td>Partial

Assessed in isolation, this design option could be used operationally in conjunction with another runway, or as a single runway operation but best use of the capacity of our existing runways may not be fully attained due to ATC operational procedures or restrictions required to address interactions as a result of the runway configurations.</td><td>Met

Assessed in isolation, this design option could be used operationally in conjunction with another runway, or as a single runway operation to enable the best use of the capacity of our existing runways.</td></tr>
<tr><td>Evaluation assessment summary</td><td colspan="3">The UK travel industry has been impacted by the global pandemic, but traffic levels are expected to fully recover. In the long term, demand at MAN is expected to continue to grow in line with Government policy and as supported by the Manchester Core Strategy.

This passenger demand also drives the number of aircraft using the airport, and this is constrained by the capacity of the terminal buildings, the taxiway infrastructure, the runways and the airspace.

As one of the elements impacting capacity, and in line with the words of this design principle, the chosen airspace solution must therefore enable the best use of existing runway capacity at Manchester Airport throughout a 24-hour period, as opposed to occasional peaks.

To achieve this will require departure routes that operate effectively as a system and in conjunction with other routes in directional peer groups. However, because at this stage this design principle is looking at individual routes (rather than the system) the analysis looks at the potential ability of the route to contribute to the achievement of a consistent movement rate against largely external factors.

The analysis therefore assesses the ability of the route to operate:
• Independently from the airborne holds, arrival routes and departure routes of adjacent airports.
• Independently from the arrival structure or arrival design options for MAN.
• To support optimal departure splits of no more than one minute which is the current CAA minimum.</td></tr>
</table>

	• Arrivals and departures in compliance with comply with current ATC published operating procedures and/or safety restrictions to ensure that runway utilisation is maximised. If a route is not able to operate in accordance with any of the above, restrictions (typically in the form of departure flow rates) may be imposed by ATC, resulting in a reduced hourly runway capacity and a failure to meet the Design Principle Capacity.
Summary of evaluation	Each design option has been assessed against the Design Principle Capacity to ensure that it satisfies the requirement for all new design options to ensure that the airport can continue to meet its utilisation of aircraft numbers in accordance with current forecasts. There will be further assessments conducted at Stage 3 of the CAP1616 process that will consider if combinations of routes still satisfy this design principle. See section 30 for Next Steps.

4.7 Design Principle Criteria - Emissions

<table>
<tr><td rowspan="2">Design Principle
E</td><td colspan="3">Emissions

We will minimise and where possible reduce, emissions when we design routes. This may be achieved by selecting the most direct routes.</td></tr>
<tr><td>Not met

When assessed in isolation, this option performs worse than the ''do nothing' scenario with respect to track distance flown.</td><td>Partial

When assessed in isolation, this option performs similar (+/- 10%) to the 'do nothing' scenario with respect to track distance flown.</td><td>Met

When assessed in isolation, this option performs better than the 'do nothing' scenario with respect to track distance flown.</td></tr>
<tr><td>Evaluation assessment summary</td><td colspan="3">Each design option has been evaluated in terms of track distance flown, as a proxy for fuel burn/emissions generated. From the quantitative analysis made in the assessment of track distance flown, the track length has been rounded to the nearest 1,000m.

Existing procedures do not support optimal aircraft performance and therefore are predicted to have a greater environmental impact compared to proposed options. Within Stage 2 of the CAP1616 process, there is no requirement for a change sponsor to conduct quantitative fuel burn or emissions analysis; this will be conducted in Stage 3. In order to make a comparison, track mileage is used as a proxy on the basis that the shorter the track mileage, the less greenhouse gases are emitted.</td></tr>
<tr><td>Summary of evaluation</td><td colspan="3">Each design option has been assessed against the Design Principle Emissions to ensure that track distance flown will be minimised or wherever possible reduced.

Further assessments will be conducted at a later stage of the ACP process that will consider if combining routes still satisfies this design principle. See section 30, Next Steps.</td></tr>
</table>

4.8 Design Principle Criteria - Noise N1

<table>
<tr><td rowspan="2">Design Principle
N1</td><td colspan="3">Noise

Our route designs should seek to minimise, and where possible reduce, the number of people affected by noise from our flights.</td></tr>
<tr><td>Not met

The estimate of total future population overflown up to both 4,000ft and 7,000ft is greater than the 'do nothing' scenario.</td><td>Partial

The estimate of total future population overflown up to either 4,000ft or 7,000ft is less than or similar to (+/- 10%) the 'do nothing' scenario.</td><td>Met

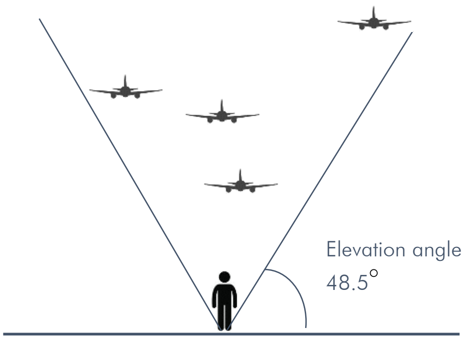
The estimate of total future population overflown up to both 4,000ft and 7,000ft is less than or equal to the 'do nothing' scenario.</td></tr>
<tr><td>Evaluation assessment summary</td><td colspan="3">The CAA's Airspace Change guidance (CAP1616) requires sponsors to assess the potential noise impact of any proposal being put forward, using a range of indicators. The level of assessment expected varies according to the scale of the change options being proposed and the stage of the change process that has been reached.

At this stage (Stage 2) in the ACP - the number of options to be assessed is significant and the level of refinement immature. CAP1616 therefore does not require the change sponsor to go into a full level of detail for every option on the 'comprehensive list'. Instead, the scale of assessment should be proportionate, and the appraisal must as a minimum, contain qualitative assessments of the different options.

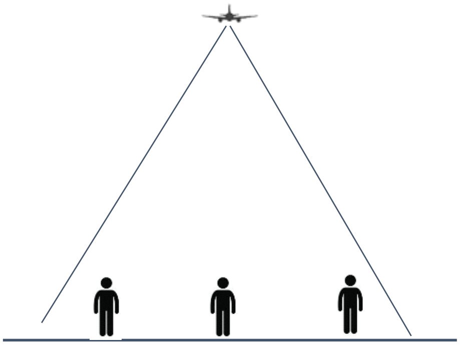
It is recognised however, that in assessing the comprehensive list, such a qualitative approach may not always adequately reflect the extent to which an option reflects the design principles. Therefore, the following quantitative assessment has been carried out on all the design options and these have been compared against that of a 'do nothing' scenario.

For stakeholder engagement purposes, L_{Aeq} contours remain the 'primary' indicator. The contours show a set of closed lines on a map – each contour shows places where people get the same amount of noise from aircraft, measured as an energy average (L_{Aeq}). However, there is a recognition that local communities situated outside these 'standard' contours, may still be adversely affected by passing aircraft. To represent people and communities affected in this way, a metric to quantify 'overflight' both inside and outside standard noise contours – up to a height of 7,000ft – has been produced by the CAA – Definition of overflight (CAP1498).

CAP1498 recognises that an aircraft does not have to pass directly overhead, to be considered an overflight. Instead, overflight should be defined to include aircraft that pass over and to the side of an observer. The distance that an aircraft can be to the side and still considered an overflight is set using an elevation angle. An aircraft flying directly overhead would be at an elevation angle of 90°. An aircraft on the ground would be at an elevation angle of 0°.</td></tr>
</table>



CAP1616 recommends the use of 48.5° as an elevation angle. This is because for an aircraft to give a noise level approximately 3dB lower than if it had flown directly overhead, it would need to be at an elevation angle of 48.5°. 3dB is widely accepted as the smallest difference between two noise levels that the average person can perceive.



Alternatively, by looking at this from an aircraft's perspective, all locations within the cone are 'overflown'

*In this stage of evaluation, the overflight analysis provides an estimate for the total number of people overflown by taking into consideration:
- The number of households currently overflown.*
- The population currently overflown.**
- Known planned property developments as of 22nd July 2022.
- The number of proposed dwellings associated with the above developments.

*Provided by OS AddressBase
**Population figures based on CACI database using 2021 census.

In order to estimate the future potential population:
- Divide the current population identified by the number of existing households; this gives an average population per household for that option.
- Multiply the number of proposed dwellings by the average population per household for that option.
- The sum of the existing population and the future potential population to get an estimate for the total number of people overflown.

From the quantitative analysis, the population count has been rounded to the nearest 100, households and proposed dwellings to the nearest 50.

Departures baseline - 'do nothing'

The baseline 'do nothing' scenario reflects the present-day situation at MAN. Currently, departing aircraft are required to follow their planned SID until reaching a published release height, at which point they may be vectored away from the SID by ATC. The actual release height varies (dependent upon the SID) but in practice, is either 3,000ft, 4,000ft or 5,000ft. A consequence of such tactical vectoring by ATC, is that - since those aircraft are no longer flying a prescribed path – the tracks over the ground are less concentrated and far more widely spread.

To estimate the size of the population affected by noise from departures, a modal average path* has been created for each of the existing SIDs and this has been assessed against the above overflight definition both to a height of 4,000ft, reflecting the point at which an aircraft flying the route is unlikely to result in noise exposure above the Lowest Observed Adverse Effect Level (LOAELs) and to 7,000ft, the height up to which MAN are responsible for the route design. Further, to ensure that the impact of aircraft that have been vectored away from the SID has also been captured, the actual spread of tracks (to a height 7,000ft) has been mapped. This was used to estimate the area and affected population beneath those tracks.

Departures Design Options

The centreline of each individual design option, (from our comprehensive list) has been taken and assessed against the above overflight definition. This has been done both to a height of 4,000ft, reflecting the point at which an aircraft flying the route is unlikely to result in noise exposure above the LOAELs, and to 7,000ft, the height up to which MAN is responsible for the route design.

Arrivals baseline - 'do nothing'

Currently arriving aircraft are tactically vectored by ATC from the airborne holding stacks in a sequence. This sequencing enables the most efficient spacing between arrivals on final approach.

To estimate the size of the population affected by noise from arrivals, modal average path(s) have been created that reflect the typical concentrations of aircraft over the ground. Recognising, however, that this approach may not always fully capture the current picture – aircraft may be vectored over a much wider area, where there is little or no evidence of a common path. To take account of this, the actual spread of tracks (from a height of 7,000ft) has been mapped. This was used to estimate the area and affected population beneath those tracks.

Arrivals Design Options

The centreline of each individual design option, (from our comprehensive list) has been taken and assessed against the above overflight definition. This has been done both from a height of 4,000ft, reflecting the point at which an aircraft flying the route is unlikely to result in noise exposure above the LOAELs, and from 7,000ft, the height from which MAN is responsible for the route design.

It is important to remember that, at this stage, the 'overflight' assessment is simply a mechanism to set out how each design option has responded to the design principles, in terms of populations overflown – it does not illustrate noise impacts.

Summary of evaluation	Each design option has been assessed against the Design Principle Noise N1 to ensure that it satisfies the requirement for all new design options to ensure that MAN satisfies the requirement to seek to minimise the number of people overflown There will be further assessments conducted at Stage 3 of the ACP process that will consider if combinations of routes still satisfy this design principle. See section 30 for Next Steps.

4.9 Design Principle Criteria - Noise N2

<table>
<tr><td rowspan="2">Design Principle
N2</td><td colspan="3">Noise N2

Where practical, noise effects should be shared. The use of dispersion and/or respite, especially at night, will be considered to achieve this.</td></tr>
<tr><td>Not met

N/A</td><td>Partial

N/A</td><td>Met

At this stage, when considering individual design options in isolation, it is not possible to evaluate against this design principle. It has therefore been assumed that all options could be used as part of a network. Performance against this design principle will be assessed further at Stage 3. See section 30, Next Steps.</td></tr>
<tr><td>Evaluation assessment summary</td><td colspan="3">The CAA's AMS (CAP 1711) sets out detailed initiatives that the aviation industry must deliver to achieve the Government's objectives in relation to airspace modernisation. CAP1711 details the outcomes that airspace modernisation must bring, under six broad headings:

• Safety
• Efficiency
• Integration
• Environmental performance:
• Defence and security
• International alignment:

In relation to environmental performance, CAP1711 states that the interests of all stakeholders affected by the use of airspace, should be taken into account when it is modernised. In line with guidance provided by the Government on environmental objectives, the Air Navigation Guidance 2017, sets out how carbon emissions, air quality and noise should be considered. This includes the consideration of more efficient, shorter and cost-effective flightpaths, enabling CCO and CDA, the re-design of arrival and departure routes allowing for noise impacts to be redistributed away from more noise sensitive areas and the introduction of respite (routes).

CAP1616 defines respite as 'Planned and notified periods where overflight or noise impact are reduced or halted to allow communities undisturbed time.'

CAP1616 expands upon the topic stating that - if multiple routes are considered in order to provide respite, then it is vital that the views of local communities and stakeholders are taken into consideration when deciding what might constitute a sufficient period of respite.</td></tr>
</table>

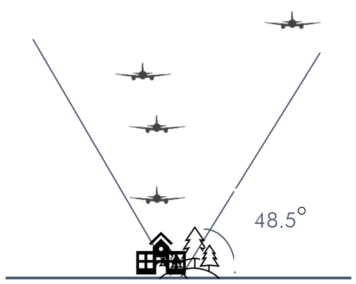
	At this (Step 2A) point in the airspace change process, when considering individual design options, it has not been possible to assess an ability to deliver 'respite' - this will only become possible when the design options have been grouped into dependent networks. Therefore, no route will be excluded at this stage, on the basis of respite – all will pass, and the issue will be considered more fully later in the process when the design options are grouped into dependent networks. As described at sections [3, 4, 5 and 6] of the SER, MAN have engaged with local communities and other stakeholders to understand how respite and relief could be used to best effect.
Summary of Evaluation	As stated, there will be further assessments conducted at a later stage of the ACP, see section 30, Next Steps, when we will consider whether combinations of routes still satisfy this design principle.

4.10 Design Principle Criteria - Noise N3

Design Principle N3	Noise N3 Where practical, our route designs should avoid, or limit effects upon, noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education.		
	Not met The estimated number of noise sensitive areas overflown up to 4,000ft **and** 7,000ft is considered to be greater than the 'do nothing' scenario.	**Partial** The estimated number of noise sensitive areas overflown up to 4,000ft **or** 7,000ft is less than or similar to (+/- 10%) the 'do nothing' scenario.	**Met** The number of noise sensitive areas overflown up to both 4,000ft **and** 7,000ft is less than or equal to the 'do nothing' scenario.

Evaluation assessment summary

We have applied the same overflight tool used in Design Principle Noise N1, to estimate the impact upon noise sensitive areas.



CAP 1616 recommends the use of 48.5° as an elevation angle. This is because for an aircraft to give a noise level approximately 3dB lower than if it had flown directly overhead, it would need to be at an elevation angle of 48.5°. 3dB is widely accepted as the smallest difference between two noise levels that the average person can perceive.

Alternatively, by looking at this from an aircraft's perspective, all buildings and locations within the cone are 'overflown'.

In this stage of evaluation, the overflight analysis will provide an estimate for the total number of noise sensitive areas overflown by taking into consideration:

- Educational facilities*
- Medical facilities*
- Places of Worship*

*Provided by OS AddresBase

Following the stakeholder engagement phases, no additional areas were accounted for in this evaluation. This includes cultural or historic assets, tranquil or rural areas. In the IOA, Tranquillity will be analysed and is detailed in section 2.6.5 of the Initial Options Appraisal.

	Departures baseline - ‘do nothing’ The baseline ‘do nothing’ scenario reflects the present-day situation, at MAN. Currently, departing aircraft are required to follow their planned SID until reaching a published release height, at which point they may be vectored away from the SID by ATC. The actual release height varies (dependent upon the SID) but in practice, is either 3,000ft, 4,000ft or 5,000ft. A consequence of such tactical vectoring by ATC, is that - since those aircraft are no longer flying a prescribed path – the tracks over the ground are less concentrated and far more widely spread. To estimate the size of the population affected by noise from departures, a modal average path* has been created for each of the existing SIDs and it has been assessed against the above overflight definition both to a height of 4,000ft, reflecting the point at which an aircraft flying the route is unlikely to result in noise exposure above the LOAELs, and to 7,000ft, the height up to which MAN are responsible for the route design. Further, to ensure that the impact of aircraft that have been vectored away from the SID has been captured, the actual spread of tracks (to a height 7,000ft) has been mapped. This was used to estimate the area and affected population beneath those tracks. Departures Design Options The centreline of each individual design option, (from our comprehensive list) has been taken and assessed against the above overflight definition. Both to a height of 4,000ft, reflecting the point at which an aircraft flying the route is unlikely to result in noise exposure above the LOAELs, and to 7,000ft, the height up to which MAN are responsible for the route design. Arrivals baseline - ‘do nothing’ Currently arriving aircraft are tactically vectored by ATC from the airborne holding stacks in a sequence. This sequencing enables the most efficient spacing between arrivals on final approach. Each individual viable design option, from our comprehensive list, has been taken and assessed against the above overflight definition. It is important to remember that, at this stage, this ‘overflight’ assessment is simply a mechanism to set out how each design option has responded to the design principles – it does not illustrate noise impacts.
Summary of evaluation	Each design option has been assessed against the Design Principle Noise N3 to ensure that it satisfies the requirement for all new design options to ensure that where practical, our route designs should avoid, or limit effects upon, noise sensitive areas. There will be further assessments conducted at Stage 3 of the ACP process that will consider if combinations of routes still satisfy this design principle. See section 30 for Next Steps.

4.11 Design Principle Criteria - Airspace

<table>
<tr><td rowspan="2">Design Principle
A</td><td colspan="3">Airspace

Our route designs should minimise the impacts on other airspace users by limiting Controlled Airspace.</td></tr>
<tr><td>Not met

The option is likely to require additional controlled airspace to provide containment in accordance with the CAA policy.</td><td>Partial

The option does not require additional controlled airspace but may require ATC intervention to resolve/deconflict the interactions with aircraft from other airports.</td><td>Met

The option does not require additional controlled airspace.</td></tr>
<tr><td>Evaluation assessment summary</td><td colspan="3">The CAA Controlled Airspace Containment Policy Statement (January 2014) sets out the minimum criteria applicable to containment of instrument flight procedures for airports already within CAS. Each option has been assessed against this policy statement to ensure that the minimum volume of airspace is used to contain the route within CAS. An assessment will also be made, at a during Stage 3 of the ACP process, as to whether it might be possible to reduce the current volume of CAS whilst still complying with the containment criteria.

In line with advice from the Secretary of State, the CAA has the power to review airspace classification. The classification of the airspace determines the flight rules that apply and the procedures that must be followed. The size and classification of the airspace around an airport is determined by the types of aircraft and the complexity of the route structure. Ultimately the establishment of controlled airspace is to provide a safe environment for passenger-carrying commercial aircraft.

In the vicinity of MAN, most airspace is classified as Class D (up to 3,500ft) and Class A above (forming part of the Manchester Terminal Manoeuvring Area [MTMA]), allowing operations to take place in a controlled environment but placing some restrictions on general aviation (or recreational flying). However, as changes are made to routes there is the possibility that some of the airspace may no longer be required to contain commercial aircraft and could be considered for re-classification as uncontrolled Class G airspace which could allow greater general aviation access.
Access to our airspace for the emergency services will always be given the highest priority. It is accepted that there may be disruptions to normal operations in order to accommodate access for Category A flights; the preservation of life is paramount.</td></tr>
<tr><td>Summary of evaluation</td><td colspan="3">Each option has been assessed to evaluate whether the design option is likely to alter the arrangements for controlled airspace at MAN. However, the full containment assessment will be undertaken at a later stage in the process, at that point therefore this initial evaluation may need to be updated. Further details on this process are contained in the DOR, section 4.5.</td></tr>
</table>

	There will be further assessments conducted at a later stage of the ACP, see section 30, Next Steps, that will consider whether this initial assessment remains valid when considering combinations of routes.

4.12 Design Principle Criteria - Technology

<table>
<tr><td rowspan="2">Design Principle

T</td><td colspan="3">**Technology**

Our route designs should be based on the latest aircraft navigational technology widely available.</td></tr>
<tr><td>**Not met**

Assessed in isolation, this design option does not utilise latest aircraft technology and is not PBN compliant.</td><td>**Partial**

Assessed in isolation, this design option utilises latest aircraft technology and may not be PBN compliant.

Further work may be required to confirm that the route is flyable and/or it meets with route design rules.</td><td>**Met**

Assessed in isolation, this design option has been designed to utilise latest aircraft technology and is PBN compliant.</td></tr>
<tr><td>**Evaluation assessment summary**</td><td colspan="3">Aircraft taking off from or landing at MAN currently do so flying ‘conventional’ departure and arrival routes. Conventional routes use a network of ground-based DVOR navigation aids to provide guidance to aircraft on departure and arrival. However, this technology is becoming obsolete, and these DVORs are gradually being withdrawn from service. As a result, in the future, all guidance will be provided via satellites to on-board aircraft systems. This is known as Performance Based Navigation (PBN).

In its AMS (CAP1711), the CAA set out detailed initiatives that the aviation industry must deliver to achieve the Government’s objectives in relation to airspace modernisation. The strategy describes the outcomes that airspace modernisation must bring, under six broad headings: safety; efficiency; integration; environmental performance; defence and security and international alignment. Of these groups, ‘efficiency’ talks, in particular about the “removal of dependence upon ground-based navigation beacons.”

CAP1711 summarises the requirement by stating that modernisation in airspace at lower altitudes (up to 7,000ft), must deliver precision routes, separated by design – PBN.

PBN technology enables aircraft to fly along pre-determined flightpaths (including departure and arrival routes) more accurately and results in less dispersed tracks than those based on ground-based systems. However, to provide flexibility across aviation there are a range of PBN specifications that can be used, some of which result in greater accuracy of track keeping than others.

To understand which of those PBN specifications the aircraft operating into MAN are able to use, an airline fleet equipage survey was conducted, as detailed further in section 5.6 of the DOR. This survey confirmed that all commercial flights can operate to a specification known</td></tr>
</table>

	as RNAV1, with 97% capable of using the more advance RNP1 specification. Our design options are therefore being designed to both of these standards.
Summary of Evaluation	Each option has been assessed against the above criteria to ensure that it satisfies the Design Principle Technology that design options should be designed to make use of the latest widely available aircraft navigation technology. Assessments will be conducted at Stage 3 of the ACP process that will consider to what extent design options satisfy this design principle. See section 30, Next Steps.

5 Standard Instrument Departures - Evaluation

6 Runways 05L/05R North

6.1 Runways 05L/05R North Option 1

Design Principle Evaluation	Option No: 1
Option Name: SID RW 05 L North Option 1	ACCEPT
Option Name: SID RW 05 R North Option 1	ACCEPT

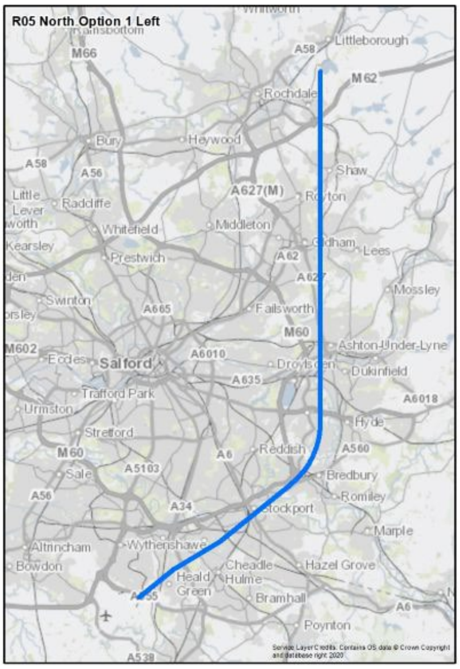
Option Description:

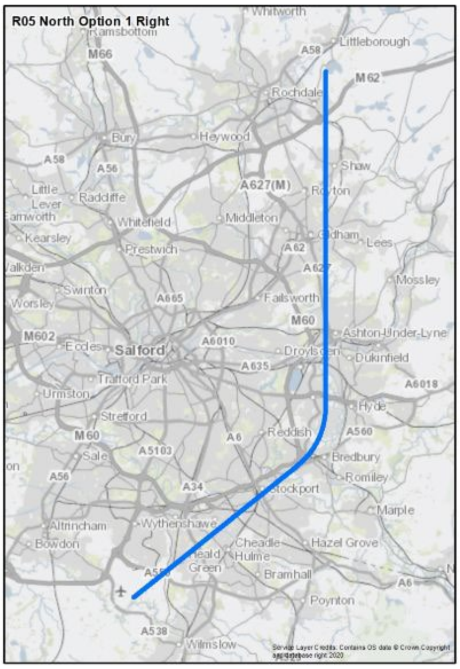
Option 1 is an RNAV1 replication of the current departure to POL and uses fly-by waypoints to create a replication of the existing conventional POL 4S/1Z departure.

As a replicated route it follows a similar track over the ground as the current published departure. The routes combine shortly after departure and fly straight ahead overflying Stockport where they commence a left turn to the north. This takes the routes west of Ashton-under-Lyne and close to Oldham and they terminate at 7,000ft to the east of Rochdale.

The design speed will permit a large number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply. Due to the track-to-fix coding and simplicity of the route, dispersion is likely to be low even with maximum speeds.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 replication of the current route. When assessed in isolation, both routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. They connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1 L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1 R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1L is estimated to overfly approximately 36,750 households with an approximate population of 79,900. Taking account of planned property developments, this option is estimated to impact a total population of 79,900.

Up to 7,000ft, this option is estimated to overfly approximately 87,100 households with an approximate population of 206,600. Taking account of planned property developments, this option is estimated to impact a total population of 213,600.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 1R is estimated to overfly approximately 37,050 households with an approximate population of 80,700. Taking account of planned property developments, this option is estimated to impact a total population of 80,700.

Up to 7,000ft, this option is estimated to overfly approximately 91,100 households with an approximate population of 216,300. Taking account of planned property developments, this option is estimated to impact a total population of 223,300.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1L is estimated to overfly 177 noise sensitive areas.

Up to 7,000ft, option 1L is estimated to overfly 180 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 1R is estimated to overfly 191 noise sensitive areas.

Up to 7,000ft, option 1R is estimated to overfly 195 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

6.2 Runways 05L/05R North Option 3

Design Principle Evaluation	Option No: 3
Option Name: SID RW 05 L North Option 3	REJECT
Option Name: SID RW 05 R North Option 3	REJECT

Option Description:

This is an RNAV1 option that provides an earlier turn to the north than option 1 to avoid direct overflight of Stockport. This turn point is approximately half the distance when compared to option 1 and has been created to ensure safe separation from west and south-west options from Runway 05.

The option has a direct routing to the north following the initial turn, which due to the track-to-fix coding and a fly-by waypoint, would result in repeatable ground tracks and a low level of dispersal.

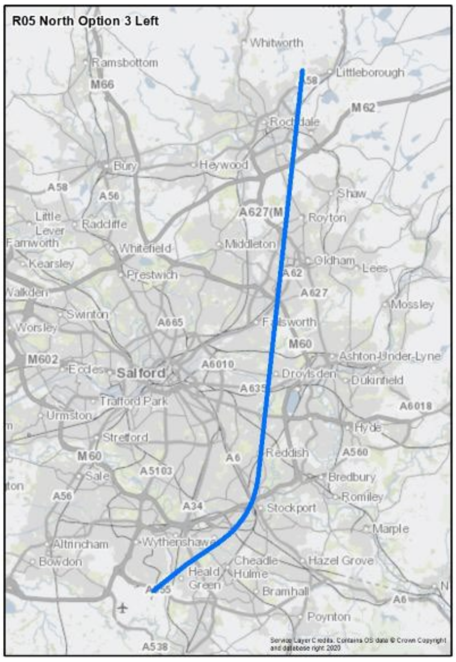
The design speed will permit a large number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

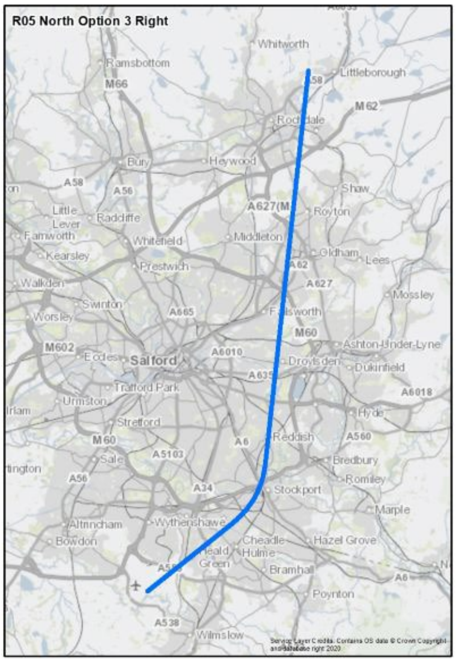
The route has been designed using fly-by waypoints.

- 05L: After departure this route flies straight ahead and commences a left turn just to the west of Stockport, at which point it combines with the option for 05R. The routes continue north, flying to the west of Audenshaw reservoir, Ashton-under-Lyne and Oldham and terminate at 7,000ft just to the east of Rochdale.

- 05R: After departure this route flies straight ahead and commences a left turn north just to the west of Stockport, at which point it combines with the option for 05L. The routes continue north, flying to the west of Audenshaw reservoir, Ashton-under-Lyne and Oldham and terminate at 7,000ft just to the east of Rochdale.

There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply.





<table>
<tr><td colspan="2"></td><td colspan="3"></td></tr>
<tr><td rowspan="2">Design Principle Safety</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.</td></tr>
<tr><td rowspan="2">Design Principle Policy</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
Both these departure routes are designed as RNAV routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.</td></tr>
<tr><td rowspan="2">Design Principle Capacity</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.
When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.
Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.
Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.</td></tr>
<tr><td rowspan="2">Design Principle Emissions</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
</table>

Summary of Qualitative Assessment: The estimated track length of option 3L is 38km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 3R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: Up to 4,000ft, option 3L is estimated to overfly approximately 40,900 households with an approximate population of 93,400. Taking account of planned property developments, this option is estimated to impact a total population of 95,000. Up to 7,000ft, this option is estimated to overfly approximately 94,950 households with an approximate population of 232,500. Taking account of planned property developments, this option is estimated to impact a total population of 239,200. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 3R is estimated to overfly approximately 42,450 households with an approximate population of 96,300. Taking account of planned property developments, this option is estimated to impact a total population of 97,500. Up to 7,000ft, this option is estimated to overfly approximately 99,500 households with an approximate population of 242,900. Taking account of planned property developments, this option is estimated to impact a total population of 249,700. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: Up to 4,000ft, option 3L is estimated to overfly 201 noise sensitive areas. Up to 7,000ft, option 3L is estimated to overfly 205 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 3R is estimated to overfly 208 noise sensitive areas. Up to 7,000ft, option 3R is estimated to overfly 210 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle and do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enable CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

6.3 Runways 05L/05R North Option 4

Design Principle Evaluation	Option No: 4
Option Name: SID RW 05 L North Option 4	ACCEPT
Option Name: SID RW 05 R North Option 4	ACCEPT

Option Description:

This is an RNAV1 option that has a turn mid-way between options 1 and 3. It has been created in line with the Design Principle Noise N1 by following the course of the M60 motorway which already generates a level of ambient noise.

This option has a direct routing to the north following the initial turn, which due to the track-to-fix coding and a fly-by waypoint, would result in repeatable ground tracks and a low level of dispersal.

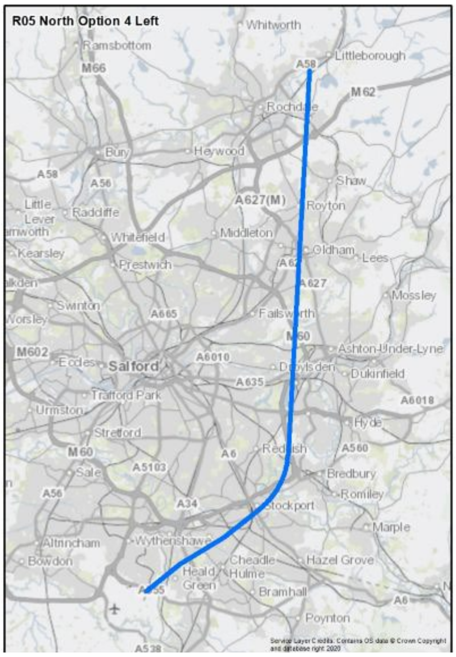
The design speed will permit a large number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

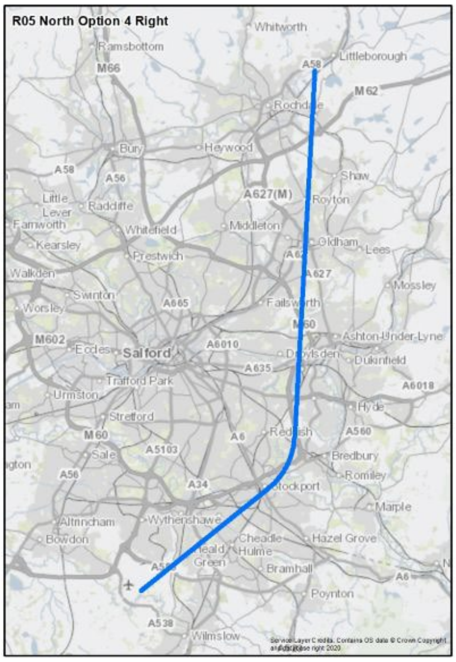
The route has been designed using fly-by waypoints.

- 05L: After departure, this route combines with the option for 05R and flies straight ahead and commences a left turn just to the east of Stockport. It continues north, broadly following the route of the M60 motorway which takes it over Audenshaw reservoir and west of Ashton-under-Lyne. It passes overhead Oldham and terminates at 7,000ft just to the east of Rochdale.

- 05R: After departure, this route combines with the option for 05L and flies straight ahead overflying Heald Green and commences a left turn just to the east of Stockport. It continues north, broadly following the route of the M60 motorway which takes it over Audenshaw reservoir and west of Ashton-under-Lyne. It passes overhead Oldham and terminates at 7,000ft just to the east of Rochdale

There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply. Due to the track-to-fix coding however, and simplicity of the route, dispersion is likely to be low even with maximum speeds.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 4R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4L is estimated to overfly pproximately 24,900 households with an approximate population of 55,200. Taking account of planned property developments, this option is estimated to impact a total population of 55,800.

Up to 7,000ft, this option is estimated to overfly approximately 84,550 households with an approximate population of 208,100. Taking account of planned property developments, this option is estimated to impact a total population of 213,200.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 4R is estimated to overfly approximately 27,650 households with an approximate population of 61,200. Taking account of planned property developments, this option is estimated to impact a total population of 61,400.

Up to 7,000ft, this option is estimated to overfly approximately 88,850 households with an approximate population of 218,000. Taking account of planned property developments, this option is estimated to impact a total population of 223,200.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4L is estimated to overfly 117 noise sensitive areas.

Up to 7,000ft, option 4L is estimated to overfly 120 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Up to 4,000ft, option 4R is estimated to overfly 133 noise sensitive areas.

Up to 7,000ft, option 4R is estimated to overfly 135 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

6.4 Runways 05L/05R North Viable but Poor Fit Options

<table>
<tr><th>Option</th><th>Safety</th><th>Policy</th><th>Capacity</th></tr>
<tr><td>A2 Early left turn</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">Originally designed as option 2, this was considered to provide an early turn and a more direct route to POL. The route was designed as an RNAV 1 route using fly-over waypoints.

<u>Safety</u>: This option was expected to interact with the Runway 05 westbound design options.

<u>Capacity</u>: This option would interact with departures to the west and south-west and would limit the ability to achieving capacity through one minute departure splits.</td></tr>
<tr><td>B5 Straight ahead then gradual left turn north</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">After departure from Runway 05L/05R, aircraft would continue straight ahead to beyond Stockport before gradually turning left towards the north, towards the SID aiming point.

<u>Policy</u>: This option involves greater track mileage than is necessary by taking traffic a significant distance east before turning it north, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

<u>Capacity</u>: This option would take the same track as some departure options in the east envelope which would limit the ability to achieve one minute departure splits and not enabling best of runway capacity.</td></tr>
<tr><td>C6 Left Wraparound</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">After departure from Runway 05L/05R, aircraft would make a left-hand turn, fly around the airport, through the overhead and then begin heading north towards the SID aiming point.

<u>Safety</u>: This option is expected to interact with the Runway 05R Missed Approach Procedure (MAP).

<u>Policy</u>: This option involves greater track mileage than is necessary by taking traffic south and east before turning it north, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

<u>Capacity</u>: This option interacts with arrivals from the north and south along with the 05 South Departure Envelope, which would limit the ability to enable best use of runway capacity.</td></tr>
<tr><td>C7 Right Wraparound</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">After departure from Runway 05L/05R, aircraft would make a right-hand turn, fly around the airport, through the overhead and then begin heading north towards the SID aiming point.

<u>Safety</u>: This option is expected to interact with the Runway 05R MAP.

<u>Policy</u>: This option involves greater track mileage than is necessary by taking traffic south and west before turning it north, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

<u>Capacity</u>: This option interacts with arrivals from the north and south along with the 05 South Departure Envelope along with arrivals, which would limit the ability to enable best use of runway capacity.</td></tr>
</table>

7 Runways 05L/05R East

7.1 Runways 05L/05R East Option 1

Design Principle Evaluation	Option No: 1
Option Name: SID RW 05 L East Option 1	ACCEPT
Option Name: SID RW 05 R East Option 1	ACCEPT

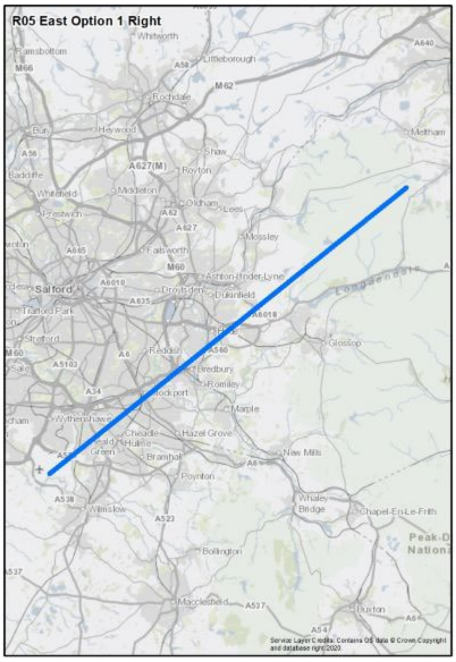
Option Description:

Option 1 is an RNAV1 replication of the current DESIG 1S/1Z SID and uses fly-over waypoints.

As a replicated route it follows a similar track over the ground as the current published route. After departure this takes it straight ahead on a runway heading in a straight line to 7,000ft. This takes it overhead Stockport and Hyde, and to the north of Glossop and it terminates south-west of Holmfirth.

There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply. This design speed will permit many aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

Due to the track-to-fix coding and simplicity of the route, dispersion is likely to be low even with maximum speeds.



Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 replication of the current departure route to DESIG. When assessed in isolation, the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1L is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1R is 44km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1L is estimated to overfly approximately 25,950 households with an approximate population of 58,200. Taking account of planned property developments, this option is estimated to impact a total population of 58,200.

Up to 7,000ft, option 1L is estimated to overfly approximately 26,100 households with an approximate population of 58,600. Taking account of planned property developments, this option is estimated to impact a total population of 58,600.

These are both less than or equal to the 'do nothing' scenario.

Up to 4,000ft, option 1R is estimated to overfly approximately 28,850 households with an approximate population of 64,006. Taking account of planned property developments, this option is estimated to impact a total population of 65,000.

Up to 7,000ft, option 1R is estimated to overfly approximately 29,150 households with an approximate population of 65,700. Taking account of planned property developments, this option is estimated to impact a total population of 65,700.

These are both less than or equal to the 'do nothing' scenario.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1L is estimated to overfly 124 noise sensitive areas.

Up to 7,000ft, option 1L is estimated to overfly 125 noise sensitive areas.

When compared to the ‘do nothing’ scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 1R is estimated to overfly 146 noise sensitive areas.

Up to 7,000ft, option 1R is estimated to overfly 150 noise sensitive areas.

When compared to the ‘do nothing’ scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% following a fleet survey. They are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enable CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

7.2 Runways 05L/05R East Option 4

Design Principle Evaluation	Option No: 4
Option Name: SID RW 05 L East Option 4	ACCEPT
Option Name: SID RW 05 R East Option 4	ACCEPT

Option Description:

This is an **RNAV1** option to provide an initial route identical to the existing DESIG SID, but with an earlier turn towards the network joining point to the east. This has been done to align with current operational practice and routes it to the southern edge of route L975 in line with the NATS network traffic flow.

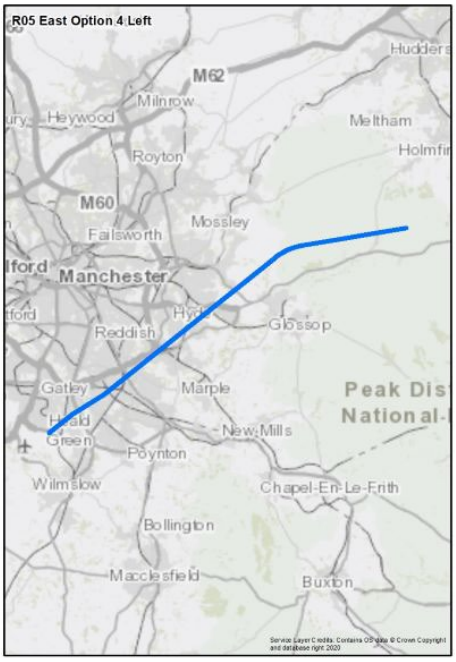
The design speed will permit many aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

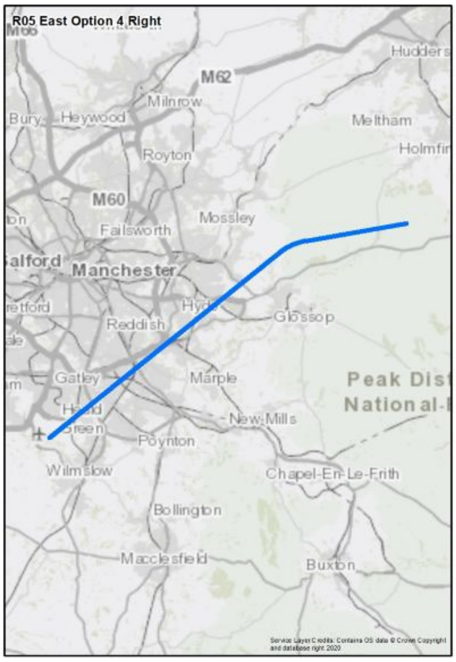
The route has been designed using fly-by waypoints.

05L: After departure this route combines with the option for 05R and flies straight ahead overflying Stockport and the southern edge of Hyde. It routes to the north-west of Glossop at which point it makes a right turn to route north of Glossop and terminates at 7,000ft just to the north and east of the Woodhead reservoir.

05R: After departure this route combines with the option for 05L and flies straight ahead overflying Stockport and the southern edge of Hyde. It routes to the north-west of Glossop at which point it makes a right turn to route north of Glossop and terminates at 7,000ft just to the north and east of the Woodhead reservoir.

There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply.





Design Principle **Safety**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Policy **Capacity**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 4R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4L is estimated to overfly approximately 25,950 households with an approximate population of 58,200. Taking account of planned property developments, this option is estimated to impact a total population of 58,200. Up to 7,000ft, option 4L is estimated to overfly approximately 25,950 households with an approximate population of 58,200. Taking account of planned property developments, this option is estimated to impact a total population of 58,200. These are both less than or equal to the 'do nothing' scenario. Up to 4,000ft, option 4R is estimated to overfly approximately 28,850 households with an approximate population of 64,006. Taking account of planned property developments, this option is estimated to impact a total population of 65,000. Up to 7,000ft, option 4R is estimated to overfly approximately 29000 households with an approximate population of 65,400. Taking account of planned property developments, this option is estimated to impact a total population of 65,400. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4L is estimated to overfly 124 noise sensitive areas. Up to 7,000ft, option 4L is estimated to overfly 125 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 4R is estimated to overfly 146 noise sensitive areas. Up to 7,000ft, option 4R is estimated to overfly 150 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

7.3 Runways 05L/05R East Option 5

Design Principle Evaluation	Option No: 5
Option Name: SID RW 05 L East Option 5	ACCEPT
Option Name: SID RW 05 R East Option 5	ACCEPT

Option Description:

This is an **RNAV1** option which provides an initial 15° track adjustment from the runway heading before correcting back to the runway heading (parallel to the existing SID) before turning east north-east of Glossop and Hadfield. This track adjustment is intended to reduce the impact of noise for communities on the extended runway centreline that are also impacted by Runways 23R/23L arrivals.

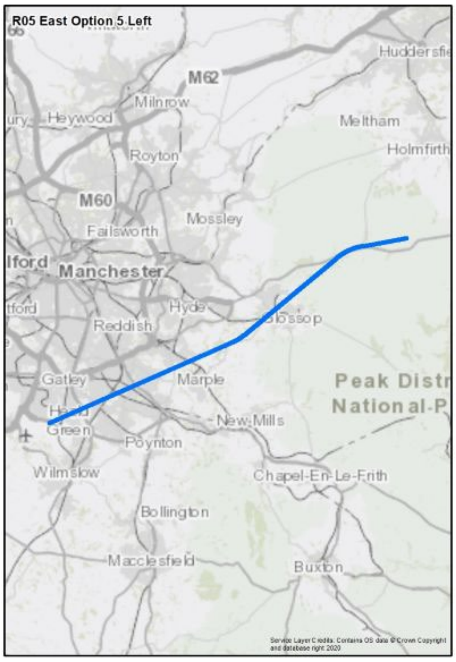
This 15° initial track adjustment from the extended centreline is to a width of 2.25nm parallel to the centreline. It extends to 9nm from the DER on Runway 05L and 8.5nm for Runway 05R.

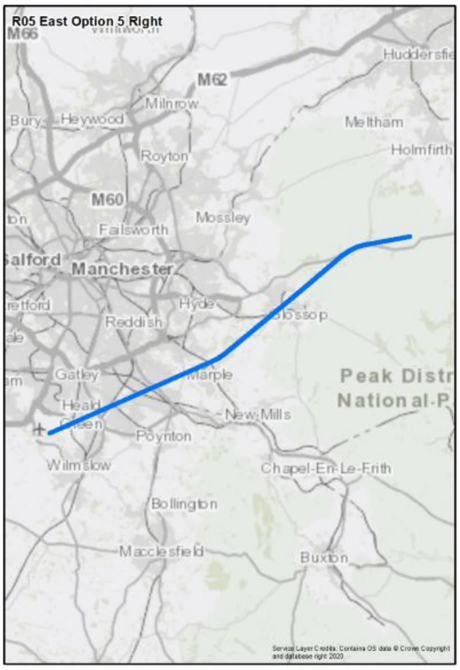
The design speed will permit a large number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise, and the option has been designed using track to fix coding.

05L: After passing the DER this route has a 15° track adjustment to the right which routes it south of Stockport. This track continues until just to the south-west of Glossop where it combines with the option for 05R returns to a runway heading. After overflying Glossop it makes a right turn to the east and terminates at 7,000ft just east of the Woodhead reservoir.

05R: After passing the DER this route has a 15° track adjustment to the right which routes it south of Stockport. This track continues until just to the south-west of Glossop where it combines with the option for 05L and returns to a runway heading. After overflying Glossop it makes a right turn to the east and terminates at 7,000ft just east of the Woodhead reservoir.

There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply. Due to the track-to-fix coding and simplicity of the route, dispersion is likely to be low even with maximum speeds.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS -OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 5L is 38km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 5R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 5L is estimated to overfly approximately 15,100 households with an approximate population of 34,900. Taking account of planned property developments, this option is estimated to impact a total population of 36,100. Up to 7,000ft, option 5L is estimated to overfly approximately 21,450 households with an approximate population of 49,500. Taking account of planned property developments, this option is estimated to impact a total population of 51,400. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 5R is estimated to overfly approximately 15,800 households with an approximate population of 46,410. Taking account of planned property developments, this option is estimated to impact a total population of 38,600. Up to 7,000ft, option 5R is estimated to overfly approximately 23,550 households with an approximate population of 55,600. Taking account of planned property developments, this option is estimated to impact a total population of 56,900. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 5L is estimated to overfly 101 noise sensitive areas. Up to 7,000ft, option 5L is estimated to overfly 105 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 5R is estimated to overfly 113 noise sensitive areas. Up to 7,000ft, option 5R is estimated to overfly 115 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

7.4 Runways 05L/05R East Option 6

Design Principle Evaluation	Option No: 6
Option Name: SID RW 05 L East Option 6	ACCEPT
Option Name: SID RW 05 R East Option 6	ACCEPT

Option Description:

This is an RNAV1 option to provide an initial route identical to the existing DESIG SID, but with an earlier turn towards the network joining point to the east. This has been done to align with current operational practice and routes it to the southern edge of route L975 in line with the NATS network traffic flow.

This option has a similar profile to option 4 but the right turn takes place approximately 2.5nm earlier.

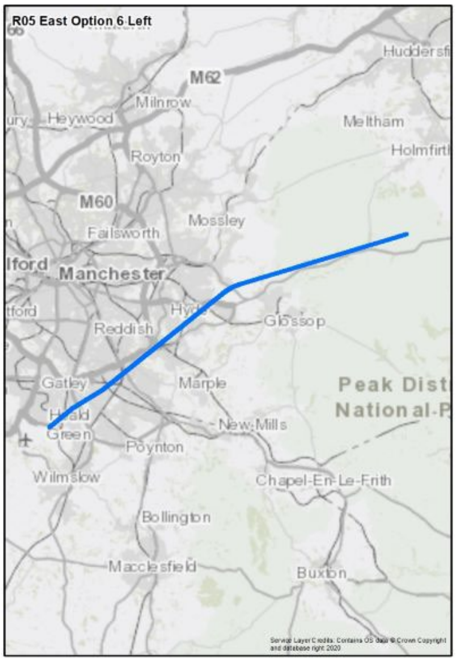
The design speed will permit many aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

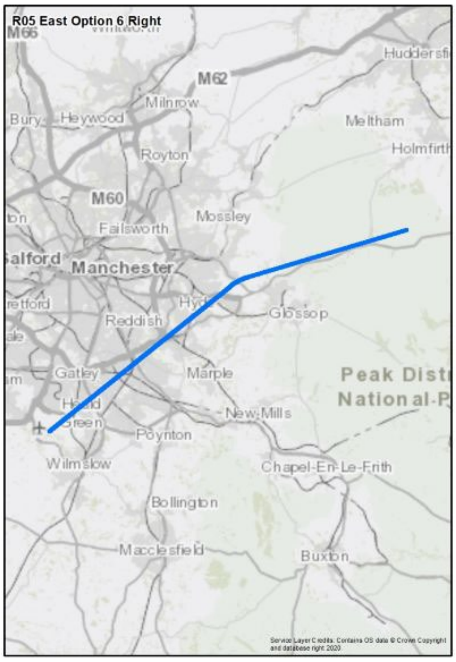
The route has been designed using fly-by waypoints.

05L: After departure, this route combines with the option for 05R and flies straight ahead overflying Stockport and the southern edge of Hyde. It routes to the west of Glossop at which point it makes a right turn to the east to the north of Glossop and terminates at 7,000ft overhead the Woodhead reservoir.

05R: After departure, this route combines with the option for 05L and flies straight ahead overflying Stockport and the southern edge of Hyde. It routes to the west of Glossop at which point it makes a right turn to the east to the north of Glossop and terminates at 7,000ft overhead the Woodhead reservoir.

There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 6R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6L is estimated to overfly approximately 25,950 households with an approximate population of 58,200. Taking account of planned property developments, this option is estimated to impact a total population of 58,200.

Up to 7,000ft, option 6L is estimated to overfly approximately 27,150 households with an approximate population of 60,900. Taking account of planned property developments, this option is estimated to impact a total population of 60,900.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 6R is estimated to overfly approximately 28,800 households with an approximate population of 65,000. Taking account of planned property developments, this option is estimated to impact a total population of 65,000.

Up to 7,000ft, option 6R is estimated to overfly approximately 30,200 households with an approximate population of 68,000. Taking account of planned property developments, this option is estimated to impact a total population of 68,000.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6L is estimated to overfly 124 noise sensitive areas.

Up to 7,000ft, option 6L is estimated to overfly 125 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 6R is estimated to overfly 146 noise sensitive areas.

Up to 7,000ft, option 6R is estimated to overfly 150 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

7.5 Runways 05L/05R East Option 7

Design Principle Evaluation	Option No: 7
Option Name: SID RW 05 L East Option 7	ACCEPT
Option Name: SID RW 05 R East Option 7	ACCEPT

Option Description:

This is an RNAV1 option that seeks to provide the shortest (most fuel efficient) route to the network joining point by using the earliest turn to the east, taking account of the constraints created by the base of controlled airspace.

It has a similar profile to options 4 and 6 except aircraft make the first right turn just north of Stockport to route to the network joining point. The position of this first turn is dictated by the dimensions of the controlled airspace to the east of Glossop which do not permit a turn and a direct route from an earlier point.

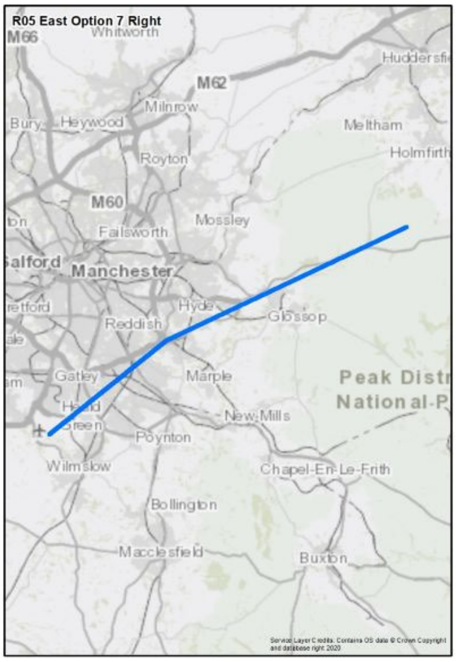
The design speed will permit many aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

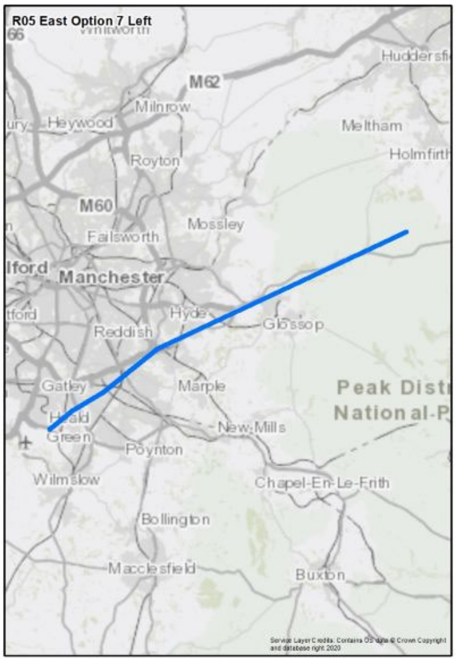
The route has been designed using fly-by waypoints.

05L: After departure, this route combines with the option for 05R and flies straight ahead overflying Stockport. Upon reaching Bredbury the route turns right to route south of Hyde and routes direct to the east to terminates at 7,000ft to the east of the Woodhead reservoir.

05R: After departure, this route combines with the option for 05L and flies straight ahead overflying Stockport. Upon reaching Bredbury the route turns right to route south of Hyde and routes direct to the east to terminates at 7,000ft to the east of the Woodhead reservoir.

There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 7R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 7L is estimated to overfly approximately 23,550 households with an approximate population of 51,300. Taking account of planned property developments, this option is estimated to impact a total population of 51n300. Up to 7,000ft, option 7L is estimated to overfly approximately 29,100 households with an approximate population of 63,900. Taking account of planned property developments, this option is estimated to impact a total population of 64,200. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 7R is estimated to overfly approximately 26,100 households with an approximate population of 57,400. Taking account of planned property developments, this option is estimated to impact a total population of 57,400. Up to 7,000ft, option 7R is estimated to overfly approximately 32,150 households with an approximate population of 71,000. Taking account of planned property developments, this option is estimated to impact a total population of 71,200. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 7L is estimated to overfly 113 noise sensitive areas. Up to 7,000ft, option 7L is estimated to overfly 115 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 7R is estimated to overfly 129 noise sensitive areas. Up to 7,000ft, option 7R is estimated to overfly 130 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

7.6 Runways 05L/05R East Option 8

Design Principle Evaluation	Option No: 8
Option Name: SID RW 05 L East Option 8	ACCEPT
Option Name: SID RW 05 R East Option 8	ACCEPT

Option Description:

This is an **RNAV1** option created to provide a 45° track divergence from northbound departures and enable a one-minute departure separation to align with the Design Principle Capacity. This one-minute separation between north and eastbound departures is not possible on other options within this design envelope all of which will all require two minutes separation.

In line with CAP493 Manual of Air Traffic Services Pt1, the minimum departure separation can be reduced to one minute provided that the aircraft fly on tracks diverging by 45° or more immediately after take-off.

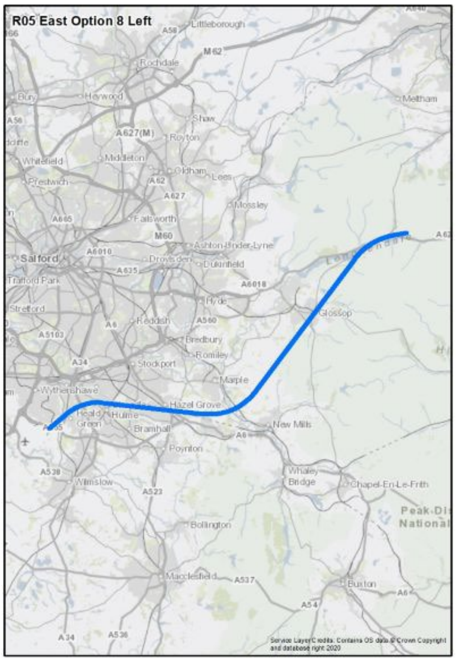
This right turn also has a benefit in reducing the impact of noise for communities on the extended runway centreline that are impacted by Runways 23R/23L arrivals and Runways 05L/05R north departures. The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

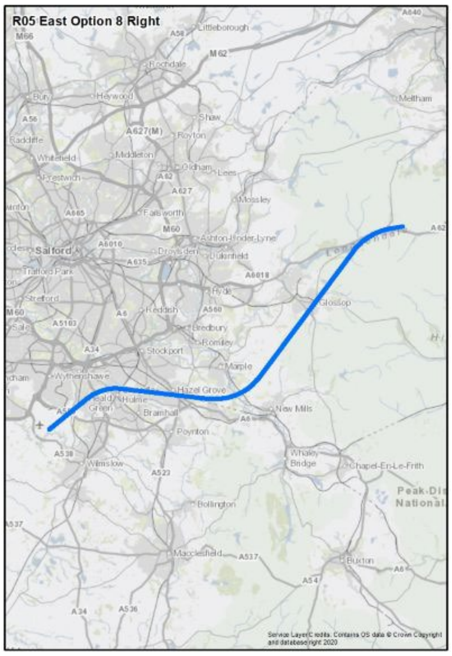
This option has a right turn no earlier than 1nm from DER, which is in accordance with CAP778.

The route has been designed as an RNAV1 route using fly-over and fly-by waypoints.

05L: After departure, this route makes a 45° turn to the right at 1nm from the DER and combines with the option for 05R. This routes it overhead Hazel Grove after which it makes a second turn to the left to route in a north-easterly direction. It overflies Glossop before making a final right turn to the east and terminates at 7,000ft to the Woodhead reservoir.

05R After departure this route makes a 45° turn to the right at approximately 2.1nm from the DER and combines with the option for 05L. This routes it overhead Hazel Grove after which it makes a second turn to the left to route in a north-easterly direction. It overflies Glossop before making a final right turn to the east and terminates at 7,000ft to the Woodhead reservoir.





A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.				
Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 8R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 8L is estimated to overfly approximately 8,750 households with an approximate population of 21,000. Taking account of planned property developments, this option is estimated to impact a total population of 21,300. Up to 7,000ft, option 8L is estimated to overfly approximately 16,900 households with an approximate population of 39,300. Taking account of planned property developments, this option is estimated to impact a total population of 39,800. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 8R is estimated to overfly approximately 10,700 households with an approximate population of 25,900. Taking account of planned property developments, this option is estimated to impact a total population of 26,100. Up to 7,000ft, this option is estimated to overfly approximately 18,900 households with an approximate population of 44,100. Taking account of planned property developments, this option is estimated to impact a total population of 44,700 When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 8L is estimated to overfly 55 noise sensitive areas. Up to 7,000ft, option 8L is estimated to overfly 55 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 8R is estimated to overfly 64 noise sensitive areas. Up to 7,000ft, option 8R is estimated to overfly 65 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

7.7 Runways 05L/05R East Viable but Poor Fit Options

<table>
<tr><th>Option</th><th>Safety</th><th>Policy</th><th>Capacity</th></tr>
<tr><td>A2 Track divergence 15° to the south then continue north-east.</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Originally option 2 this uses initial track adjustment of 15° right of the departure track, then routing directly north-east to terminate close to the current DESIG SID.

Safety: Inbound aircraft to both MAN and LPL are routed westbound in the area towards the end of this option. This option would route traffic in conflict with this traffic flow. As a result, this option was not considered safe and does not comply with industry standards and regulations.

Because of this conflict, this option was replaced with option 5 which turns traffic south at the end of the SID.</td></tr>
<tr><td>B3 Route directly to the east</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Originally option 3, this was considered to formalise tracks that are representative of current operations, where ATC provide a bearing to the east following take off and reaching the correct altitude permitted for vectors.

Safety: This option would not be compliant with airspace containment requirements for slower climbing aircraft and has the possibility to interact with Camphill gliding operations.

Policy: May require additional controlled airspace, which is not aligned to the aims of the AMS.</td></tr>
<tr><td>C9 Track divergence 15° to the north then route direct north-east.</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">An alternative version of this option was considered whereby the route diverges 15° to the north.

Safety: Inbound aircraft to both MAN and LPL are routed westbound in the area towards the end of this option. This option would route traffic in conflict with this traffic flow.</td></tr>
<tr><td>D10 Left-hand wraparound</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">After departure from Runway 05L/05R, aircraft would make a left-hand turn, fly around the airport then begin heading north-east towards the SID aiming point.

Policy: This option involves greater track mileage than is necessary by taking traffic north and west before turning it east, leading to increased fuel burn and emissions which means the option does not meet with the AMS.

Capacity: This option interacts with arrivals from the north and the south departure envelope, which would not enable best use of runway capacity.</td></tr>
<tr><td>E11 Right-hand wraparound</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">After departure from Runway 05L/05R, aircraft would make a right-hand turn, fly around the airport then begin heading north-east towards the SID aiming point.

Safety: This option is expected to interact with the Runway 05R MAP.

Policy: This option involves greater track mileage than is necessary by taking traffic south and west before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

Capacity: This option interacts with arrivals from the south along with the 05 South Departure Envelope, which would limit the ability to enable best use of runway capacity.</td></tr>
</table>

F12: Left turn towards north then right-hand turn back to east			
After departure from Runway 05L/05R, aircraft would make a left turn to head north before turning right to the SID aiming point. Policy: This option involves greater track mileage than is necessary by taking traffic north before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option will interact with departures in the north envelope which would limit the ability to achieve one minute departure splits and not enabling best of runway capacity.			

8 Runways 05L/05R South

8.1 Runways 05L/05R South Option 1

Design Principle Evaluation	Option No: 1
Option Name: SID RW 05 L South Option 1	ACCEPT
Option Name: SID RW 05 R South Option 1	ACCEPT

Option Description:

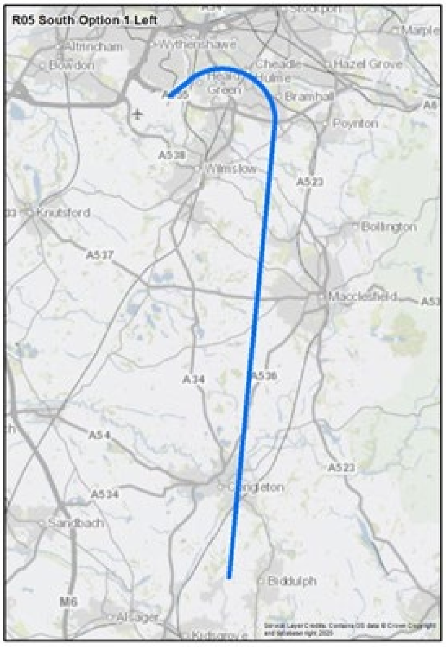
Option 1 is included to provide an RNAV1 replication of the existing conventional LISTO 2S/2Z SID. As a replicated route it follows a similar track over the ground as the current route to connect to the NATS network.

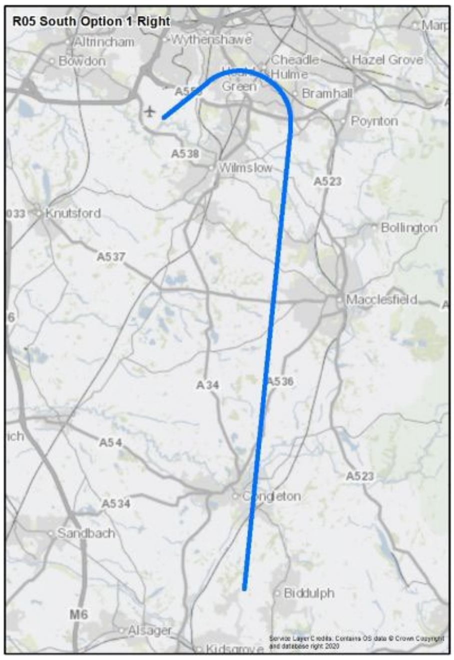
The fly-over waypoints for the right turn to the south are positioned at the position of the existing markers. For Runway 05L this is at the MCT D1.2 point which less than 1nm from DER but as this replicates the turn of the current procedure it aligns to the Design Principle Safety.

After departure the routes turn right to pass overhead Cheadle Hulme at which point they combine. They then pass just to the west of Woodford and Macclesfield and overfly Congleton and terminate at 7,000ft just west of Biddulph.

An element of dispersion will be present in the right turn to the south due to the fly-over coding and the variables that affect this. This is seen currently with the conventional procedure.

A speed restriction of 185 KIAS is used for the first turn.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET	
	05R	NOT MET	PARTIAL	MET	

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 replication of the existing conventional LISTO 2S 2Z SID. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV 1 replication routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1L is 38km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1L is estimated to overfly approximately 5,750 households with an approximate population of 13,700. Taking account of planned property developments, this option is estimated to impact a total population of 15,000.

Up to 7,000ft, this option is estimated to overfly approximately 17,950 households with an approximate population of 40,800. Taking account of planned property developments, this option is estimated to impact a total population of 46,400.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 1R is estimated to overfly approximately 7,950 households with an approximate population of 19,400. Taking account of planned property developments, this option is estimated to impact a total population of 21,000.

Up to 7,000ft, this option is estimated to overfly approximately 20,150 households with an approximate population of 46,600. Taking account of planned property developments, this option is estimated to impact a total population of 52,400.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1L is estimated to overfly 40 noise sensitive areas.

Up to 7,000ft, option 1L is estimated to overfly 40 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 1R is estimated to overfly 44 noise sensitive areas.

Up to 7,000ft, option 1R is estimated to overfly 45 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

8.2 Runways 05L/05R South Option 2A

Design Principle Evaluation	Option No: 2A
Option Name: SID RW 05 L South Option 2A	REJECT
Option Name: SID RW 05 R South Option 2A	REJECT

Option Description:

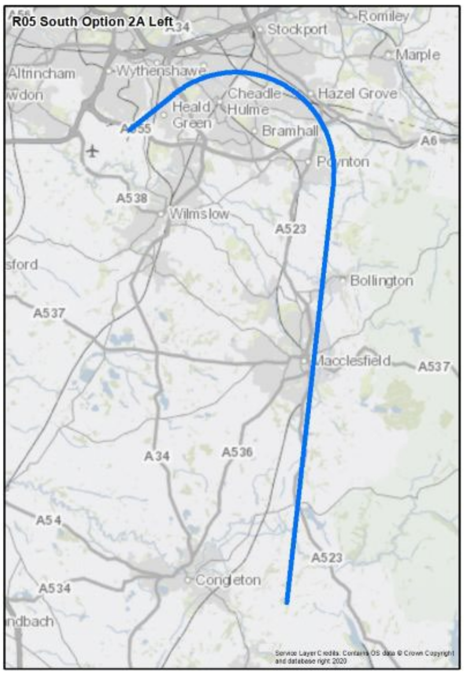
This is an **RNP1** option with RF coding that makes a turn at the recommended PANS-OPS distance from the end of the runway. This results in a wider turn and a track to the eastern edge of the envelope.

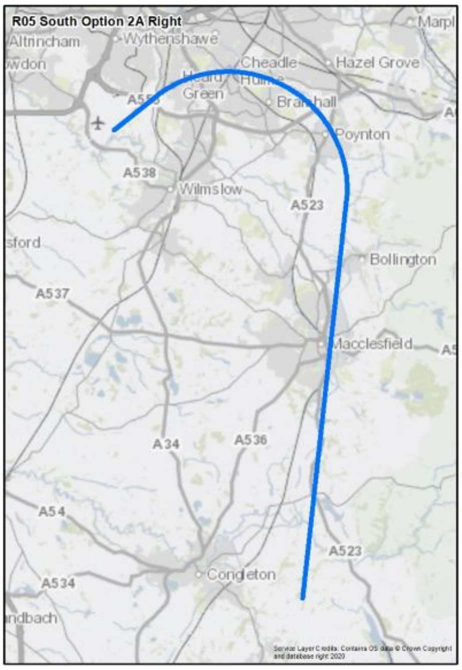
The wider track allows a greater speed in the turn which permits aircraft to be in a clean configuration (without the use of flaps). This has potential benefits in terms of noise. The wider arc may also aid vertical separation from MAN arriving traffic from the south by allowing aircraft to climb higher before any potential interaction.

05L: After departure, this route turns right shortly after Heald Green in a wide turn that routes it just east of Poynton where it combines with the route for 05R. The routes continue south passing overhead Macclesfield and terminate at 7,000ft to the east of Congleton.

05R: After departure, this route turns right in a track that is inside the route for 05L and that passes overhead Cheadle Hulme and Poynton where it combines with the route for 05L. The routes continue south passing overhead Macclesfield and terminate at 7,000ft to the east of Congleton.

A speed restriction of 220 KIAS is applied to the first turn.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2A L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 2A R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	**PARTIAL**	MET
	05R	**NOT MET**	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to overfly approximately 15,550 households with an approximate population of 36,700. Taking account of planned property developments, this option is estimated to impact a total population of 37,900.

Up to 7,000ft, this option is estimated to overfly approximately 30,750 households with an approximate population of 68,500. Taking account of planned property developments, this option is estimated to impact a total population of 73,300.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 2A R is estimated to overfly approximately 12,800 households with an approximate population of 30,100. Taking account of planned property developments, this option is estimated to impact a total population of 30,900.

Up to 7,000ft, this option is estimated to overfly approximately 27,700 households with an approximate population of 61,200. Taking account of planned property developments, this option is estimated to impact a total population of 65,500.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	**MET**
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	**NOT MET**	PARTIAL	MET
	05R	**NOT MET**	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to overfly 92 noise sensitive areas.

Up to 7,000ft, option 2A L is estimated to overfly 95 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 2A R is estimated to overfly 74 noise sensitive areas.

Up to 7,000ft, option 2A R is estimated to overfly 75 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

	05L	NOT MET	PARTIAL	**MET**

Design Principle **Airspace**	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

8.3 Runways 05L/05R South Option 2B

Design Principle Evaluation	Option No: 2B
Option Name: SID RW 05 L South Option 2B	REJECT
Option Name: SID RW 05 R South Option 2B	REJECT

Option Description:

This is an **RNP1** option with RF coding that has the same first turn as option 2A but then routes south-west then south to avoid both Macclesfield and Congleton in line with the Design Principle Noise N1.

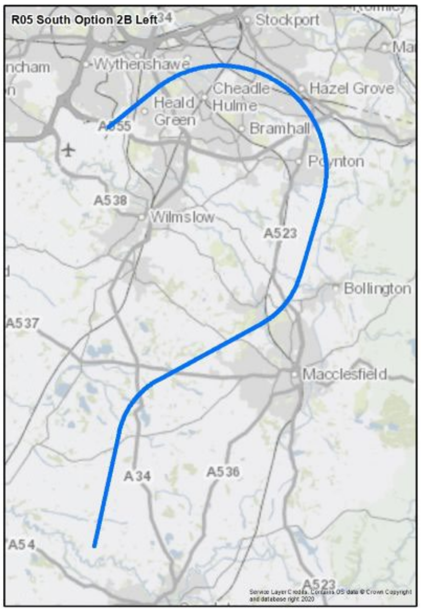
As with option 2A, the wider track allows a greater speed in the turn which permits aircraft to be in a clean configuration (without the use of flaps). This has potential benefits in terms of noise. The wider arc may also aid vertical separation from MAN arriving traffic from the south by re-creating common ATC operational practice to separate departures and arrivals above 4,000ft.

The design speed will permit many aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

05L: After departure, this route turns right shortly after Heald Green in a wide turn that routes it just east of Poynton where it combines with the route for 05R. The routes continue south passing overhead Macclesfield and terminate at 7,000ft to the east of Congleton.

05R: After departure this route turns right in a track that is inside the route for 05L and that passes overhead Cheadle Hulme and Poynton where it combines with the route for 05R. The routes continue south passing overhead Macclesfield and terminate at 7,000ft to the east of Congleton.

A speed restriction of 220 KIAS is applied to the first turn.



Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2B L is 49km (26nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. The estimated track length of option 2B R is 48km (26nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2B L is estimated to overfly approximately 14,100 households with an approximate population of 33,700. Taking account of planned property developments, this option is estimated to impact a total population of 34,500. Up to 7,000ft, this option is estimated to overfly approximately 17,550 households with an approximate population of 42,100. Taking account of planned property developments, this option is estimated to impact a total population of 43,400. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 2B R is estimated to overfly approximately 12,100 households with an approximate population of 28,800. Taking account of planned property developments, this option is estimated to impact a total population of 29,400. Up to 7,000ft, this option is estimated to overfly approximately 14,650 households with an approximate population of 35,000. Taking account of planned property developments, this option is estimated to impact a total population of 36,100. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2B L is estimated to overfly 81 noise sensitive areas. Up to 7,000ft, option 2B L is estimated to overfly 85 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 2B R is estimated to overfly 66 noise sensitive areas. Up to 7,000ft, option 2B R is estimated to overfly 70 noise sensitive areas.				

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

8.4 Runways 05L/05R South Option 3

Design Principle Evaluation	Option No: 3
Option Name: SID RW 05 L South Option 3	ACCEPT
Option Name: SID RW 05 R South Option 3	ACCEPT

Option Description:

This is an **RNP1** option with RF coding to provide a tight right turn then routing south-west to align with current operational practice.

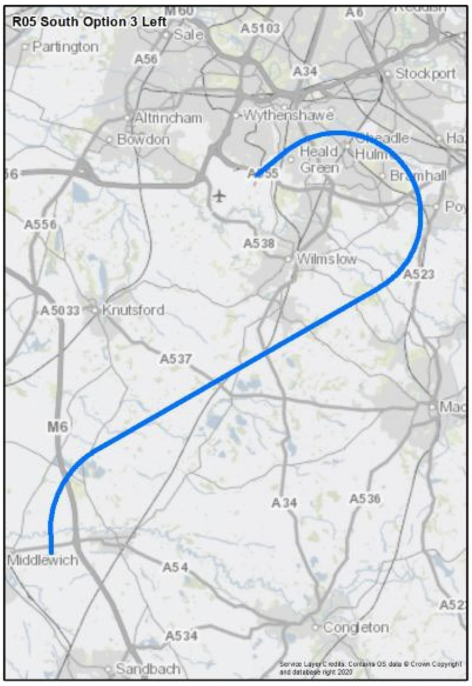
The track following the right turn is often used by ATC to resolve interactions between flights on the LISTO departure and MAN arrivals from the south. This option therefore re-creates common operational practice above 4,000ft.

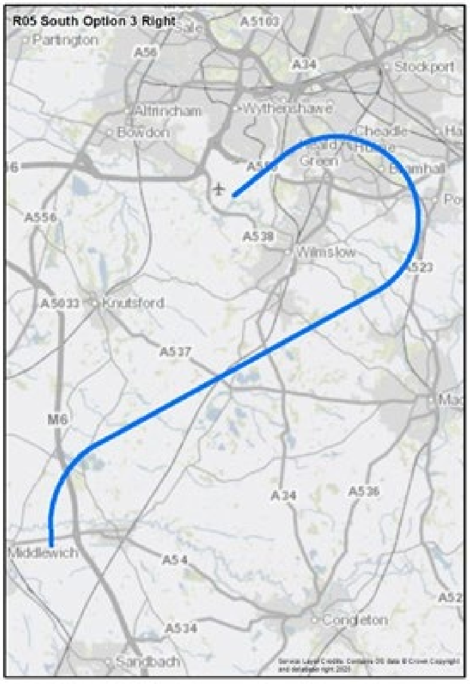
In the case of 05L, the turn point is at a minimum distance of 1nm from the DER, in accordance with PANS-OPS and CAP778. The turn point for 05R is located at a point roughly perpendicular to 05L, to create a similar ground track in the turn and subsequent leg.

05L: After departure this route turns right shortly after Heald Green in a tight radius turn that routes it inside of Poynton. This turn is continued onto a south-west heading to take it south of Wilmslow and Alderley Edge. It makes a left turn to head south to the north of Holmes Chapel and terminates at 7,000ft east of Middlewich.

05R: After departure this route turns right shortly after Heald Green in a tight radius turn that routes it inside of Poynton. This turn is continued onto a south-west heading to take it south of Wilmslow and Alderley Edge. It makes a left turn to head south to the north of Holmes Chapel and terminates at 7,000ft east of Middlewich.

A speed restriction of 190 KIAS is applied to the first turn which allows the smallest radius. Although PANS-OPS compliant it should be tested for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3L is 55km (30nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. The estimated track length of option 3R is 56km (30nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 3L is estimated to overfly approximately 4,900 households with an approximate population of 11,900. Taking account of planned property developments, this option is estimated to impact a total population of 12,200. Up to 7,000ft, this option is estimated to overfly approximately 6,750 households with an approximate population of 16,200. Taking account of planned property developments, this option is estimated to impact a total population of 17,400. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft Up to 4,000ft, option 3R is estimated to overfly approximately 6,950 households with an approximate population of 16,800. Taking account of planned property developments, this option is estimated to impact a total population of 17,300. Up to 7,000ft, this option is estimated to overfly approximately 8,800 households with an approximate population of 21,200. Taking account of planned property developments, this option is estimated to impact a total population of 22,600. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 3L is estimated to overfly 31 noise sensitive areas. Up to 7,000ft, option 3L is estimated to overfly 35 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 3R is estimated to overfly 110 noise sensitive areas. Up to 7,000ft, option 3R is estimated to overfly 110 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

8.5 Runways 05L/05R South Option 4

Design Principle Evaluation	Option No: 4
Option Name: SID RW 05 L South Option 4	REJECT
Option Name: SID RW 05 R South Option 4	REJECT

Option Description:

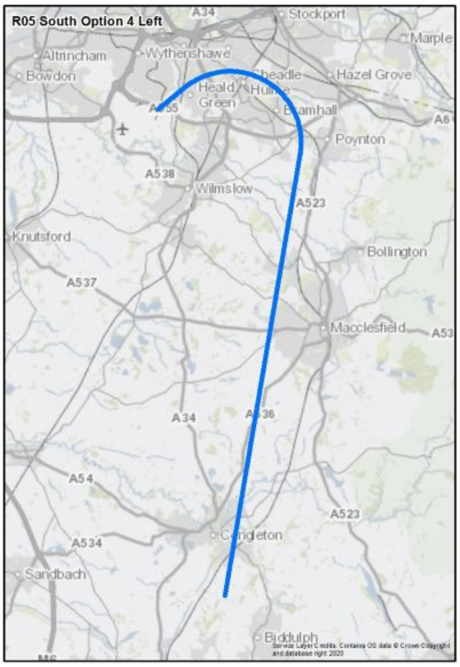
This is included as an **RNP1** route using RF coding that is similar to the current LISTO 2S/2Z SID. The use of RF coding results in a slightly wider first turn and a route slightly east of the 'do minimum' option which uses RNAV1.

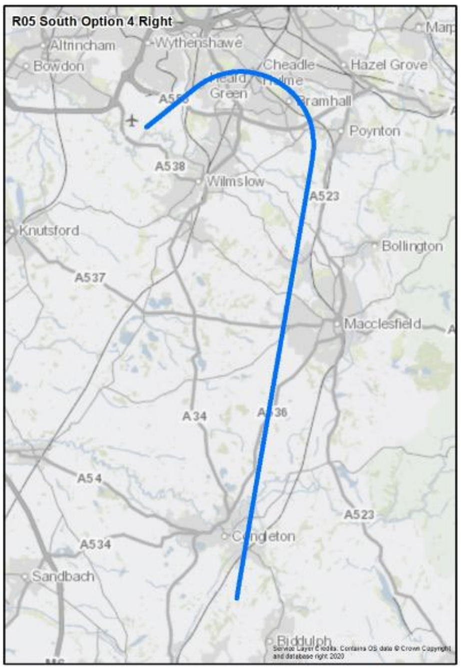
In the case of 05L, the turn point is at a minimum distance of 1nm from the DER, in accordance with PANS-OPS and CAP778. The turn point for Runway 05R is located at a point roughly perpendicular to Runway 05L, to create a similar ground track in the turn and subsequent leg.

05L: After departure, the route turns right to pass just north of Cheadle Hulme and combines with the option for 05R just west of Poynton. They then pass just to the west of Macclesfield and just east of Congleton and terminate at 7,000ft just north of Biddulph.

05R: After departure the route turns right to pass just north of Cheadle Hulme and combines with the option for 05L just west of Poynton. They then pass just to the west of Macclesfield and just east of Congleton and terminate at 7,000ft just north of Biddulph.

A speed restriction of 190 KIAS is applied to the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 4R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4L is estimated to overfly approximately 9,600 households with an approximate population of 23,000. Taking account of planned property developments, this option is estimated to impact a total population of 25,100. Up to 7,000ft, this option is estimated to overfly approximately 21,300 households with an approximate population of 49,300. Taking account of planned property developments, this option is estimated to impact a total population of 54,600. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 4R is estimated to overfly approximately 11,450 households with an approximate population of 27,600. Taking account of planned property developments, this option is estimated to impact a total population of 29,000. Up to 7,000ft, this option is estimated to overfly approximately 24,000 households with an approximate population of 55,600. Taking account of planned property developments, this option is estimated to impact a total population of 60,900. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4L is estimated to overfly 55 noise sensitive areas. Up to 7,000ft, option 4L is estimated to overfly 55 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 4R is estimated to overfly 52 noise sensitive areas. Up to 7,000ft, option 4R is estimated to overfly 55 noise sensitive areas.				

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

8.6 Runways 05L/05R South Option 5

Design Principle Evaluation	Option No: 5
Option Name: SID RW 05 L South Option 5	REJECT
Option Name: SID RW 05 R South Option 5	REJECT

Option Description:

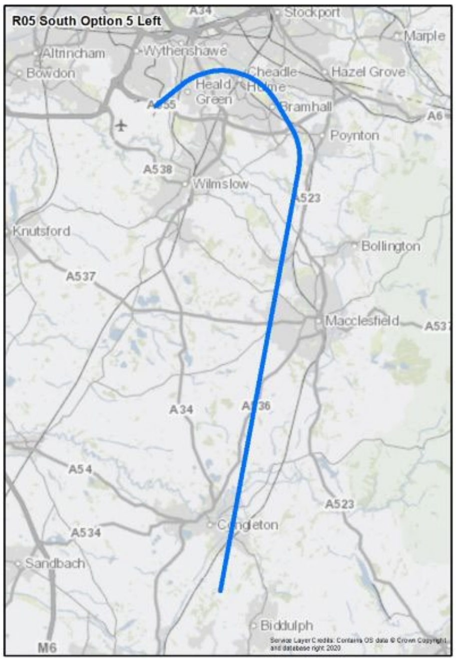
This option is included to provide a **RNAV1** route that is similar to that of the existing conventional LISTO 2S/2Z SID but with the first turn slightly later. This turn has been designed to be no earlier than 1nm from DER for Runway 05L and at the DME1.2 marker for Runway 05R, in line with CAA and PANS-OPS first turn recommendations. This results in a track that is almost identical to option 4 but using different technology.

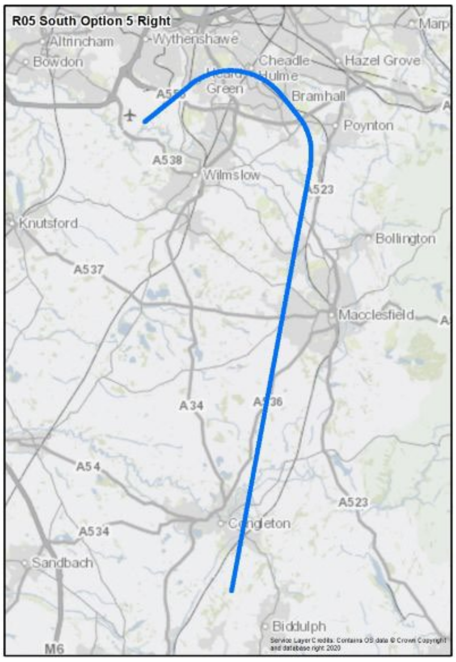
The route uses fly-by waypoints.

05L: After departure, the route turns right to pass just north of Cheadle Hulme and combines with the option for 05R just west of Poynton. They then pass just to the west of Macclesfield and just east of Congleton and terminate at 7,000ft just north of Biddulph.

05R: After departure the route turns right to pass just north of Cheadle Hulme and combines with the option for 05L just west of Poynton. They then pass just to the west of Macclesfield and just east of Congleton and terminate at 7,000ft just north of Biddulph.

A speed restriction of 200 KIAS for the first turn and 210 KIAS for the second turn is used to keep segment lengths and track miles to a minimum.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide RNAV1 routes. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV1 routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

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Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 5L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 5R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**				
	05L	NOT MET	**PARTIAL**	MET
	05R	**NOT MET**	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5L is estimated to overfly approximately 11,100 households with an approximate population of 26,100. Taking account of planned property developments, this option is estimated to impact a total population of 27,300.

Up to 7,000ft, this option is estimated to overfly approximately 22,350 households with an approximate population of 51,400. Taking account of planned property developments, this option is estimated to impact a total population of 55,800.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 5R is estimated to overfly approximately 12,150 households with an approximate population of 29,100. Taking account of planned property developments, this option is estimated to impact a total population of 30,200.

Up to 7,000ft, this option is estimated to overfly approximately 24,250 households with an approximate population of 56,200. Taking account of planned property developments, this option is estimated to impact a total population of 60,700.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**				
	05L	NOT MET	PARTIAL	**MET**
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	05L	NOT MET	**PARTIAL**	MET
	05R	**NOT MET**	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5L is estimated to overfly 55 noise sensitive areas.

Up to 7,000ft, option 5L is estimated to overfly 55 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 5R is estimated to overfly 61 noise sensitive areas.

Up to 7,000ft, option 5R is estimated to overfly 65 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

	05L	NOT MET	PARTIAL	**MET**

<table>
<tr><td>Design Principle Airspace</td><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.</td></tr>
<tr><td rowspan="2">Design Principle Technology</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.</td></tr>
</table>

8.7 Runways 05L/05R South Option 6A

Design Principle Evaluation	Option No: 6A
Option Name: SID RW 05 L South Option 6A	ACCEPT
Option Name: SID RW 05 R South Option 6A	ACCEPT

Option Description:

This is an **RNP1** option with RF coding to provide a tight right turn to route south-west to align with current operational practice. It is similar to option 3 initially but uses a higher speed in the initial turn which allow aircraft to climb more quickly, and it then turns south earlier.

This design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

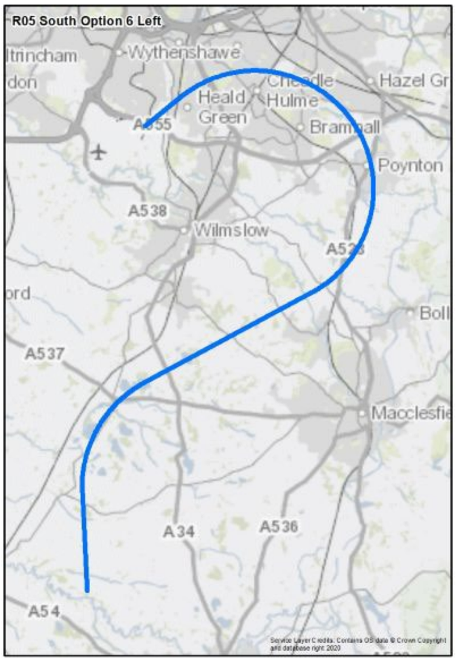
The track following the right turn is often used by ATC to resolve interactions between flights on the LISTO departure and MAN arrivals from the south. This option therefore re-creates common operational practice above 4,000ft.

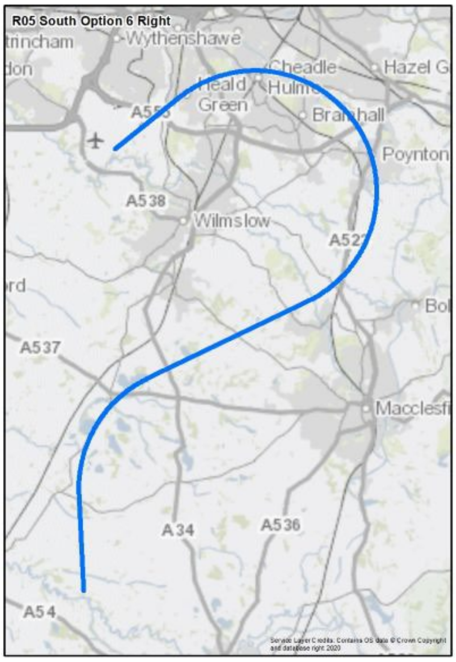
In the case of 05L, the turn point is at a minimum distance of 1nm from the DER, in accordance with PANS-OPS and CAP778. The turn point for Runway 05R is located at a point roughly perpendicular to Runway 05L, to create a similar ground track in the turn and subsequent leg.

05L: After departure, this route turns right shortly after Heald Green to route overhead Poynton. This turn is continued onto a south-west heading to take it south of Wilmslow and Alderley Edge and west of Macclesfield. It makes a left turn to head south at Chelford and terminates at 7,000ft east of Holmes Chapel.

05R: After departure, this route turns right shortly after Heald Green to route overhead Poynton. This turn is continued onto a south-west heading to take it south of Wilmslow and Alderley Edge and west of Macclesfield. It makes a left turn to head south at Chelford and terminates at 7,000ft east of Holmes Chapel.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6A L is 49km (26nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

The estimated track length of option 6A R is 50km (27nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to overfly approximately 8,800 households with an approximate population of 20,800. Taking account of planned property developments, this option is estimated to impact a total population of 21,300.

Up to 7,000ft, this option is estimated to overfly approximately 10,300 households with an approximate population of 24,100. Taking account of planned property developments, this option is estimated to impact a total population of 25,400.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 6A R is estimated to overfly approximately 9,500 households with an approximate population of 22,800. Taking account of planned property developments, this option is estimated to impact a total population of 23,300.

Up to 7,000ft, this option is estimated to overfly approximately 11,000 households with an approximate population of 26,100. Taking account of planned property developments, this option is estimated to impact a total population of 27,400.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to overfly 51 noise sensitive areas.

Up to 7,000ft, option 6A L is estimated to overfly 55 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 6A R is estimated to overfly 57 noise sensitive areas.

Up to 7,000ft, option 6A R is estimated to overfly 60 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

8.8 Runways 05L/05R South Option 6B

Design Principle Evaluation	Option No: 6B
Option Name: SID RW 05 L South Option 6B	REJECT
Option Name: SID RW 05 R South Option 6B	REJECT

Option Description:

This is an **RNP1** option with RF coding to provide a tight right turn to route south-west to align with current operational practice. It is identical to option 6 in the speed and initial right turn but has a left turn to the south earlier to follow the course of the A34 which has a level of ambient noise.

This design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

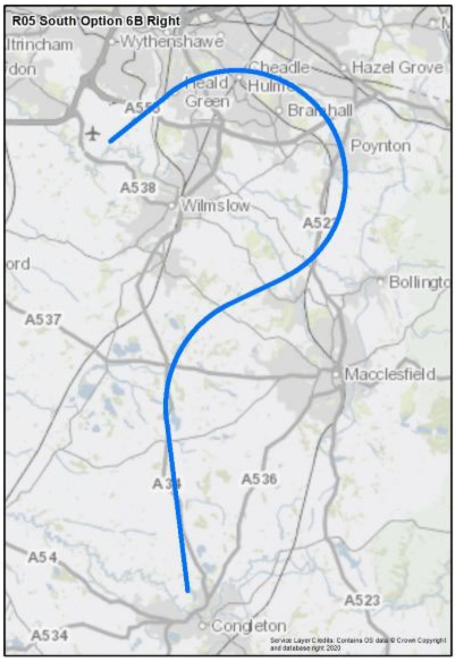
The track following the right turn is often used by ATC to resolve interactions between flights on the LISTO departure and MAN arrivals from the south. This option therefore re-creates common operational practice above 4,000ft.

In the case of 05L, the turn point is at a minimum distance of 1nm from the DER, in accordance with PANS-OPS and CAP778. The turn point for Runway 05R is located at a point roughly perpendicular to Runway 05L, to create a similar ground track in the turn and subsequent leg.

05L: After departure, this route turns right shortly after Heald Green to route overhead Poynton. This turn is continued onto a south-west heading to take it south of Wilmslow and Alderley Edge and west of Macclesfield. It makes a left turn to head south between Chelford and Macclesfield, roughly following the A34 road to terminate at 7,000ft just north of Congleton.

05R: After departure, this route turns right shortly after Heald Green to route overhead Poynton. This turn is continued onto a south-west heading to take it south of Wilmslow and Alderley Edge and west of Macclesfield. It makes a left turn to head south between Chelford and Macclesfield, roughly following the A34 road to terminate at 7,000ft just north of Congleton.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.



Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6B L is 45km (24nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

The estimated track length of option 6B R is 46km (25nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to overfly approximately 8,850 households with an approximate population of 20,900. Taking account of planned property developments, this option is estimated to impact a total population of 21,300.

Up to 7,000ft, this option is estimated to overfly approximately 15,950 households with an approximate population of 36,200. Taking account of planned property developments, this option is estimated to impact a total population of 41,200.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 6B R is estimated to overfly approximately 9,550 households with an approximate population of 22,900. Taking account of planned property developments, this option is estimated to impact a total population of 23,300.

Up to 7,000ft, this option is estimated to overfly approximately 16,700 households with an approximate population of 38,300. Taking account of planned property developments, this option is estimated to impact a total population of 43,400.

This is less than or similar to the ‘do nothing’ scenario at 4,000ft, but greater than the ‘do nothing’ scenario at 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to overfly 50 noise sensitive areas.

Up to 7,000ft, option 6B L is estimated to overfly 50 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 6B R is estimated to overfly 57 noise sensitive areas.

Up to 7,000ft, option 6B R is estimated to overfly 60 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

8.9 Runways 05L/05R South Viable but Poor Fit Options

Note: Because the options development process for 05 South Right Turn and Left Turn took place simultaneously, the viable but poor fit options are identical and apply equally to both envelopes.

<table>
<tr><th>Option</th><th>Safety</th><th>Policy</th><th>Capacity</th></tr>
<tr><td>A11 Extended straight ahead then right towards south</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">After departure from Runway 05L/05R, aircraft would continue straight ahead to Stockport before making a 180° right-hand turn, southwest, towards the SID aiming point.

<u>Policy</u>: This option involves greater track mileage than is necessary by taking traffic a significant distance east before turning it south, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

<u>Capacity:</u> This option would take the same track as departures in the east which could limit the ability to enable best use of runway capacity and limit the ability to achieve one minute departure splits.</td></tr>
<tr><td>B12 Extended straight ahead then left towards south</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">After departure from Runway 05L/05R, aircraft would continue straight ahead to Stockport before making a 180° left-hand turn, south-west, and then another left-hand turn to the south-west, towards the SID aiming point.

<u>Policy</u>: This option involves greater track mileage than is necessary by taking traffic east before turning it west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

<u>Capacity</u>: This option is expected to interact with arrivals from the north along with departures in the 05 East Design Envelope, which could limit the ability to enable best use of runway capacity and limit the ability to achieve one-minute departure splits.</td></tr>
<tr><td>C13 Extended straight ahead then extended left towards south</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">After departure from Runway 05L/05R, aircraft would continue straight ahead beyond Stockport before making a gradual 180° left-hand turn, heading south-west, and then another left-hand turn to the south-west, towards the SID aiming point.

<u>Policy</u>: This option involves greater track mileage than is necessary by taking traffic a significant distance east before turning it west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

<u>Capacity</u>: This option is expected to interact with arrivals from the north along with departures in the 05 East Design Envelope, which could limit the ability to which could limit the ability to enable best use of runway capacity or limit the ability to achieve one minute departure splits.</td></tr>
</table>

9 Runways 05L/05R South (Left Turn)

9.1 Runways 05L/05R South Option 7A Left Turn

Design Principle Evaluation	Option No: 7A Left Turn
Option Name: SID RW 05 L South Option 7A Left Turn	ACCEPT
Option Name: SID RW 05 R South Option 7A Left Turn	ACCEPT

Option Description:

This is an **RNP1** option with RF coding that turns left after departure to route north of Sale and then head south-west before heading south.

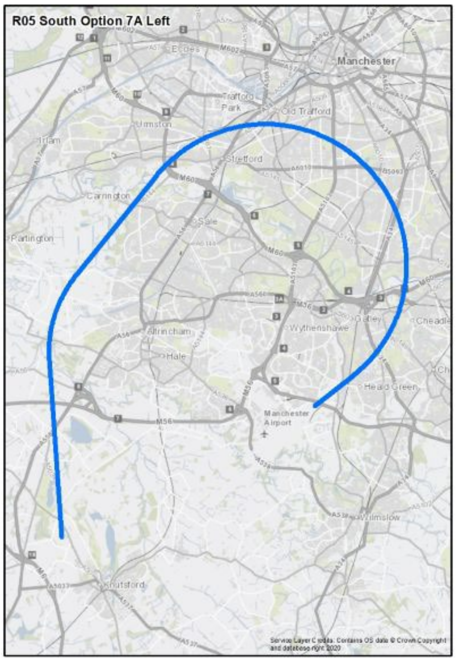
The design speed will permit many aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

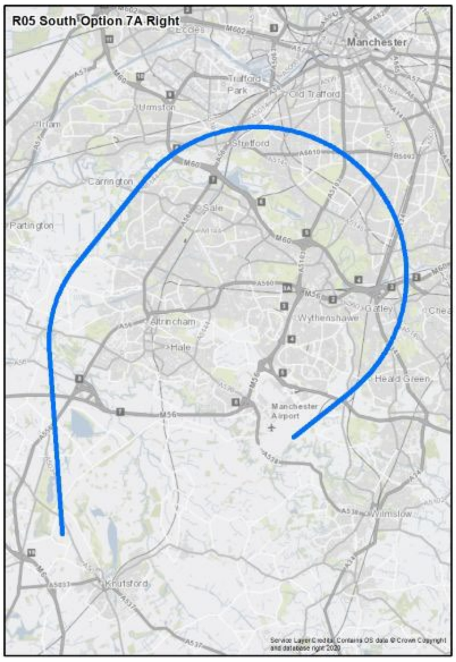
Although this option creates more track miles to route to the south, because of the large number of southbound departures it has potential to aid departure flow and achieving one-minute splits for southbound SIDs to align to the Design Principle Capacity.

05L: After departure this route turns left shortly after Heald Green to route overhead Cheadle. This turn is continued in a wide arc to the north of Chorlton and Sale and overhead Stretford where it combines with the option for 05R. It then heads south-west for a short straight segment and passes north of Altrincham where it makes a left turn to head south and terminates at 7,000ft west of Tatton Park.

05R: After departure this route turns left shortly after Heald Green to route overhead Cheadle. This turn is continued in a wide arc to the north of Chorlton and Sale and overhead Stretford where it combines with the option for 05L. It then heads south-west for a short straight segment and passes north of Altrincham where it makes a left turn to head south and terminates at 7,000ft west of Tatton Park.

A speed restriction of 220 KIAS has been applied to the first turn which allows most aircraft to fly in a clean configuration.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7A L is 45km (24nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

The estimated track length of option 7A R is 45km (24nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 7A L is estimated to overfly approximately 44,250 households with an approximate population of 115,300. Taking account of planned property developments, this option is estimated to impact a total population of 117,600. Up to 7,000ft, this option is estimated to overfly approximately 51,000 households with an approximate population of 130,700. Taking account of planned property developments, this option is estimated to impact a total population of 134,300. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 7A R is estimated to overfly approximately 41,450 households with an approximate population of 106,100. Taking account of planned property developments, this option is estimated to impact a total population of 106,100. Up to 7,000ft, this option is estimated to overfly approximately 48,150 households with an approximate population of 121,500. Taking account of planned property developments, this option is estimated to impact a total population of 122,800. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 7A L is estimated to overfly 206 noise sensitive areas. Up to 7,000ft, option 7A L is estimated to overfly 210 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 7A R is estimated to overfly 182 noise sensitive areas. Up to 7,000ft, option 7A R is estimated to overfly 185 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

9.2 Runways 05L/05R South Option 7B Left Turn

Design Principle Evaluation	Option No: 7B Left Turn
Option Name: SID RW 05 L South Option 7B Left Turn	REJECT
Option Name: SID RW 05 R South Option 7B Left Turn	REJECT

Option Description:

This is an **RNP1** option with RF coding that turns left after departure to route north of Sale. It is initially the same as option 7A, except the track routes further south-west before making the left turn south.

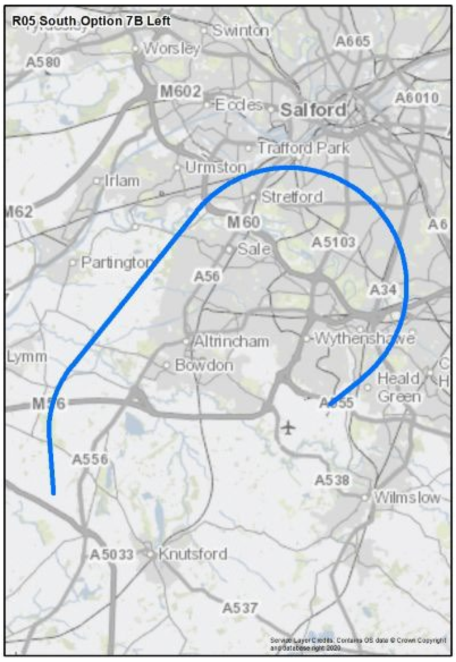
The design speed will permit many aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

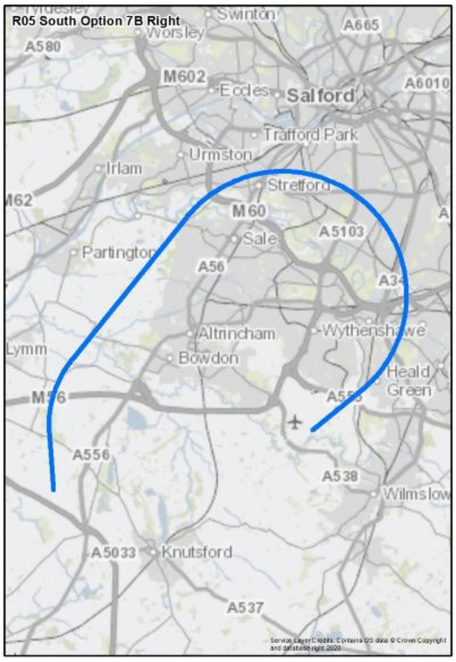
Although this option creates more track miles to route to the south, because of the large number of southbound departures it has potential to aid departure flow and achieving 1-minute splits for southbound SIDs to align to the Design Principle Capacity.

05L: After departure this route turns left shortly after Heald Green to route overhead Cheadle. This turn is continued in a wide arc to the north of Chorlton and Sale and overhead Stretford where it combines with the option for 05R. It then heads south-west for a straight segment and passes north of Altrincham and makes a left turn to head south between Boden and the Lymm Interchange on the M6. It terminates at 7,000ft close to Over Tabley.

05R: After departure this route turns left shortly after Heald Green to route overhead Cheadle. This turn is continued in a wide arc to the north of Chorlton and Sale and overhead Stretford where it combines with the option for 05L. It then heads south-west for a straight segment and passes north of Altrincham and makes a left turn to head south between Boden and the Lymm Interchange on the M6. It terminates at 7,000ft close to Over Tabley.

A speed restriction of 220 KIAS has been applied to the first turn which allows most aircraft to fly in a clean configuration.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7B L is 47km (25nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

The estimated track length of option 7B R is 47km (25nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to overfly approximately 44,250 households with an approximate population of 115,300. Taking account of planned property developments, this option is estimated to impact a total population of 117,600.

Up to 7,000ft, this option is estimated to overfly approximately 50,950 households with an approximate population of 130,600. Taking account of planned property developments, this option is estimated to impact a total population of 132,900.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 7B R is estimated to overfly approximately 41,450 households with an approximate population of 106,100. Taking account of planned property developments, this option is estimated to impact a total population of 106,100.

Up to 7,000ft, this option is estimated to overfly approximately 48,150 households with an approximate population of 121,500. Taking account of planned property developments, this option is estimated to impact a total population of 121,500.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to overfly 206 noise sensitive areas.

Up to 7,000ft, option 7B L is estimated to overfly 210 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 7B R is estimated to overfly 182 noise sensitive areas.

Up to 7,000ft, option 7B R is estimated to overfly 185 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Airspace**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PAN OPS requirements.				

9.3 Runways 05L/05R South Option 8 Left Turn

Design Principle Evaluation	Option No: 8 Left Turn
Option Name: SID RW 05 L South Option 8 Left Turn	ACCEPT
Option Name: SID RW 05 R South Option 8 Left Turn	ACCEPT

Option Description:

This is an **RNP1** option with RF coding that turns left after departure with the tightest radius possible to reduce track miles. This requires a speed restriction to allow the smaller turn radius.

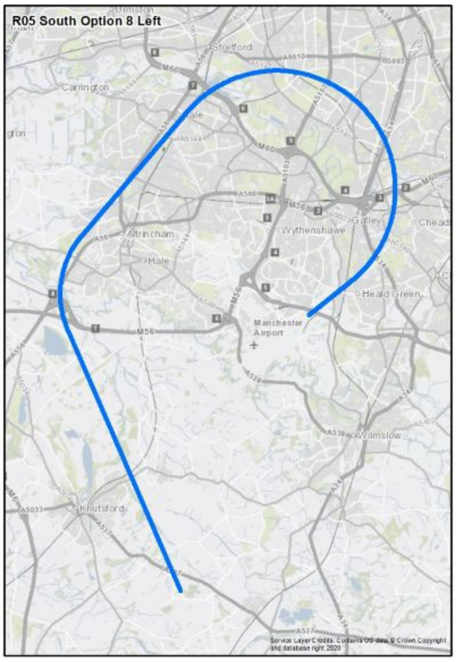
In the case of 05L, the turn point is at a minimum distance of 1nm from the DER, in accordance with PANS-OPS and CAP778 recommendation. The turn point for Runway 05R is located at a point roughly perpendicular to Runway 05L, to create a similar ground track in the turn and subsequent leg.

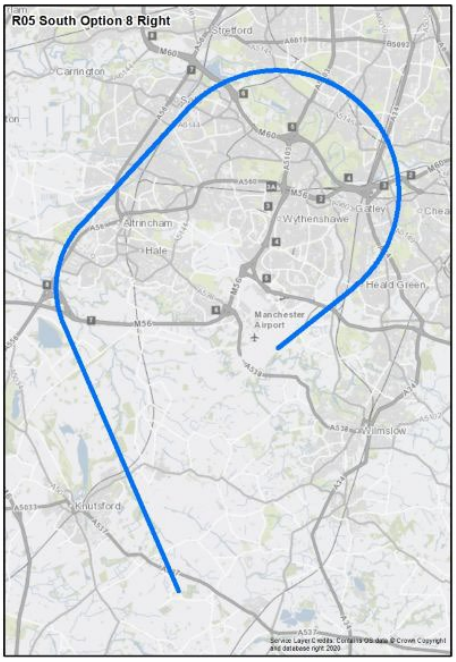
Although this option creates more track miles to route to the south, it is the shortest of the left turn options. In addition, because of the large number of southbound departures it has potential to aid departure flow and achieving 1-minute splits for southbound SIDs to align to the Design Principle Capacity.

05L: After departure this route turns left shortly after Heald Green to route overhead Cheadle, West Didsbury and Sale. It then heads south-west for a straight segment and passes just north of Altrincham where it turns slightly south-east and combines with the route for 05R to pass east of Knutsford and terminate at 7,000ft.

05R: After departure this route turns left shortly after Heald Green to route overhead Cheadle, West Didsbury and Sale. It then heads south-west for a straight segment and passes just north of Altrincham where it turns slightly south-east and combines with the route for 05L to pass east of Knutsford and terminates at 7,000ft.

A speed restriction of 190 KIAS has been applied to the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8L is 38km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 8R is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 8L is estimated to overfly approximately 41,500 households with an approximate population of 99,500. Taking account of planned property developments, this option is estimated to impact a total population of 99,500. Up to 7,000ft, this option is estimated to overfly approximately 48,150 households with an approximate population of 115,000. Taking account of planned property developments, this option is estimated to impact a total population of 116,100. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 8R is estimated to overfly approximately 41,800 households with an approximate population of 98,200. Taking account of planned property developments, this option is estimated to impact a total population of 98,200. Up to 7,000ft, this option is estimated to overfly approximately 49,850 households with an approximate population of 116,900. Taking account of planned property developments, this option is estimated to impact a total population of 118,000. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 8L is estimated to overfly 187 noise sensitive areas. Up to 7,000ft, option 8L is estimated to overfly 190 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 8R is estimated to overfly 190 noise sensitive areas. Up to 7,000ft, option 8R is estimated to overfly 190 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

9.4 Runways 05L/05R South Option 9

Design Principle Evaluation	Option No: 9
Option Name: SID RW 05 L South Option 9	ACCEPT
Option Name: SID RW 05 R South Option 9	ACCEPT

Option Description:

This is an **RNP1** option with RF coding that turns left after departure with the tightest radius possible to reduce track miles. It is similar to option 8 but terminates slightly further west.

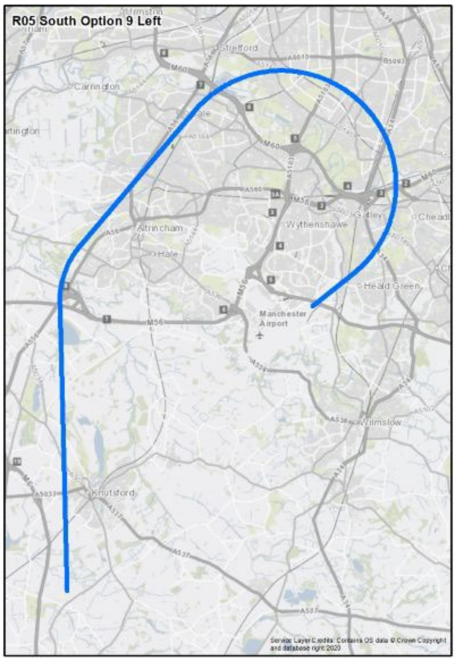
In the case of 05L, the turn point is at a minimum distance of 1nm from the DER, in accordance with PANS-OPS and CAP778. The turn point for Runway 05R is located at a point roughly perpendicular to Runway 05L, to create a similar ground track in the turn and subsequent leg.

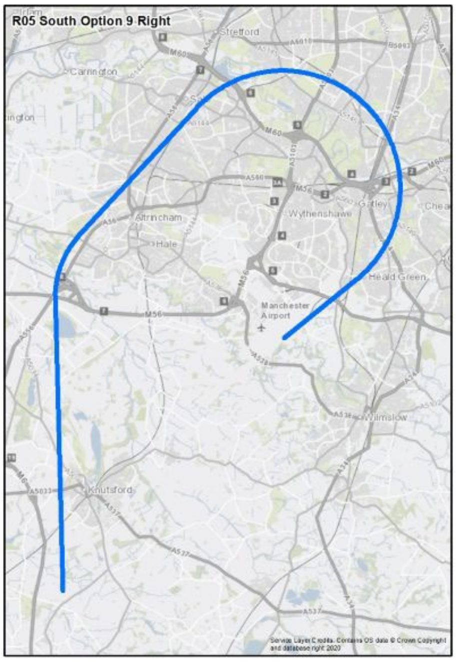
Although this option creates more track miles to route to the south, it is only slightly more track miles than option 8 which is shortest. Because of the large number of southbound departures it has potential to aid departure flow and achieving one minute splits for southbound SIDs.

05L: After departure this route turns left shortly after Heald Green to route overhead Cheadle, West Didsbury and Sale. It then heads south-west for a straight segment and passes just north of Altrincham where it turns south and combines with the route for 05R to pass west of Knutsford and terminates at 7,000ft.

05R: After departure this route turns left shortly after Heald Green to route overhead Cheadle, West Didsbury and Sale. It then heads south-west for a straight segment and passes just north of Altrincham where it turns south and combines with the route for 05L to pass west of Knutsford and terminates at 7,000ft.

A speed restriction of 190 KIAS applied to the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle	Runway			
Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle	Runway			
Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle	Runway			
Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle	Runway			
Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 9L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 9R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 9L is estimated to overfly approximately 41,550 households with an approximate population of 99,600. Taking account of planned property developments, this option is estimated to impact a total population of 99,600.

Up to 7,000ft, this option is estimated to overfly approximately 48,650 households with an approximate population of 115,700. Taking account of planned property developments, this option is estimated to impact a total population of 117,000.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 9R is estimated to overfly approximately 41,850 households with an approximate population of 98,500. Taking account of planned property developments, this option is estimated to impact a total population of 98,500.

Up to 7,000ft, this option is estimated to overfly approximately 50,200 households with an approximate population of 117,500. Taking account of planned property developments, this option is estimated to impact a total population of 118,700.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 9L is estimated to overfly 187 noise sensitive areas.

Up to 7,000ft, option 9L is estimated to overfly 190 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 9R is estimated to overfly 190 noise sensitive areas.

Up to 7,000ft, option 9R is estimated to overfly 190 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

9.5 Runways 05L/05R South Option 10 Left Turn

Design Principle Evaluation	Option No: 10 Left Turn
Option Name: SID RW 05 L South Option 10 Left Turn	ACCEPT
Option Name: SID RW 05 R South Option 10 Left Turn	ACCEPT

Option Description:

This is an **RNP1** option with RF coding that turns left after departure. It routes mid-way between the other options in this envelope.

Although this option creates more track miles to route to the south, because of the large number of southbound departures it has potential to aid departure flow and achieving one minute splits for southbound SIDs.

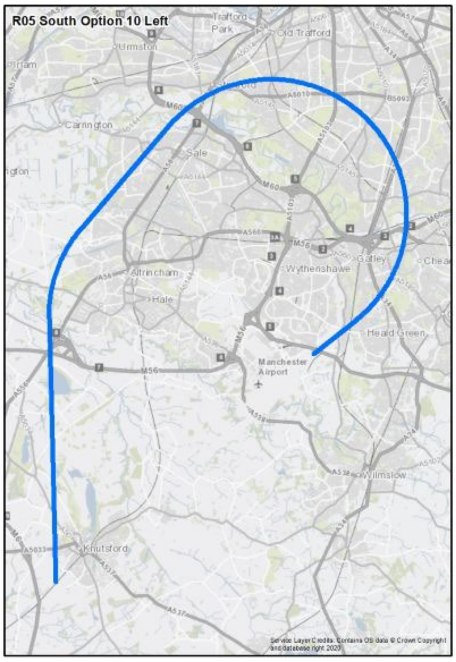
The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

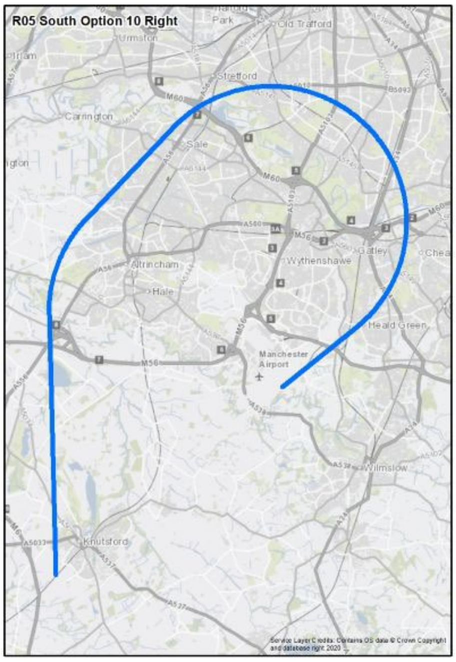
In the case of 05L, the turn point is at a minimum distance of 1nm from the DER, in accordance with PANS-OPS and CAP778. The turn point for Runway 05R is located at a point roughly perpendicular to Runway 05L, to create a similar ground track in the turn and subsequent leg.

05L: After departure this route turns left shortly after Heald Green to route overhead Cheadle, Chorlton and Sale. It then heads south-west for a straight segment and passes just north of Altrincham where it turns south and combines with the route for 05R to pass west of Knutsford and terminates at 7,000ft.

05R: After departure this route turns left shortly after Heald Green to route overhead Cheadle, Chorlton and Sale. It then heads south-west for a straight segment and passes just north of Altrincham where it turns south and combines with the route for 05L to pass west of Knutsford and terminates at 7,000ft.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 10L is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 10R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 10L is estimated to overfly approximately 42,800 households with an approximate population of 108,400. Taking account of planned property developments, this option is estimated to impact a total population of 108,400. Up to 7,000ft, this option is estimated to overfly approximately 52,300 households with an approximate population of 130,800. Taking account of planned property developments, this option is estimated to impact a total population of 132,200. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 10R is estimated to overfly approximately 41,050 households with an approximate population of 101,200. Taking account of planned property developments, this option is estimated to impact a total population of 101,200. Up to 7,000ft, this option is estimated to overfly approximately 52,600 households with an approximate population of 128,600. Taking account of planned property developments, this option is estimated to impact a total population of 130,000. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 10L is estimated to overfly 180 noise sensitive areas. Up to 7,000ft, option 10L is estimated to overfly 180 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 10R is estimated to overfly 192 noise sensitive areas. Up to 7,000ft, option 10R is estimated to overfly 195 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

9.6 Runways 05L/05R South Left Turn Viable but Poor Fit Options

Note: Because the options development process for 05 South Right Turn and Left Turn took place simultaneously, the viable but poor fit options are identical and apply equally to both envelopes.

Option	Safety	Policy	Capacity
A11 Extended straight ahead then right towards south			
After departure from Runway 05L/05R, aircraft would continue straight ahead to Stockport before making a 180° right-hand turn, southwest, towards the SID aiming point. Policy: This option involves greater track mileage than is necessary by taking traffic a significant distance east before turning it south, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option would take the same track as departures in the east which could limit the ability to enable best use of runway capacity and limit the ability to achieve one minute departure splits.			
B12 Extended straight ahead then left towards south			
After departure from Runway 05L/05R, aircraft would continue straight ahead to Stockport before making a 180° left-hand turn, south-west, and then another left-hand turn to the south-west, towards the SID aiming point. Policy: This option involves greater track mileage than is necessary by taking traffic east before turning it west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option is expected to interact with arrivals from the north along with departures in the 05 East Design Envelope, which could limit the ability to enable best use of runway capacity and limit the ability to achieve one-minute departure splits.			
C13 Extended straight ahead then extended left towards south			
After departure from Runway 05L/05R, aircraft would continue straight ahead beyond Stockport before making a gradual 180° left-hand turn, heading south-west, and then another left-hand turn to the south-west, towards the SID aiming point. Policy: This option involves greater track mileage than is necessary by taking traffic a significant distance east before turning it west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option is expected to interact with arrivals from the north along with departures in the 05 East Design Envelope, which could limit the ability to which could limit the ability to enable best use of runway capacity or limit the ability to achieve one minute departure splits.			

10 Runways 05L/05R West

10.1 Runways 05L/05R West Option 1

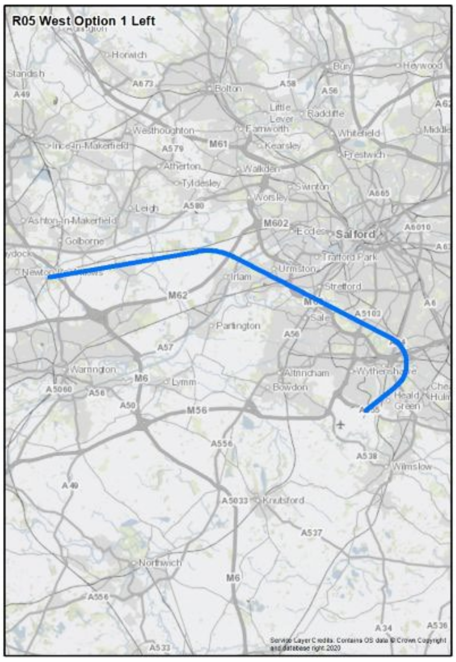
Design Principle Evaluation	Option No: 1
Option Name: SID RW 05 L West Option 1	ACCEPT
Option Name: SID RW 05 R West Option 1	ACCEPT

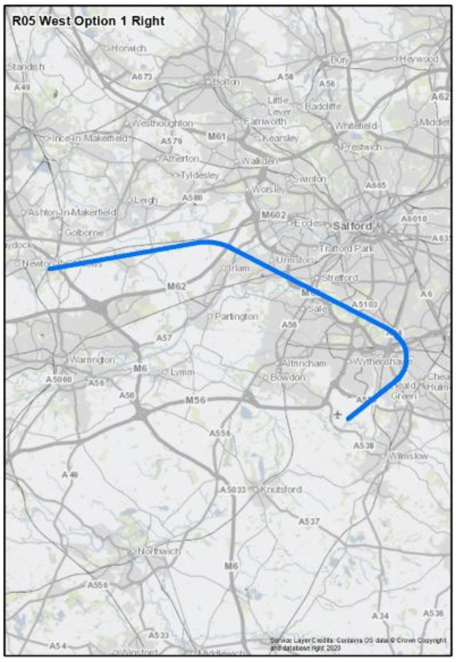
Option Description:

This option is included to provide a RNAV1 replication of the existing conventional ASMIM 1S/1Z SID. It uses a fly-over waypoint with Course-to-Fix (CF) path terminator coding and an element of dispersion would be apparent in the turn due to this coding

As a replicated route it follows a similar track over the ground as the current route. After departure this involves a right turn to pass overhead Cheadle at which point the routes combine. They then pass just to the west of Didsbury and overfly Stretford and Urmston. The routes make a left turn just north of Irlam and route west to terminate at 7,000ft to the north of Warrington at Earlestown.

A speed restriction of 185 KIAS is used for the first turn to replicate the existing 298° course to XOBRO, although this can be increased if it proves flyability issues. A higher speed would result in greater track dispersal in the first turn. This flyability will be conducted as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 replication of the current route. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV1 replication routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 1R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 1L is estimated to overfly approximately 24,100 households with an approximate population of 57,300. Taking account of planned property developments, this option is estimated to impact a total population of 57,300. Up to 7,000ft, this option is estimated to overfly approximately 36,550 households with an approximate population of 86,100. Taking account of planned property developments, this option is estimated to impact a total population of 88,400. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 1R is estimated to overfly approximately 26,400 households with an approximate population of 63,000. Taking account of planned property developments, this option is estimated to impact a total population of 63,000. Up to 7,000ft, this option is estimated to overfly approximately 39,500 households with an approximate population of 93,300. Taking account of planned property developments, this option is estimated to impact a total population of 95,600. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 1L is estimated to overfly 120 noise sensitive areas. Up to 7,000ft, option 1L is estimated to overfly 120 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 1R is estimated to overfly 137 noise sensitive areas. Up to 7,000ft, option 1R is estimated to overfly 140 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

10.2 Runways 05L/05R West Option 3

Design Principle Evaluation	Option No: 3
Option Name: SID RW 05 L West Option 3	REJECT
Option Name: SID RW 05 R West Option 3	REJECT

Option Description:

This is an **RNAV1** option included to provide a shorter and more fuel-efficient route to the west and the network joining point at Wallasey. It has a wider track in the turn but avoids routing as far to the north.

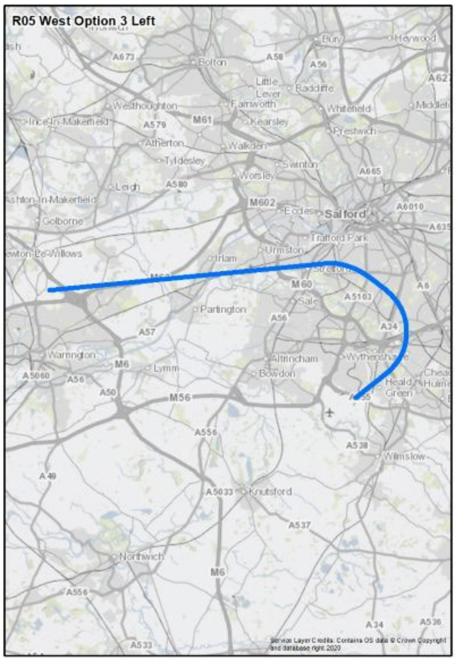
This design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

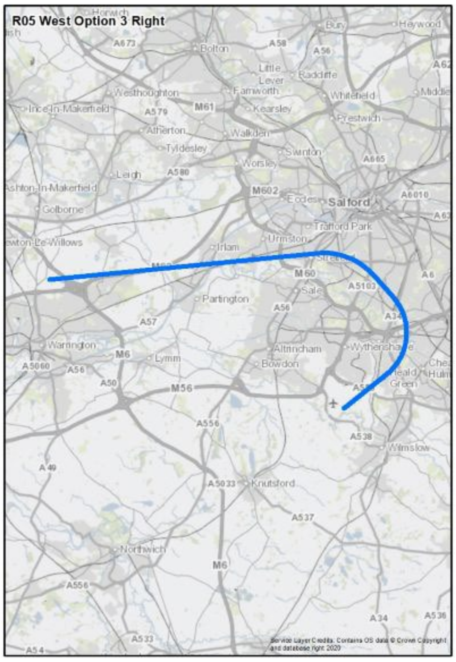
The option maximises fuel efficiency by removing the leg between the first turn to XOBRO and replacing it with a direct route to the west. The procedure uses fly-by waypoints, and the climb gradient has been set at 6%.

05L: After departure this route turns left shortly after Cheadle (at approximately MCT D2), and heads north in a track that takes it just west of Didsbury and Chorlton where the routes combine. At this point a left turn to the west is made to route overhead Urmston and Lower Irlam and terminates at 7,000ft north of Warrington.

05R: After departure this route turns left shortly after Cheadle, (at approximately MCT D2) and heads north, in a track that takes it just west of Didsbury and Chorlton where the routes combine. At this point a left turn to the west is made to route overhead Urmston and Lower Irlam and terminates at 7,000ft north of Warrington.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV1 routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

<table>
<tr><td colspan="5">The estimated track length of option 3R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.</td></tr>
<tr><td rowspan="2">Design Principle Noise N1</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
Up to 4,000ft, option 3L is estimated to overfly approximately 42,900 households with an approximate population of 109,600. Taking account of planned property developments, this option is estimated to impact a total population of 109,600.
Up to 7,000ft, this option is estimated to overfly approximately 62,500 households with an approximate population of 155,600. Taking account of planned property developments, this option is estimated to impact a total population of 159,100.
This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.
Up to 4,000ft, option 3R is estimated to overfly approximately 42,900 households with an approximate population of 106,400. Taking account of planned property developments, this option is estimated to impact a total population of 106,400.
Up to 7,000ft, this option is estimated to overfly approximately 63,550 households with an approximate population of 155,000. Taking account of planned property developments, this option is estimated to impact a total population of 158,500.
This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.</td></tr>
<tr><td rowspan="2">Design Principle Noise N2</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.</td></tr>
<tr><td rowspan="2">Design Principle Noise N3</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
Up to 4,000ft, option 3L is estimated to overfly 202 noise sensitive areas.
Up to 7,000ft, option 3L is estimated to overfly 205 noise sensitive areas.
This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.
Up to 4,000ft, option 3R is estimated to overfly 207 noise sensitive areas.
Up to 7,000ft, option 3R is estimated to overfly 210 noise sensitive areas.
This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.</td></tr>
</table>

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

10.3 Runways 05L/05R West Option 4A

Design Principle Evaluation	Option No: 4A
Option Name: SID RW 05 L West Option 4A	REJECT
Option Name: SID RW 05 R West Option 4A	REJECT

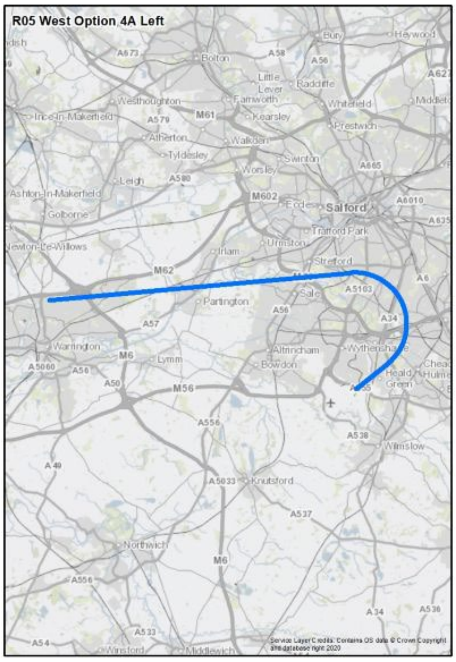
Option Description:

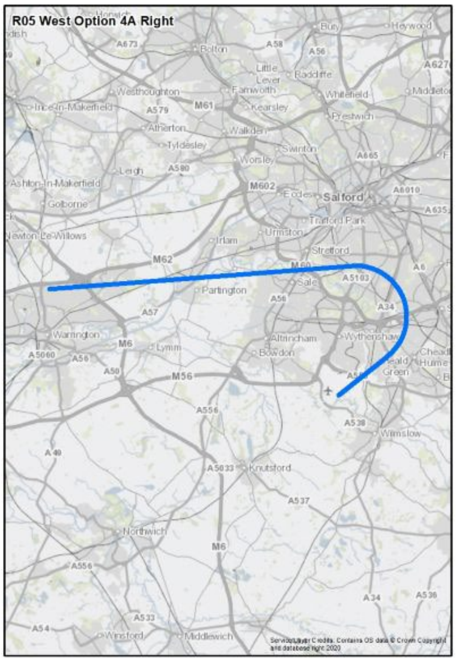
This is an RNP1 that uses RF coding to provide a single initial turn starting at the position of the current turn to create a fuel-efficient route to the network joining point to the west. Because of the turn position used, the routes are separate for their duration and do not combine until the 7,000ft which creates a small element of dispersal.

05L: After departure this route makes a single left turn just after Cheadle which takes it overhead Burnage and Withington. The left turn is completed heading in a westerly direction to the south of Chorlton and it continues west to route just north of Sale and terminates at 7,000ft north of Warrington where the two routes combine.

05R: After departure this route makes a single left turn just after Cheadle which takes it overhead Burnage and Withington. The left turn is completed heading in a westerly direction to the south of Chorlton and it continues west to route just north of Sale and terminates at 7,000ft north of Warrington where the two routes combine.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4A L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 4A R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4A L is estimated to overfly approximately 29,200 households with an approximate population of 72,700. Taking account of planned property developments, this option is estimated to impact a total population of 73,000.

Up to 7,000ft, this option is estimated to overfly approximately 55,800 households with an approximate population of 133,200. Taking account of planned property developments, this option is estimated to impact a total population of 139,600.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 4A R is estimated to overfly approximately 34,000 households with an approximate population of 84,100. Taking account of planned property developments, this option is estimated to impact a total population of 84,100.

Up to 7,000ft, this option is estimated to overfly approximately 61,500 households with an approximate population of 146,500. Taking account of planned property developments, this option is estimated to impact a total population of 153,500.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4A L is estimated to overfly 152 noise sensitive areas.

Up to 7,000ft, option 4A L is estimated to overfly 155 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 4A R is estimated to overfly 164 noise sensitive areas.

Up to 7,000ft, option 4A R is estimated to overfly 165 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

	05L	NOT MET	PARTIAL	MET

<table>
<tr><td>Design Principle Airspace</td><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.</td></tr>
<tr><td rowspan="2">Design Principle Technology</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.</td></tr>
</table>

10.4 Runways 05L/05R West Option 4B

Design Principle Evaluation	Option No: 4B
Option Name: SID RW 05 L West Option 4B	REJECT
Option Name: SID RW 05 R West Option 4B	ACCEPT

Option Description:

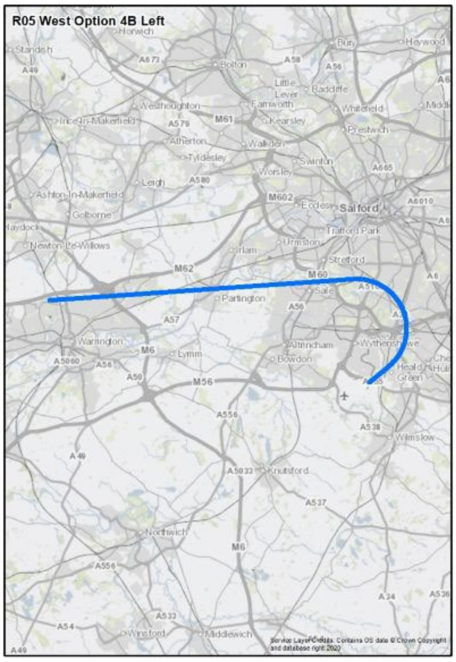
This is an **RNP1** that uses RF coding to provide a single initial turn to create a fuel-efficient route to the network joining point to the west. It differs from option 4A in that the turn is at the earliest PANS-OPS compliant position from 05L to create the shortest route possible at this design speed.

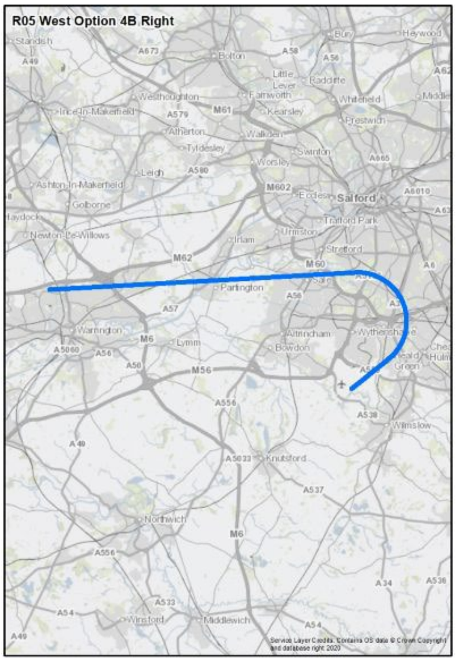
Because of the turn positions used, the routes are separate for their duration and do not combine until the 7,000ft which creates a small element of dispersal.

05L: After departure this route turns left at the earliest PANS-OPS compliant position (1nm from DER). This is a single left turn that takes it overhead Cheadle and West Didsbury before completing the left turn heading in a westerly direction to the south of Chorlton. It continues west to route just north of Sale and terminates at 7,000ft north of Warrington where the two routes combine.

05R: After departure this route turns left at a point that is perpendicular with the turn point for the 05L option. This is a single left turn that takes it overhead Cheadle and West Didsbury before completing the left turn heading in a westerly direction to the south of Chorlton. It continues west to route just north of Sale and terminates at 7,000ft north of Warrington where the two routes combine.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4B L is 38km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 4B R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4B L is estimated to overfly approximately 23,950 households with an approximate population of 55,400. Taking account of planned property developments, this option is estimated to impact a total population of 56,800. Up to 7,000ft, this option is estimated to overfly approximately 54,250 households with an approximate population of 125,500. Taking account of planned property developments, this option is estimated to impact a total population of 132,500. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 4B R is estimated to overfly approximately 29,600 households with an approximate population of 67,800. Taking account of planned property developments, this option is estimated to impact a total population of 68,700. Up to 7,000ft, this option is estimated to overfly approximately 60,850 households with an approximate population of 140,200. Taking account of planned property developments, this option is estimated to impact a total population of 147,400. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4B L is estimated to overfly 110 noise sensitive areas. Up to 7,000ft, option 4B L is estimated to overfly 110 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 4B R is estimated to overfly 136 noise sensitive areas. Up to 7,000ft, option 4B R is estimated to overfly 140 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

10.5 Runways 05L/05R West Option 5A

Design Principle Evaluation	Option No: 5A
Option Name: SID RW 05 L West Option 5A	REJECT
Option Name: SID RW 05 R West Option 5A	REJECT

Option Description:

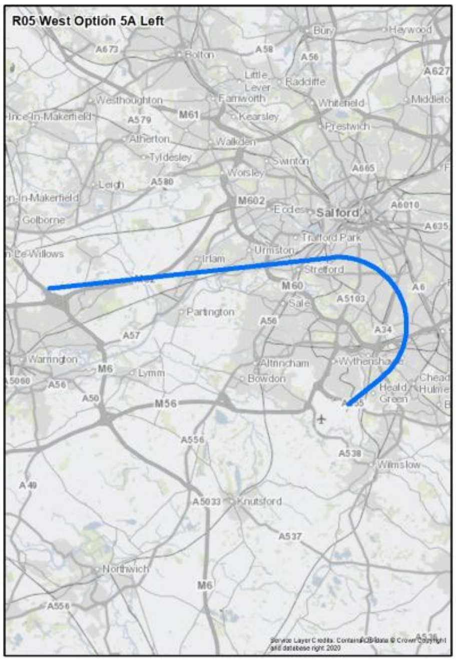
This is an **RNP1** that uses RF coding to provide a single initial turn based on the position of the current turn to create a fuel-efficient route to the network joining point to the west.

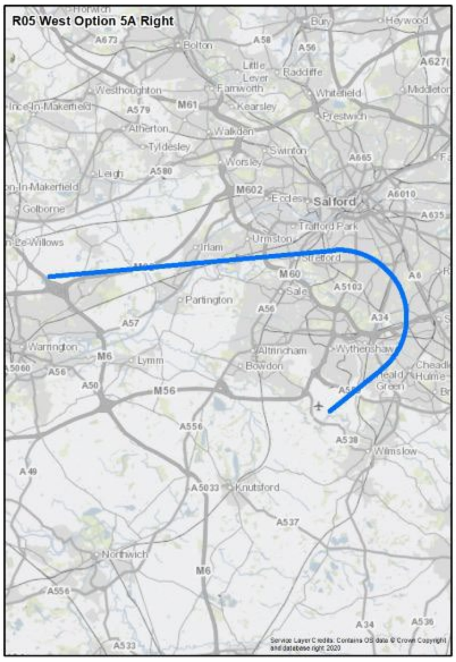
It is similar to option 4A but is designed with a higher speed of 210kts. The greater speed results in a wider track, which may aid vertical separation from MAN arriving traffic from the north. This design speed may also permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

05L: After departure this route makes a single left turn just after Cheadle which takes it east of Burnage and overhead Fallowfield. The left turn is completed heading in a westerly direction close to Old Trafford and it continues west to route via Urmston and terminates at 7,000ft north of Warrington close to the junction between the M62 and the M6 where the two routes combine.

05R: After departure this route makes a single left turn just after Cheadle which takes it east of Burnage and overhead Fallowfield. The left turn is completed heading in a westerly direction close to Old Trafford and it continues west to route via Urmston and terminates at 7,000ft north of Warrington close to the junction between the M62 and the M6 where the two routes combine.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 5A L is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 5A R is 44km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5A L is estimated to overfly approximately 50,850 households with an approximate population of 135,300. Taking account of planned property developments, this option is estimated to impact a total population of 135,300.

Up to 7,000ft, this option is estimated to overfly approximately 72,800 households with an approximate population of 187,800. Taking account of planned property developments, this option is estimated to impact a total population of 189,600.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 5A R is estimated to overfly approximately 51,500 households with an approximate population of 137,200. Taking account of planned property developments, this option is estimated to impact a total population of 137,200.

Up to 7,000ft, this option is estimated to overfly approximately 75,800 households with an approximate population of 195,000. Taking account of planned property developments, this option is estimated to impact a total population of 197,100.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5A L is estimated to overfly 234 noise sensitive areas.

Up to 7,000ft, option 5A L is estimated to overfly 235 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 5A R is estimated to overfly 213 noise sensitive areas.

Up to 7,000ft, option 5A R is estimated to overfly 215 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

10.6 Runways 05L/05R West Option 5B

Design Principle Evaluation	Option No: 5B
Option Name: SID RW 05 L West Option 5B	REJECT
Option Name: SID RW 05 R West Option 5B	REJECT

Option Description:

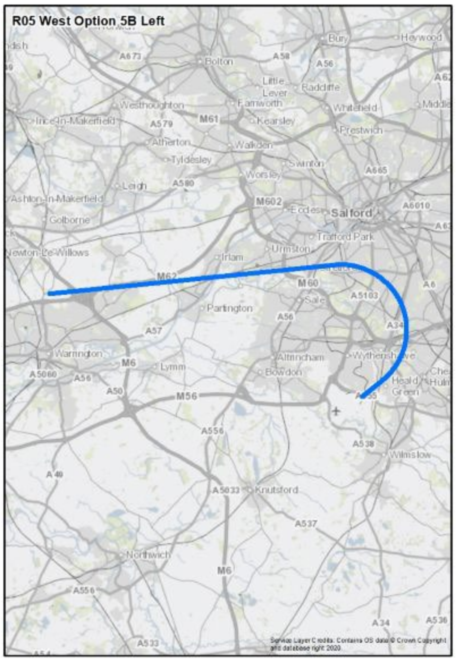
This is an **RNP1** that uses RF coding to provide a single initial turn to create a fuel-efficient route to the network joining point to the west. It differs from option 5A in that the turn is at the earliest PANS-OPS compliant position from Runway 05L to create a shorter route for this design speed.

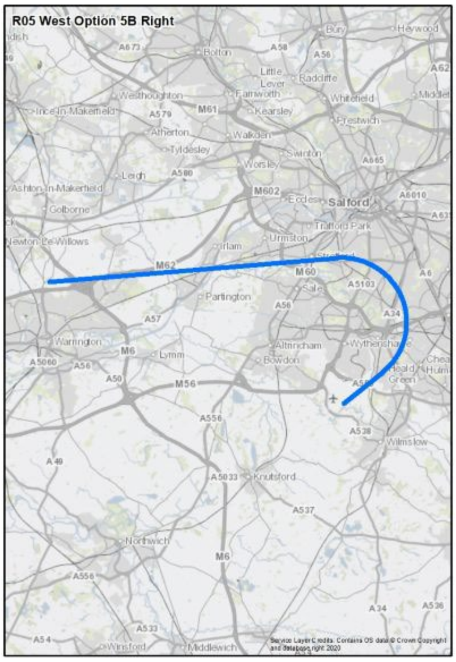
It is similar to option 4B but is designed with a higher speed of 210kts. The greater speed results in a wider track, which may aid vertical separation from MAN arriving traffic from the north. The design speed may also permit some aircraft to be in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

05L: After departure this route turns left at the earliest PANS-OPS compliant position (1nm from DER). This is a single left turn that takes it overhead Cheadle and Withington before completing the left turn heading in a westerly direction to the north of Chorlton. It continues west to route to be south of Stretford and Urmston and terminates at 7,000ft north of Warrington just beyond the junction between the M62 and the M6 where **the two routes combine.**

05R: After departure this route turns left at a point that is perpendicular with the turn point for the 05L option. This single left turn takes it overhead Cheadle and Withington before completing the left turn heading in a westerly direction to the north of Chorlton. It continues west to route to be south of Stretford and Urmston and terminates at 7,000ft north of Warrington just beyond the junction between the M62 and the M6 where the two routes combine.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 5B L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 5B R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5B L is estimated to overfly approximately 40,600 households with an approximate population of 103,300. Taking account of planned property developments, this option is estimated to impact a total population of 103,300.

Up to 7,000ft, this option is estimated to overfly approximately 61,400 households with an approximate population of 152,300. Taking account of planned property developments, this option is estimated to impact a total population of 156,600.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 5B R is estimated to overfly approximately 39,100 households with an approximate population of 99,500. Taking account of planned property developments, this option is estimated to impact a total population of 99,500.

Up to 7,000ft, this option is estimated to overfly approximately 61,050 households with an approximate population of 151,200. Taking account of planned property developments, this option is estimated to impact a total population of 155,900.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5B L is estimated to overfly 177 noise sensitive areas.

Up to 7,000ft, option 5B L is estimated to overfly 180 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 5B R is estimated to overfly 199 noise sensitive areas.

Up to 7,000ft, option 5B R is estimated to overfly 200 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

10.7 Runways 05L/05R West Option 6A

Design Principle Evaluation	Option No: 6A
Option Name: SID RW 05 L West Option 6A	ACCEPT
Option Name: SID RW 05 R West Option 6A	ACCEPT

Option Description:

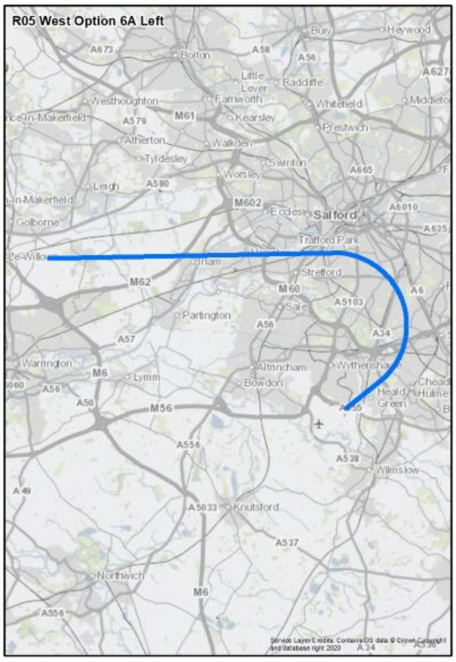
This is an RNP1 that uses RF coding to provide a single initial turn based on the position of the current turn to create a fuel-efficient route to the network joining point to the west. It is similar to option 5A but is designed with a higher speed of 220kts speed intended to allow aircraft to use the route in a more aerodynamic configuration.

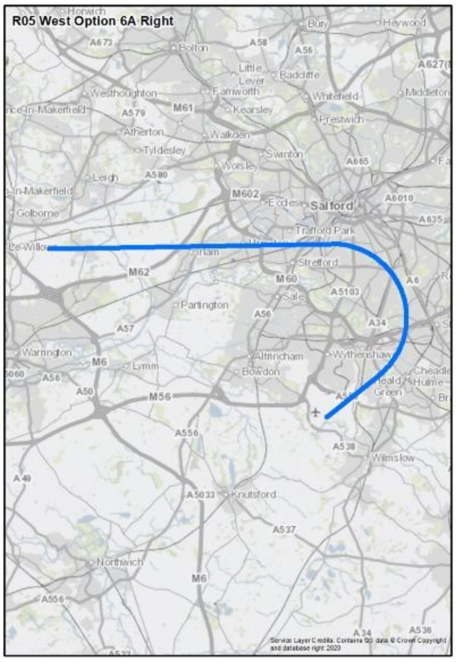
The greater speed results in a wider track, which may aid vertical separation from Manchester arriving traffic from the north. It will also permit a larger number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

05L: After departure this route makes a single left turn just after Cheadle which takes it east of Burnage and overhead Fallowfield. The left turn is completed heading in a westerly direction overhead Old Trafford where the routes combine and continue west to route north of Stretford, Urmston and Irlam. It terminates at 7,000ft north of Warrington to the east of Earlestown.

05R: After departure this route makes a single left turn just after Cheadle which takes it east of Burnage and overhead Rusholme. The left turn is completed heading in a westerly direction overhead Old Trafford where the routes combine and continue west to route north of Stretford, Urmston and Irlam. It terminates at 7,000ft north of Warrington to the east of Earlestown.

A speed restriction of 220 KIAS is used for the first turn which allows most aircraft to fly in a clean configuration.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6A L is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 6A R is 45km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 6A L is estimated to overfly approximately 45,300 households with an approximate population of 121,100. Taking account of planned property developments, this option is estimated to impact a total population of 124,900. Up to 7,000ft, this option is estimated to overfly approximately 64,700 households with an approximate population of 168,800. Taking account of planned property developments, this option is estimated to impact a total population of 173,300. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 6A R is estimated to overfly approximately 48,450 households with an approximate population of 130,100. Taking account of planned property developments, this option is estimated to impact a total population of 133,800. Up to 7,000ft, this option is estimated to overfly approximately 71,650 households with an approximate population of 187,000. Taking account of planned property developments, this option is estimated to impact a total population of 191,600. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 6A L is estimated to overfly 247 noise sensitive areas. Up to 7,000ft, option 6A L is estimated to overfly 250 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 6A R is estimated to overfly 245 noise sensitive areas. Up to 7,000ft, option 6A R is estimated to overfly 245 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

10.8 Runways 05L/05R West Option 6B

Design Principle Evaluation	Option No: 6B
Option Name: SID RW 05 L West Option 6B	REJECT
Option Name: SID RW 05 R West Option 6B	REJECT

Option Description:

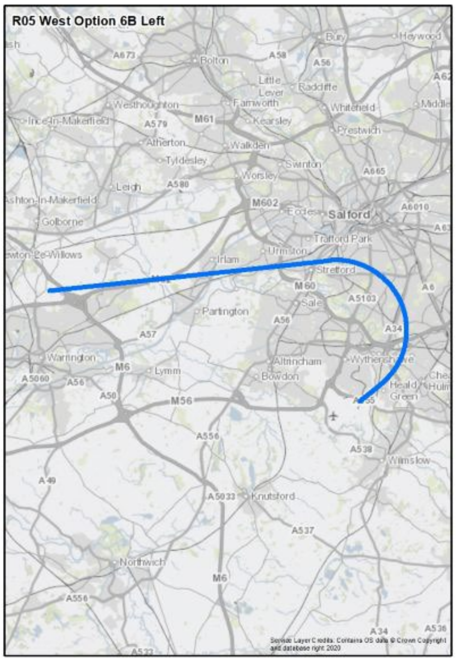
This is an **RNP1** that uses RF coding to provide a single initial turn to create a fuel-efficient route to the network joining point to the west. It differs from option 6A in that the turn is at the earliest PANS-OPS compliant position from Runway 05L to create a shorter route for this design speed.

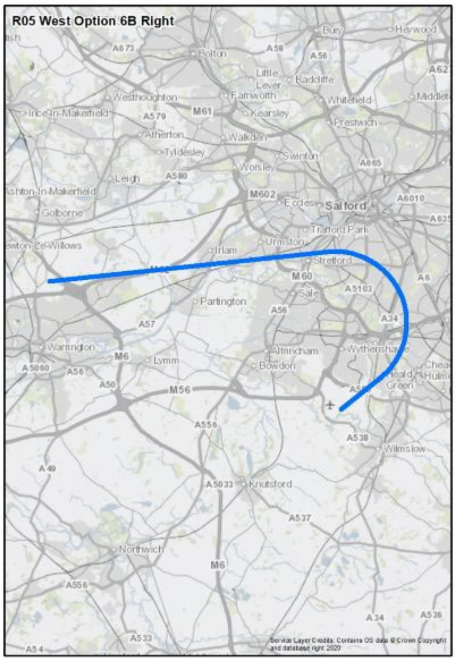
It is similar to option 5B but is designed with a higher speed of 220kts. The greater speed results in a wider track, which may aid vertical separation from Manchester arriving traffic from the north. The greater speed will also permit a larger number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

05L: After departure this route turns left at the earliest PANS-OPS compliant position (1nm from DER). This is a single left turn that takes it overhead Cheadle and Burnage before completing the left turn heading in a westerly between Chorlton and Old Trafford. It continues west to route overhead Stretford and Urmston and terminates at 7,000ft north of Warrington just beyond the junction between the M62 and the M6.

05R: After departure this route turns left at a point that is perpendicular with the turn point for the 05L option. This single left turn takes it overhead Cheadle and Burnage before completing the left turn heading in a westerly between Chorlton and Old Trafford. It continues west to route overhead Stretford and Urmston and terminates at 7,000ft north of Warrington just beyond the junction between the M62 and the M6.

A speed restriction of 220 KIAS is used for the first turn which allows most aircraft to fly in a clean configuration.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6B L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 6B R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to overfly approximately 47,550 households with an approximate population of 121,100. Taking account of planned property developments, this option is estimated to impact a total population of 121,100.

Up to 7,000ft, this option is estimated to overfly approximately 67,000 households with an approximate population of 167,000. Taking account of planned property developments, this option is estimated to impact a total population of 170,200.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 6B R is estimated to overfly approximately 49,500 households with an approximate population of 127,700. Taking account of planned property developments, this option is estimated to impact a total population of 127,700.

Up to 7,000ft, this option is estimated to overfly approximately 72,150 households with an approximate population of 181,200. Taking account of planned property developments, this option is estimated to impact a total population of 184,600.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to overfly 211 noise sensitive areas.

Up to 7,000ft, option 6B L is estimated to overfly 215 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 6B R is estimated to overfly 229 noise sensitive areas.

Up to 7,000ft, option 6B R is estimated to overfly 230 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

10.9 Runways 05L/05R West Option 7

Design Principle Evaluation	Option No: 7
Option Name: SID RW 05 L West Option 7	ACCEPT
Option Name: SID RW 05 R West Option 7	ACCEPT

Option Description:

This is an **RNP1** option that uses RF coding to provide a similar route to that of option 4B, but it uses an initial 15° track adjustment to the left from the DER for Runway 05L, and a 5° adjustment for Runway 05R. This is to provide noise relief for the Cheadle area, which lies underneath the approach path for Runways 23R/23L arrivals. After this track adjustment it has a single initial turn at the earliest PANS-OPS compliant position to create a fuel-efficient route to the network joining point to the west.

05L: After passing the DER aircraft make a 15° track adjustment to the left (north) and then turn left at the earliest PANS-OPS compliant position (1nm from DER). This is a single left turn that takes it to the west side of Cheadle and then overhead West Didsbury before completing the left turn heading in a westerly direction to the south of Chorlton where the two routes combine. It continues west to route just north of Sale and terminates at 7,000ft north-west of Warrington.

05R: After passing the DER aircraft make a 5° track adjustment to the left (north) and then turn left at a point that is abeam the turn point for 05L. This is a single left turn that takes it to the west side of Cheadle and then overhead Didsbury before completing the left turn heading in a westerly direction to the south of Chorlton where the two routes combine. It continues west to route just north of Sale and terminates at 7,000ft north-west of Warrington.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.

Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7L is 36km (19nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 7R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 7L is estimated to overfly approximately 22,800 households with an approximate population of 52,900. Taking account of planned property developments, this option is estimated to impact a total population of 57,100. Up to 7,000ft, this option is estimated to overfly approximately 52,200 households with an approximate population of 121,800. Taking account of planned property developments, this option is estimated to impact a total population of 131,600. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 7R is estimated to overfly approximately 26,600 households with an approximate population of 60,600. Taking account of planned property developments, this option is estimated to impact a total population of 63,200. Up to 7,000ft, this option is estimated to overfly approximately 59,900 households with an approximate population of 138,500. Taking account of planned property developments, this option is estimated to impact a total population of 148,200. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 7L is estimated to overfly 118 noise sensitive areas. Up to 7,000ft, option 7L is estimated to overfly 120 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 7R is estimated to overfly 140 noise sensitive areas. Up to 7,000ft, option 7R is estimated to overfly 140 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

10.10 Runways 05L/05R West Viable but Poor Fit Options

Option	Safety	Policy	Capacity
A2 Later wider initial turn	S	P	C
Originally designed as **option 2** this was created to provide a later and wider initial turn using RF coding, forming the east side of the envelope, then routing to XOBRO and thereafter replicating the existing procedure. Policy: This option involves greater track mileage than is necessary by taking traffic a significant distance east before turning it west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.			
B8 Extended straight ahead then gradual left turn towards west	S	P	C
After departure from Runway 05L/05R, aircraft would fly straight ahead to Stockport before making a left-hand turn, heading west towards the SID aiming point. Safety: This option is likely to interact with Runway 05 departures to the north. Policy: This option involves greater track mileage than is necessary by taking traffic a significant distance east before turning it west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option would take the same track as departures on the east options which would limit the ability to achieve one minute departure splits and not enabling best of runway capacity. In addition, this option is expected to interact with departures in the north envelopes.			
C9 Right-hand wraparound	S	P	C
After departure from Runway 05L/05R, aircraft would make a right-hand turn, in the vicinity of Hazel Grove before making a right-hand turn, passing to the south of the airport and then turning west, towards the SID aiming point. Safety: This option is expected to interact with the Runway 05R MAP. Capacity: This option interacts with departures in the 05 South Design Envelope and arrivals from the south which would limit the ability to enable best use of runway capacity.			

11 Runways 05L/05R South-west

11.1 Runways 05L/05R South-west Option 1

Design Principle Evaluation	Option No: 1
Option Name: SID RW 05 L South-west Option 1	REJECT
Option Name: SID RW 05 R South-west Option 1	ACCEPT

Option Description:

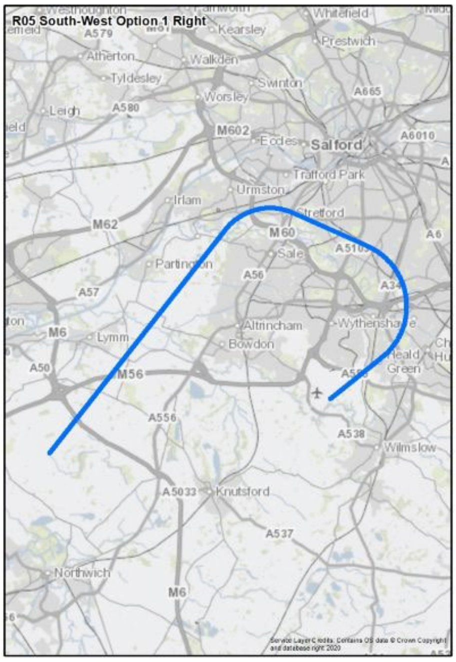
This is an **RNAV1** option that provides two left turns and then a track to join the NATS network to the south-west. The initial course is similar to the current ASMIM 1S/1Z SID, but it turns off this to the north of MAN.

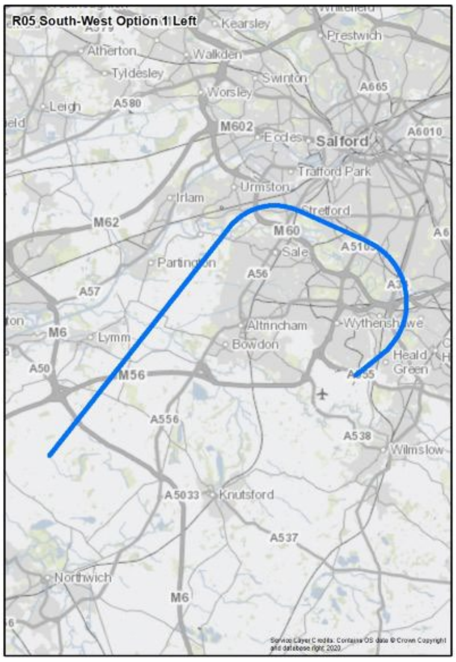
It has an initial turn at 1nm DER (05L) followed by a 117° left turn to head south-west. The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise. The procedure uses fly-by waypoints.

05L: After departure this route turns left at the earliest PANS-OPS compliant position (1nm from DER). This takes it overhead Cheadle and West Didsbury where it combines with the option for 05R. There is then a short straight segment before a second turn is made over Stretford and it heads in a south-westerly direction over sparsely populated areas to terminate at 7,000ft south of the Lymm interchange between the M56 and the M6.

05R: After departure this route turns left at a point that is perpendicular with the turn point for the 05L option. This takes it overhead Cheadle and West Didsbury where it combines with the option for 05L. There is then a short straight segment before a second turn is made over Stretford and it heads in a south westerly direction over sparsely populated areas to terminate at 7,000ft south of the Lymm interchange between the M56 and the M6.

A speed restriction of 210 KIAS is used for the first turn and second turn, which is the CAP778 recommended speed.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1L is estimated to overfly approximately 33,800 households with an approximate population of 79,600. Taking account of planned property developments, this option is estimated to impact a total population of 80,000.

Up to 7,000ft, this option is estimated to overfly approximately 36,100 households with an approximate population of 85,000. Taking account of planned property developments, this option is estimated to impact a total population of 86,000.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 1R is estimated to overfly approximately 38,250 households with an approximate population of 90,100. Taking account of planned property developments, this option is estimated to impact a total population of 90,100.

Up to 7,000ft, this option is estimated to overfly approximately 40,800 households with an approximate population of 96,100. Taking account of planned property developments, this option is estimated to impact a total population of 97,300.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1L is estimated to overfly 160 noise sensitive areas.

Up to 7,000ft, option 1L is estimated to overfly 160 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 1R is estimated to overfly 187 noise sensitive areas.

Up to 7,000ft, option 1R is estimated to overfly 190 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

11.2 Runways 05L/05R South-west Option 2A

Design Principle Evaluation	Option No: 2A
Option Name: SID RW 05 L South-west Option 2A	REJECT
Option Name: SID RW 05 R South-west Option 2A	ACCEPT

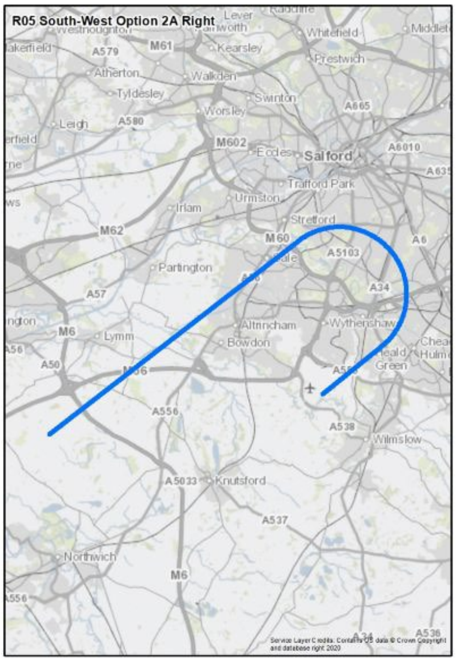
Option Description:

This is an **RNP1** option that uses RF coding to provide a single left turn starting at the position of the current turn to create a fuel-efficient route. The design speed results in a tight radius turn to create a short track length to join the NATS network to the south-west.

05L: After departure this route makes a single left turn just after Cheadle which takes it overhead Burnage and Withington where it combines with the option for 05R. The left turn is completed heading in a south-westerly direction in the vicinity of Chorlton and it continues in this direction to terminate at 7,000ft south of the Lymm interchange between the M56 and the M6.

05R: After departure this route makes a single left turn just after Cheadle which takes it overhead Burnage and Withington where it combines with the option for 05L. The left turn is completed heading in a south-westerly direction in the vicinity of Sale and it continues in this direction to terminate at 7,000ft south of the Lymm interchange between the M56 and the M6.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.



Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2A L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 2A R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to overfly approximately 43,850 households with an approximate population of 110,600. Taking account of planned property developments, this option is estimated to impact a total population of 110,600.

Up to 7,000ft, this option is estimated to overfly approximately 50,250 households with an approximate population of 125,800. Taking account of planned property developments, this option is estimated to impact a total population of 125,800.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 2A R is estimated to overfly approximately 46,450 households with an approximate population of 118,500. Taking account of planned property developments, this option is estimated to impact a total population of 118,500.

Up to 7,000ft, this option is estimated to overfly approximately 57,700 households with an approximate population of 145,600. Taking account of planned property developments, this option is estimated to impact a total population of 145,600.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to overfly 195 noise sensitive areas.

Up to 7,000ft, option 2A L is estimated to overfly 195 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 2A R is estimated to overfly 203 noise sensitive areas.

Up to 7,000ft, option 2A R is estimated to overfly 205 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PAN OPS requirements.				

11.3 Runways 05L/05R South-west Option 2B

Design Principle Evaluation	Option No: 2B
Option Name: SID RW 05 L South-west Option 2B	REJECT
Option Name: SID RW 05 R South-west Option 2B	ACCEPT

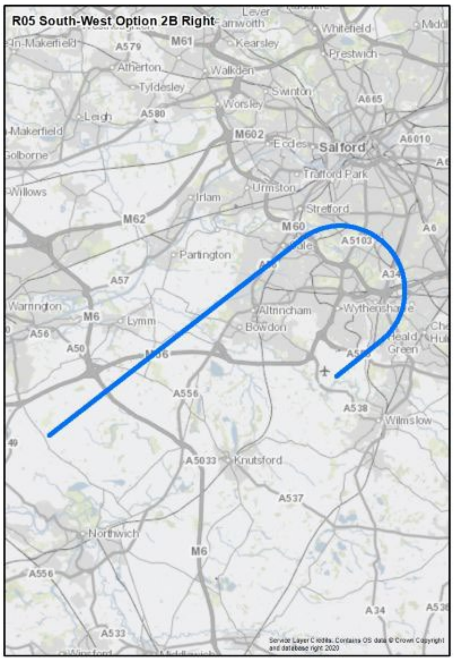
Option Description:

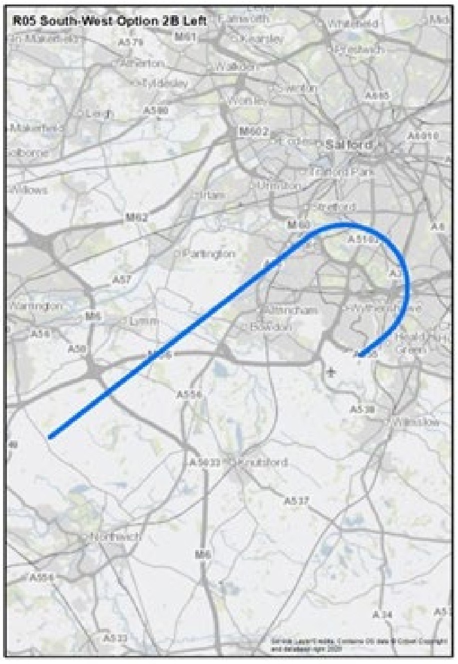
This is an **RNP1** that uses RF coding to provide a single initial turn to create a fuel-efficient route to the network joining point to the west. It differs from option 2A in that the turn is at the earliest PANS-OPS compliant position from Runway 05L to create the shortest route possible at this design speed.

05L: After departure this route turns left at the earliest PANS-OPS compliant position (1nm from DER). This is a single left turn that takes it overhead Cheadle and West Didsbury before completing the left turn heading in a south-westerly direction to the south of Sale where it combines with the option for 05R. It continues south-west to route just north of Altrincham and terminates at 7,000ft south of Warrington.

05R: After departure this route turns left at a point that is perpendicular with the turn point for the 05L option. This is a single left turn that takes it overhead Cheadle and West Didsbury before completing the left turn heading in a south-westerly direction to the south of Sale where it combines with the option for 05L. It continues south-west to route just north of Altrincham and terminates at 7,000ft south of Warrington.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





<table>
<tr><td rowspan="2">Design Principle Safety</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.</td></tr>
<tr><td rowspan="2">Design Principle Policy</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.</td></tr>
<tr><td rowspan="2">Design Principle Capacity</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.
When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.
Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.
Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.</td></tr>
<tr><td rowspan="2">Design Principle Emissions</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
The estimated track length of option 2B L is 38km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.</td></tr>
</table>

The estimated track length of option 2B R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to overfly approximately 38,400 households with an approximate population of 91,300. Taking account of planned property developments, this option is estimated to impact a total population of 91,300.

Up to 7,000ft, this option is estimated to overfly approximately 40,200 households with an approximate population of 95,500. Taking account of planned property developments, this option is estimated to impact a total population of 95,500.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 2B R is estimated to overfly approximately 42,650 households with an approximate population of 101,400. Taking account of planned property developments, this option is estimated to impact a total population of 101,400.

Up to 7,000ft, this option is estimated to overfly approximately 45,800 households with an approximate population of 109,200. Taking account of planned property developments, this option is estimated to impact a total population of 109,200.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to overfly 160 noise sensitive areas.

Up to 7,000ft, option 2B L is estimated to overfly 160 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 2B R is estimated to overfly 194 noise sensitive areas.

Up to 7,000ft, option 2B R is estimated to overfly 195 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

11.4 Runways 05L/05R South-west Option 3A

Design Principle Evaluation	Option No: 3A
Option Name: SID RW 05 L South-west Option 3A	REJECT
Option Name: SID RW 05 R South-west Option 3A	ACCEPT

Option Description:

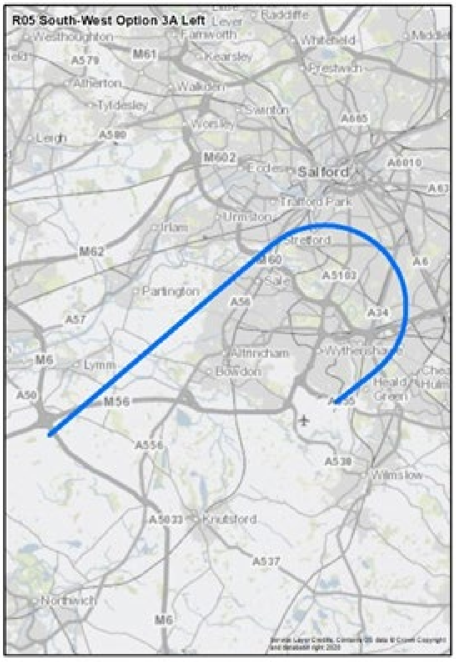
This is an **RNP1** that uses RF coding to provide a single initial turn starting at the position of the current turn to create a fuel-efficient route to the south-west. It is similar to option 2A but is designed with a higher design speed of 210kts.

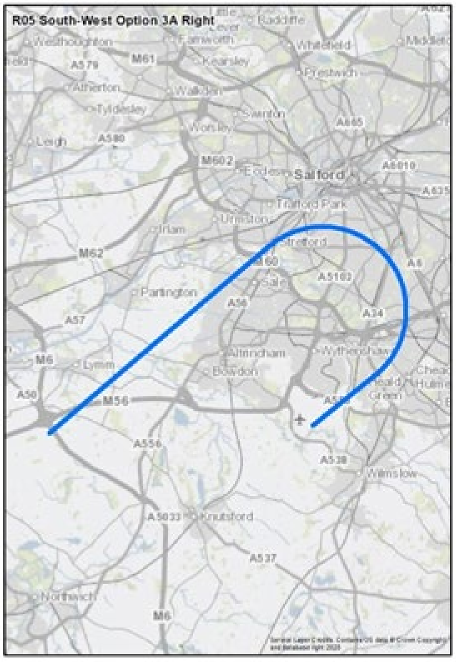
The greater speed results in a wider track, which may aid vertical separation from MAN arriving traffic from the north. The design speed may also permit some aircraft to be in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

05L: After departure this route makes a single left turn just after Cheadle which takes it overhead Burnage and Fallowfield where it combines with the option for 05R. The left turn is completed heading in a south-westerly direction between Chorlton and Stretford and it continues in this direction to terminate at 7,000ft south of the Lymm interchange between the M56 and the M6.

05R: After departure this route makes a single left turn just after Cheadle which takes it overhead Burnage and Fallowfield where it combines with the option for 05L. The left turn is completed heading in a south-westerly direction between Chorlton and Stretford and it continues in this direction to terminate at 7,000ft south of the Lymm interchange between the M56 and the M6.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.





	05L	NOT MET	PARTIAL	MET

Design Principle **Safety**	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**				
	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3A L is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 3A R is 45km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3A L is estimated to overfly approximately 47,400 households with an approximate population of 126,300. Taking account of planned property developments, this option is estimated to impact a total population of 126,300.

Up to 7,000ft, this option is estimated to overfly approximately 58,450 households with an approximate population of 152,300. Taking account of planned property developments, this option is estimated to impact a total population of 152,300.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 3A R is estimated to overfly approximately 50,650 households with an approximate population of 135,500. Taking account of planned property developments, this option is estimated to impact a total population of 135,500.

Up to 7,000ft, this option is estimated to overfly approximately 66,350 households with an approximate population of 172,200. Taking account of planned property developments, this option is estimated to impact a total population of 172,200.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3A L is estimated to overfly 222 noise sensitive areas.

Up to 7,000ft, option 3A L is estimated to overfly 225 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 3A R is estimated to overfly 234 noise sensitive areas.

Up to 7,000ft, option 3A R is estimated to overfly 235 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

	05L	NOT MET	PARTIAL	MET

<table>
<tr><td>Design Principle Airspace</td><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.</td></tr>
<tr><td rowspan="2">Design Principle Technology</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.</td></tr>
</table>

11.5 Runways 05L/05R South-west Option 3B

Design Principle Evaluation	Option No: 3B
Option Name: SID RW 05 L South-west Option 3B	REJECT
Option Name: SID RW 05 R South-west Option 3B	ACCEPT

Option Description:

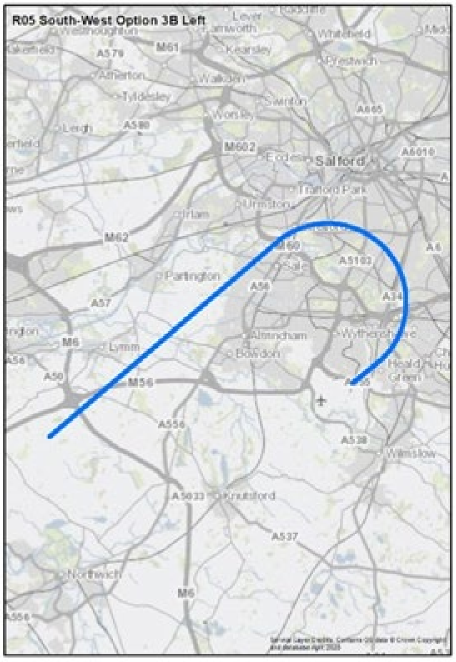
This is an **RNP1** option that uses RF coding to provide a single initial turn to create a fuel-efficient route to the network joining point to the west. It differs from option 3A in that the turn is at the earliest PANS-OPS compliant position from 05L to create a shorter route for this design speed.

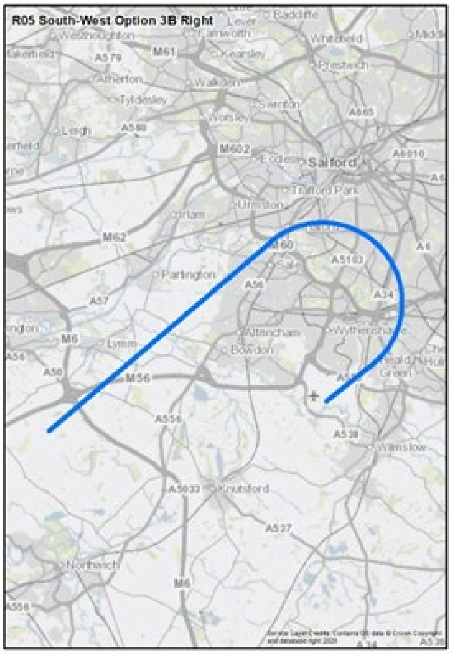
It is similar to option 2B but is designed with a higher speed of 210kts. The greater speed results in a wider track, which may aid vertical separation from MAN arriving traffic from the north. It may also permit some aircraft to be in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

05L: After departure this route turns left at the earliest PANS-OPS compliant position (1nm from DER). This is a single left turn that takes it overhead Cheadle and Withington before completing the left turn heading in a south-westerly direction to the south of Stretford where it combines with the option for 05R. It continues south-west to route to avoid Altrincham and terminates at 7,000ft west of the Lymm interchange between the M56 and the M6.

05R: After departure this route turns left at a point that is perpendicular with the turn point for the 05L option. This is a single left turn that takes it overhead Cheadle and Withington before completing the left turn heading in a south-westerly direction to the south of Stretford where it combines with the option for 05L. It continues south-west to route to avoid Altrincham and terminates at 7,000ft west of the Lymm interchange between the M56 and the M6.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3B L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 3B R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3B L is estimated to overfly approximately 40,600 households with an approximate population of 103,000. Taking account of planned property developments, this option is estimated to impact a total population of 103,000.

Up to 7,000ft, this option is estimated to overfly approximately 44,400 households with an approximate population of 112,000. Taking account of planned property developments, this option is estimated to impact a total population of 112,000.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 3B R is estimated to overfly approximately 44,250 households with an approximate population of 112,500. Taking account of planned property developments, this option is estimated to impact a total population of 112,500.

Up to 7,000ft, this option is estimated to overfly approximately 50,950 households with an approximate population of 128,500. Taking account of planned property developments, this option is estimated to impact a total population of 128,500.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3B L is estimated to overfly 167 noise sensitive areas.

Up to 7,000ft, option 3B L is estimated to overfly 170 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 3B R is estimated to overfly 214 noise sensitive areas.

Up to 7,000ft, option 3B R is estimated to overfly 215 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

11.6 Runways 05L/05R South-west Option 4A

Design Principle Evaluation	Option No: 4A
Option Name: SID RW 05 L South-west Option 4A	REJECT
Option Name: SID RW 05 R South-west Option 4A	REJECT

Option Description:

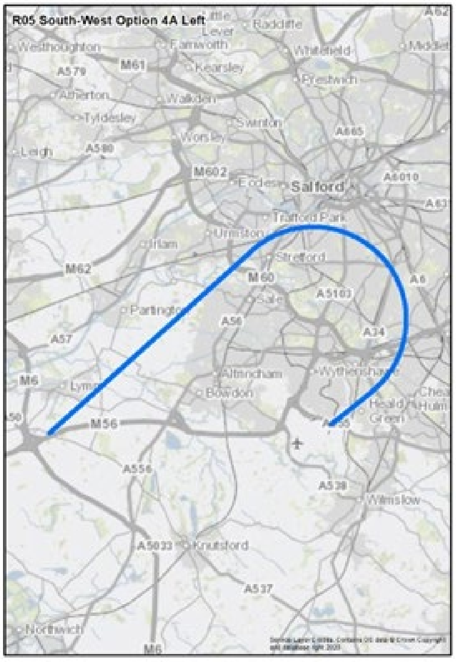
This is an **RNP1** option that uses RF coding to provide a single initial turn based on the position of the current turn to create a route to the south-west. It is similar to option 2A and 3A but is designed with a higher speed of 220kts intended to allow aircraft to use the route in a more aerodynamic configuration.

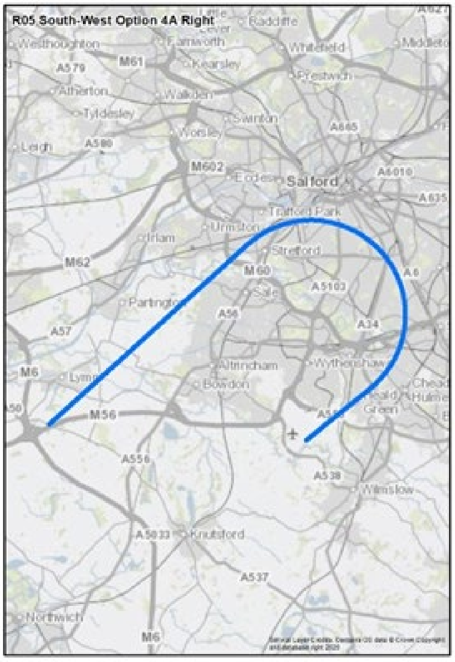
The greater speed results in a wider track, which may aid vertical separation from MAN arriving traffic from the north. It will also permit a larger number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

05L: After departure this route makes a single left turn just after Cheadle which takes it overhead Rusholme and Old Trafford where it combines with the option for 05R. The left turn is completed heading in a south-westerly direction at Stretford and it continues in this direction to terminate at 7,000ft east of the Lymm interchange between the M56 and the M6.

05R: After departure this route makes a single left turn just after Cheadle which takes it overhead Rusholme and Old Trafford where it combines with the option for 05L. The left turn is completed heading in a south-westerly direction at Stretford and it continues in this direction to terminate at 7,000ft east of the Lymm interchange between the M56 and the M6.

A speed restriction of 220 KIAS is used for the first turn which allows most aircraft to fly in a clean configuration.





	05L	NOT MET	PARTIAL	MET

Design Principle **Safety**	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4A L is 44km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 4A R is 47km (25nm). When compared to the 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4A L is estimated to overfly approximately 47,700 households with an approximate population of 127,800. Taking account of planned property developments, this option is estimated to impact a total population of 132,400.

Up to 7,000ft, this option is estimated to overfly approximately 59,800 households with an approximate population of 155,800. Taking account of planned property developments, this option is estimated to impact a total population of 161,300.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 4A R is estimated to overfly approximately 51,650 households with an approximate population of 140,100. Taking account of planned property developments, this option is estimated to impact a total population of 145,100.

Up to 7,000ft, this option is estimated to overfly approximately 67,550 households with an approximate population of 176,800. Taking account of planned property developments, this option is estimated to impact a total population of 182,800.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4A L is estimated to overfly 235 noise sensitive areas.

Up to 7,000ft, option 4A L is estimated to overfly 235 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 4A R is estimated to overfly 272 noise sensitive areas.

Up to 7,000ft, option 4A R is estimated to overfly 275 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

	05L	NOT MET	PARTIAL	MET

Design Principle **Airspace**	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as PBN routes that enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

11.7 Runways 05L/05R South-west Option 4B

Design Principle Evaluation	Option No: 4B
Option Name: SID RW 05 L South-west Option 4B	ACCEPT
Option Name: SID RW 05 R South-west Option 4B	ACCEPT

Option Description:

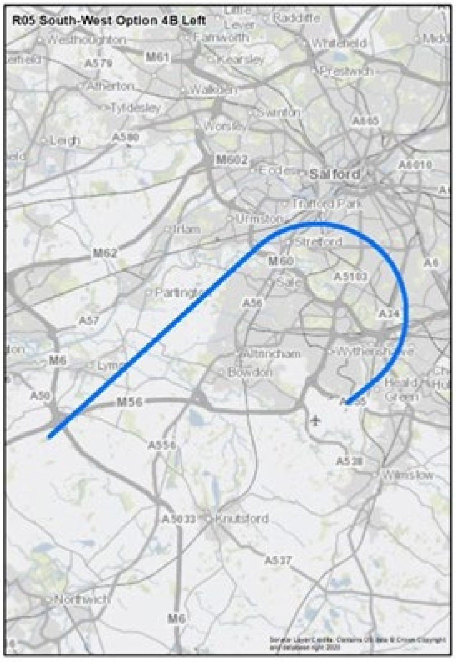
This is an **RNP1** option that uses RF coding to provide a single initial turn at the earliest PANS-OPS compliant position to create a route to the south-west. It differs from option 4A in that the turn is at the earliest PANS-OPS compliant position from Runway 05L to create a shorter route for this design speed.

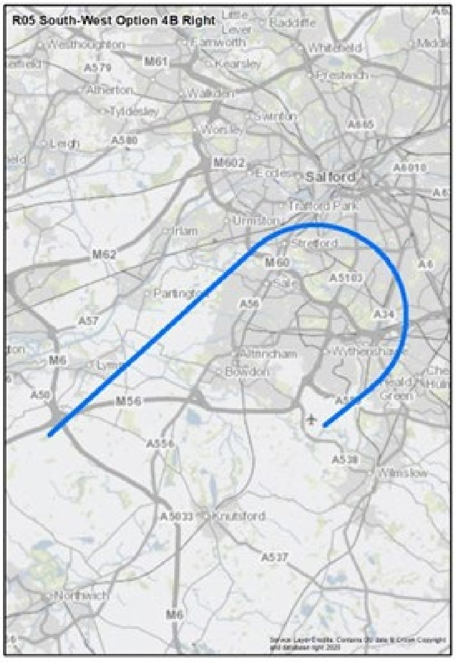
It is similar to options 2B and 3B but is designed with a higher speed of 220kts. The design speed results in a wider track, which may aid vertical separation from MAN arriving traffic from the north. It will also permit a larger number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

05L: After departure this route turns left at the earliest PANS-OPS compliant position (1nm from DER). This is a single left turn that takes it overhead Cheadle, Burnage and Fallowfield before completing the left turn heading in a south-westerly direction at Stretford where it combines with the option for 05R. It continues in this direction to terminate at 7,000ft west of the Lymm interchange between the M56 and the M6.

05R: After departure this route turns left at a point that is perpendicular with the turn point for the 05L option. This single left turn takes it overhead Cheadle, Burnage and Fallowfield before completing the left turn heading in a south-westerly direction at Stretford where it combines with the option for 05L. It continues in this direction to terminate at 7,000ft west of the Lymm interchange between the M56 and the M6.

A speed restriction of 220 KIAS is used for the first turn which allows most aircraft to fly in a clean configuration.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4B L is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 4B R is 45km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: Up to 4,000ft, option 4B L is estimated to overfly approximately 44,300 households with an approximate population of 114,300. Taking account of planned property developments, this option is estimated to impact a total population of 114,400. Up to 7,000ft, this option is estimated to overfly approximately 50,700 households with an approximate population of 129,000. Taking account of planned property developments, this option is estimated to impact a total population of 129,700. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 4B R is estimated to overfly approximately 47,300 households with an approximate population of 126,300. Taking account of planned property developments, this option is estimated to impact a total population of 126,700. Up to 7,000ft, this option is estimated to overfly approximately 56,600 households with an approximate population of 147,900. Taking account of planned property developments, this option is estimated to impact a total population of 149,200. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: Up to 4,000ft, option 4B L is estimated to overfly 191 noise sensitive areas. Up to 7,000ft, option 4B L is estimated to overfly 195 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 4B R is estimated to overfly 223 noise sensitive areas. Up to 7,000ft, option 4B R is estimated to overfly 225 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: This option is designed as RNP1 option that uses RF coding, is flyable and provides for a continuous climb.				

11.8 Runways 05L/05R South-west Option 5

Design Principle Evaluation	Option No: 5
Option Name: SID RW 05 L South-west Option 5	ACCEPT
Option Name: SID RW 05 R South-west Option 5	ACCEPT

Option Description:

This is an **RNAV1** option that provides two turns to the left to route south-west similar option 1 but uses an initial 15° track adjustment to the left from the DER for Runway 05L, and a 5° adjustment for Runway 05R. This is to provide noise relief for the Cheadle area, which lies underneath the approach path for Runways 23R/23L arrivals.

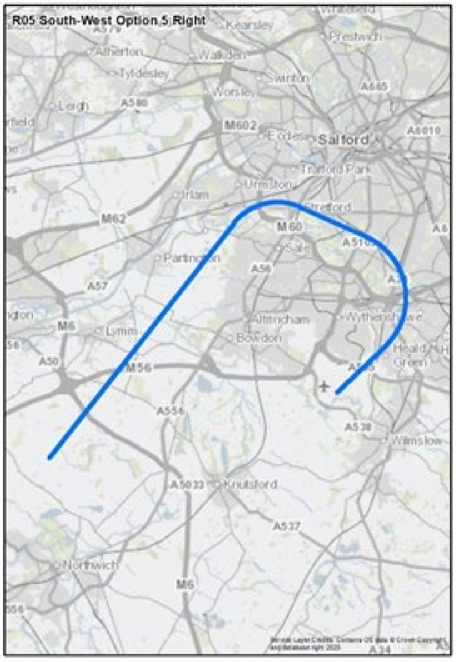
The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

The procedure uses fly-by waypoints.

05L: After passing the DER aircraft make a 15° track adjustment to the left (north) followed by a left turn that routes aircraft to the west of Cheadle. There is then a short straight segment where the routes combine before a second turn is made over Stretford and it heads in a south-westerly direction over sparsely populated areas to terminate at 7,000ft to the south-west of the junction between the M56 and M6.

05R: After passing the DER aircraft make a 5° track adjustment to the left (north) followed by a left turn that routes aircraft to the west of Cheadle. There is then a short straight segment where the routes combine before a second turn is made over Stretford and it heads in a south-westerly direction over sparsely populated areas to terminate at 7,000ft to the south-west of the junction between the M56 and M6.

A speed restriction of 210 KIAS is used for the first turn which is the CAP778 recommended speed.



Design Principle Safety				
	05L	NOT MET	PARTIAL	**MET**
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNAV1 When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle Policy				
	05L	NOT MET	PARTIAL	**MET**
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV1 routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle Capacity				
	05L	NOT MET	PARTIAL	**MET**
	05R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 05R, there is a greater likelihood that best use of capacity may not be fully attained due to ground movement limitations and the time taken for aircraft to enter and backtrack the runway for a Runway 05R departure.

Based on current information, these options should not adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle Emissions				
	05L	NOT MET	**PARTIAL**	MET
	05R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

The estimated track length of option 5L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 5R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 5L is estimated to overfly approximately 31,500 households with an approximate population of 73,700. Taking account of planned property developments, this option is estimated to impact a total population of 74,100. Up to 7,000ft, this option is estimated to overfly approximately 33,800 households with an approximate population of 79,100. Taking account of planned property developments, this option is estimated to impact a total population of 80,000. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft Up to 4,000ft, option 5R is estimated to overfly approximately 36,800 households with an approximate population of 86,500. Taking account of planned property developments, this option is estimated to impact a total population of 86,900. Up to 7,000ft, this option is estimated to overfly approximately 39,200 households with an approximate population of 92,100. Taking account of planned property developments, this option is estimated to impact a total population of 93,200. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 5L is estimated to overfly 148 noise sensitive areas. Up to 7,000ft, option 5L is estimated to overfly 150 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 5R is estimated to overfly 177 noise sensitive areas. Up to 7,000ft, option 5R is estimated to overfly 180 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
	05L	NOT MET	PARTIAL	MET

Design Principle **Airspace**	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: This option is designed as RNAV1, is flyable and provides for a continuous climb.				

11.9 Runways 05L/05R South-west Viable but Poor Fit Options

Option	Safety	Policy	Capacity
A6 Extended climb out then left turn	S	P	C

After departure from Runway 05L/05R, aircraft would continue straight ahead beyond Stockport before making a 180° left turn, south-west, towards the SID aiming point.

Safety: This option may interact with Runway 05 departures to the north.

Policy: This option involves greater track mileage than is necessary by taking traffic a significant distance east before turning it south-west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

Capacity: This option would take the same track as departures in the east which would limit the ability to achieve one minute departure splits and not enabling best of runway capacity. In addition, this option is expected to interact with departures in the north envelopes.

Option	Safety	Policy	Capacity
B7 Extended climb out, right turn	S	P	C

After departure from Runway 05L/05R, aircraft would continue straight ahead beyond Stockport before making a 180° right-hand turn to the south-west.

Safety: This option may interact with Runway 05 departures to the south and east.

Policy: This option involves greater track mileage than is necessary by taking traffic a significant distance east before turning it west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

Capacity: This option would take the same track as departures in the east which would limit the ability to achieve one minute departure splits and not enabling best of runway capacity. In addition, this option is expected to interact with departures in the south envelope.

Option	Safety	Policy	Capacity
C8 Right-hand wraparound	S	P	C

After departure from Runway 05L/05R, aircraft would make a right-hand turn, fly around the airport then begin heading south-west towards the SID aiming point.

Safety: This option is expected to interact with the Runway 05R MAP.

Capacity: This option interacts with departures in the 05 South Design Envelope and arrivals from the south which would limit the ability to enable best use of runway capacity.

12 Runways 23R/23L North

12.1 Runways 23R/23L North Option 1A

Design Principle Evaluation	Option No: 1A
Option Name: SID RW 23 L North Option 1A	ACCEPT
Option Name: SID RW 23 R North Option 1A	ACCEPT

Option Description:

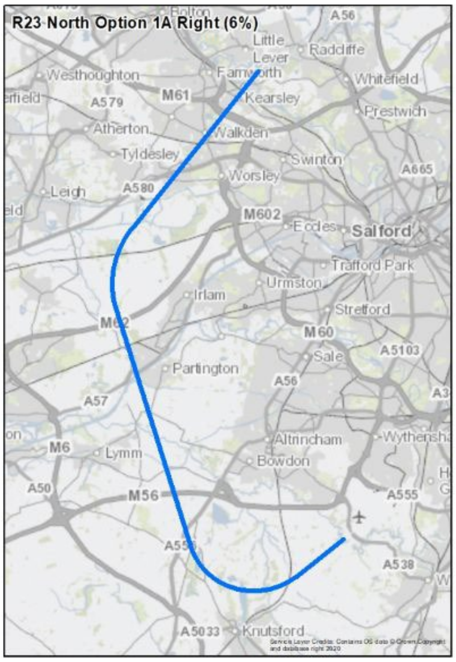
Option 1A is an RNAV1 replication of the current departure to POL and uses fly-over waypoints with CF path terminator coding to create an approximate replication of the existing conventional POL 5R 1Y SID. An element of dispersion would be apparent in the turns due to the fly-over waypoint and CF coding.

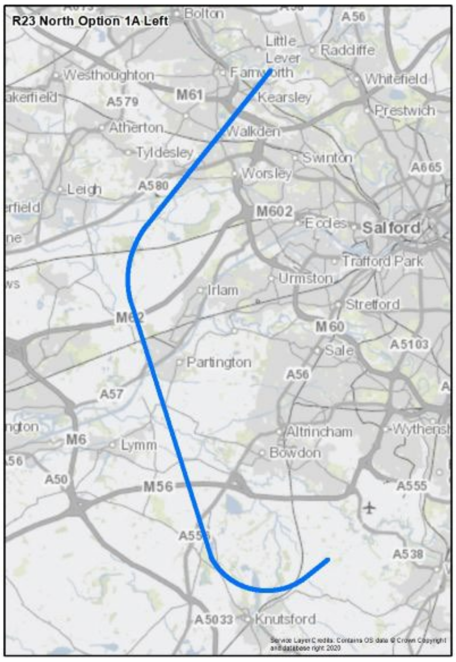
The fly-over waypoints are positioned at the existing markers.

- For Runway 23R this first turn is at MCT D3.
- For Runway 23L, this is at D3.2 which is less than 1nm from DER but replicates the current procedure.

As a replicated route it follows a similar track over the ground as the current published route. This takes both routes to the north of Knutsford at which point the tracks of the SIDs converge. The route heads north until turning right to the north-west of Irlam to head in a north-east direction and terminates at 7,000ft just east of Farnworth.

A speed restriction of 200 KIAS is used for the first turn.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 replication of the current route. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. They connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1A L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 1A R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 1A L is estimated to overfly approximately 4,450 households with an approximate population of 10,800. Taking account of planned property developments, this option is estimated to impact a total population of 12,400. Up to 7,000ft, this option is estimated to overfly approximately 38,850 households with an approximate population of 89,300. Taking account of planned property developments, this option is estimated to impact a total population of 91,900. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 1A R is estimated to overfly approximately 4,650 households with an approximate population of 11,300. Taking account of planned property developments, this option is estimated to impact a total population of 12,500. Up to 7,000ft, this option is estimated to overfly approximately 39200 households with an approximate population of 90,100. Taking account of planned property developments, this option is estimated to impact a total population of 92,400. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 1A L is estimated to overfly 14 noise sensitive areas. Up to 7,000ft, option 1A L is estimated to overfly 15 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 1A R is estimated to overfly 15 noise sensitive areas.				

Up to 7,000ft, option 1A R is estimated to overfly 15 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 which is the lowest PBN specification and is therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

12.2 Runways 23R/23L North Option 1B

Design Principle Evaluation	Option No: 1B
Option Name: SID RW 23 L North Option 1B	REJECT
Option Name: SID RW 23 R North Option 1B	ACCEPT

Option Description:

Option 1B is an RNAV1 option, similar to option 1A, using fly-over waypoints with CF path terminator coding. However, aircraft make a second right turn earlier to provide a more direct and fuel-efficient route.

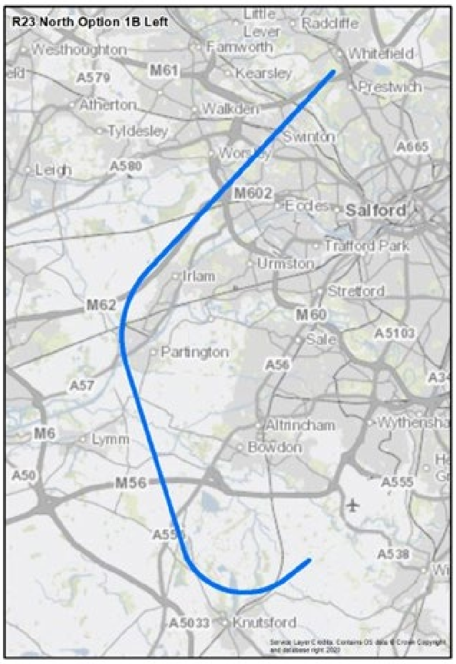
The fly-over waypoints are positioned at the existing markers:

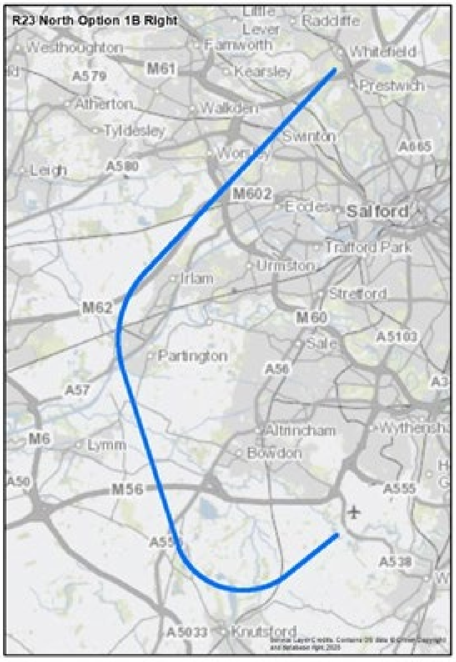
- For Runway 23R this first turn is at MCT D3.
- For Runway 23L, this is at D3.2 which is less than 1nm from DER, but this replicates the turn of the current procedure and therefore aligns to the Design Principle Safety.

23L: This route commences the RF turn to the north of Knutsford. This turn continues until Mere where it combines with the option for 23R and continues north until west of Partington at which point the route heads north-east following the line of the M62 initially and terminates at 7,000ft north of Prestwich.

23R: This route commences the RF turn to the north of Knutsford. This turn continues until Mere where it combines with the option for 23L and continues north until west of Partington at which point the route heads north-east following the line of the M62 initially and terminates at 7,000ft north of Prestwich.

An element of dispersion would be apparent in the turn due to the fly-over waypoint and CF coding. To create replication with the existing procedure, a speed restriction of 200 KIAS is used for the first turn.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. They connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1B L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1B R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to overfly approximately 5,350 households with an approximate population of 12,700. Taking account of planned property developments, this option is estimated to impact a total population of 14,400.

Up to 7,000ft, this option is estimated to overfly approximately 51,500 households with an approximate population of 118,000. Taking account of planned property developments, this option is estimated to impact a total population of 119,900.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 1B R is estimated to overfly approximately 5,500 households with an approximate population of 13,000. Taking account of planned property developments, this option is estimated to impact a total population of 14,300.

Up to 7,000ft, this option is estimated to overfly approximately 52,050 households with an approximate population of 119,200. Taking account of planned property developments, this option is estimated to impact a total population of 120,800.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to overfly 22 noise sensitive areas.

Up to 7,000ft, option 1B L is estimated to overfly 25 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 1B R is estimated to overfly 22 noise sensitive areas.

Up to 7,000ft, option 1B R is estimated to overfly 25 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 which is the lowest PBN specification and is therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

12.3 Runways 23R/23L North Option 2B

Design Principle Evaluation	Option No: 2B
Option Name: SID RW 23 L North Option 2B	ACCEPT
Option Name: SID RW 23 R North Option 2B	ACCEPT

Option Description:

This is an **RNP1** option with RF coding that is similar to option 1B but the use of RF coding results in a track slightly further west initially before heading north-east initially following the course of the M62 to provide a more direct and fuel-efficient route.

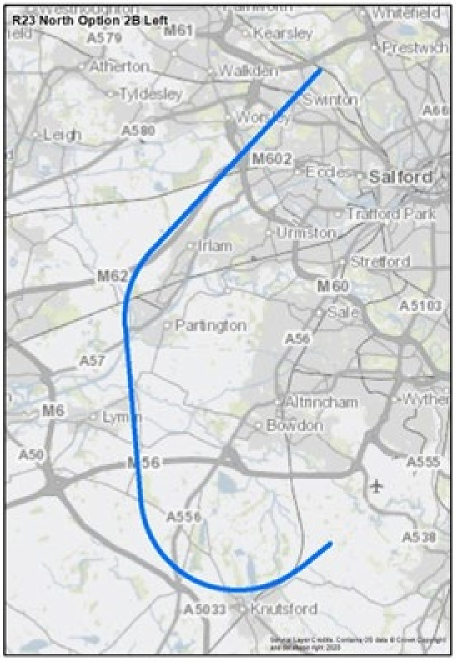
The option has been created to use the more modern technology and maximise fuel efficiency by making a second right turn earlier to head on a north-east trajectory where it terminates south of the existing POL SID.

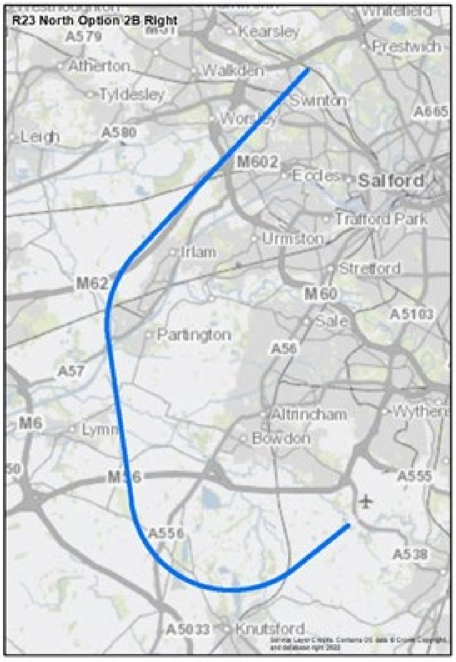
The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: This route commences the RF turn to the north of Knutsford. This turn continues via Over Tabley and routes north to the east of Lymm until west of Partington at which point the route heads north-east. It initially follows the route of the M62 and terminates at 7,000ft north of Prestwich.

23R: This route commences the RF turn to the north of Knutsford. This turn continues via Over Tabley and routes north to the east of Lymm until west of Partington at which point the route heads north-east. It initially follows the route of the M62 and terminates at 7,000ft north of Prestwich.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.





Design Principle	Runway			
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle	Runway			
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle	Runway			
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle	Runway			
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2B L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 2B R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to overfly approximately 4,750 households with an approximate population of 11,200. Taking account of planned property developments, this option is estimated to impact a total population of 12100.

Up to 7,000ft, this option is estimated to overfly approximately 39,750 households with an approximate population of 92,000. Taking account of planned property developments, this option is estimated to impact a total population of 93,400.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 2B R is estimated to overfly approximately 4,100 households with an approximate population of 9,700. Taking account of planned property developments, this option is estimated to impact a total population of 10,200.

Up to 7,000ft, this option is estimated to overfly approximately 39,600 households with an approximate population of 91,700. Taking account of planned property developments, this option is estimated to impact a total population of 92,500.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to overfly 25 noise sensitive areas.

Up to 7,000ft, option 2B L is estimated to overfly 25 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 2B R is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, option 2B R is estimated to overfly 15 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

12.4 Runways 23R/23L North Option 3

Design Principle Evaluation	Option No: 3
Option Name: SID RW 23 L North Option 3	ACCEPT
Option Name: SID RW 23 R North Option 3	ACCEPT

Option Description:

This provides an **RNP1** option with RF coding using fly-by waypoints.

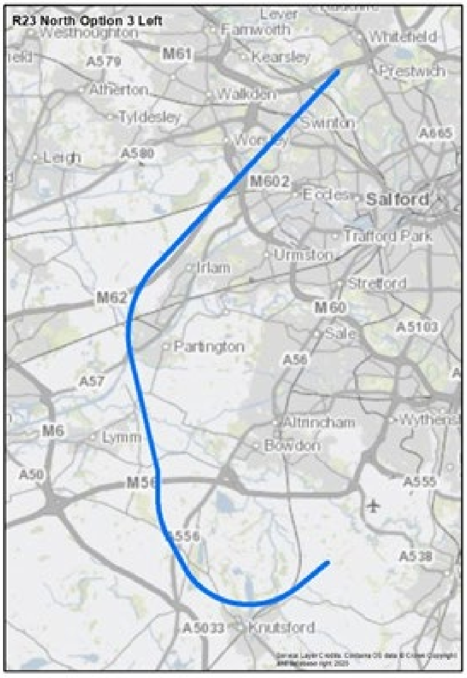
It has been created using fly-by waypoints with a tighter radius first turn than option 2B to reduce noise impact for Knutsford. It also aims to improve fuel efficiency by making a second right turn earlier than the current POL SID.

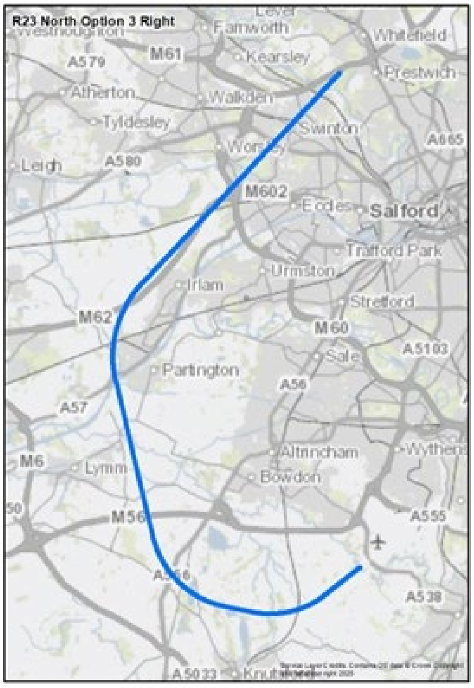
The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: This route commences the RF turn to the north of Knutsford. The radius of this turn takes it further north of Knutsford than option 2B to route between High Legh and Bucklow Hill. The route heads north and combine near Broomedge and continue until just west of Partington. At this point the route turns right to follow the course of the M62 in a north-easterly direction and terminates at 7,000ft west of Prestwich.

23R: This route commences the RF turn earlier than 23L, to route further to the north of Knutsford. This routes it between High Legh and Bucklow Hill and it converges with the option for 23L in the vicinity of Broomedge. The route heads north until just west of Partington. At this point the route turns right to follow the course of the M62 in a north-easterly direction and terminates at 7,000ft west of Prestwich.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 3R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3L is estimated to overfly approximately 4,600 households with an approximate population of 10,900. Taking account of planned property developments, this option is estimated to impact a total population of 12,200.

Up to 7,000ft, this option is estimated to overfly approximately 43,150 households with an approximate population of 99,000. Taking account of planned property developments, this option is estimated to impact a total population of 100,600.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 3R is estimated to overfly approximately 4,650 households with an approximate population of 11,100. Taking account of planned property developments, this option is estimated to impact a total population of 11,700.

Up to 7,000ft, this option is estimated to overfly approximately 43,100 households with an approximate population of 98,800. Taking account of planned property developments, this option is estimated to impact a total population of 99,700.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3L is estimated to overfly 18 noise sensitive areas.

Up to 7,000ft, option 3L is estimated to overfly 20 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 3R is estimated to overfly 18 noise sensitive areas.

Up to 7,000ft, option 3R is estimated to overfly 20 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

12.5 Runways 23R/23L North Option 4A

Design Principle Evaluation	Option No: 4A
Option Name: SID RW 23 L North Option 4A	ACCEPT
Option Name: SID RW 23 R North Option 4A	ACCEPT

Option Description:

This is an **RNP1** option with RF coding included to replicate the existing conventional POL SID but using an RF turn. This results in a slightly wider initial turn than the conventional route and the RNAV1 replication options.

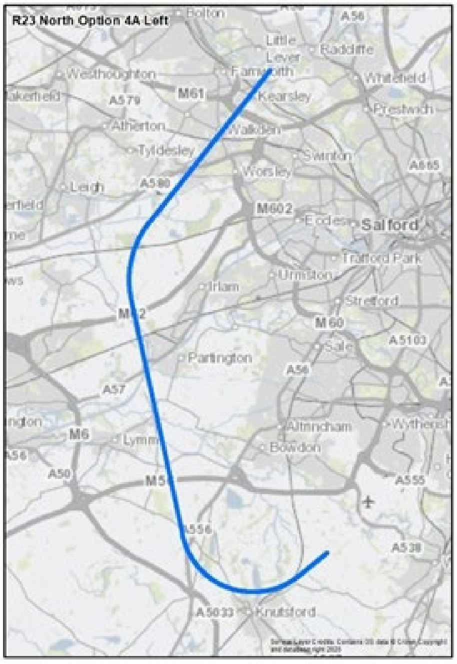
It has been created with the slightly tighter radius first turn similar to option 3 to reduce noise impact for Knutsford but does not have the second turn at the earlier point of that option because it replicates the current SID.

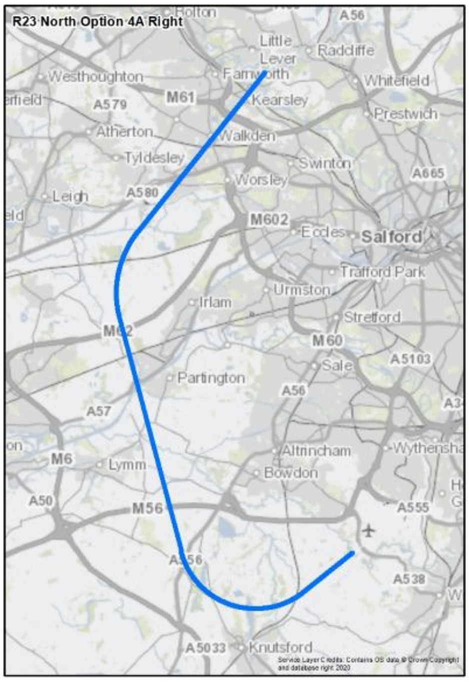
The design aims to have aircraft make the first right turn no closer than 1nm from DER after which both routes head in a northerly direction and converge just north of Cadishead.

23L: This route commences the RF turn to the north of Knutsford. The radius of this turn takes it further north of Knutsford than option 2B to route between High Legh and Bucklow Hill. The route heads north until turning right via a fly-by turn at XUMAT (north of Cadishead) to head in a north-east direction and terminates just east of Farnworth.

23R: This route commences the RF turn earlier than 23L, to route further to the north of Knutsford. This routes it between High Legh and Bucklow Hill and it converges with the option for 23L in the vicinity of Cadishead. At this point the route turns right to head in a north-east direction and terminates just east of Farnworth.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it may need to be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4A L is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 4A R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: Up to 4,000ft, option 4A L is estimated to overfly approximately 3,500 households with an approximate population of 8,300. Taking account of planned property developments, this option is estimated to impact a total population of 9,400. Up to 7,000ft, this option is estimated to overfly approximately 37,750 households with an approximate population of 86,500. Taking account of planned property developments, this option is estimated to impact a total population of 88,700. This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft. Up to 4,000ft, option 4A R is estimated to overfly approximately 42,00 households with an approximate population of 10,100. Taking account of planned property developments, this option is estimated to impact a total population of 10,800. Up to 7,000ft, this option is estimated to overfly approximately 38,550 households with an approximate population of 88,400. Taking account of planned property developments, this option is estimated to impact a total population of 90,200. This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: Up to 4,000ft, option 4A L is estimated to overfly 12 noise sensitive areas. Up to 7,000ft, option 4A L is estimated to overfly 15 noise sensitive areas. This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft. Up to 4,000ft, option 4A R is estimated to overfly 16 noise sensitive areas. Up to 7,000ft, option 4A R is estimated to overfly 20 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

12.6 Runways 23R/23L North Option 4B

Design Principle Evaluation	Option No: 4B
Option Name: SID RW 23 L North Option 4B	ACCEPT
Option Name: SID RW 23 R North Option 4B	ACCEPT

Option Description:

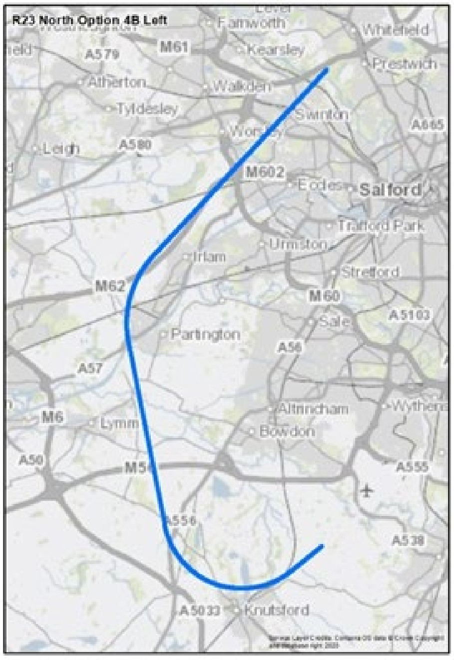
This is an **RNP1** option with RF coding included to replicate the existing conventional POL SID but using an RF turn. It has the same slightly tighter turn radius as option 4A to reduce noise impact for Knutsford but makes a second right turn earlier to head north-east to provide a more direct and fuel-efficient route.

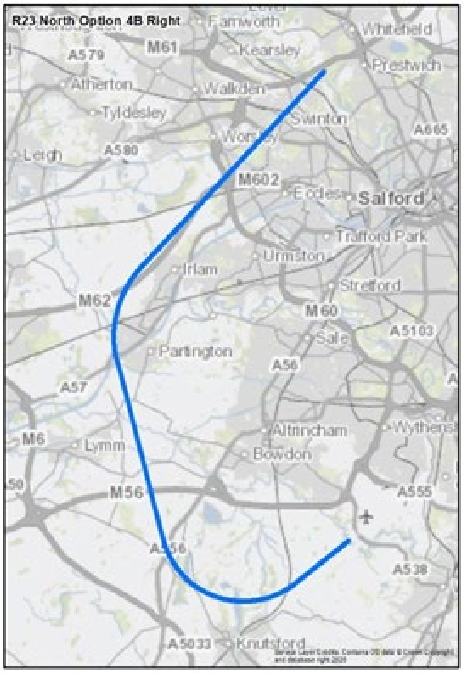
The design aims to have aircraft make the first right turn no closer than 1nm from DER.

23L: This route commences the RF turn to the north of Knutsford. The radius of this turn takes it further north of Knutsford than option 2B to route between High Legh and Bucklow Hill. The route heads north until just west of Partington where it combines with the option for 23R. At this point the route turns right to follow the course of the M62 in a north-easterly direction and terminates at 7,000ft west of Prestwich.

23R: This route commences the RF turn earlier than 23L, prior to Parkgate Industrial Area to route further to the north of Knutsford. This routes between High Legh and Bucklow Hill and it converges with the option for 23L in the vicinity of Partington. At this point the route turns right to follow the course of the M62 in a north-easterly direction and terminates at 7,000ft west of Prestwich.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4B L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 4B R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4B L is estimated to overfly approximately 4,800 households with an approximate population of 11,400. Taking account of planned property developments, this option is estimated to impact a total population of 12,900. Up to 7,000ft, this option is estimated to overfly approximately 42,450 households with an approximate population of 97900. Taking account of planned property developments, this option is estimated to impact a total population of 99,700. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 4B R is estimated to overfly approximately 4,850 households with an approximate population of 11,500. Taking account of planned property developments, this option is estimated to impact a total population of 12,700. Up to 7,000ft, this option is estimated to overfly approximately 42,900 households with an approximate population of 99,000. Taking account of planned property developments, this option is estimated to impact a total population of 100,500. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4B L is estimated to overfly 17 noise sensitive areas. Up to 7,000ft, option 4B L is estimated to overfly 20 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 4B R is estimated to overfly 20 noise sensitive areas. Up to 7,000ft, option 4B R is estimated to overfly 20 noise sensitive areas.				

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

12.7 Runways 23R/23L North Option 6A

Design Principle Evaluation	Option No: 6A
Option Name: SID RW 23 L North Option 6A	ACCEPT
Option Name: SID RW 23 R North Option 6A	ACCEPT

Option Description:

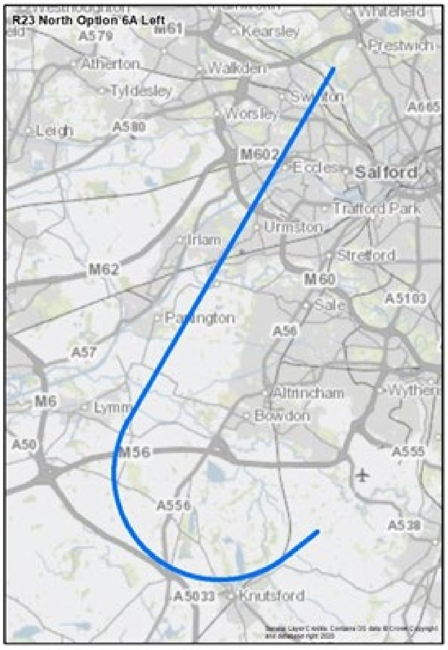
This is an **RNP1** option with RF coding that maximises fuel efficiency by removing the northbound leg between the first and second turns and replacing it with a single turn to the north-east. This provides the most direct route to POL.

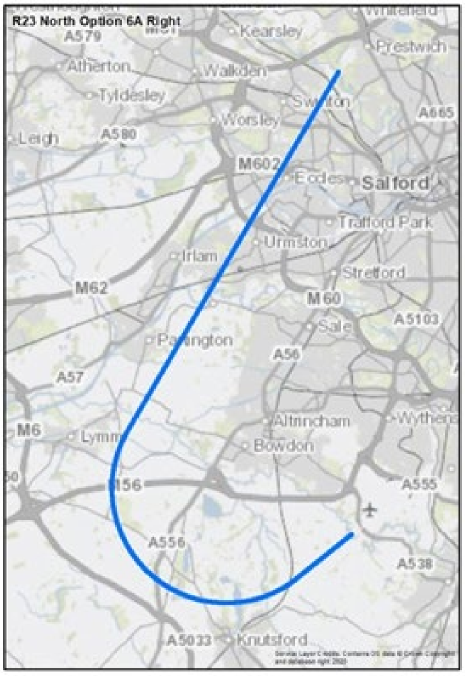
The design aims to have aircraft make the first right turn no closer than 1nm from DER, and the speed applied to this option results in this option forming the westerly edge of the envelope in the initial turn along with option 6B. This speed will also permit a larger number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: This route commences the single RF turn to the north of Knutsford. The turn continues north via Over Tabley before heading in a north easterly direction in the vicinity of Broomedge. The route then continues to the west of the Sale and Urmston before terminating at 7,000ft in the vicinity of Eccles.

23R: This route commences the single RF turn earlier than 23L, prior to route further to the north of Knutsford. The turn continues to route east of Over Tabley before converging with the option for 23L in the vicinity of Broomedge. The route then continues to the west of the Sale and Urmston before terminating at 7,000ft in the vicinity of Eccles.

A speed restriction of 220 KIAS is used for the first turn.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

	23L	NOT MET	PARTIAL	MET

Design Principle **Emissions**	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6A L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 6A R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to overfly approximately 2,200 households with an approximate population of 5,000. Taking account of planned property developments, this option is estimated to impact a total population of 6,200.

Up to 7,000ft, this option is estimated to overfly approximately 56,750 households with an approximate population of 129,800. Taking account of planned property developments, this option is estimated to impact a total population of 141,000.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Up to 4,000ft, option 6A R is estimated to overfly approximately 1,900 households with an approximate population of 4,500. Taking account of planned property developments, this option is estimated to impact a total population of 5,200.

Up to 7,000ft, this option is estimated to overfly approximately 56,650 households with an approximate population of 129,500. Taking account of planned property developments, this option is estimated to impact a total population of 140,500.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to overfly 12 noise sensitive areas.

Up to 7,000ft, option 6A L is estimated to overfly 15 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 6A R is estimated to overfly 9 noise sensitive areas.

Up to 7,000ft, option 6A R is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

12.8 Runways 23R/23L North Option 6B

Design Principle Evaluation	Option No: 6B
Option Name: SID RW 23 L North Option 6B	ACCEPT
Option Name: SID RW 23 R North Option 6B	ACCEPT

Option Description:

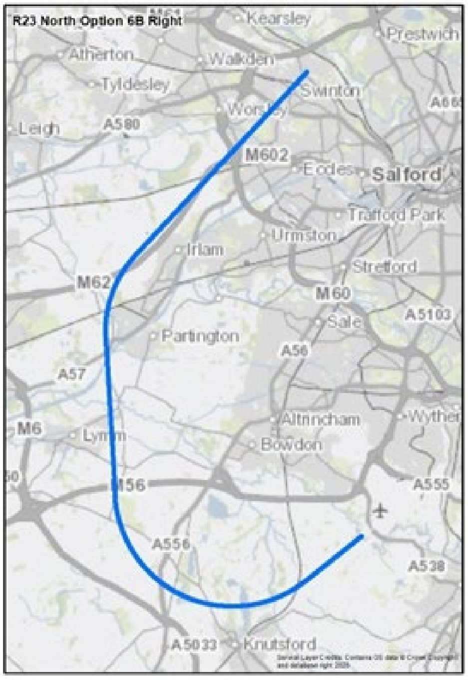
This is an RNP1option with RF coding that is similar to option 2B but the use of a higher speed results in a track slightly further west before making the second turn to the north.

The design aims to have aircraft make the first right turn no closer than 1nm from DER, and the speed applied to this option results in this option forming the westerly edge of the envelope in the initial turn along with option 6A. This speed will also permit a larger number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: This route commences the RF turn to the north of Knutsford. The radius of this turn takes it on the same track as option 6a via Over Tabley and east of Lymm, until west of Partington. At this point it combines with the option for 23R and heads north-east. They initially follow the route of the M62 and terminate at 7,000ft north of Prestwich.

23R: This route commences the RF turn earlier than 23L, to route further to the north of Knutsford. The radius of this turn takes it on the same track as option 6a via Over Tabley and east of Lymm, until west of Partington. At this point it combines with the option for 23L and heads north-east. They initially follow the route of the M62 and terminate at 7,000ft north of Prestwich.

A speed restriction of 220 KIAS is used for the first turn which allows most aircraft to fly in a clean configuration; however, this results in a wider turn radius than the replicated route.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6B L is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 6B R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to overfly approximately 4,200 households with an approximate population of 9,700. Taking account of planned property developments, this option is estimated to impact a total population of 10,400.

Up to 7,000ft, this option is estimated to overfly approximately 41,050 households with an approximate population of 93,900. Taking account of planned property developments, this option is estimated to impact a total population of 95,100.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 6B R is estimated to overfly approximately 3,500 households with an approximate population of 8,300. Taking account of planned property developments, this option is estimated to impact a total population of 8,600.

Up to 7,000ft, this option is estimated to overfly approximately 40,800 households with an approximate population of 93,500. Taking account of planned property developments, this option is estimated to impact a total population of 94,300.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to overfly 23 noise sensitive areas.

Up to 7,000ft, option 6B L is estimated to overfly 25 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 6B R is estimated to overfly 19 noise sensitive areas.

Up to 7,000ft, option 6B R is estimated to overfly 20 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

12.9 Runways 23R/23L North Option 7

Design Principle Evaluation	Option No: 7
Option Name: SID RW 23 L North Option 7	ACCEPT
Option Name: SID RW 23 R North Option 7	ACCEPT

Option Description:

This is an **RNP1** option that uses RF coding and an initial 15° track adjustment to the right from the DER for Runway 23L and a 5° adjustment for Runway 23R. This track adjustment is aimed to reduce noise impact on Knutsford. Thereafter this option has a similar route to that of option 4B.

An RNP+RF turn follows the initial track adjustment, and this commences at 1nm from DER for Runway 23L.

The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: After passing DER this route has a 15° track adjustment to the north which continues until 1nm from DER. An RNP+RF turn is then commenced to the north of Knutsford. This is continued until heading north in the vicinity of High Legh at which point the route heads north until just west of Partington. It then turns right to follow the course of the M62 in a north-easterly direction and terminates at 7,000ft north of Prestwich.

23R: After passing DER this route has a 5° track adjustment to the north. An RNP+RF turn is then commenced to the north of Knutsford. This is continued until the vicinity of High Legh where the route converges with the option for 23L. After this point the route heads north until just west of Cadishead where it turns right to follow the course of the M62 in a north-easterly direction and terminates at 7,000ft north of Prestwich.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 7R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 7L is estimated to overfly approximately 4,550 households with an approximate population of 10,800. Taking account of planned property developments, this option is estimated to impact a total population of 11.200. Up to 7,000ft, this option is estimated to overfly approximately 48.200 households with an approximate population of 110,100. Taking account of planned property developments, this option is estimated to impact a total population of 110,800. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 7R is estimated to overfly approximately 4,800 households with an approximate population of 11,400. Taking account of planned property developments, this option is estimated to impact a total population of 11,800. Up to 7,000ft, this option is estimated to overfly approximately 49,000 households with an approximate population of 112,000. Taking account of planned property developments, this option is estimated to impact a total population of 112,700. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 7L is estimated to overfly 16 noise sensitive areas. Up to 7,000ft, option 7L is estimated to overfly 20 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 7R is estimated to overfly 17 noise sensitive areas. Up to 7,000ft, option 7R is estimated to overfly 20 noise sensitive areas.				

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

12.10 Runways 23R/23L North Viable but Poor Fit Options

Option	Safety	Policy	Capacity
A5 Tight right-hand turn 190kts	S	P	C
Originally **option 5**, this was initially included to provide a more direct route to POL following an initial tight turn at 190kts. Safety: This has been classed as a poor fit against the Design Principle Safety, as it is potentially conflicts with the MAP for Runway 23R. This option may result in both procedures routing to the north of the airfield in a similar location.			
B8 Tight right-turn turn 210kts	S	P	C
Originally **option 2A** this was initially included to provide a more direct route to POL following the initial turn using RF coding at 210kts. It is similar to viable poor fit option A5. Safety: This has been classed as a poor fit against the Design Principle Safety, as it is potentially conflicts with the MAP for Runway 23R. This option may result in both procedures routing to the north of the airfield in a similar location.			
C9 Left-hand extended wraparound	S	P	C
After departure from Runway 23R/23L, aircraft would make a left-hand turn, fly around the airport and then begin heading north towards the SID aiming point. Safety: This option interacts with the 23 South and 23 East Departure Envelopes and the arrivals from the south requiring additional tactical mitigation to safely manage the flow of air traffic. Policy: This option involves greater track mileage than is necessary by taking traffic south before turning it north, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option interacts with the South and East Left Turn Departure Envelopes as well as arrivals from the south which would limit the ability to achieve one-minute departure splits and not enabling best of runway capacity.			
D10 Tight right-hand turn, east then north.	S	P	C
After departure from Runway 23R/23L, aircraft would make a tight right-hand turn, fly parallel to the airport then begin heading north towards the SID aiming point. Safety: This option is expected to interact with the Runway 23R MAP. Policy: This option involves greater track mileage than is necessary by taking traffic east before turning it north, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.			
E11 Extended straight ahead then right turn to north	S	P	C

After departure from Runway 23R/23L, aircraft would continue straight ahead to the vicinity of Knutsford before gradually turning right towards the north, towards the SID aiming point. <u>Safety</u>: From a safety perspective, this option may interact with LPL airspace which would require tactical intervention to resolve. <u>Policy</u>: This option involves greater track mileage than is necessary by taking traffic west before turning it north, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.			
F12 Sharp right-hand turn before heading north	S	P	C
After departure from Runway 23R/23L, aircraft would make a sharp right-hand turn before heading north, towards the SID aiming point. <u>Safety</u>: This option is expected will interact with the Runway 23R MAP.			

13 Runways 23R/23L East

13.1 Runways 23R/23L East Option 1A

Design Principle Evaluation	Option No: 1A
Option Name: SID RW 23 L East Option 1A	ACCEPT
Option Name: SID RW 23 R East Option 1A	ACCEPT

Option Description:

Option 1A is an RNAV1 replication of the current SONEX 1R/1Y SID and uses a fly-over waypoint with CF path terminator coding.

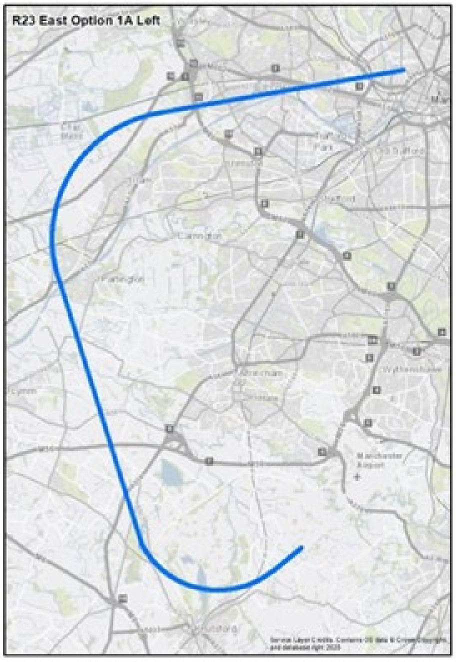
The fly-over waypoints are positioned at the existing markers.

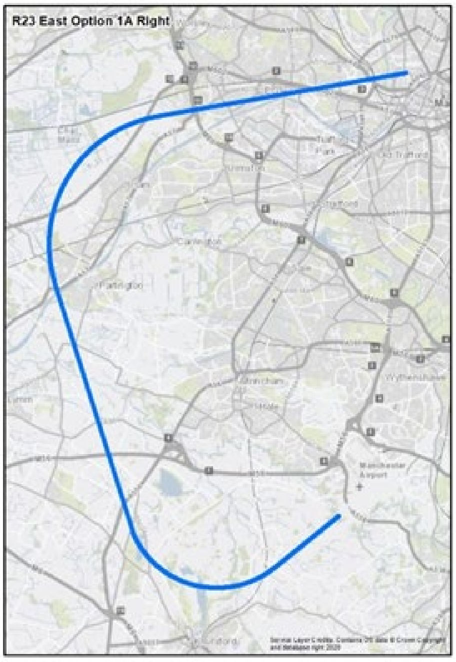
23R this first turn is at MCT D3.

23L this is at MCT D3.2 which less than 1nm from DER but as this replicates the turn of the current procedure it therefore aligns to the Design Principle Safety.

As a replicated route it follows a similar track over the ground as the current published route. The first turn commences to the north and east of Knutsford which takes both routes north of Knutsford at which point the tracks of the SIDs converge close to Mere. The routes head north until turning right to the north of Irlam, and then heads in an easterly direction south of Eccles and terminates at 7,000ft just east of Salford.

An element of dispersion would be apparent in the turns due to the fly-over waypoint and CF coding. A speed restriction of 200 KIAS is used for the first turn to create replication of the current route.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 replication of the current route. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. They connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1A L is 46km (25nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1A R is 47km (25nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1A L is estimated to overfly approximately 4,650 households with an approximate population of 11,200. Taking account of planned property developments, this option is estimated to impact a total population of 12,800.

Up to 7,000ft, this option is estimated to overfly approximately 74,800 households with an approximate population of 154,600. Taking account of planned property developments, this option is estimated to impact a total population of 168,500.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 1A R is estimated to overfly approximately 4,850 households with an approximate population of 11,700. Taking account of planned property developments, this option is estimated to impact a total population of 12,900.

Up to 7,000ft, this option is estimated to overfly approximately 75,300 households with an approximate population of 155,700. Taking account of planned property developments, this option is estimated to impact a total population of 169,500.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1A L is estimated to overfly 14 noise sensitive areas.

Up to 7,000ft, this option is estimated to overfly 15 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 1A R is estimated to overfly 17 noise sensitive areas.

Up to 7,000ft, option 1A R is estimated to overfly 20 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNAV routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

13.2 Runways 23R/23L East Option 1B

Design Principle Evaluation	Option No: 1B
Option Name: SID RW 23 L East Option 1B	REJECT
Option Name: SID RW 23 R East Option 1B	REJECT

Option Description:

This is an RNAV1 option similar to the existing conventional SID. However, aircraft will make the second right turn to head east at an earlier point to create a more direct and fuel-efficient route.

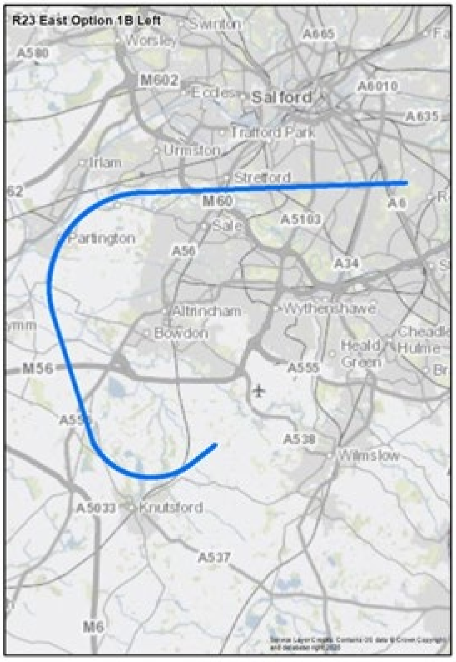
The fly-over waypoints are positioned at the existing markers:

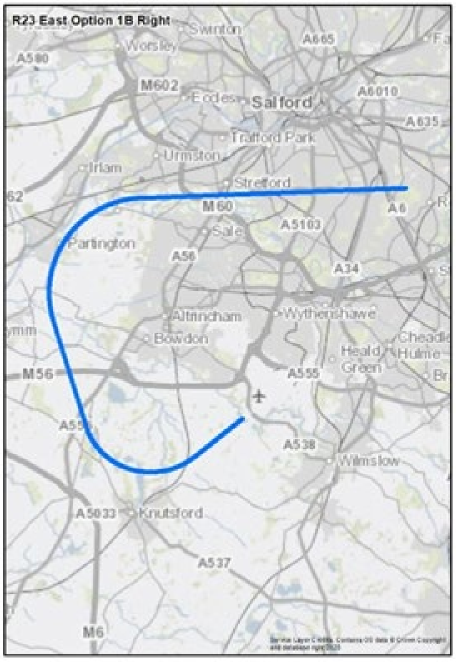
- For Runway 23R this first turn is at MCT D3.
- For Runway 23L, this is at D3.2 which is less than 1nm from DER, but this replicates the turn of the current procedure and therefore aligns to the Design Principle Safety.

23L: This follows an initial track over the ground that seeks to replicate the current route in the first right turn. This turn routes to the north of Knutsford and the route converges with the option for 23R close to Mere. The routes continue north until turning east to the south of Partington routing over Stretford and Urmston and terminating at 7,000ft overhead Levenshulme.

23R: This follows an initial track over the ground that seeks to replicate the current route in the first right turn. This turn routes to the north of Knutsford and the route converges with the option for 23L close to Mere. The routes continue north until turning east to the south of Partington routing over Stretford and Urmston and terminating at 7,000ft overhead Levenshulme.

An element of dispersion would be apparent in the turn due to the fly-over waypoint. A speed restriction of 200 KIAS is used for the first turn to create replication of the current route.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 current route. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. They connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1B L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1B R is 42km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 1B L is estimated to overfly approximately 4,400 households with an approximate population of 10,600. Taking account of planned property developments, this option is estimated to impact a total population of 15,100. Up to 7,000ft, this option is estimated to overfly approximately 101,600 households with an approximate population of 269,900. Taking account of planned property developments, this option is estimated to impact a total population of 275,000. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 1B R is estimated to overfly approximately 4,150 households with an approximate population of 10,000. Taking account of planned property developments, this option is estimated to impact a total population of 13,900. Up to 7,000ft, this option is estimated to overfly approximately 102,500 households with an approximate population of 272,200. Taking account of planned property developments, this option is estimated to impact a total population of 276,900. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 1B L is estimated to overfly 19 noise sensitive areas. Up to 7,000ft, option 1B L is estimated to overfly 20 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 1B R is estimated to overfly 20 noise sensitive areas. Up to 7,000ft, option 1B R is estimated to overfly 20 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

13.3 Runways 23R/23L East Option 1C

Design Principle Evaluation	Option No: 1C
Option Name: SID RW 23 L East Option 1C	ACCEPT
Option Name: SID RW 23 R East Option 1C	REJECT

Option Description:

This option provides a similar initial **RNAV1** route to options 1A and 1B which are based on the existing conventional SID. However, aircraft will make the second right turn at an earlier point to route via an area of low population density to reduce noise impact.

This is aimed at recreating current ATC operational practice whereby aircraft are vectored to the east after passing 4,000ft.

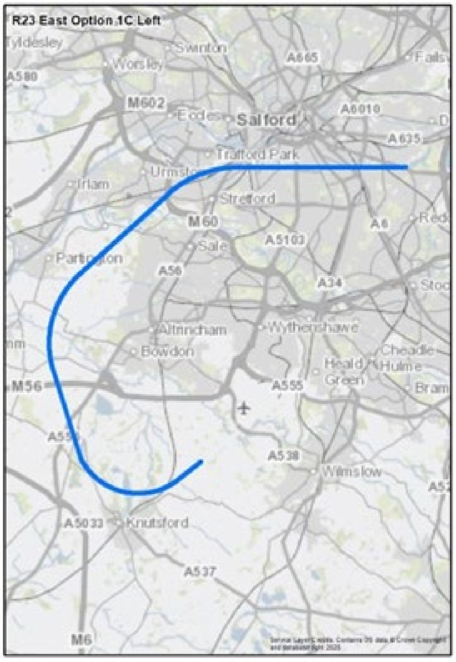
An element of dispersion would be apparent in the turn due to the fly-over waypoint. These fly-over waypoints are positioned at the existing markers:

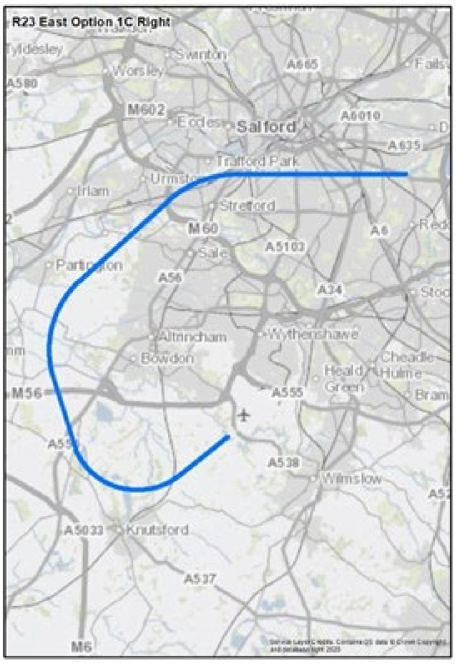
- For Runway 23R this first turn is at MCT D3.
- For Runway 23L, this is at D3.2 which is less than 1nm from DER, but this replicates the turn of the current procedure and therefore aligns to the Design Principle Safety.

23L: This follows an initial track over the ground that seeks to replicate the current route in the first right turn. This turn commences to the north of Knutsford and takes the route north where it converges with the option for 23R close to Mere. The routes continue north until turning right to the south of Partington through an area of low population density until Stretford and Urmston, where they turn right to head in an easterly direction routing south of Manchester City Centre and terminating at 7,000ft overhead Gorton.

23R: This follows an initial track over the ground that seeks to replicate the current route in the first right turn. This turn commences to the north of Knutsford which takes the route north where it converges with the option for 23L close to Mere. The routes continue north until turning right to the south of Partington through an area of low population density until Stretford and Urmston, where they turn right to head in an easterly direction routing south of Manchester City Centre and terminating at 7,000ft overhead Gorton.

A speed restriction of 200 KIAS is used for the first turn to create track replication of the current route.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 current route. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. They connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1C L is 40km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 1C R is 41km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1C L is estimated to overfly approximately 1,250 households with an approximate population of 2,700. Taking account of planned property developments, this option is estimated to impact a total population of 4,700.

Up to 7,000ft, this option is estimated to overfly approximately 105,650 households with an approximate population of 276,800. Taking account of planned property developments, this option is estimated to impact a total population of 287,000.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 1C R is estimated to overfly approximately 500 households with an approximate population of 1,200. Taking account of planned property developments, this option is estimated to impact a total population of 3,000.

Up to 7,000ft, this option is estimated to overfly approximately 106,550 households with an approximate population of 279,700. Taking account of planned property developments, this option is estimated to impact a total population of 289,700.

This is less than or similar to the ‘do nothing’ scenario at 4,000ft, but greater than the ‘do nothing’ scenario at 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1C L is estimated to overfly 2 noise sensitive areas.

Up to 7,000ft, option 1C L is estimated to overfly 5 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 4,000ft, but greater than the ‘do nothing’ scenario at 7,000ft.

Up to 4,000ft, option 1C R is estimated to overfly 2 noise sensitive areas.

Up to 7,000ft, option 1C R is estimated to overfly 5 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 4,000ft, but greater than the ‘do nothing’ scenario at 7,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

13.4 Runways 23R/23L East Option 2

Design Principle Evaluation	Option No: 2
Option Name: SID RW 23 L East Option 2	REJECT
Option Name: SID RW 23 R East Option 2	REJECT

Option Description:

This option provides an **RNP1+RF** coded option that provides a more direct route to the east using a single right turn.

It has been created by using a turn with the lowest possible speed to create a tight radius turn to the north-east initially, before making a second smaller turn to head east. The design aims to have aircraft make the first right turn no closer than 1nm from DER.

23L: The first RF right turn starts to the north of Knutsford. This routes the aircraft between Mere and Over Tabley before heading in a north-easterly direction to avoid Bowdon and Altrincham. The route continues in this direction before making a second right turn to the east to route to the south of Sale before terminating at 7,000ft to the east of Reddish.

23R: This route commences the single RF turn earlier than 23L, prior to Parkgate Industrial Area to route further to the north of Knutsford. This results in a turn over Mere before heading in a north-easterly direction to avoid Bowdon and Altrincham. It converges with the option for 23L south of Sale where it heads east before terminating at 7,000ft to the east of Reddish.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2L is 39km (21nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 2R is 39km (21nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2L is estimated to overfly approximately 9,650 households with an approximate population of 23,400. Taking account of planned property developments, this option is estimated to impact a total population of 24,300. Up to 7,000ft, this option is estimated to overfly approximately 97,900 households with an approximate population of 242,200. Taking account of planned property developments, this option is estimated to impact a total population of 243,200. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 2R is estimated to overfly approximately 8,100 households with an approximate population of 19,600. Taking account of planned property developments, this option is estimated to impact a total population of 19,600. Up to 7,000ft, this option is estimated to overfly approximately 97,500 households with an approximate population of 241,400. Taking account of planned property developments, this option is estimated to impact a total population of 241,400. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2L is estimated to overfly 24 noise sensitive areas. Up to 7,000ft, option 2L is estimated to overfly 25 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft Up to 4,000ft, option 2R is estimated to overfly 18 noise sensitive areas. Up to 7,000ft, option 2R is estimated to overfly 20 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft				

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

13.5 Runways 23R/23L East Option 4A

Design Principle Evaluation	Option No: 4A
Option Name: SID RW 23 L East Option 4A	REJECT
Option Name: SID RW 23 R East Option 4A	ACCEPT

Option Description:

This is an **RNP1** option using RF coding that provides a more direct route to the east using a single right turn.

It is similar to option 2A but at the CAP778 recommended speed of 210kts in the turn which results in a slightly wider track to the west and north. This speed may also permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise. The design aims to have aircraft make the first right turn no closer than 1nm from DER.

23L: The first RF right turn starts to the north of Knutsford. This routes aircraft further west of Mere than option 2 but via Over Tabley before heading in a north-easterly direction to avoid Bowdon and Altrincham. The route continues in this direction before making a second right turn to the east to route to the south of Sale before terminating at 7,000ft near Heaton Chapel.

23R: This route commences the single RF turn earlier than 23L, prior to route further to the north of Knutsford. This results in a turn just west of Mere before heading in a north-easterly direction to avoid Bowdon and Altrincham. It converges with the option for 23L south of Sale where it heads east before terminating at 7,000ft near Heaton Chapel.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.

Design Principle **Safety**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

The estimated track length of option 4A L is 41km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 4A R is 41km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4A L is estimated to overfly approximately 2,350 households with an approximate population of 5,500. Taking account of planned property developments, this option is estimated to impact a total population of 6,200. Up to 7,000ft, this option is estimated to overfly approximately 94,450 households with an approximate population of 235,800. Taking account of planned property developments, this option is estimated to impact a total population of 236,600. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 4A R is estimated to overfly approximately 1,150 households with an approximate population of 2,600. Taking account of planned property developments, this option is estimated to impact a total population of 2,600. Up to 7,000ft, this option is estimated to overfly approximately 93,950 households with an approximate population of 234,600. Taking account of planned property developments, this option is estimated to impact a total population of 234,600. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4A L is estimated to overfly 11 noise sensitive areas. Up to 7,000ft, option 4A L is estimated to overfly 15 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft Up to 4,000ft, option 4A R is estimated to overfly 6 noise sensitive areas. Up to 7,000ft, option 4A R is estimated to overfly 10 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
	23L	NOT MET	PARTIAL	MET

Design Principle **Airspace**	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

13.6 Runways 23R/23L East Option 4B

Design Principle Evaluation	Option No: 4B
Option Name: SID RW 23 L East Option 4B	ACCEPT
Option Name: SID RW 23 R East Option 4B	ACCEPT

Option Description:

Option 4B is and **RNP1** option using RF coding included to increase the distance of routes from Knutsford through the use of a track adjustment to the north commencing at the DER. A 5° adjustment is used for Runway 23R and 15° for Runway 23L.

An RNP+RF turn follows the initial track adjustment (1nm from DER for 23L), and it then follows a similar track to option 4A.

The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: After passing DER this route has a 15° track adjustment to the north which continues until 1nm from DER. An RNP+RF turn is then commenced which results in the route passing north of Knutsford. This RF turn takes aircraft over Mere where it combines with the option for 23R before heading in a north-easterly direction to avoid Bowdon and Altrincham. The route continues in this direction before making a second right turn to the east to route to the south of Sale before terminating at 7,000ft near Heaton Chapel.

23R: After passing DER this route has a 5° track adjustment to the north. An RNP+RF turn is then commenced which results in the route passing north of Knutsford. This is continued until the vicinity of Mere where the route converges with the option for 23L. The combined routes head in a north-easterly direction to avoid Bowdon and Altrincham and continue in this direction before making a second right turn to the east to route to the south of Sale before terminating at 7,000ft near Heaton Chapel.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4B L is 39km (21nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 4B R is 45km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4B L is estimated to overfly approximately 6,950 households with an approximate population of 16,800. Taking account of planned property developments, this option is estimated to impact a total population of 16,800.

Up to 7,000ft, this option is estimated to overfly approximately 95,250 households with an approximate population of 235,800. Taking account of planned property developments, this option is estimated to impact a total population of 235,800.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 4B R is estimated to overfly approximately 4,500 households with an approximate population of 10,800. Taking account of planned property developments, this option is estimated to impact a total population of 10,800.

Up to 7,000ft, this option is estimated to overfly approximately 96,300 households with an approximate population of 238,500. Taking account of planned property developments, this option is estimated to impact a total population of 238,500.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4B L is estimated to overfly 14 noise sensitive areas.

Up to 7,000ft, option 4B L is estimated to overfly 15 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 4B R is estimated to overfly 9 noise sensitive areas.

Up to 7,000ft, option 4B R is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

13.7 Runways 23R/23L East Option 5

Design Principle Evaluation	Option No: 5
Option Name: SID RW 23 L Eats Option 5	REJECT
Option Name: SID RW 23 R East Option 5	ACCEPT

Option Description:

This is an **RNP1** option using RF coding that provides a direct route to the east using a single right turn.

It is similar to option 4A but with an increased speed in the turn which results in this option forming the westerly edge of the envelope in the initial turn

The greater speed will also permit a larger number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise. The design aims to have aircraft make the first right turn no closer than 1nm from DER.

23L: This route commences the single RF turn to the north of Knutsford. The turn continues north via Over Tabley before heading in an easterly direction north of Altrincham. The route continues easterly heading and terminates at 7,000ft at Burnage.

23R: This route commences the single RF turn earlier than 23L, prior to Parkgate Industrial Area to route further to the north of Knutsford. The turn continues to route between Over Tabley and Mere before heading in an easterly direction north of Altrincham. It then continues easterly heading and terminates at 7,000ft at Burnage.

A speed restriction of 220 KIAS is used for the first turn which is 10kts higher than option 4A.

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 5L is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 5R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5L is estimated to overfly approximately 2,500 households with an approximate population of 5,800. Taking account of planned property developments, this option is estimated to impact a total population of 6,200.

Up to 7,000ft, this option is estimated to overfly approximately 85,350 households with an approximate population of 215,300. Taking account of planned property developments, this option is estimated to impact a total population of 215,800.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 5R is estimated to overfly approximately 2,450 households with an approximate population of 5,800. Taking account of planned property developments, this option is estimated to impact a total population of 6,100.

Up to 7,000ft, this option is estimated to overfly approximately 85,800 households with an approximate population of 216,600. Taking account of planned property developments, this option is estimated to impact a total population of 217,400.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5L is estimated to overfly 11 noise sensitive areas.

Up to 7,000ft, option 5L is estimated to overfly 15 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 5R is estimated to overfly 12 noise sensitive areas.

Up to 7,000ft, option 5R is estimated to overfly 15 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

13.8 Runways 23R/23L East Viable but Poor Fit Options

Note: Because the options development process for 23 East Right Turn and Left Turn took place simultaneously, the viable but poor fit options are identical and apply equally to both envelopes.

Option	Safety	Policy	Capacity
A3 Extended straight ahead then left turn to north-east	S	P	C
After departure from Runways 23R/23L, aircraft would continue straight ahead until beyond Knutsford before gradually turning left towards the north-east towards the SID aiming point. Safety: This option interacts with traffic on the south departure envelopes requiring additional tactical mitigation to safely manage the flow of air traffic. Policy: This option involves greater track mileage than is necessary by taking traffic a significant distance west before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option is expected to interact with departures to the south, and MAN arrivals from the south, which could limit the ability to enable best use of runway capacity or limit the ability to achieve one minute departure splits.			
B7 Extended straight ahead then right turn to north-east	S	P	C
After departure from Runways 23R/23L, aircraft would continue straight ahead until beyond Knutsford before gradually turning right towards the north-east, towards the SID aiming point. Policy: This option involves greater track mileage than is necessary by taking traffic west before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option is expected to interact with arrivals from the north, which could limit the ability to enable best use of runway capacity.			
C9 Further extended straight ahead then left turn to north-east	S	P	C
After departure from Runways 23R/23L, aircraft would continue straight ahead for approximately 6nm until just before Northwich before gradually turning left towards the north-east, towards the SID aiming point. Safety: This option may cause additional interaction with LPL departures and arrivals. In addition, it may interact with traffic on the south departure envelopes requiring additional tactical mitigation to safely manage the flow of air traffic. Policy: This option involves greater track mileage than is necessary by taking traffic a significant distance west before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option is expected to interact with departures to the south, and arrivals from the south, which could limit the ability to enable best use of runway capacity and limit the ability to achieve one-minute departure splits.			
D10 Further extended straight ahead then right turn to north-east	S	P	C
After departure from Runways 23R/23L, aircraft would continue straight ahead beyond Knutsford before gradually turning right towards the north-east, towards the SID aiming point.			

Safety: This option may cause additional interaction with LPL departures and arrivals. It may also interact with other departure envelopes to the west and south-west requiring additional tactical mitigation to safely manage the flow of air traffic.

Policy: This option involves greater track mileage than is necessary by taking traffic west before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

14 Runways 23R/23L East

14.1 Runways 23R/23L East Option 6A Left Turn

Design Principle Evaluation	Option No: 6A
Option Name: SID RW 23 L East Option 6A Left Turn	ACCEPT
Option Name: SID RW 23 R East Option 6A Left Turn	REJECT

Option Description:

This is an **RNP1** left turn option using RF coding. It is included to provide a direct route to the east following an initial left turn and is intended to provide an alternative to the existing right turn departures.

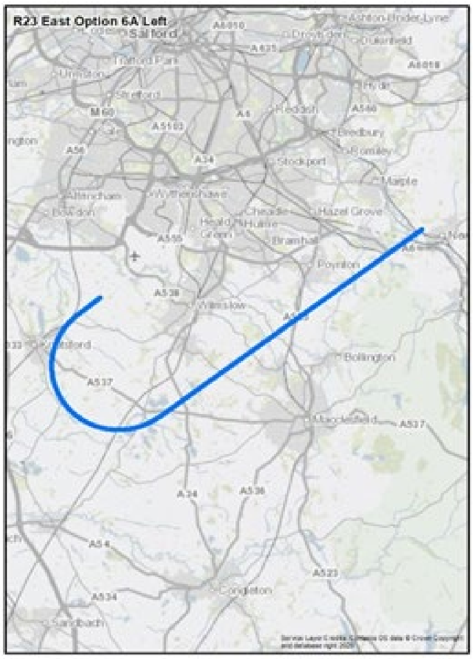
This route is already used tactically by ATC in adverse weather conditions and therefore formalises these routes. The speed of the initial left turn has been applied to create the smallest radius and reduce the noise impact on Knutsford.

These routes do not converge until reaching 7,000ft.

23L: This route commences the single RF left turn close to Mobberley and routes aircraft to the south of Knutsford. The turn continues before heading in an easterly direction to the south of Alderley Edge and continues south of Poynton on an easterly heading to terminate at 7,000ft to the west of New Mills.

23R: This route commences the single RF turn slightly earlier than 23L, which results in a track slightly further south of Knutsford. The turn continues before heading in an easterly direction to the south of Alderley Edge and continues south of Poynton on an easterly heading to terminate and converge with the option for 23L at 7,000ft to the west of New Mills.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6A L is 39km (21nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 6A R is 39km (21nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to overfly approximately 1,650 households with an approximate population of 3,700. Taking account of planned property developments, this option is estimated to impact a total population of 4,200.

Up to 7,000ft, this option is estimated to overfly approximately 10,200 households with an approximate population of 23,200. Taking account of planned property developments, this option is estimated to impact a total population of 24,100.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 6A R is estimated to overfly approximately 1,400 households with an approximate population of 3,100. Taking account of planned property developments, this option is estimated to impact a total population of 4,100.

Up to 7,000ft, this option is estimated to overfly approximately 10,650 households with an approximate population of 24,300. Taking account of planned property developments, this option is estimated to impact a total population of 25,700.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to overfly 92 noise sensitive areas.

Up to 7,000ft, option 6A L is estimated to overfly 95 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 6A R is estimated to overfly 90 noise sensitive areas.

Up to 7,000ft, option 6A R is estimated to overfly 90 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

14.2 Runways 23R/23L East Option 6B Left Turn

Design Principle Evaluation	Option No: 6B
Option Name: SID RW 23 L East Option 6B Left Turn	ACCEPT
Option Name: SID RW 23 R East Option 6B Left Turn	ACCEPT

Option Description:

This is an RNP1 left turn option using RF coding that is identical to option 6A in the initial turn but terminates at 7,000ft further to the north. As with option 6A it is included to provide a direct route to the east following the initial left turn and to provide an alternative to the existing right turn departures. The speed of the initial left turn has been applied to create the smallest radius and reduce the noise impact on Knutsford.

23L: This route commences the single RF left turn close to Mobberley and routes aircraft to the south of Knutsford. The turn continues before heading in an easterly direction over Chelford to the south of Alderley Edge and continues via Woodford and Poynton to terminate at 7,000ft south of Marple.

23R: This route commences the single RF turn slightly earlier than 23L, which results in a track slightly further south of Knutsford. The turn continues before heading in an easterly direction over Chelford to the south of Alderley Edge and continues via Woodford and Poynton to terminate at 7,000ft south of Marple.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.				
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.				
Design Principle Capacity	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment:				

The estimated track length of option 6B L is 40km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 6B R is 40km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to overfly approximately 1,650 households with an approximate population of 3,700. Taking account of planned property developments, this option is estimated to impact a total population of 4,300.

Up to 7,000ft, this option is estimated to overfly approximately 18,400 households with an approximate population of 42,800. Taking account of planned property developments, this option is estimated to impact a total population of 46,400.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 6B R is estimated to overfly approximately 1,450 households with an approximate population of 3,300. Taking account of planned property developments, this option is estimated to impact a total population of 4,100.

Up to 7,000ft, this option is estimated to overfly approximately 18,550 households with an approximate population of 43,300. Taking account of planned property developments, this option is estimated to impact a total population of 47,400.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to overfly 92 noise sensitive areas.

Up to 7,000ft, option 6B L is estimated to overfly 95 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 6B R is estimated to overfly 89 noise sensitive areas.

Up to 7,000ft, option 6B R is estimated to overfly 90 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

14.3 Runways 23R/23L East Option 6C Left Turn

Design Principle Evaluation	Option No: 6C
Option Name: SID RW 23 L East Option 6C Left Turn	ACCEPT
Option Name: SID RW 23 R East Option 6C Left Turn	ACCEPT

Option Description:

This is an RNP1 left turn option using RF coding that has been created with an earlier turn point when compared to option 6A and 6B to increase the distance of routes from Knutsford. This turn point used is less than 1nm from the DER but is identical to that used by existing Runway 23 departures.

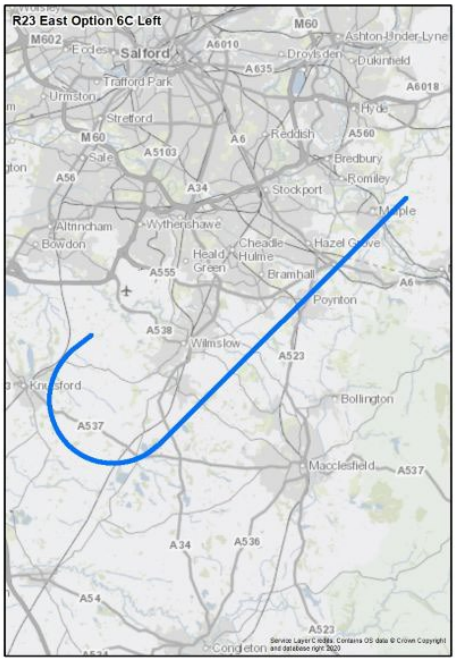
After the initial turn it routes in a similar direction to option 6B and is included to provide a direct route to the east following the initial turn and provide an alternative to the existing right turn departures. The speed of the initial left turn has been applied to create the smallest radius and reduce the noise impact on Knutsford.

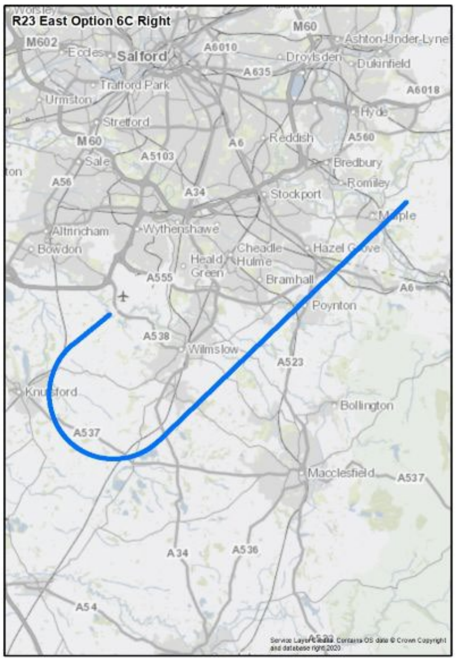
The waypoints for the first turn are positioned at the existing markers:

- For Runway 23R this first turn is at MCT D3.
- For Runway 23L, this is at D3.2 which is less than 1nm from DER, but this replicates the turn of the current procedure and therefore aligns to the Design Principle Safety.

23L: This route commences the single RF left turn close to Mobberley and routes aircraft further to the south of Knutsford when compared to option 6B. The turn continues before heading over Chelford in an easterly direction to the south of Alderley Edge and continues via Woodford and Poynton to terminate at 7,000ft at Marple.

23R: This route commences the single RF turn slightly earlier than 23L, which results in a track slightly further south of Knutsford when compared to option 6B. The turn continues before heading in an easterly direction over Chelford to the south of Alderley Edge and continues via Woodford and Poynton to terminate at 7,000ft at Marple.





A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.	

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

	23L	NOT MET	PARTIAL	MET

Design Principle **Emissions**	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6CL is 38km (21nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 6CR is 39km (21nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6CL is estimated to overfly approximately 1,050 households with an approximate population of 2,400. Taking account of planned property developments, this option is estimated to impact a total population of 3,100. Up to 7,000ft, this option is estimated to overfly approximately 19,150 households with an approximate population of 44,800. Taking account of planned property developments, this option is estimated to impact a total population of 48,900.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 6CR is estimated to overfly approximately 1,800 households with an approximate population of 4,000. Taking account of planned property developments, this option is estimated to impact a total population of 4,800.

Up to 7,000ft, this option is estimated to overfly approximately 20,150 households with an approximate population of 47,100. Taking account of planned property developments, this option is estimated to impact a total population of 51,200.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6CL is estimated to overfly 82 noise sensitive areas.

Up to 7,000ft, option 6CL is estimated to overfly 85 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 6CR is estimated to overfly 11 noise sensitive areas. Up to 7,000ft, option 6CR is estimated to overfly 15 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

14.4 Runways 23R/23L East Option 8A Left Turn

Design Principle Evaluation	Option No: 8A
Option Name: SID RW 23 L East Option 8A Left Turn	ACCEPT
Option Name: SID RW 23 R East Option 8A Left Turn	REJECT

Option Description:

This is an **RNP1** left turn option using RF coding that uses a higher speed in the initial turn but terminates in a similar area to option 6A. As with option 6A it is included to provide a direct route to the east following the initial left turn and to provide an alternative to the existing right turn departures.

The speed of the initial left turn is the CAP778 recommended but this results in a track closer to Knutsford. The design speed may also permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: This route commences the single RF left turn close to Mobberley and routes aircraft close to the centre of Knutsford. The turn continues before heading in an easterly direction to the south of Chelford and Alderley Edge and continues to the north of Prestbury to terminate at 7,000ft close to Disley.

23R: This route commences the single RF turn slightly earlier than 23L, which results in a track to the southern edge of Knutsford. The turn continues before heading in an easterly direction to the south of Chelford and Alderley Edge and continues to the north of Prestbury to terminate and converge with the route for 23L at 7,000ft close to Disley.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET	
	23R	NOT MET	PARTIAL	MET	

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET

	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8A L is 40km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 8A R is 41km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8A L is estimated to overfly approximately 1,550 households with an approximate population of 3,500. Taking account of planned property developments, this option is estimated to impact a total population of 4,000.

Up to 7,000ft, this option is estimated to overfly approximately 6,450 households with an approximate population of 14,600. Taking account of planned property developments, this option is estimated to impact a total population of 15,200.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 8A R is estimated to overfly approximately 1,750 households with an approximate population of 3,900. Taking account of planned property developments, this option is estimated to impact a total population of 4800.

Up to 7,000ft, this option is estimated to overfly approximately 6,700 households with an approximate population of 15,100. Taking account of planned property developments, this option is estimated to impact a total population of 16,400.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8A L is estimated to overfly 17 noise sensitive areas.

Up to 7,000ft, option 8A L is estimated to overfly 20 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 8A R is estimated to overfly 91 noise sensitive areas. Up to 7,000ft, option 8A R is estimated to overfly 95 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

14.5 Runways 23R/23L East Option 8B Left Turn

Design Principle Evaluation	Option No: 8B Left
Option Name: SID RW 23 L East Option 8B Left Turn	REJECT
Option Name: SID RW 23 R East Option 8B Left Turn	REJECT

Option Description:

This is an RNP1 left turn option using RF coding that uses the same higher speed and identical initial turn as option 8A but terminates further north.

As with option 8A it is included to provide a direct route to the east following the initial left turn and to provide an alternative to the existing right turn departures.

The speed of the initial left turn is the CAP778 recommended but this results in a track closer to Knutsford. The design speed may also permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: This route commences the single RF left turn close to Mobberley and routes aircraft to the south of Knutsford. The turn continues before heading in an easterly direction to the south of Chelford and Alderley Edge and continues via Woodford and Poynton to terminate at 7,000ft south of Marple.

23R: This route commences the single RF turn slightly earlier than 23L, which results in a track slightly further south of Knutsford. The turn continues before heading in an easterly direction to the south of Chelford and Alderley Edge and continues via Woodford and Poynton to terminate at 7,000ft south of Marple.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.

Design Principles **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8B L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 8B R is 42km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8B L is estimated to overfly approximately 1,500 households with an approximate population of 3,500. Taking account of planned property developments, this option is estimated to impact a total population of 4,100.

Up to 7,000ft, this option is estimated to overfly approximately 12,250 households with an approximate population of 28,300. Taking account of planned property developments, this option is estimated to impact a total population of 30,000.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 8B R is estimated to overfly approximately 1,750 households with an approximate population of 3,900. Taking account of planned property developments, this option is estimated to impact a total population of 4,800.

Up to 7,000ft, this option is estimated to overfly approximately 12,550 households with an approximate population of 29,000. Taking account of planned property developments, this option is estimated to impact a total population of 31,300.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8B L is estimated to overfly 92 noise sensitive areas.

Up to 7,000ft, option 8B L is estimated to overfly 95 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 8B R is estimated to overfly 90 noise sensitive areas.

Up to 7,000ft, option 8B R is estimated to overfly 90 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

14.6 Runways 23R/23L East Option 8C Left Turn

Design Principle Evaluation	Option No: 8C Left
Option Name: SID RW 23 L East Option 8C Left Turn	ACCEPT
Option Name: SID RW 23 R East Option 8C Left Turn	REJECT

Option Description:

This is an **RNP1** left turn option using RF coding that has the higher CAP778 turn speed as options 8A and 8B but with an earlier turn point that aims to reduce the impact of noise on Knutsford. This turn point used is less than 1nm from the DER but is identical to that used by existing Runway 23 departures.

After the initial turn it routes in a similar direction to option 8B and is included to provide a direct route to the east following the initial turn and provide an alternative to the existing right turn departures.

The design speed may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

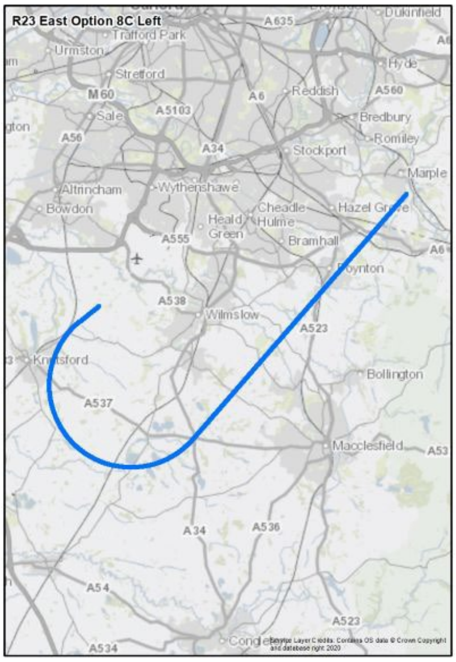
The waypoints for the first turn are positioned at the existing markers:

- For Runway 23R this first turn is at MCT D3.
- For Runway 23L, this is at D3.2 which is less than 1nm from DER, but this replicates the turn of the current procedure and therefore aligns with the Design Principle Safety.

23L: This route commences the single RF left turn close to Mobberley and routes aircraft just to the south of Knutsford. The turn continues before heading in an easterly direction to the south of Chelford and Alderley Edge and continues via Woodford and Poynton to terminate south of Marple.

23R: This route commences the single RF turn slightly earlier than 23L, which results in a track slightly further south of Knutsford than 23L. The turn continues before heading in an easterly direction to the south of Chelford and Alderley Edge and continues via Woodford and Poynton to terminate south of Marple.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8CL is 40km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 8CR is 42km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8CL is estimated to overfly approximately 1,200 households with an approximate population of 2,700. Taking account of planned property developments, this option is estimated to impact a total population of 3,600.

Up to 7,000ft, this option is estimated to overfly approximately 16,950 households with an approximate population of 39,200. Taking account of planned property developments, this option is estimated to impact a total population of 42,400.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 8CR is estimated to overfly approximately 1,350 households with an approximate population of 3,100. Taking account of planned property developments, this option is estimated to impact a total population of 4,200.

Up to 7,000ft, this option is estimated to overfly approximately 17,250 households with an approximate population of 40,000. Taking account of planned property developments, this option is estimated to impact a total population of 43,500.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8CL is estimated to overfly 91 noise sensitive areas.

Up to 7,000ft, option 8CL is estimated to overfly 95 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 8CR is estimated to overfly 89 noise sensitive areas.

Up to 7,000ft, option 8CR is estimated to overfly 90 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

14.7 Runways 23R/23L East Left Turn Viable but Poor Fit Options

Note: Because the options development process for 23 East Right Turn and Left Turn took place simultaneously, the viable but poor fit options are identical and apply equally to both envelopes.

Option	Safety	Policy	Capacity
A3 Extended straight ahead then left turn to north-east	S	P	C
After departure from Runways 23R/23L, aircraft would continue straight ahead until beyond Knutsford before gradually turning left towards the north-east towards the SID aiming point. Safety: This option interacts with traffic on the south departure envelopes requiring additional tactical mitigation to safely manage the flow of air traffic. Policy: This option involves greater track mileage than is necessary by taking traffic a significant distance west before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option is expected to interact with departures to the south, and MAN arrivals from the south, which could limit the ability to enable best use of runway capacity or limit the ability to achieve one minute departure splits.			
B7 Extended straight ahead then right turn to north-east	S	P	C
After departure from Runways 23R/23L, aircraft would continue straight ahead until beyond Knutsford before gradually turning right towards the north-east, towards the SID aiming point. Policy: This option involves greater track mileage than is necessary by taking traffic west before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option is expected to interact with arrivals from the north, which could limit the ability to enable best use of runway capacity.			
C9 Further extended straight ahead then left turn to north-east	S	P	C
After departure from Runways 23R/23L, aircraft would continue straight ahead for approximately 6nm until just before Northwich before gradually turning left towards the north-east, towards the SID aiming point. Safety: This option may cause additional interaction with LPL departures and arrivals. In addition, it may interact with traffic on the south departure envelopes requiring additional tactical mitigation to safely manage the flow of air traffic. Policy: This option involves greater track mileage than is necessary by taking traffic a significant distance west before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option is expected to interact with departures to the south, and arrivals from the south, which could limit the ability to enable best use of runway capacity and limit the ability to achieve one-minute departure splits.			

D10 Further extended straight ahead then right turn to north-east	S	P	C
After departure from Runways 23R/23L, aircraft would continue straight ahead beyond Knutsford before gradually turning right towards the north-east, towards the SID aiming point. Safety: This option may cause additional interaction with LPL departures and arrivals. It may also interact with other departure envelopes to the west and south-west requiring additional tactical mitigation to safely manage the flow of air traffic. Policy: This option involves greater track mileage than is necessary by taking traffic west before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.			

15 Runways 23R/23L South

15.1 Runways 23R/23L South Option 1

Design Principle Evaluation	Option No: 1 (6%)
Option Name: SID RW 23 L South Option 1	ACCEPT
Option Name: SID RW 23 R South Option 1	ACCEPT

Option Description:

Option 1 is an **RNAV1** replication of the current SANBA 1R/1Y SID and uses a fly-by to fly-over waypoint sequence with CF path terminator coding to create an approximate replication.

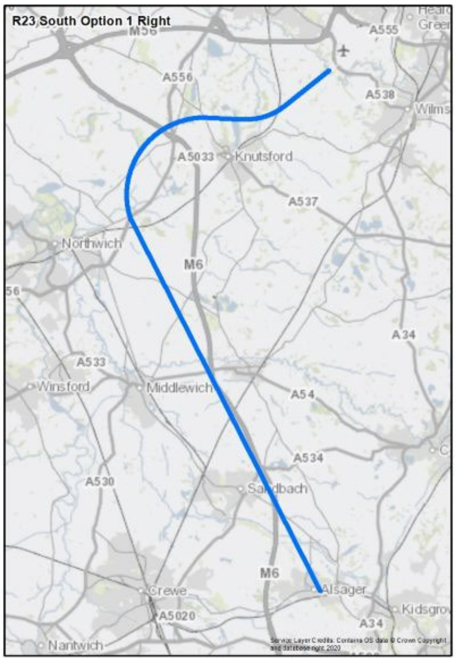
As a replication of the SANBA, this option routes to the west side of the envelope.

The fly-by waypoints are positioned to replicate the turn at the existing markers:

- **23R** this first turn is at MCT D3.
- **23L** this is at MCT D3.2 which less than 1nm from DER but as this replicates the turn of the current procedure it therefore aligns to the Design Principle Safety. This earlier turn is to avoid Knutsford.

As a replicated route it follows a similar track over the ground as the current published route. The first turn commences in the vicinity of Parkgate Industrial Area and the route kinks to the north of Knutsford before turning left to head south. The routes converge in the vicinity of Lostock Gralam and it then routes in a south easterly direction to pass west of Holmes Chapel and east of Sandbach and terminates at 7,000ft just west of Kidsgrove.

An element of dispersion would be apparent in the turns due to the fly-over waypoint and CF coding. A speed restriction of 200 KIAS, then 210 KIAS is used for the first and second turn to create replication of the current route.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 replication of the current route. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1L is 47km (25nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 1R is 50km (27nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1L is estimated to overfly approximately 500 households with an approximate population of 1,200. Taking account of planned property developments, this option is estimated to impact a total population of 2,000.

Up to 7,000ft, this option is estimated to overfly approximately 11,800 households with an approximate population of 25,900. Taking account of planned property developments, this option is estimated to impact a total population of 29,800.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Up to 4,000ft, option 1R is estimated to overfly approximately 1,150 households with an approximate population of 2,700. Taking account of planned property developments, this option is estimated to impact a total population of 2,700.

Up to 7,000ft, this option is estimated to overfly approximately 12,650 households with an approximate population of 27,900. Taking account of planned property developments, this option is estimated to impact a total population of 31,100.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1L is estimated to overfly 2 noise sensitive areas.

Up to 7,000ft, option 1L is estimated to overfly 5 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Up to 4,000ft, option 1R is estimated to overfly 4 noise sensitive areas.

Up to 7,000ft, option 1R is estimated to overfly 5 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

15.2 Runways 23R/23L South Option 2A

Design Principle Evaluation	Option No: 2A (6%)
Option Name: SID RW 23 L South Option 2A	ACCEPT
Option Name: SID RW 23 R South Option 2A	ACCEPT

Option Description:

This is an RNAV1 replication of the current LISTO 2R/2Y SID which turns south before Knutsford. It uses a fly-over waypoint with CF path terminator coding to create an approximate replication.

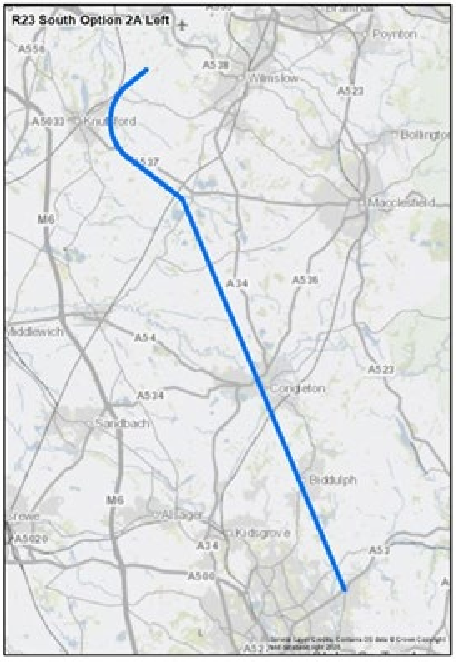
As a replication of the LISTO, this option routes to the east side of the envelope.

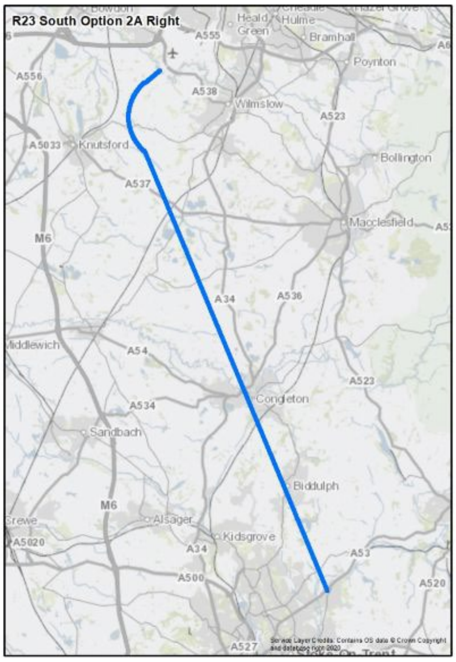
The fly-by waypoints are positioned to replicate the turn at the existing markers:

- 23R this first turn is at MCT D3.
- 23L this is at MCT D3.2 which less than 1nm from DER but as this replicates the turn of the current procedure it therefore aligns to the Design Principle Safety. This earlier turn is to avoid Knutsford.

The first turn results in both routes avoiding Knutsford to the south-east and they converge in the vicinity of Chelford. It routes in a south-easterly direction to pass over Congleton and terminate just east of Stoke-on-Trent.

An element of dispersion would be apparent in the turn due to the fly-over waypoint and CF coding. A speed restriction of 185kts is required for the initial turn for aircraft to avoid Knutsford.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 replication of the current LISTO 2R/2Y SID route. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2A L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 2A R is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2A L is estimated to overfly approximately 500 households with an approximate population of 1,100. Taking account of planned property developments, this option is estimated to impact a total population of 3,100. Up to 7,000ft, this option is estimated to overfly approximately 26,450 households with an approximate population of 59,700. Taking account of planned property developments, this option is estimated to impact a total population of 66,400. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 2A R is estimated to overfly approximately 650 households with an approximate population of 1,400. Taking account of planned property developments, this option is estimated to impact a total population of 3,100. Up to 7,000ft, this option is estimated to overfly approximately 26,750 households with an approximate population of 60,300. Taking account of planned property developments, this option is estimated to impact a total population of 66,800. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2A L is estimated to overfly 2 noise sensitive areas. Up to 7,000ft, option 2A L is estimated to overfly 5 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft. Up to 4,000ft, option 2ARis estimated to overfly 4 noise sensitive areas. Up to 7,000ft, option 2ARis estimated to overfly 5 noise sensitive areas.				

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

15.3 Runways 23R/23L South Option 2B

Design Principle Evaluation	Option No: 2B (6%)
Option Name: SID RW 23 L South Option 2B	ACCEPT
Option Name: SID RW 23 R South Option 2B	ACCEPT

Option Description:

This is an RNAV1 option is included that provides the same initial turn inside of Knutsford but then has a track to create the maximum divergence from other southbound routes and to avoid the overflight of Congleton.

The aim is to provide a 45° track divergence from other southbound SIDs when created as a network which would enable a one-minute departure separation to align with the Design Principle Capacity.

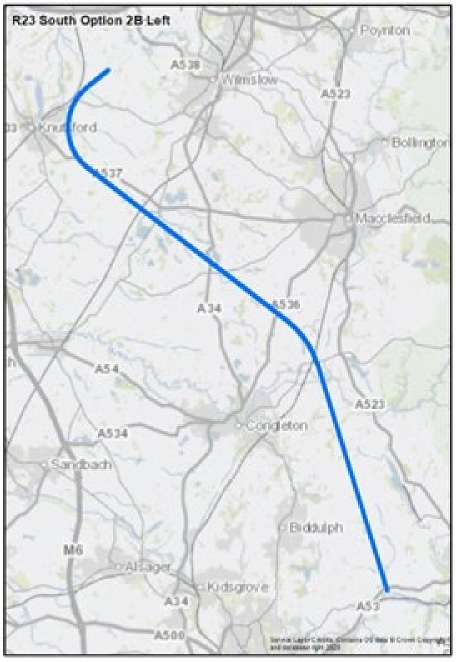
In line with CAP493 (Manual of Air Traffic Services Pt1), the minimum departure separation can be reduced to one minute provided that the aircraft fly on tracks diverging by 45° or more immediately after take-off.

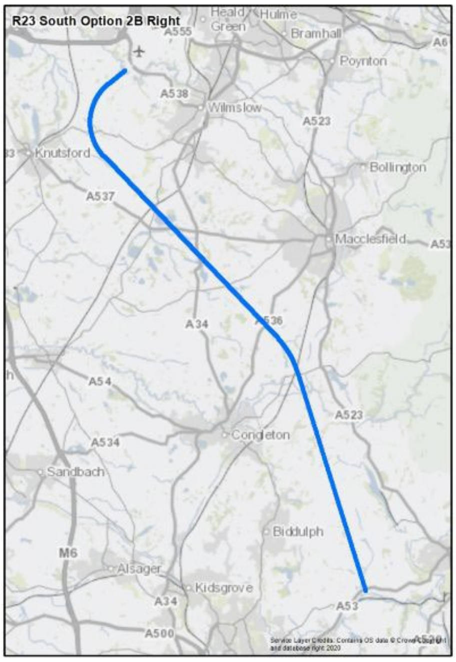
The option uses a fly-over waypoint with CF path terminator coding to create an approximate replication of the initial turn and a similar track over the ground as the current route. The waypoints are positioned to replicate the turn at the existing markers.

23L: After departure this route makes a left turn south at MCT D3.2 which less than 1nm from DER. As this replicates the turn of the current procedure it aligns to the Design Principle Safety. This first turn routes to the south-east of Knutsford and the route continues on a south-easterly heading to pass west of Chelford. A right turn to the south is made to the north-east of Congleton where the routes converge and terminate at 7,000ft to the east of Leek.

23R: After departure this route makes a left turn south at MCT D3 which creates a route that passes just east of Mobberley. The route continues on a south-easterly heading to pass east of Chelford. A right turn to the south is made to the north-east of Congleton where the routes converge and terminate at 7,000ft to the east of Leek. The combined routes avoid Congleton to the east.

A speed restriction of 185kts is required for the initial turn for aircraft to avoid Knutsford.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2B L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 2B R is 40km (22m). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2B L is estimated to overfly approximately 400 households with an approximate population of 900. Taking account of planned property developments, this option is estimated to impact a total population of 1,100. Up to 7,000ft, this option is estimated to overfly approximately 1,850 households with an approximate population of 4,300. Taking account of planned property developments, this option is estimated to impact a total population of 4,900. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft Up to 4,000ft, option 2B R is estimated to overfly approximately 300 households with an approximate population of 900. Taking account of planned property developments, this option is estimated to impact a total population of 900. Up to 7,000ft, this option is estimated to overfly approximately 1,750 households with an approximate population of 4,300. Taking account of planned property developments, this option is estimated to impact a total population of 4,700. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2B L is estimated to overfly 4 noise sensitive areas. Up to 7,000ft, option 2B L is estimated to overfly 5 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 2B R is estimated to effect 12 noise sensitive areas. Up to 7,000ft, option 2B R is estimated to effect 15 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

15.4 Runways 23R/23L South Option 3

Design Principle Evaluation	Option No: 3 (6%)
Option Name: SID RW 23 L South Option 3	REJECT
Option Name: SID RW 23 R South Option 3	REJECT

Option Description:

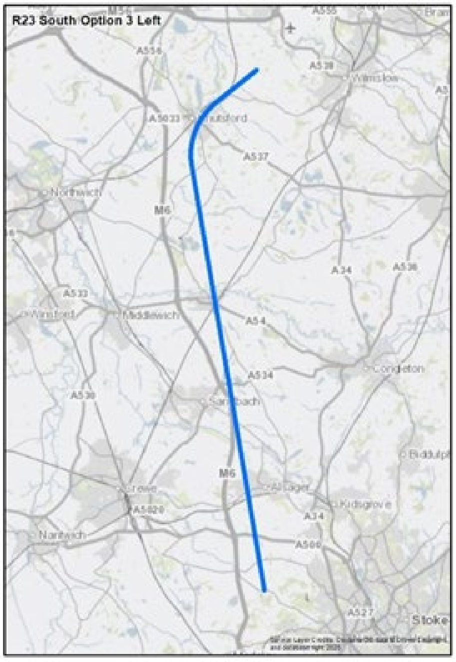
This is an **RNAV1** option that provides a straight-ahead route with an extended climb out over the Knutsford area before routing aircraft south. It is similar to the existing SANBA SID but without the avoidance of Knutsford and it terminates on the west side of the envelope.

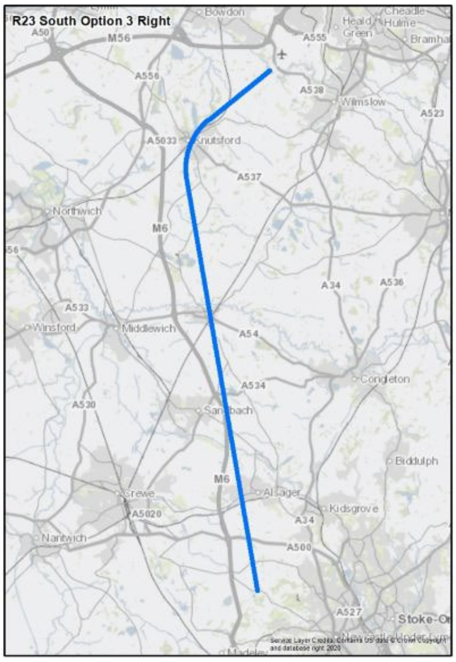
The procedure reduces fuel burn when compared to the current SANBA SID as it eliminates the kink to the north around Knutsford. This also has a positive impact on capacity by reducing interactions with other departure routes to the north and east that also follow the same initial track as the SANBA. The procedure uses a fly-by turn.

23L: After departure this route continues straight ahead before making a left turn south over Knutsford. It converges with the route for 23R to the south-west of Knutsford and then continues south, running parallel to the M6 motorway. It passes over Holmes Chapel and to the east of Sandbach and terminates at 7,000ft to the north-west of Newcastle-under-Lyme.

23R: After departure this route continues straight ahead before making a left turn south over Knutsford to converge with the route for 23L. The combined routes continue south, running parallel to the M6 motorway to pass over Holmes Chapel, to the east of Sandbach and terminates at 7,000ft to the north-west of Newcastle-under-Lyme.

A speed restriction of 220 KIAS is used for the first turn.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3L is 41km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 3R is 43km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 3L is estimated to overfly approximately 5,450 households with an approximate population of 12,200. Taking account of planned property developments, this option is estimated to impact a total population of 13,400. Up to 7,000ft, this option is estimated to overfly approximately 15,250 households with an approximate population of 34,200. Taking account of planned property developments, this option is estimated to impact a total population of 38,800. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 3R is estimated to overfly approximately 5,300 households with an approximate population of 11,900. Taking account of planned property developments, this option is estimated to impact a total population of 13,600. Up to 7,000ft, this option is estimated to overfly approximately 15,350 households with an approximate population of 34,500. Taking account of planned property developments, this option is estimated to impact a total population of 39,700. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 3L is estimated to overfly 31 noise sensitive areas. Up to 7,000ft, option 3L is estimated to overfly 35 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft Up to 4,000ft, option 3R is estimated to overfly 41 noise sensitive areas. Up to 7,000ft, option 3R is estimated to overfly 45 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft				
Deign Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

15.5 Runways 23R/23L South Option 4A

Design Principle Evaluation	Option No: 4A (6%)
Option Name: SID RW 23 L South Option 4A	ACCEPT
Option Name: SID RW 23 R South Option 4A	ACCEPT

Option Description:

This **RNAV1** option provides an initial turn over the southern edge of Knutsford and heads in a south-west direction. It serves a similar purpose as the SANBA SID and terminates on the west side of the envelope.

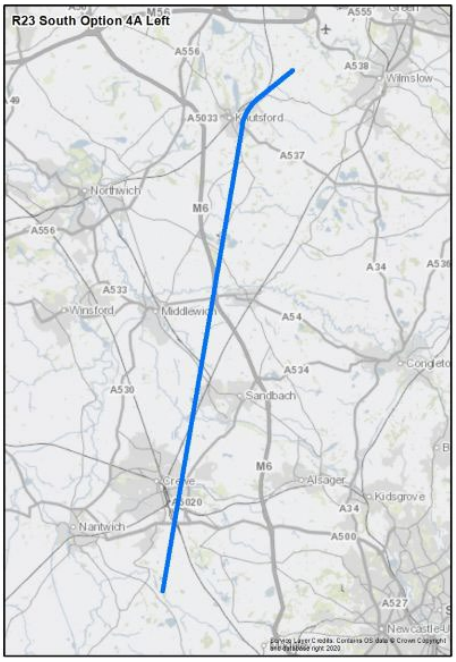
The procedure uses a fly-over waypoint and can be coded as either course-to-fix, track-to-fix, or direct-to-fix. The climb gradient has been set at 6%.

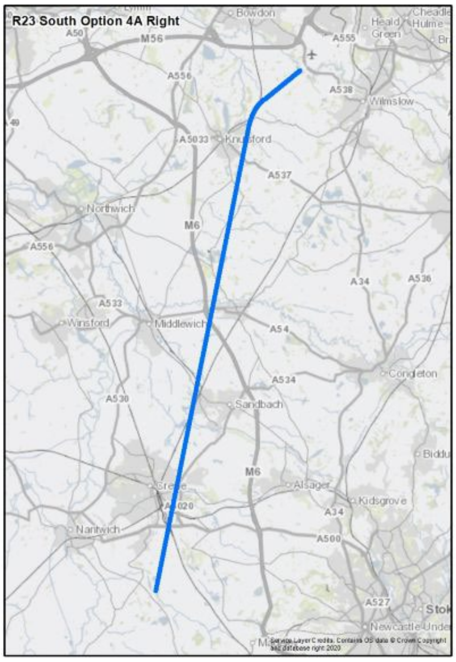
An element of dispersion would be apparent in the turn due to the path terminator coding.

23L: After departure this route continues straight ahead before making a left turn to the south-west over Knutsford. It continues in this direction to the west of Holmes Chapel and Sandbach. It passes over the eastern edge of Crewe and converges with the option for 23R at the 7,000ft termination point just south of Crewe.

23R: After departure this route makes a left turn to the south-west to route between Knutsford and Mobberley and continues in this direction just to the west of Holmes Chapel and Sandbach. It passes over the eastern edge of Crewe and both routes converge at the 7,000ft termination point just south of Crewe.

A speed restriction of 190 KIAS is applied to the first turn.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4A L is 44km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 4A R is 46km (25nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle	Runway			
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4A L is estimated to overfly approximately 2,300 households with an approximate population of 5,400. Taking account of planned property developments, this option is estimated to impact a total population of 6,400.

Up to 7,000ft, this option is estimated to overfly approximately 18,100 households with an approximate population of 42,100. Taking account of planned property developments, this option is estimated to impact a total population of 49,800.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 4A R is estimated to overfly approximately 1,400 households with an approximate population of 3,400. Taking account of planned property developments, this option is estimated to impact a total population of 4,000.

Up to 7,000ft, this option is estimated to overfly approximately 16,950 households with an approximate population of 39,800. Taking account of planned property developments, this option is estimated to impact a total population of 48,700.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle	Runway			
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle	Runway			
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4A L is estimated to overfly 9 noise sensitive areas.

Up to 7,000ft, option 4A L is estimated to overfly 10 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 4A R is estimated to overfly 4 noise sensitive areas.

Up to 7,000ft, option 4A R is estimated to overfly 5 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

15.6 Runways 23R/23L South Option 4B

Design Principle Evaluation	Option No: 4B (6%)
Option Name: SID RW 23 L South Option 4B	REJECT
Option Name: SID RW 23 R South Option 4B	REJECT

Option Description:

This **RNAV1** option provides a route that heads to the south-south-west of the envelope, but with an earlier initial turn intended to avoid Knutsford.

The option terminates at the same point as 4A, but the initial turn is now at:

- For Runway 23L it is at MCT D3.2, which is 0.7nm from DER.
- For Runway 23R it is at 1nm from DER.

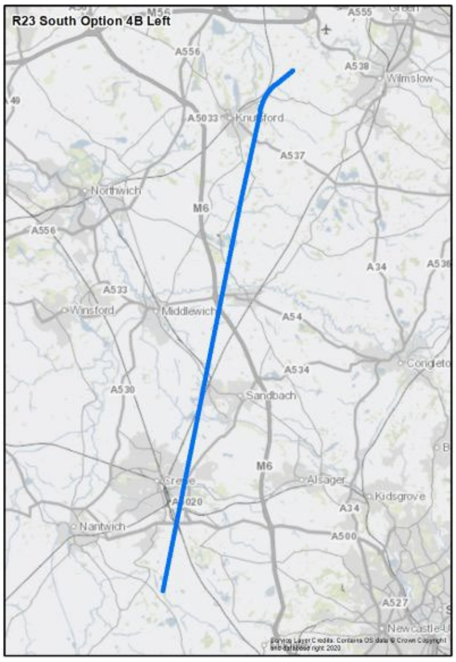
This combination allows the subsequent tracks to be further east than that of option 4A, creating more separation from Knutsford.

The procedure uses a fly-over waypoint and can be coded as either course-to-fix, track-to-fix, or direct-to-fix. The climb gradient has been set at 6%.

23L: After departure this route makes a left turn south-west at MCT D3.2 which less than 1nm from DER. As this replicates the turn of the current procedure it aligns to the Design Principle Safety. This first turn routes to the south of Knutsford and the route continues on a south-westerly heading to the west of Holmes Chapel and Sandbach. It passes over the eastern edge of Crewe and converges with the option for 23R at the 7,000ft termination point just south of Crewe.

23R: After departure this route makes a left turn to the south-west to route south of Knutsford and continues in this direction, passing just to the west of Holmes Chapel and Sandbach. It then routes over the eastern edge of Crewe and both routes converge at the 7,000ft termination point just south of Crewe.

A speed restriction of 190 KIAS is applied to the first turn.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4B L is 44km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 4B R is 46km (25nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4B L is estimated to overfly approximately 1,150 households with an approximate population of 2,900. Taking account of planned property developments, this option is estimated to impact a total population of 4,500. Up to 7,000ft, this option is estimated to overfly approximately 16,100 households with an approximate population of 37,700. Taking account of planned property developments, this option is estimated to impact a total population of 46,300. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 4B R is estimated to overfly approximately 1,350 households with an approximate population of 3,200. Taking account of planned property developments, this option is estimated to impact a total population of 3,200. Up to 7,000ft, this option is estimated to overfly approximately 16,950 households with an approximate population of 39,700. Taking account of planned property developments, this option is estimated to impact a total population of 48,000. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4B L is estimated to overfly 0 noise sensitive areas. Up to 7,000ft, option 4B L is estimated to overfly 0 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft. Up to 4,000ft, option 4B R is estimated to overfly 3 noise sensitive areas. Up to 7,000ft, option 4B R is estimated to overfly 5 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft				
	23L	NOT MET	PARTIAL	MET

Design Principle **Airspace**	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

15.7 Runways 23R/23L South Option 4C

Design Principle Evaluation	Option No: 4C (6%)
Option Name: SID RW 23 L South Option 4C	ACCEPT
Option Name: SID RW 23 R South Option 4C	ACCEPT

Option Description:

This **RNAV1** option provides a route that heads to the south-south-west of the envelope with the same earlier initial turn intended to avoid Knutsford as option 4B, and a left turn further down route to avoid Sandbach and Crewe.

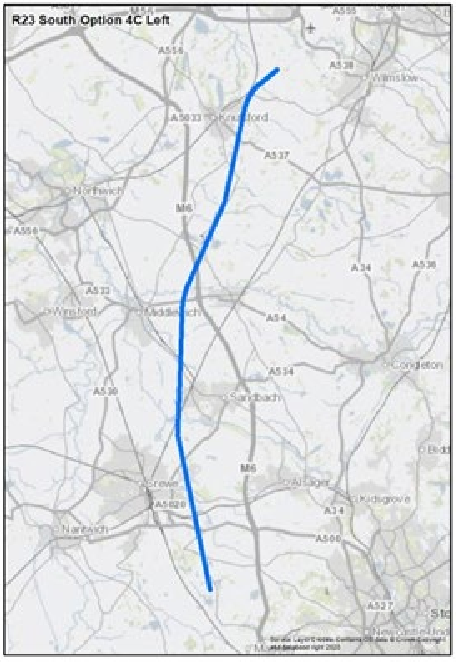
In common with option 4B the turn point for Runway 23L is at MCT D3.2, which is 0.7nm from DER. The turn point for Runway 23R is at 1nm from DER. This combination creates separation from Knutsford.

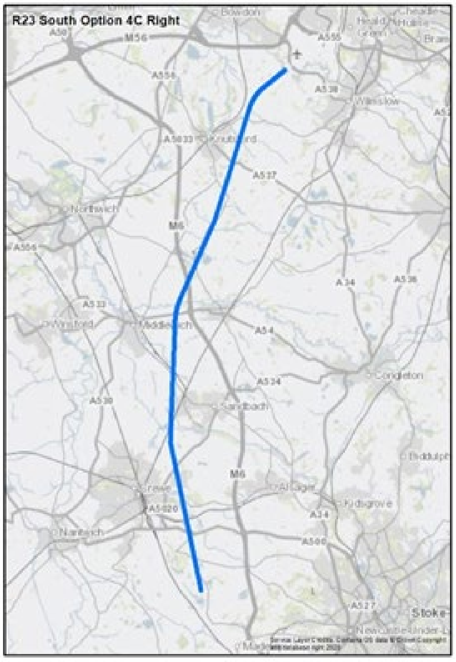
The procedure uses a fly-over waypoint and can be coded as either course-to-fix, track-to-fix, or direct-to-fix. The climb gradient has been set at 6%. An element of dispersion would be apparent in the turn due to the path terminator coding.

23L: After departure this route makes a left turn south-west at MCT D3.2 which less than 1nm from DER. As this replicates the turn of the current procedure it aligns to the Design Principle Safety. This first turn routes to the south of Knutsford and the route continues on a south-westerly heading and combines with the 23R option midway between Lower Peover and Over Peover. The combined routes pass to the west of Holmes Chapel and Sandbach and then make a slight right turn to avoid Crewe and terminate at 7,000ft in the vicinity of Betley.

23R: After departure this route makes a left turn to the south-west to route south of Knutsford and combines with the 23L option midway between Lower Peover and Over Peover. The combined routes pass to the west of Holmes Chapel and Sandbach and then make a slight right turn to avoid Crewe and terminate at 7,000ft in the vicinity of Betley.

A speed restriction of 190 KIAS is applied to the first turn.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4CL is 43km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 4CR is 44km (24nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4CL is estimated to overfly approximately 700 households with an approximate population of 1,700. Taking account of planned property developments, this option is estimated to impact a total population of 3,300. Up to 7,000ft, this option is estimated to overfly approximately 7,900 households with an approximate population of 19,500. Taking account of planned property developments, this option is estimated to impact a total population of 26,300. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft. Up to 4,000ft, Option 4CR is estimated to overfly approximately 850 households with an approximate population of 2,000. Taking account of planned property developments, this option is estimated to impact a total population of 2,100. Up to 7,000ft, this option is estimated to overfly approximately 8,550 households with an approximate population of 20,800. Taking account of planned property developments, this option is estimated to impact a total population of 27,200. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4CL is estimated to overfly 1 noise sensitive areas. Up to 7,000ft, option 4CL is estimated to overfly 5 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft. Up to 4,000ft, option 4CR is estimated to overfly 2 noise sensitive areas. Up to 7,000ft, option 4CR is estimated to overfly 5 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

15.8 Runways 23R/23L South Option 5A

Design Principle Evaluation	Option No: 5A (6%)
Option Name: SID RW 23 L South Option 5A	ACCEPT
Option Name: SID RW 23 R South Option 5A	ACCEPT

Option Description:

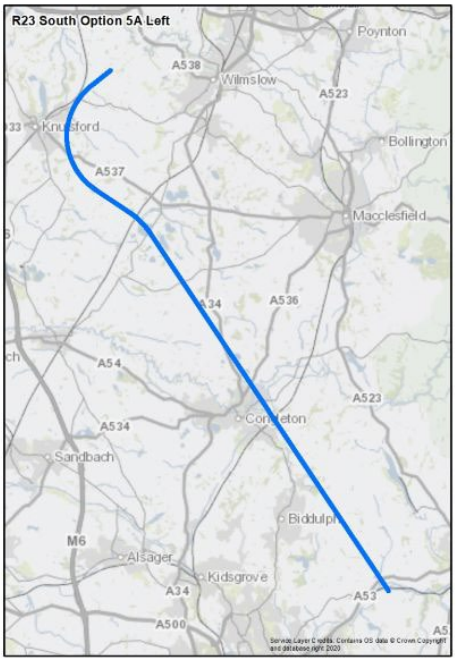
This is an **RNP1** option that uses RF coding and follows a similar initial track to the existing LISTO SID which turns south before Knutsford. However, the track following the initial turn routes further south-east than the existing LISTO SID once south of Chelford.

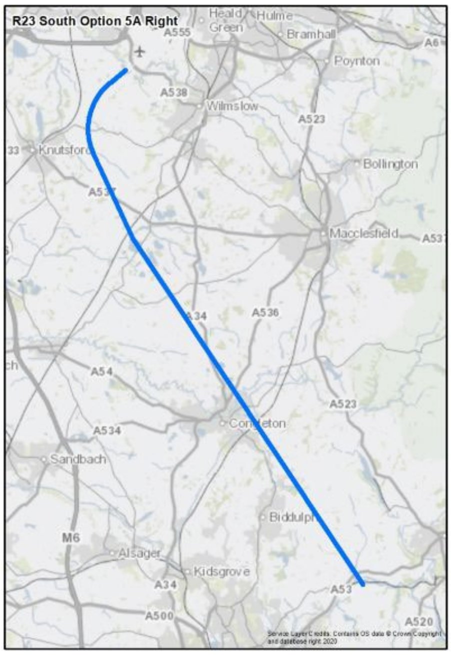
The aim is to provide a 45° track divergence from other southbound SIDs when created as a network which would enable a one-minute departure separation to align with the Design Principle Capacity.

23L: After departure, this route makes a left turn at MCT D3.2 which less than 1nm from DER. As this replicates the turn of the current procedure it aligns to the Design Principle Safety. This first turn routes to the south of Knutsford and the route continues on a south-easterly heading to route west of Chelford where it and combines with the 23R option. The combined routes avoid Congleton and Stoke-on-Trent and terminate at 7,000ft west of Leek.

23R: After departure this route makes a left turn to route south of Knutsford and combines with the 23L option to the west of Chelford. The combined routes avoid Congleton and Stoke-on-Trent and terminate at 7,000ft west of Leek.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius to avoid Knutsford. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 5A L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 5A R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5A L is estimated to overfly approximately 450 households with an approximate population of 1,000. Taking account of planned property developments, this option is estimated to impact a total population of 1,700.

Up to 7,000ft, this option is estimated to overfly approximately 9,550 households with an approximate population of 22,000. Taking account of planned property developments, this option is estimated to impact a total population of 26,400.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft

Up to 4,000ft, option 5A R is estimated to overfly approximately 650 households with an approximate population of 1,400. Taking account of planned property developments, this option is estimated to impact a total population of 1,400.

Up to 7,000ft, this option is estimated to overfly approximately 9800 households with an approximate population of 22,400. Taking account of planned property developments, this option is estimated to impact a total population of 26,400.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5A L is estimated to overfly 4 noise sensitive areas.

Up to 7,000ft, option 5A L is estimated to overfly 5 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 5A R is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 5A R is estimated to overfly 10 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

15.9 Runways 23R/23L South Option 5B

Design Principle Evaluation	Option No: 5B (6%)
Option Name: SID RW 23 L South Option 5B	ACCEPT
Option Name: SID RW 23 R South Option 5B	ACCEPT

Option Description:

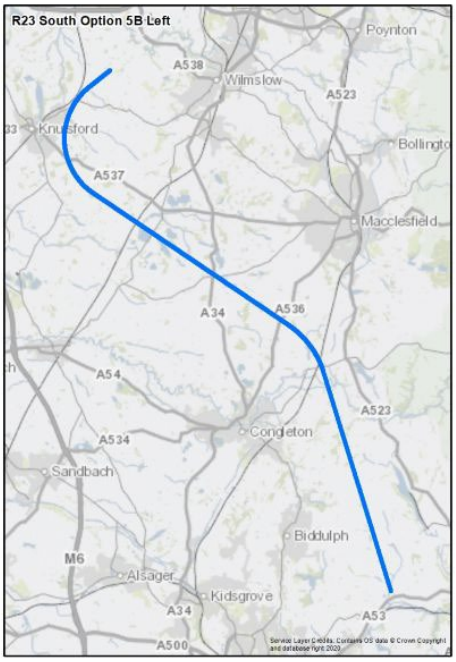
This is an RNP1 option with RF coding that follows a similar initial track to option 5A and turns south before Knutsford. However, this left turn is continued to provide a route more to the east to avoid Congleton and Leek to aid capacity and departure separation.

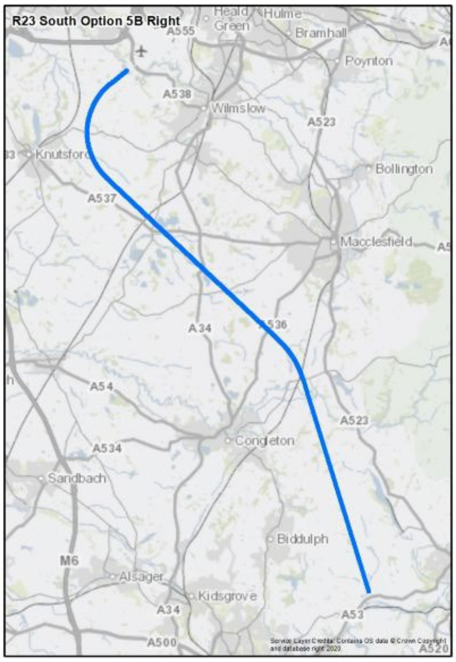
In a similar way to options 2B and 5A, the aim is to provide a 45° track divergence from other southbound SIDs when created as a network which would enable a one-minute departure separation to align with the Design Principle Capacity.

23L: After departure this route makes a left turn at MCT D3.2 which less than 1nm from DER. As this replicates the turn of the current procedure it aligns to the Design Principle Safety. This first turn routes to the south of Knutsford and the route continues on a south-easterly heading south-west of Chelford and then mid-way between Macclesfield and Congleton to avoid both towns. It combines with the 23R option south of Macclesfield and the combined routes turn south and terminate at 7,000ft between Stoke-on-Trent and Leek.

23R: After departure this route makes a left turn to route south of Knutsford and continues on a south-easterly heading over Chelford and then mid-way between Macclesfield and Congleton to avoid both towns. It combines with the 23L option south of Macclesfield and the combined routes turn south and terminate at 7,000ft between Stoke-on-Trent and Leek.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius to avoid Knutsford. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 5B L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 5B R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 5B L is estimated to overfly approximately 400 households with an approximate population of 900. Taking account of planned property developments, this option is estimated to impact a total population of 1,400. Up to 7,000ft, this option is estimated to overfly approximately 1,800 households with an approximate population of 4,300. Taking account of planned property developments, this option is estimated to impact a total population of 5,100. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft Up to 4,000ft, option 5B R is estimated to overfly approximately 1,100 households with an approximate population of 2,300. Taking account of planned property developments, this option is estimated to impact a total population of 2,500. Up to 7,000ft, this option is estimated to overfly approximately 2,550 households with an approximate population of 5,600. Taking account of planned property developments, this option is estimated to impact a total population of 6,200. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 5B L is estimated to overfly 2 noise sensitive areas. Up to 7,000ft, option 5B L is estimated to overfly 5 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. Up to 4,000ft, option 5B R is estimated to overfly 4 noise sensitive areas. Up to 7,000ft, option 5B R is estimated to overfly 5 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

15.10 Runways 23R/23L South Option 5C

Design Principle Evaluation	Option No: 5C (6%)
Option Name: SID RW 23 L South Option 5C	ACCEPT
Option Name: SID RW 23 R South Option 5C	REJECT

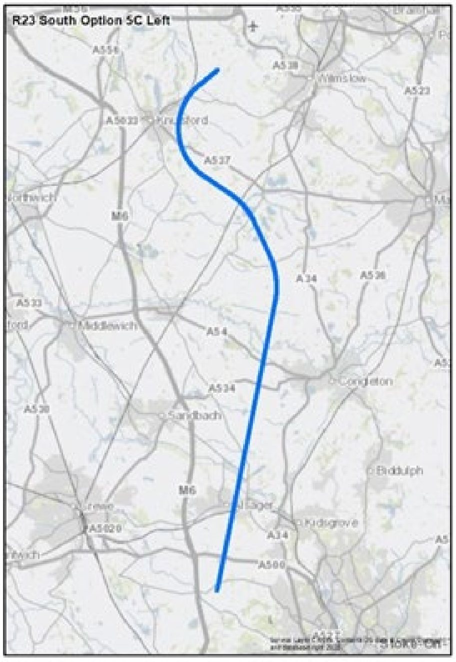
Option Description:

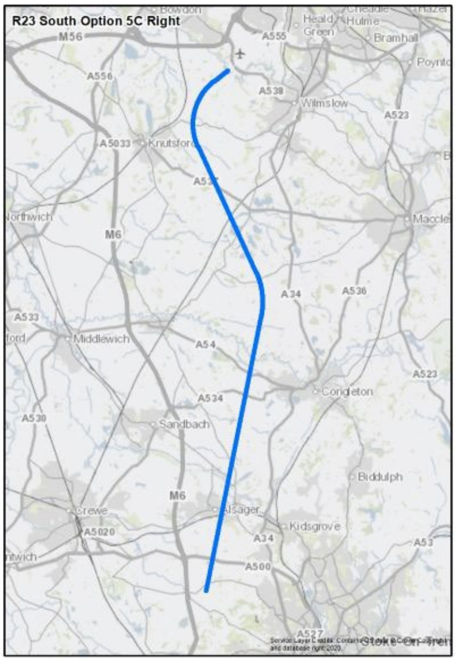
This is an **RNP1** option with RF coding that follows a similar initial track to the existing LISTO 2R/2Y SID. However, the turn is stopped earlier to provide a route to the south which passes west of Congleton to terminate in the vicinity of that for the current SANBA SID.

23L: After departure this route makes a left turn at MCT D3.2 which less than 1nm from DER. As this replicates the turn of the current procedure it aligns to the Design Principle Safety. This first turn routes to the south of Knutsford and the route continues on a south-easterly heading to the south of Chelford where it combines with the 23R option. The combined routes then turn south-west to avoid Congleton and Sandbach and terminate at 7,000ft west of Stoke-on-Trent.

23R: After departure this route makes a left turn to route south of Knutsford and continues on a south-easterly heading to the south of Chelford where it combines with the 23L option. The combined routes then turn south-west to avoid Congleton and Sandbach and terminate at 7,000ft west of Stoke-on-Trent.

A speed restriction of 190 KIAS is used for the first turn to avoid Knutsford. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 5CL is 42km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 5CR is 43km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 5CL is estimated to overfly approximately 450 households with an approximate population of 1,200. Taking account of planned property developments, this option is estimated to impact a total population of 1,700. Up to 7,000ft, this option is estimated to overfly approximately 10,050 households with an approximate population of 22,200. Taking account of planned property developments, this option is estimated to impact a total population of 24,000. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft. Up to 4,000ft, option 5CR is estimated to overfly approximately 650 households with an approximate population of 1,400. Taking account of planned property developments, this option is estimated to impact a total population of 1,400. Up to 7,000ft, this option is estimated to overfly approximately 10,300 households with an approximate population of 22,600. Taking account of planned property developments, this option is estimated to impact a total population of 23,800. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 5CL is estimated to overfly 2 noise sensitive areas. Up to 7,000ft, option 5CL is estimated to overfly 5 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft. Up to 4,000ft, option 5CR is estimated to overfly 4 noise sensitive areas. Up to 7,000ft, option 5CR is estimated to overfly 5 noise sensitive areas.				

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

15.11 Runways 23R/23L South Option 6

Design Principle Evaluation	Option No: 6 (6%)
Option Name: SID RW 23 L South Option 6	ACCEPT
Option Name: SID RW 23 R South Option 6	ACCEPT

Option Description:

This option is included to provide a **RNAV1** replication of the existing conventional SANBA 1R/1Y SID to 7,000ft. However, unlike the 'do minimum' option 1 which uses fly-over waypoints, this option has been designed as an RNAV1 route using **fly-by** waypoints.

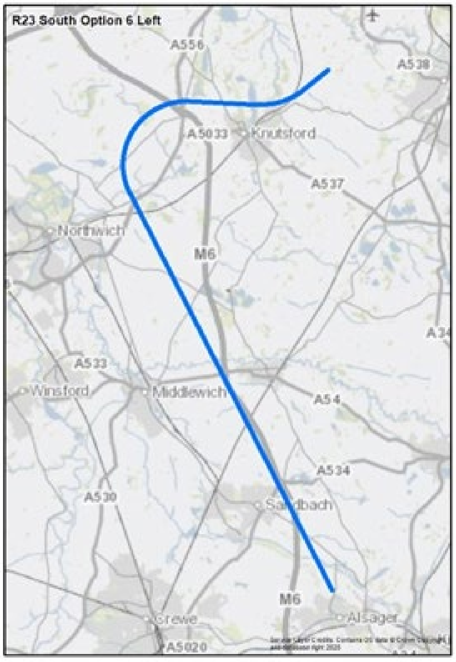
The benefit of fly over waypoints is more accurate track keeping. However, option 1 is more likely to be a better representation of existing operations with dispersion being apparent in the turn to the south.

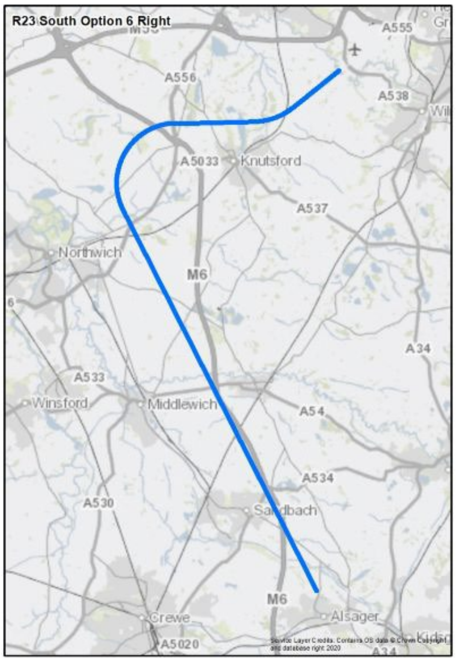
The route has been designed as an RNAV1 route and uses fly-by waypoints. The climb gradient has been set at 6%.

23L: After departure, this route makes a right turn at MCT D3.2 which less than 1nm from DER. As this replicates the turn of the current procedure it aligns to the Design Principle Safety. This first turn routes to the north of Knutsford and following a short straight segment, then turns left to route south between Knutsford and Northwich where it combines with the 23R option. The combined routes pass just to the west of Holmes Chapel and to the eastern edge of Sandbach and terminate at 7,000ft south-east of Sandbach.

23R: After departure, this route makes a right turn to route north of Knutsford and following a short straight segment, then turns left to route south between Knutsford and Northwich where it combines with the 23L option. The combined routes pass just to the west of Holmes Chapel and to the eastern edge of Sandbach and terminate at 7,000ft south-east of Sandbach.

A speed restriction of 200 KIAS then 210 KIAS is used for the first turn and second turn.





Design Principle	Runway			
Design Principle **Safety**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 replication of the conventional SANBA 1R/1Y SID. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle	Runway			
Design Principle **Policy**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle	Runway			
Design Principle **Capacity**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle	Runway			
Design Principle **Emissions**	23L	NOT MET	**PARTIAL**	MET
	23R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

The estimated track length of option 6L is 48km (26nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 6R is 51km (28nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6L is estimated to overfly approximately 1,500 households with an approximate population of 3,600. Taking account of planned property developments, this option is estimated to impact a total population of 4,400.

Up to 7,000ft, this option is estimated to overfly approximately 11,750 households with an approximate population of 26,100. Taking account of planned property developments, this option is estimated to impact a total population of 29,700.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 6R is estimated to overfly approximately 1,850 households with an approximate population of 4,600. Taking account of planned property developments, this option is estimated to impact a total population of 4,600.

Up to 7,000ft, this option is estimated to overfly approximately 12,300 households with an approximate population of 27,500. Taking account of planned property developments, this option is estimated to impact a total population of 30,400.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6L is estimated to overfly 4 noise sensitive areas.

Up to 7,000ft, option 6L is estimated to overfly 5 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 4,000ft, but greater than the ‘do nothing’ scenario at 7,000ft.

Up to 4,000ft, option 6R is estimated to overfly 3 noise sensitive areas.

Up to 7,000ft, option 6R is estimated to overfly 5 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

15.12 Runways 23R/23L South Option 7A

Design Principle Evaluation	Option No: 7A (6%)
Option Name: SID RW 23 L South Option 7A	REJECT
Option Name: SID RW 23 R South Option 7A	REJECT

Option Description:

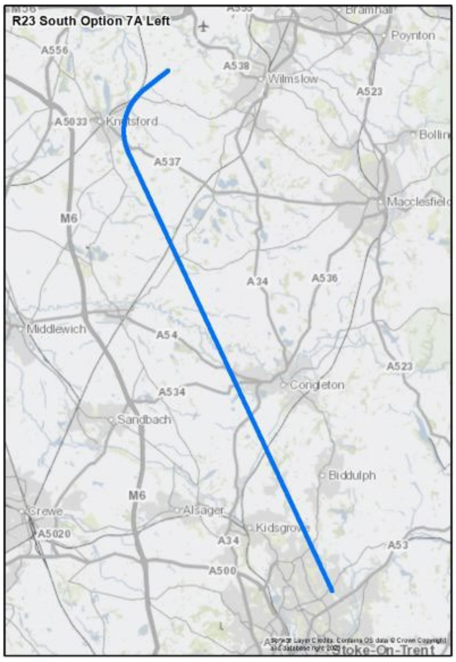
This is an **RNP1** option with RF coding that provides an alternative version of the existing LISTO 2R/2Y SID. It turns south before Knutsford but heads south slightly further west than option 2A (the LISTO replication) to terminate near Stoke-on-Trent.

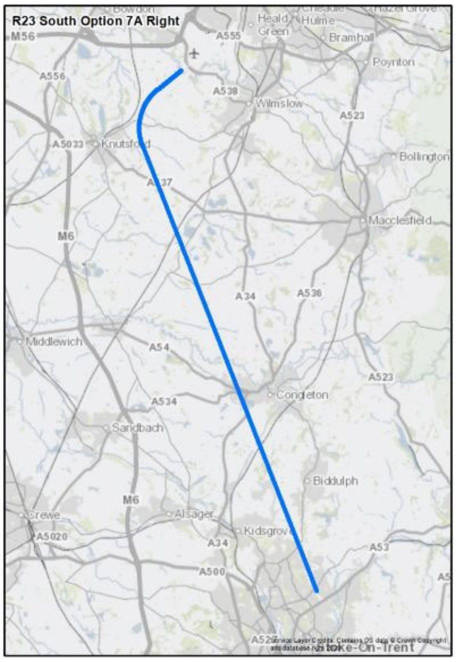
It uses an RF turn at 1nm DER in accordance with PANS-OPS/CAP778 which has the effect of routing this option closer to the centre of Knutsford.

23L: After departure this route makes a left turn south at 1nm from DER and routes to the south of Knutsford. It then routes to the west of Chelford and over the western edge of Congleton and terminates at 7,000ft to the north-east corner of Stoke-on-Trent.

23R: After departure this route makes a left turn south at 1nm from DER which routes it over the south-east edge of Knutsford. It then routes over the western edge of Congleton and terminates at 7,000ft to the north-east corner of Stoke-on-Trent.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7A L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 7A R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to overfly approximately 1,250 households with an approximate population of 3,000. Taking account of planned property developments, this option is estimated to impact a total population of 4,300.

Up to 7,000ft, this option is estimated to overfly approximately 29,850 households with an approximate population of 69,400. Taking account of planned property developments, this option is estimated to impact a total population of 73,900.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 7A R is estimated to overfly approximately 900 households with an approximate population of 2,000. Taking account of planned property developments, this option is estimated to impact a total population of 3,400.

Up to 7,000ft, this option is estimated to overfly approximately 30,500 households with an approximate population of 70,600. Taking account of planned property developments, this option is estimated to impact a total population of 76,600.

This is less than or similar to the ‘do nothing’ scenario at 4,000ft, but greater than the ‘do nothing’ scenario at 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to overfly 8 noise sensitive areas.

Up to 7,000ft, option 7A L is estimated to overfly 10 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 7A R is estimated to overfly 3 noise sensitive areas.

Up to 7,000ft, option 7A R is estimated to overfly 5 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

15.13 Runways 23R/23L South Option 7B

Design Principle Evaluation	Option No: 7B (6%)
Option Name: SID RW 23 L South Option 7B	REJECT
Option Name: SID RW 23 R South Option 7B	REJECT

Option Description:

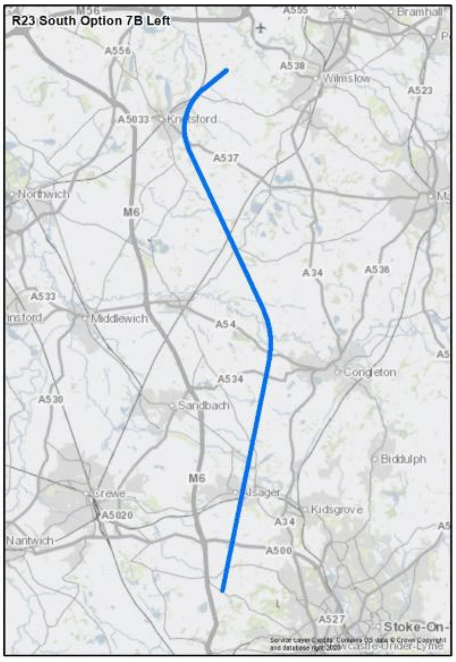
This is an **RNP1** option with RF coding that provides an alternative version of the existing LISTO 2R/2Y SID. It is similar to option 7A but makes a turn to the west of Congleton to avoid Stoke-on-Trent.

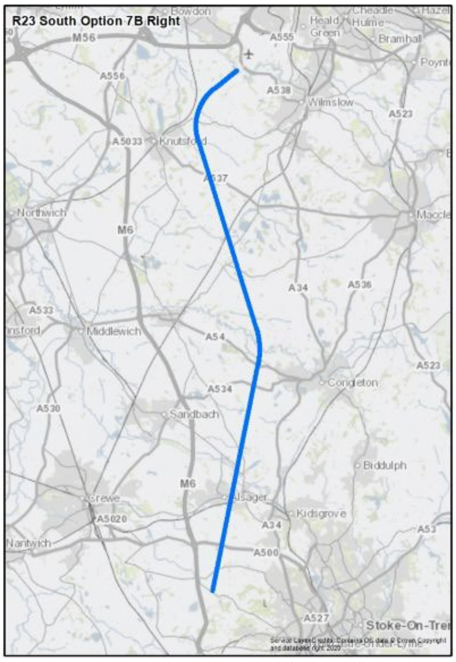
In common with option 7A, the RF turn is at 1nm DER in accordance with PANS-OPS/CAP778 which routes this option closer to the centre of Knutsford, however the final track is in a south-westerly direction.

23L: After departure, this route makes a left turn south at 1nm from DER and routes to the south of Knutsford. It then routes to the west of Chelford before turning south-west to avoid Congleton. This has the effect of avoiding Stoke-on-Trent and the route terminates at 7,000ft to the west of the town.

23R: After departure, this route makes a left turn south at 1nm from DER which routes it over the south-east edge of Knutsford. It then routes to the west of Chelford before turning south-west to avoid Congleton. This has the effect of avoiding Stoke-on-Trent and the route terminates at 7,000ft to the west of the town.

A speed restriction of 190 KIAS is used for the first turn which allows the smallest radius. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle	Runway			
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle	Runway			
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle	Runway			
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle	Runway			
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7B L is 42km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 7B R is 43km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to overfly approximately 900 households with an approximate population of 2,100. Taking account of planned property developments, this option is estimated to impact a total population of 2,300.

Up to 7,000ft, this option is estimated to overfly approximately 10,450 households with an approximate population of 23,100. Taking account of planned property developments, this option is estimated to impact a total population of 24,500.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Up to 4,000ft, option 7B R is estimated to overfly approximately 850 households with an approximate population of 1,900. Taking account of planned property developments, this option is estimated to impact a total population of 1,900.

Up to 7,000ft, this option is estimated to overfly approximately 10,350 households with an approximate population of 22,900. Taking account of planned property developments, this option is estimated to impact a total population of 24,000.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to overfly 8 noise sensitive areas.

Up to 7,000ft, option 7B L is estimated to overfly 10 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 7B R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, option 7B R is estimated to overfly 5 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

15.14 Runways 23R/23L South Viable but Poor Fit Options

Option	Safety	Policy	Capacity
A8 Left hand wraparound	S	P	C
After departure from Runway 23R/23L, aircraft would make a left-hand turn, fly around the airport through the overhead and then begin heading south towards the SID aiming point. Safety: This option risks interaction with other departure/arrival envelopes requiring additional tactical mitigation to safely manage the flow of air traffic. Policy: This option involves greater track mileage than is necessary by taking traffic east and north before turning it south leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Additionally, this option may hinder the achievement of CDAs for arriving aircraft from the south. Capacity: It is likely this option would interact with Runway 23R/23L arrivals from the south and the SID 23R/23L East Design Envelope. In addition, this option will interact with northbound and eastbound departures and therefore does not support the requirement for one-minute departure splits to enable best use of runway capacity.			
B9 Right hand wraparound	S	P	C
After departure from Runway 23R/23L, aircraft would make a right-hand turn, fly around the airport through the overhead then begin heading south towards the SID aiming point. Safety: This option risks interaction with other departure/arrival envelopes requiring additional tactical mitigation to safely manage the flow of air traffic. Furthermore, this option is expected to interact with the Runway 23R MAP. Policy: This option involves greater track mileage than is necessary This option involves greater track mileage than is necessary by taking traffic north and east before turning it south leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Additionally, this option may hinder the achievement of CDAs for arriving aircraft. Capacity: This option is likely to interact with Runway 23R/23L arrivals which is likely to lead to a restriction in achieving the required capacity. In addition, this option will interact with northbound and eastbound departures and therefore does not support the requirement for one-minute departure splits to enable best use of runway capacity.			
C10 Extended straight and then turn south	S	P	C
After departure from Runway 23R/23L, aircraft would continue straight ahead towards Northwich before turning south towards the SID aiming point. Safety: This option may cause additional interaction with LPL departures and arrivals. Capacity: This option is likely to interact to with options within the south-west departure envelope which could limit the ability to enable best use of runway capacity and limit the ability to achieve one minute departure splits.			
D11: Slight right after departure then 90° left turn to the south	S	P	C

After departure from Runway 23R/23L, aircraft would make a slight right-hand turn due west before making a 90° turn towards the south, towards the SID aiming point.

Safety: This option would infringe the LPL control zone, up to 2,500ft.

Capacity: This option is likely to interact with options within the south-west departure envelope which could limit the ability to enable best use of runway capacity and limit the ability to achieve one minute departure splits

16 Runways 23R/23L South-west

16.1 Runways 23R/23L South-west Option 1A

Design Principle Evaluation	Option No: 1A (6%)
Option Name: SID RW 23 L South-west Option 1A	ACCEPT
Option Name: SID RW 23 R South-west Option 1A	ACCEPT

Option Description:

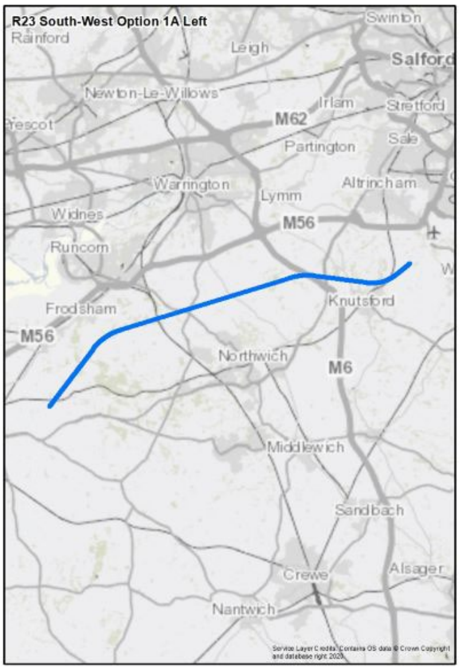
This option is included to provide a **RNAV1** replication of the **MONTY** 1R/1Y SIDs.

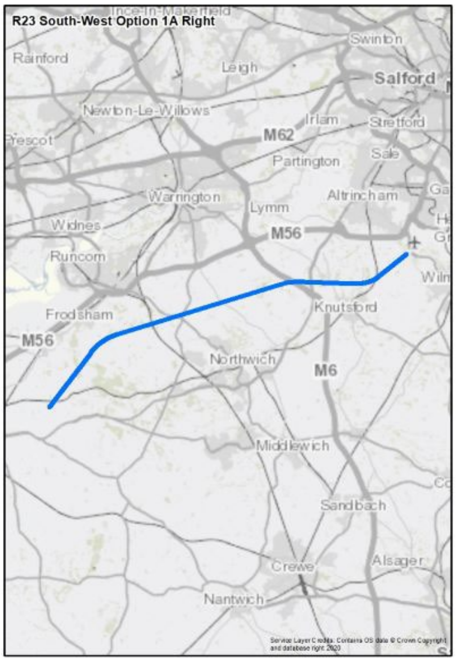
The procedure uses fly-by waypoints, positioned to replicate the turn at the existing markers:

- **23R** this first turn is at MCT D3.
- **23L** this is at MCT D3.2 which less than 1nm from DER but as this replicates the turn of the current procedure it therefore aligns to the Design Principle Safety. This earlier turn is to avoid Knutsford.

As a replicated route it follows a similar track over the ground as the current SID. This routes aircraft to the north of Knutsford, before making a left turn to the west to route north of Northwich and then making a left to the south of Frodsham to route south-west.

A speed restriction of 200 KIAS is used for the first turn, thereafter 250 KIAS would apply.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1A L is 41km (22nm). When compared to 'do nothing' this option is similar in length.

The estimated track length of option 1A R is 42km (23nm). When compared to 'do nothing' this option is similar in length.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	**PARTIAL**	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 1A L is estimated to overfly approximately 350 households with an approximate population of 900. Taking account of planned property developments, this option is estimated to impact a total population of 1,500. Up to 7,000ft, this option is estimated to overfly approximately 2,200 households with an approximate population of 5,400. Taking account of planned property developments, this option is estimated to impact a total population of 6,000. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft Up to 4,000ft, option 1A R is estimated to overfly approximately 400 households with an approximate population of 1,000. Taking account of planned property developments, this option is estimated to impact a total population of 1,000. Up to 7,000ft, this option is estimated to overfly approximately 2,300 households with an approximate population of 5,600. Taking account of planned property developments, this option is estimated to impact a total population of 5,600. This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	PARTIAL	**MET**
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	**PARTIAL**	MET
	23R	NOT MET	PARTIAL	**MET**
Summary of Qualitative Assessment: Up to 4,000ft, option 1A L is estimated to overfly 6 noise sensitive areas. Up to 7,000ft, option 1A L is estimated to overfly 10 noise sensitive areas. This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft. Up to 4,000ft, option 1A R is estimated to overfly 6 noise sensitive areas. Up to 7,000ft, option 1A R is estimated to overfly 10 noise sensitive areas. When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
	23L	NOT MET	PARTIAL	**MET**

Design Principle **Emissions**	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.2 Runways 23R/23L South-west Option 1B

Design Principle Evaluation	Option No: 1B (6%)
Option Name: SID RW 23 L South-west Option	REJECT
Option Name: SID RW 23 R South-west Option	ACCEPT

Option Description:

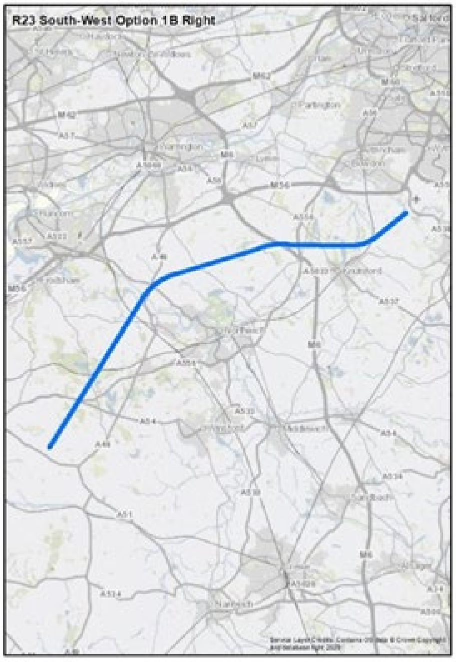
Option 1b is an RNAV1 option that avoids Knutsford in a similar way to the current KUXEM departure but the second turn to the south-west to join the network is earlier.

The procedure uses fly-by waypoints.

23L: After departure the route makes turn to the right to route to the north of Knutsford. This turn is at D3.2 which less than Design Principle Safety. Following a short straight segment, it then makes a left turn close to Over Tabley where it combines with the option for 23R. The combined routes continue in a south-westerly direction to avoid Northwich and then make a left turn to the south-west to terminate at 7,000ft south of Kelsall.

23R: After departure the route makes turn to the right to route to the north of Knutsford. Following a short straight segment it then makes a left turn close to Over Tabley where it combines with the option for 23L. The combined routes continue in a south-westerly direction to avoid Northwich and then make a left turn to the south-west to terminate at 7,000ft south of Kelsall.

A speed restriction of 200 KIAS is used for the first turn, thereafter 250 KIAS would apply.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1B L is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1B R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to overfly approximately 450 households with an approximate population of 1,100. Taking account of planned property developments, this option is estimated to impact a total population of 1,700.

Up to 7,000ft, this option is estimated to overfly approximately 3,150 households with an approximate population of 7,500. Taking account of planned property developments, this option is estimated to impact a total population of 8,500.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 1B R is estimated to overfly approximately 400 households with an approximate population of 1,000. Taking account of planned property developments, this option is estimated to impact a total population of 1,000.

Up to 7,000ft, this option is estimated to overfly approximately 3,200 households with an approximate population of 7,700. Taking account of planned property developments, this option is estimated to impact a total population of 8,100.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 1B L is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 1B R is estimated to overfly 7 noise sensitive areas.

Up to 7,000ft, option 1B R is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

16.3 Runways 23R/23L South-west Option 1C

Design Principle Evaluation	Option No: 1C (6%)
Option Name: SID RW 23 L South-west Option 1C	ACCEPT
Option Name: SID RW 23 R South-west Option 1C	ACCEPT

Option Description:

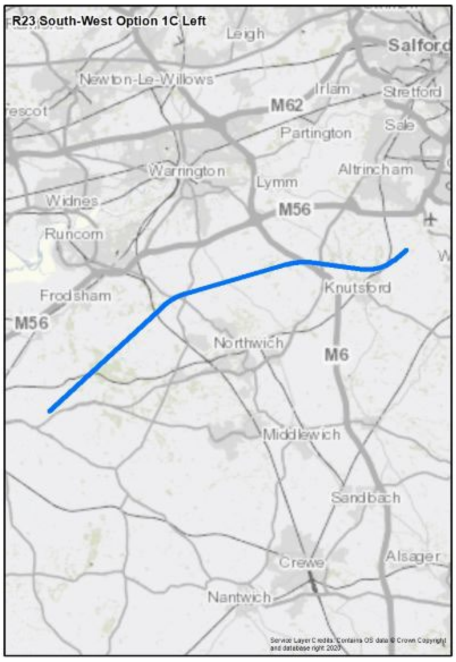
This is option is included to provide a RNAV1 replication of the **KUXEM** 1R/1Y SIDs.

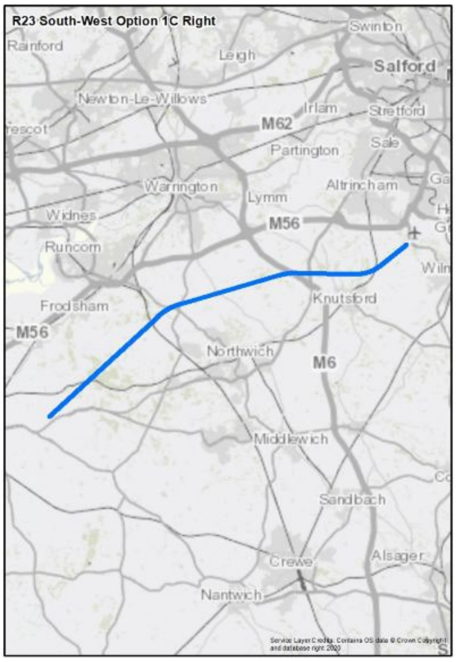
The procedure uses fly-by waypoints, positioned to replicate the turn at the existing markers:

- **23R** this first turn is at MCT D3.
- **23L** this is at MCT D3.2 which less than 1nm from DER but as this replicates the turn of the current procedure it therefore aligns to the Design Principle Safety. This earlier turn is to avoid Knutsford.

As a replicated route it follows a similar track over the ground as the current route. This routes aircraft to the north of Knutsford, before making a left turn to the west to route north of Northwich. It then then makes a second left turn to the north-west of Northwich to route south-west and terminates at 7,000ft to the east of Chester.

A speed restriction of 200 KIAS is used for the first turn, thereafter 250 KIAS would apply.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.				
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.				
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The estimated track length of option 1C L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 1C R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
	23L	NOT MET	PARTIAL	MET

Design Principle **Noise N1**	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1C L is estimated to overfly approximately 350 households with an approximate population of 800. Taking account of planned property developments, this option is estimated to impact a total population of 1,400.

Up to 7,000ft, this option is estimated to overfly approximately 3,450 households with an approximate population of 8,200. Taking account of planned property developments, this option is estimated to impact a total population of 9,000.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 1C R is estimated to overfly approximately 400 households with an approximate population of 900. Taking account of planned property developments, this option is estimated to impact a total population of 900.

Up to 7,000ft, this option is estimated to overfly approximately 3,550 households with an approximate population of 8,400. Taking account of planned property developments, this option is estimated to impact a total population of 8,600.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1C L is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 1C L is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 1C R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, option 1C R is estimated to overfly 5 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.4 Runways 23R/23L South-west Option 1D

Design Principle Evaluation	Option No: 1D (6%)
Option Name: SID RW 23 L South-west Option 1D	ACCEPT
Option Name: SID RW 23 R South-west Option 1D	ACCEPT

Option Description:

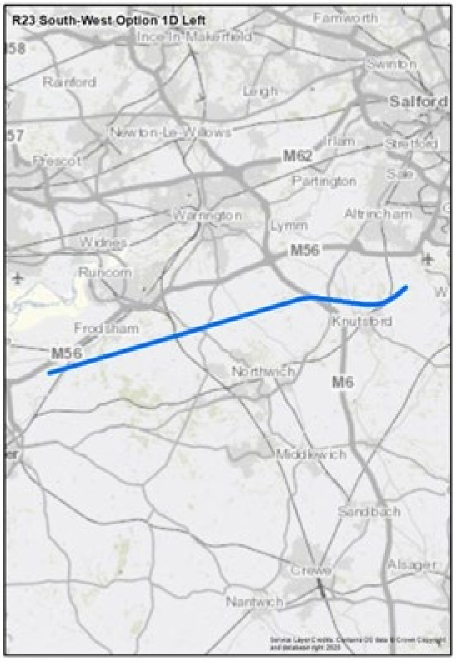
This option is included to provide a **RNAV1 replication** of the **EKLAD** 1R/1Y SIDs.

The procedure uses fly-by waypoints, positioned to replicate the turn at the existing markers:

- **23R** this first turn is at MCT D3.
- **23L** this is at MCT D3.2 which less than 1nm from DER but as this replicates the turn of the current procedure it therefore aligns to the Design Principle Safety. This earlier turn is to avoid Knutsford.

As a replicated route it follows a similar track over the ground as the current route. This routes aircraft to the north of Knutsford, before making a left turn to the west to route north of Northwich. The route continues in this direction until reaching 7,000ft to the north-east of Chester.

A speed restriction of 200 KIAS is used for the first turn, thereafter 250 KIAS would apply.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1DL is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1DR is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1DL is estimated to overfly approximately 350 households with an approximate population of 800. Taking account of planned property developments, this option is estimated to impact a total population of 1,400.

Up to 7,000ft, this option is estimated to overfly approximately 5,100 households with an approximate population of 11,800. Taking account of planned property developments, this option is estimated to impact a total population of 12,400.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Up to 4,000ft, option 1DR is estimated to overfly approximately 400 households with an approximate population of 900. Taking account of planned property developments, this option is estimated to impact a total population of 900.

Up to 7,000ft, this option is estimated to overfly approximately 5,200 households with an approximate population of 12,100. Taking account of planned property developments, this option is estimated to impact a total population of 12,100.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1DL is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 1DL is estimated to overfly 10 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 1DR is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, option 1DR is estimated to overfly 5 noise sensitive areas.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

	23L	NOT MET	PARTIAL	MET

Design Principle **Airspace**	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.5 Runways 23R/23L South-west Option 2A

Design Principle Evaluation	Option No: 2A (6%)
Option Name: SID RW 23 L South-west Option 2A	REJECT
Option Name: SID RW 23 R South-west Option 2A	REJECT

Option Description:

This is an **RNAV1** option that is includes a 15° offset to the north (right) at the DER. The aim of this is to avoid overflight of built-up areas in a more fuel-efficient manner than the current KUXEM SID.

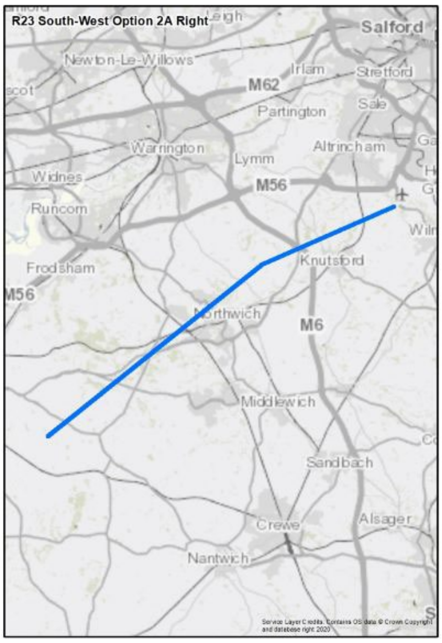
The higher design speed (when compared to the replicated route) will permit aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

The procedure uses track-to-fix coding.

23L: Upon reaching the DER this route has a 15° offset to the right that routes it to the north of Knutsford. It continues in this direction until north of Northwich where it combines with the 23R option and makes a left turn onto a slightly more south westerly track. The routes terminate at 7,000ft between Kelsall and Tarporley.

23R: Upon reaching the DER this route also has a 15° offset to the right that routes it to the north of Knutsford via Over Tabley. A 15° track adjustment to the left is then made to the north of Northwich in order to re-combine with the 23L option and the combined routes terminate at 7,000ft between Kelsall and Tarporley.

There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply. Some dispersion may be apparent close to the runway due to the track-to-fix coding although this is expected to be minimal.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2A L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 2A R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to overfly approximately 5,550 households with an approximate population of 13,100. Taking account of planned property developments, this option is estimated to impact a total population of 16,500.

Up to 7,000ft, this option is estimated to overfly approximately 8,900 households with an approximate population of 21,100. Taking account of planned property developments, this option is estimated to impact a total population of 25,400.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 2ARis estimated to overfly approximately 4,950 households with an approximate population of 11,500. Taking account of planned property developments, this option is estimated to impact a total population of 14,300.

Up to 7,000ft, this option is estimated to overfly approximately 85,50 households with an approximate population of 20,100. Taking account of planned property developments, this option is estimated to impact a total population of 23,700.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to overfly 18 noise sensitive areas.

Up to 7,000ft, option 2A L is estimated to overfly 20 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 2A R is estimated to overfly 18 noise sensitive areas.

Up to 7,000ft, option 2A R is estimated to overfly 20 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.6 Runways 23R/23L South-west Option 2B

Design Principle Evaluation	Option No: 2B (6%)
Option Name: SID RW 23 L South-west Option 2B	REJECT
Option Name: SID RW 23 R South-west Option 2B	REJECT

Option Description:

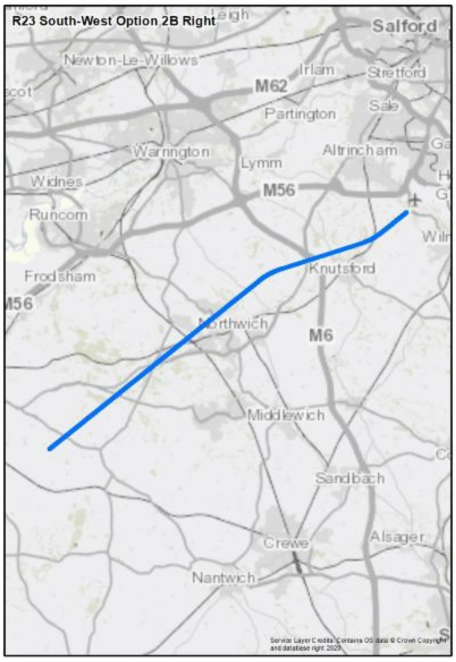
Option 2B uses an **RNP1** with RF coding, connecting to the same south-west track as shown in option 2A. The aim of this is to avoid overflight of built-up areas in a more fuel-efficient manner than the current KUXEM SID by removing the legs using the MCT and POL VOR.

The procedure uses radius-to-fix coding.

23L: After departure the route makes an RF turn to the right to route to the north of Knutsford. It continues in this direction until north-east of Northwich where it combines with the 23R option and makes a left turn onto a slightly more south-westerly track. The routes terminate at 7,000ft between Kelsall and Tarporley.

23R: After departure the route makes an RF turn to the right to route to the north of Knutsford. It continues in this direction until north-east of Northwich where it combines with the 23L option and makes a left turn onto a slightly more south-westerly track. The routes terminate at 7,000ft between Kelsall and Tarporley.

A speed restriction of 210 knots would be applied to the first turn to ensure aircraft avoid the centre of Knutsford.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2B L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 2B R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2B L is estimated to overfly approximately 5,200 households with an approximate population of 12,100. Taking account of planned property developments, this option is estimated to impact a total population of 15,600. Up to 7,000ft, this option is estimated to overfly approximately 8550 households with an approximate population of 20,200. Taking account of planned property developments, this option is estimated to impact a total population of 24,500. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 2B R is estimated to overfly approximately 5,000 households with an approximate population of 11,600. Taking account of planned property developments, this option is estimated to impact a total population of 15,000. Up to 7,000ft, this option is estimated to overfly approximately 8700 households with an approximate population of 20,500. Taking account of planned property developments, this option is estimated to impact a total population of 24,800. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2B L is estimated to overfly 15 noise sensitive areas. Up to 7,000ft, option 2B L is estimated to overfly 15 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 2B R is estimated to overfly 19 noise sensitive areas. Up to 7,000ft, option 2B R is estimated to overfly 20 noise sensitive areas.				

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.7 Runways 23R/23L South-west Option 3A

Design Principle Evaluation	Option No: 3A (6%)
Option Name: SID RW 23 L South-west Option 3A	REJECT
Option Name: SID RW 23 R Southwest Option 3A	REJECT

Option Description:

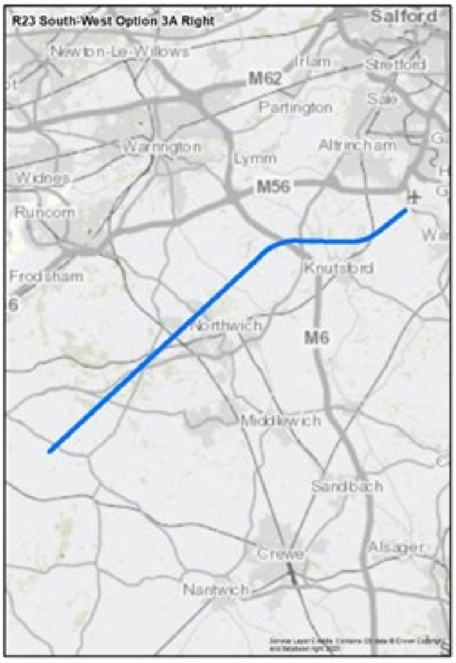
This is an RNAV1 option that that replicates the initial track of the current KUXEM SID but then turns south-west earlier to make this a more fuel-efficient route than the existing departure. This routes it towards the centre of the design envelope.

The procedure uses a fly-over to fly-by sequence. An element of dispersion would be apparent in the turn due to the fly-over waypoint and DF coding.

23L: After departure, the route makes turn to the right to route to the north of Knutsford. Following a short straight segment, it then makes a left turn close to Over Tabley where it combines with the option for 23R. The combined routes continue in a south-westerly direction to avoid Northwich and terminate at 7,000ft between Kelsall and Tarporley.

23R: After departure, the route makes turn to the right to route to the north of Knutsford. Following a short straight segment, it then makes a left turn close to Over Tabley where it combines with the option for 23L. The combined routes continue in a south-westerly direction to avoid Northwich and terminate at 7,000ft between Kelsall and Tarporley.

A speed restriction of 200 KIAS then 220 KIAS is used for the first turn and second turn.



Design Principle	Runway			
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage..

Design Principle	Runway			
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle	Runway			
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle	Runway			
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3A L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 3A R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 3A L is estimated to overfly approximately 5,500 households with an approximate population of 12,900. Taking account of planned property developments, this option is estimated to impact a total population of 16,300. Up to 7,000ft, this option is estimated to overfly approximately 9,150 households with an approximate population of 21,500. Taking account of planned property developments, this option is estimated to impact a total population of 25,700. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 3A R is estimated to overfly approximately 4,600 households with an approximate population of 10,700. Taking account of planned property developments, this option is estimated to impact a total population of 13,500. Up to 7,000ft, this option is estimated to overfly approximately 9,450 households with an approximate population of 22,200. Taking account of planned property developments, this option is estimated to impact a total population of 25,900. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 3A L is estimated to overfly 31 noise sensitive areas. Up to 7,000ft, option 3A L is estimated to overfly 35 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 3A R is estimated to overfly 25 noise sensitive areas. Up to 7,000ft, option 3A R is estimated to overfly 25 noise sensitive areas.				

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.8 Runways 23R/23L South-west Option 3B

Design Principle Evaluation	Option No: 3B (6%)
Option Name: SID RW 23 L South-west Option 3B	REJECT
Option Name: SID RW 23 R South-west Option 3B	ACCEPT

Option Description:

This option uses an **RNP1** with RF coding right turn initially (1nm DER for Runway 23L) to avoid Knutsford. It is similar to option 3A initially, but the track after the first turn is further north to provide greater avoidance from Northwich.

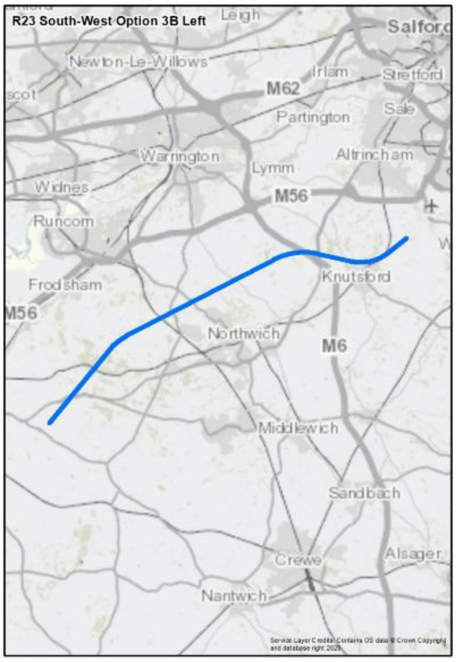
This route increases fuel efficiency when compared to the replicated route by removing the legs using the MCT and POL VOR and routes towards the centre of the design envelope.

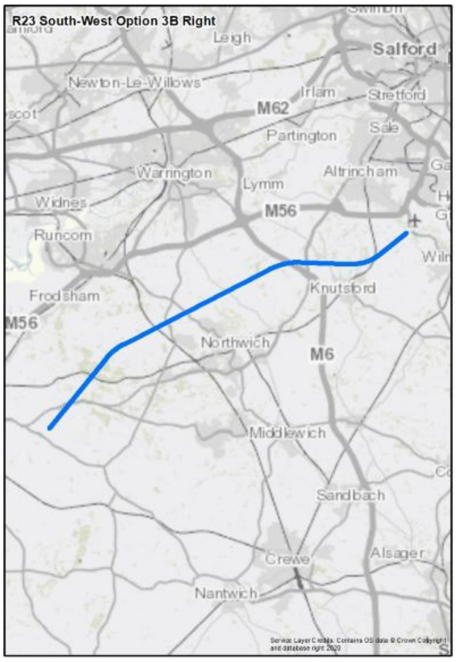
The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: After departure, the route makes an RF turn to the right to route to the north of Knutsford at 1nm from DER. Following a short straight segment, it combines with the option for 23R and turns left on a track that takes it well to the north of Northwich. It continues in this direction until north of Delamere and then turns left onto a more south-westerly track and terminates at 7,000ft close to Kelsall.

23R: After departure the route makes an RF turn to the right to route to the north of Knutsford at 1nm from DER. Following a short straight segment it combines with the option for 23L and turns left on a track that takes it well to the north of Northwich. It continues in this direction until north of Delamere and then turns left onto a more south-westerly track and terminates at 7,000ft close to Kelsall.

A speed restriction of 210 KIAS is applied to the first turn which is the PANS-OPS/CAP778 recommended speed.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3B L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 3B R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 3B L is estimated to overfly approximately 900 households with an approximate population of 2,200. Taking account of planned property developments, this option is estimated to impact a total population of 3,000. Up to 7,000ft, this option is estimated to overfly approximately 5,050 households with an approximate population of 11,900. Taking account of planned property developments, this option is estimated to impact a total population of 13,200. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 3B R is estimated to overfly approximately 800 households with an approximate population of 1,900. Taking account of planned property developments, this option is estimated to impact a total population of 1,900. Up to 7,000ft, this option is estimated to overfly approximately 5,050 households with an approximate population of 11,900. Taking account of planned property developments, this option is estimated to impact a total population of 12,300. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 33B L is estimated to overfly 8 noise sensitive areas. Up to 7,000ft, option 3B L is estimated to overfly 10 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 3B R is estimated to overfly 6 noise sensitive areas. Up to 7,000ft, option 3B R is estimated to overfly 10 noise sensitive areas.				

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.9 Runways 23R/23L South-west Option 3C

Design Principle Evaluation	Option No: 3C (6%)
Option Name: SID RW 23 L South-west Option 3C	REJECT
Option Name: SID RW 23 R South-west Option 3C	ACCEPT

Option Description:

This option uses an **RNP1** with RF coding right turn in the same way as option 3B, except that the turn point for Runway 23L is earlier and replicates the current turn position of MCT D3.2 position (0.7nm DER). This provides greater avoidance of Knutsford.

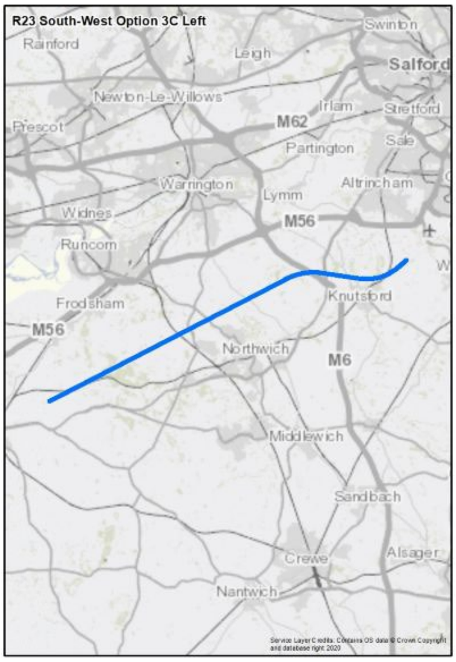
This route is intended as an alternative to the EKLAD SID and routes towards the centre of the design envelope.

The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: After departure the route makes an RF turn to the right at 0.7nm from DER which replicates the turn of the current procedure and therefore aligns to the Design Principle Safety. It routes to the north of Knutsford and following a short straight segment it combines with the option for 23R and turns left on a track that takes it well to the north of Northwich and Kelsall and terminates at 7,000ft east of Chester.

23R: After departure the route makes an RF turn to the right to route to the north of Knutsford. Following a short straight segment it combines with the option for 23L and turns left on a track that takes it well to the north of Northwich. It continues in this direction until north of Delamere and then turns left onto a more south-westerly track and terminates at 7,000ft close to Kelsall.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.



Design Principle	Runway			
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle	Runway			
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle	Runway			
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle	Runway			
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3CL is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 3CR is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3CL is estimated to overfly approximately 850 households with an approximate population of 2,000. Taking account of planned property developments, this option is estimated to impact a total population of 2,800.

Up to 7,000ft, this option is estimated to overfly approximately 3,150 households with an approximate population of 7,500. Taking account of planned property developments, this option is estimated to impact a total population of 8,200.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 3CR is estimated to overfly approximately 800 households with an approximate population of 1,900. Taking account of planned property developments, this option is estimated to impact a total population of 1,900.

Up to 7,000ft, this option is estimated to overfly approximately 3,200 households with an approximate population of 7,600. Taking account of planned property developments, this option is estimated to impact a total population of 7,600.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3CL is estimated to overfly 8 noise sensitive areas.

Up to 7,000ft, option 3CL is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 3CR is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 3CR is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.10 Runways 23R/23L South-west Option 4B

Design Principle Evaluation	Option No: 4B (6%)
Option Name: SID RW 23 L South-west Option 4B	REJECT
Option Name: SID RW 23 R South-west Option 4B	REJECT

Option Description:

This option routes fully around Knutsford and is **RNP1** with RF coding initially (1nm DER for Runway 23L), followed by a left turn and right turn, routing over Northwich.

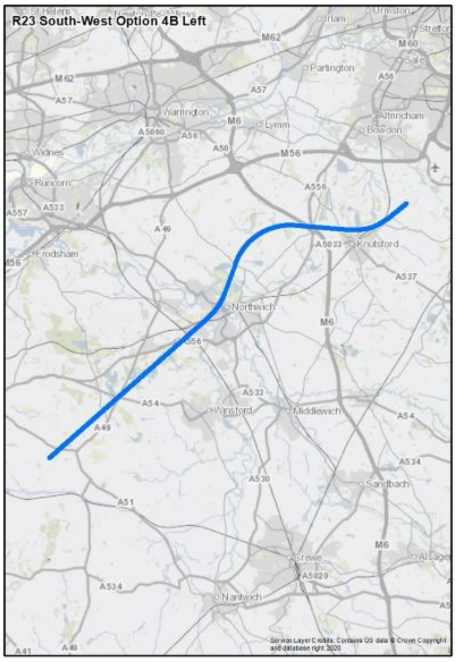
This route is similar to option 3A but routes slightly further south and is intended as an alternative to the EKLAD SID.

The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: After departure the route makes an RF turn to the right 1nm from DER to the north of Knutsford and following a short straight segment it then turns left and combines with the option for 23R. After a further short segment it then turns right to route over the northern edge of Northwich. It terminates at 7,000ft west of Tarporley.

23R: After departure the route makes an RF turn to the right to the north of Knutsford and following a short straight segment it then turns left and combines with the option for 23L. After a further short segment it then turns right to route over the northern edge of Northwich. It terminates at 7,000ft west of Tarporley.

A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4B L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 4B R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4B L is estimated to overfly approximately 7,950 households with an approximate population of 17,700. Taking account of planned property developments, this option is estimated to impact a total population of 19500. Up to 7,000ft, this option is estimated to overfly approximately 10,450 households with an approximate population of 24,000. Taking account of planned property developments, this option is estimated to impact a total population of 27,200. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 4B R is estimated to overfly approximately 6,650 households with an approximate population of 14,700. Taking account of planned property developments, this option is estimated to impact a total population of 15,700. Up to 7,000ft, this option is estimated to overfly approximately 10,700 households with an approximate population of 24,600. Taking account of planned property developments, this option is estimated to impact a total population of 27,100. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4B L is estimated to overfly 57 noise sensitive areas. Up to 7,000ft, option 4B L is estimated to overfly 60 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft Up to 4,000ft, option 4B R is estimated to overfly 51 noise sensitive areas. Up to 7,000ft, option 4B R is estimated to overfly 55 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft				

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

16.11 Runways 23R/23L South-west Option 5

Design Principle Evaluation	Option No: 5 (6%)
Option Name: SID RW 23 L South-west Option 5	REJECT
Option Name: SID RW 23 R South-west Option 5	REJECT

Option Description:

This is an RNAV1 option which is a straight climb from the DER out to 7,000ft. There is no turn in this option which results in the option overflying Knutsford.

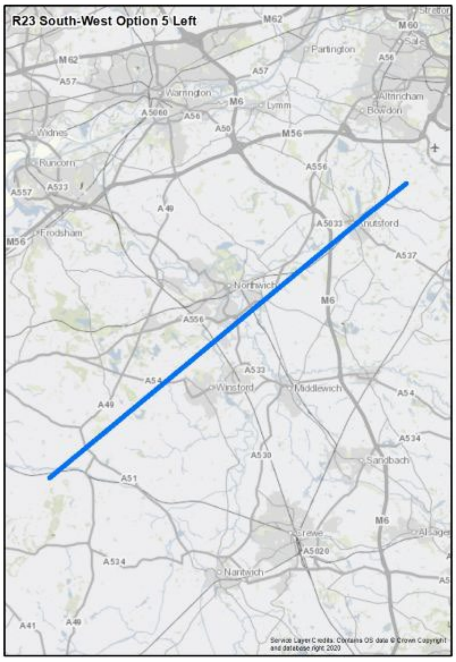
The higher design speed (when compared to the replicated route) will permit aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

The option maximises fuel efficiency by removing the turnaround Knutsford which use the MCT and POL VOR.

23L: After departure, the route continues straight ahead on runway heading to 7,000ft. This routes it overhead Knutsford and it then continues to the south of Northwich and just north of Winsford. It terminates at 7,000ft just east of Tattenhall.

23R: After departure, the route makes a slight track adjustment to combine with the 23L option. This routes it overhead Knutsford and it then continues to the south of Northwich and just north of Winsford. It terminates at 7,000ft just east of Tattenhall.

There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply. No dispersion would be apparent as the track is straight ahead and track keeping should be optimum.



Design Principle	Runway			
Design Principle **Safety**	23L	NOT MET	**PARTIAL**	MET
	23R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle	Runway			
Design Principle **Policy**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle	Runway			
Design Principle **Capacity**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle	Runway			
Design Principle **Emissions**	23L	NOT MET	**PARTIAL**	MET
	23R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

The estimated track length of option 5L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 5R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5L is estimated to overfly approximately 7,050 households with an approximate population of 16,000. Taking account of planned property developments, this option is estimated to impact a total population of 16,300.

Up to 7,000ft, this option is estimated to overfly approximately 9,750 households with an approximate population of 22,200. Taking account of planned property developments, this option is estimated to impact a total population of 27,000.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 5R is estimated to overfly approximately 8,000 households with an approximate population of 18,100. Taking account of planned property developments, this option is estimated to impact a total population of 18,500.

Up to 7,000ft, this option is estimated to overfly approximately 10,850 households with an approximate population of 24,500. Taking account of planned property developments, this option is estimated to impact a total population of 29,500.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5L is estimated to overfly 36 noise sensitive areas.

Up to 7,000ft, option 5L is estimated to overfly 40 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft.

Up to 4,000ft, option 5R is estimated to overfly 54 noise sensitive areas.

Up to 7,000ft, option 5R is estimated to overfly 55 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

16.12 Runways 23R/23L South-west Option 6

Design Principle Evaluation	Option No: 6 (6%)
Option Name: SID RW 23 L South-west Option 6	ACCEPT
Option Name: SID RW 23 R South-west Option 6	ACCEPT

Option Description:

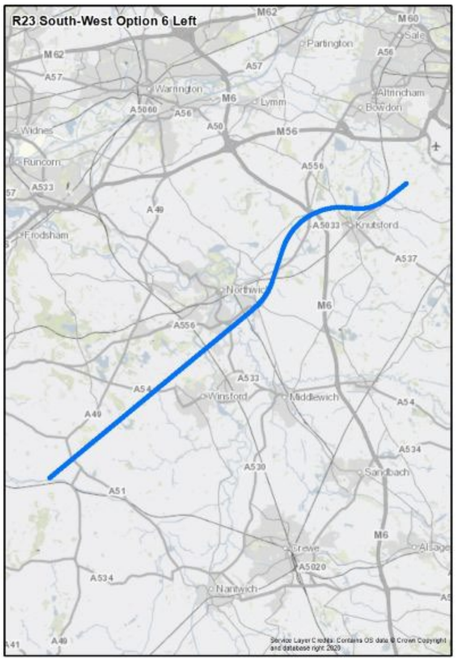
This is an **RNP1** with RF coding initially (1nm DER for Runway 23L) to make a kink around Knutsford before tracking back on the extended runway centreline. It is similar to option 4B except that the radius of the turn is shorter resulting in a track that is more to the south of Northwich.

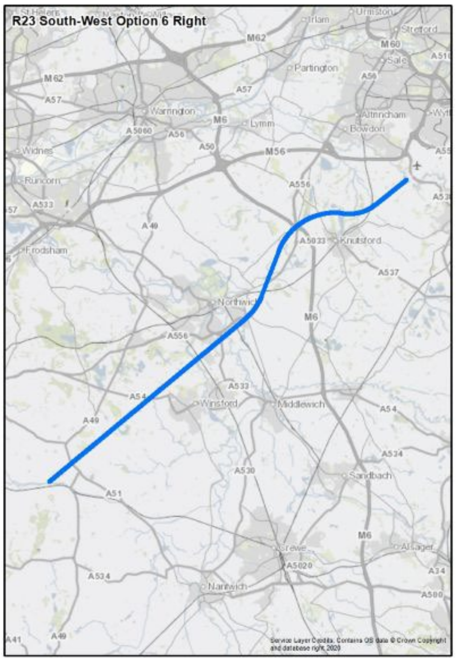
This route is intended as an alternative to the KUXEM SID and routes towards the south of the design envelope.

23L: After departure, the route makes an RF turn to the right 1nm from DER which takes it just to the north of Knutsford. It then turns left and then right to return the route onto the extended runway centreline where it combines with the option for 23R. It continues to the south of Northwich and just north of Winsford and terminates at 7,000ft just east of Tattenhall.

23R: After departure, the route makes an RF turn to the right which takes it just to the north of Knutsford. It then turns left and then right to return the route onto the extended runway centreline where it combines with the option for 23L. It continues to the south of Northwich and just north of Winsford and terminates at 7,000ft just east of Tattenhall.

A speed restriction of 190 KIAS is applied to the first turn, 210 KIAS to the second turn and 250 KIAS thereafter.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL, and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 6R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 6L is estimated to overfly approximately 6,100 households with an approximate population of 14,400. Taking account of planned property developments, this option is estimated to impact a total population of 15,800. Up to 7,000ft, this option is estimated to overfly approximately 9,000 households with an approximate population of 21,000. Taking account of planned property developments, this option is estimated to impact a total population of 27,100. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 6R is estimated to overfly approximately 6,250 households with an approximate population of 14,700. Taking account of planned property developments, this option is estimated to impact a total population of 15,300. Up to 7,000ft, this option is estimated to overfly approximately 9,400 households with an approximate population of 22,000. Taking account of planned property developments, this option is estimated to impact a total population of 27,500. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 6L is estimated to overfly 30 noise sensitive areas. Up to 7,000ft, option 6L is estimated to overfly 30 noise sensitive areas. This is less than or similar to the ‘do nothing’ scenario at 7,000ft, but greater than the ‘do nothing’ scenario at 4,000ft. Up to 4,000ft, option 6R is estimated to overfly 30 noise sensitive areas. Up to 7,000ft, option 6R is estimated to overfly 30 noise sensitive areas.				

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.13 Runways 23R/23L South-west Option 7A

Design Principle Evaluation	Option No: 7A (6%)
Option Name: SID RW 23 L South-west Option 7A	ACCEPT
Option Name: SID RW 23 R South-west Option 7A	ACCEPT

Option Description:

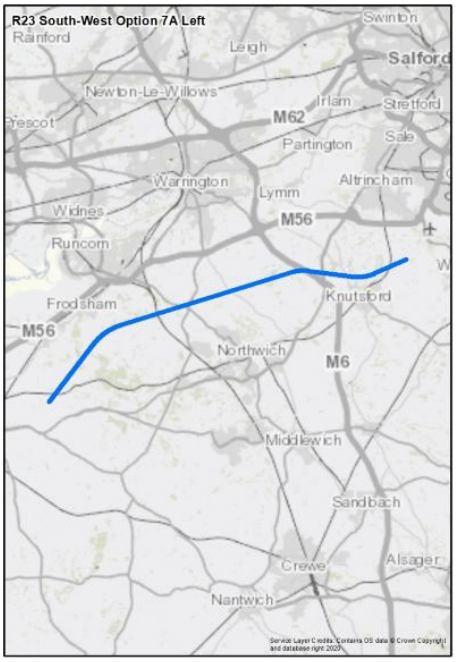
This is an **RNAV1** option included to provide a similar route to that of option 1A (the MONTY 1R /1Y SID) however, it uses an initial 15° track adjustment to the right (north) from the DER to reduce the impact of noise on Knutsford. It then follows the same route as the replicated route once beyond Mere.

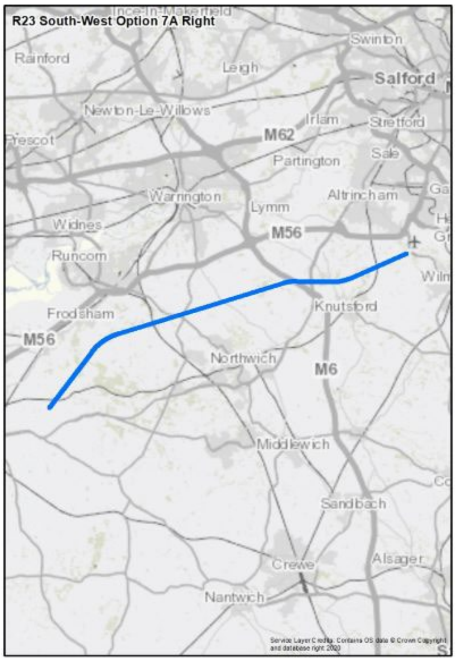
The procedure uses fly-by waypoints.

23L: Aircraft make a 15° track adjustment at DER to the right to route to the north of Knutsford and to the south of Mere. It then follows the same track as 1A and routes west to combine with the option for 23R just west of Over Tabley. The routes continue in a south-westerly direction to avoid Northwich and then makes a left turn to the south of Frodsham to terminate at 7,000ft north of Tarvin.

23R: Aircraft make a 15° track adjustment at DER to the right to route to the north of Knutsford. It then follows the same track as 1A just north of Knutsford and routes west to combine with the option for 23L around Bate Heath. The combined routes continue in a south-westerly direction to avoid Northwich and then makes a left turn to the south of Frodsham to terminate at 7,000ft north-west of Kelsall.

A speed restriction of 200/210 KIAS is used for the first and second turn, thereafter 250 KIAS would apply.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNAV1 routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7A L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 7A R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to overfly approximately 450 households with an approximate population of 1,100. Taking account of planned property developments, this option is estimated to impact a total population of 1,200.

Up to 7,000ft, this option is estimated to overfly approximately 2,350 households with an approximate population of 5,600. Taking account of planned property developments, this option is estimated to impact a total population of 5,800.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Up to 4,000ft, option 7A R is estimated to overfly approximately 400 households with an approximate population of 1,000. Taking account of planned property developments, this option is estimated to impact a total population of 1,000.

Up to 7,000ft, this option is estimated to overfly approximately 2,400 households with an approximate population of 5,800. Taking account of planned property developments, this option is estimated to impact a total population of 5,800.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 7A L is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 7A R is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 7A R is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.14 Runways 23R/23L South-west Option 7B

Design Principle Evaluation	Option No: 7B (6%)
Option Name: SID RW 23 L South-west Option 7B	ACCEPT
Option Name: SID RW 23 R South-west Option 7B	ACCEPT

Option Description:

This is an **RNAV1** option included to provide a similar route to that of option 1A (the MONTY 1R /1Y SID) however, it uses an initial 15° track adjustment to the right (north) from the DER to reduce the impact of noise on Knutsford. It then follows the same route as the replicated route once beyond Mere.

The procedure uses fly-by waypoints.

23L: Aircraft make a 15° track adjustment at DER to the right to route to the north of Knutsford and to the south of Mere. It then follows the same track as 1A and routes west to combine with the option for 23R just west of Over Tabley. The routes continue in a south-westerly direction to avoid Northwich and then makes a left turn to the south of Frodsham to terminate at 7,000ft north of Tarvin.

23R: Aircraft make a 15° track adjustment at DER to the right to route to the north of Knutsford. It then follows the same track as 1A just north of Knutsford and routes west to combine with the option for 23L around Bate Heath. The combined routes continue in a south-westerly direction to avoid Northwich and then makes a left turn to the south of Frodsham to terminate at 7,000ft north-west of Kelsall.

A speed restriction of 200/210 KIAS is used for the first and second turn, thereafter 250 KIAS would apply.

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage..				
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.				
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment:				

The estimated track length of option 7B L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 7B R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to overfly approximately 450 households with an approximate population of 1,100. Taking account of planned property developments, this option is estimated to impact a total population of 1,200.

Up to 7,000ft, this option is estimated to overfly approximately 3,150 households with an approximate population of 7,600. Taking account of planned property developments, this option is estimated to impact a total population of 8,100.

When compared to the 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft

Up to 4,000ft, option 7B R is estimated to overfly approximately 400 households with an approximate population of 1,000. Taking account of planned property developments, this option is estimated to impact a total population of 1,000.

Up to 7,000ft, this option is estimated to overfly approximately 3,200 households with an approximate population of 7,700. Taking account of planned property developments, this option is estimated to impact a total population of 8,100.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	**PARTIAL**	MET
	23R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 7B L is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 7B R is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 7B R is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.15 Runways 23R/23L South-west Option 8

Design Principle Evaluation	Option No: 8 (6%)
Option Name: SID RW 23 L South-west Option 8	ACCEPT
Option Name: SID RW 23 R South-west Option 8	ACCEPT

Option Description:

This is as an alternative **RNP1** with RF coding option to the current KUXEM SID. This option has been designed following bilateral engagement with LPL that identified interactions with the proposed LPL Runway 27 VEGUN arrival route from the south, with the intention of resolving those interactions.

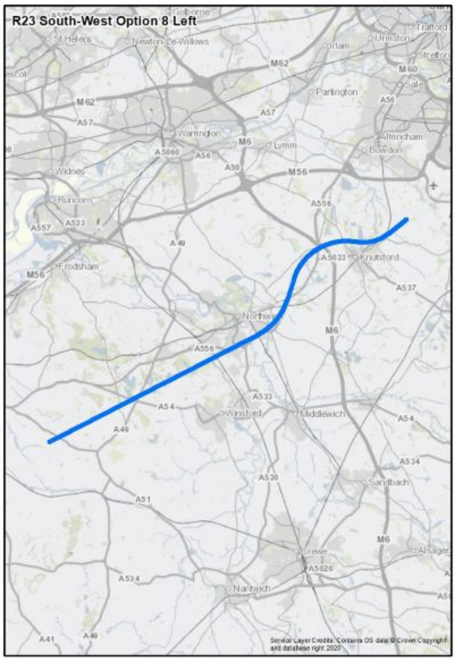
This option has been assessed against a 4.2nm buffer from this arrival route in line with minimum radar separation criteria of 3nm plus a buffer of 1.2nm (in line with CAP1385) and seeks to eliminate the interaction using vertical separation.

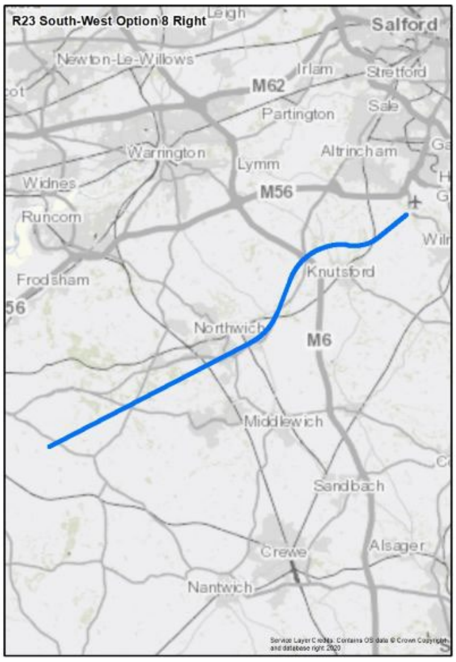
This option uses an RNP1 RF turn initially (1nm DER for Runway 23L) to make a kink around Knutsford. This is like other options, but the radius of the turn is shorter to create a track that is more to the south of Northwich. A third turn to the right routes aircraft north of the extended centreline by approximately 12° which creates a route to the expected network joining point and ensures containment within controlled airspace.

The assessment of the route identifies that a PDG of less than 6% is required for both 23R/23L to achieve 3,500ft (the required vertical separation) at the 4.2nm buffer zone therefore aligning this option with the design principles Safety and Policy.

Initially, a route south of the buffer line was considered to achieve the satisfactory lateral separation; however, this would not offer great flexibility to design options within this envelope, and so a route that achieved the required 1,000ft vertical separation was investigated.

23L: After departure, the route makes an RF turn to the right 1nm from DER which takes it just to the north of Knutsford. It then turns left and then right to return the route north





of the extended runway centreline where it combines with the option for 23R. It continues just to the south of Northwich and north of Winsford and terminates at 7,000ft south of Kelsall. **23R:** After departure, the route makes an RF turn to the right which takes it just to the north of Knutsford. It then turns left and then right to return the route north of the extended runway centreline where it combines with the option for 23L. It continues to the south of Northwich and north of Winsford and terminates at 7,000ft just south of Kelsall. A speed restriction of 190 KIAS is applied to the first turn, 210 KIAS to the second turn and 250 KIAS thereafter.					
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET	
	23R	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. However, some additional protocols or mitigations may be required to confirm safe operation with LPL and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.					
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET	
	23R	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.					
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET	
	23R	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment:					

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R, best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restrictions that prohibit the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The estimated track length of option 8L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 8R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 8L is estimated to overfly approximately 7,800 households with an approximate population of 18,800. Taking account of planned property developments, this option is estimated to impact a total population of 20,800. Up to 7,000ft, this option is estimated to overfly approximately 9,150 households with an approximate population of 22,300. Taking account of planned property developments, this option is estimated to impact a total population of 24,700. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 8R is estimated to overfly approximately 7,700 households with an approximate population of 18,600. Taking account of planned property developments, this option is estimated to impact a total population of 19,700. Up to 7,000ft, this option is estimated to overfly approximately 9,300 households with an approximate population of 22,700. Taking account of planned property developments, this option is estimated to impact a total population of 24,300. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment:				

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 8L is estimated to overfly 33 noise sensitive areas. Up to 7,000ft, option 8L is estimated to overfly 35 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 8R is estimated to overfly 34 noise sensitive areas. Up to 7,000ft, option 8R is estimated to overfly 35 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft. Based on the fleet equipage survey, they are accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enable CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.16 Runways 23R/23L South-west Option 9

Design Principle Evaluation	Option No: 9 (6%)
Option Name: SID RW 23 L South-west Option 9	REJECT
Option Name: SID RW 23 R South-west Option 9	REJECT

Option Description:

This is as an alternative **RNP1** with RF coding option to the current KUXEM SID that aims to minimise the interactions with the proposed LPL Runway 27 VEGUN arrival route from the south.

This option has been assessed against a 4.2nm buffer from this arrival route in line with minimum radar separation criteria of 3nm plus a buffer of 1.2nm (in line with CAP1385) and seeks to resolve the interaction using vertical separation.

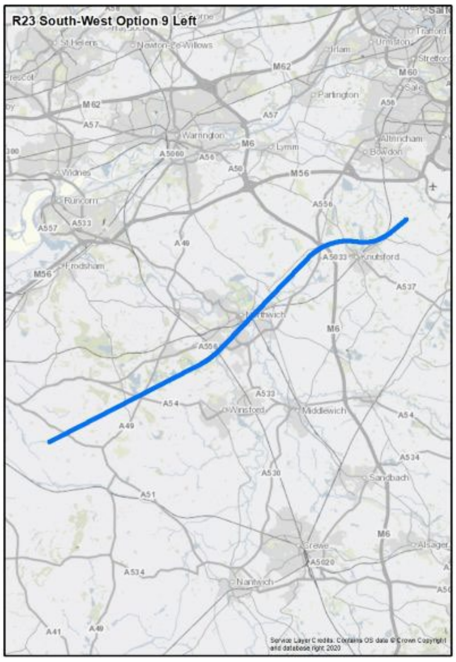
This option uses an RNP1 RF turn initially (1nm DER for Runway 23L) to make a kink around Knutsford, but then routes directly to the south-west after making the second turn. This track results in the need for a higher climb gradient on this option compared to option 8. The assessment of the route identifies a required PDG of 5.98% for 23R and 6.74% for Runway 23L to achieve 3,500ft (the required vertical separation) at the 4.2nm buffer zone.

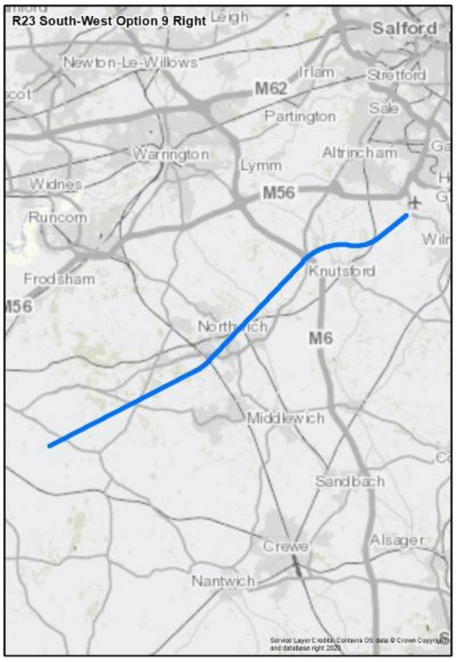
It terminates in the same position as option 8 to align to the expected network joining point and ensure containment within controlled airspace.

The procedure uses radius-to-fix coding.

Initially, a route south of the buffer line was considered to achieve the satisfactory lateral separation; however, this would not offer great flexibility to design options within this envelope, and so a route that achieved the required 1,000ft vertical separation was investigated.

23L: After departure, the route makes an RF turn to the right 1nm from DER which takes it just to the north of Knutsford. It then turns left onto a direct track to the south-west which takes the route overhead Northwich after which it combines with the option for 23R. It then makes a slight right turn to





head south-west and terminates at 7,000ft south of Kelsall. **23R:** After departure, the route makes an RF turn to the which takes it just to the north of Knutsford. It then turns left and then right to return the route north of the extended runway centreline where it combines with the option for 23L. It continues to the south of Northwich after which it combines with the option for 23L. It then makes a slight right turn to head south-west and terminates at 7,000ft south of Kelsall. A speed restriction of 190 KIAS is applied to the first turn, 210 KIAS to the second turn and 250 KIAS thereafter.	

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL, and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

<table>
<tr><td colspan="5">When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.</td></tr>
<tr><td rowspan="2">Design Principle Emissions</td><td>23L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>23R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:

The estimated track length of option 9L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 9R is 41km (22nm). When compared to the ‘do nothing’ scenario this option is similar in length and similar emissions would be anticipated.</td></tr>
<tr><td rowspan="2">Design Principle Noise N1</td><td>23L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>23R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:

Up to 4,000ft, option 9L is estimated to overfly approximately 1,1200 households with an approximate population of 25,600. Taking account of planned property developments, this option is estimated to impact a total population of 29,500.

Up to 7,000ft, this option is estimated to overfly approximately 12,400 households with an approximate population of 28,800. Taking account of planned property developments, this option is estimated to impact a total population of 33,200.

When compared to the ‘do nothing’ scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 9R is estimated to overfly approximately 11,850 households with an approximate population of 27,100. Taking account of planned property developments, this option is estimated to impact a total population of 30,300.

Up to 7,000ft, this option is estimated to overfly approximately 13,350 households with an approximate population of 30,900. Taking account of planned property developments, this option is estimated to impact a total population of 34,500.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.</td></tr>
<tr><td rowspan="2">Design Principle Noise N2</td><td>23L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>23R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.</td></tr>
</table>

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 9L is estimated to overfly 68 noise sensitive areas.

Up to 7,000ft, option 9L is estimated to overfly 70 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 9R is estimated to overfly 72 noise sensitive areas.

Up to 7,000ft, option 9R is estimated to overfly 75 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

16.17 Runways 23R/23L South-west Option 10

Design Principle Evaluation	Option No: 6 (6%)
Option Name: SID RW 23 L South-west Option 10	REJECT
Option Name: SID RW 23 R South-west Option 10	ACCEPT

Option Description:

This is as an **RNP1** option with RF coding as an alternative to the current KUXEM SID. It aims to minimise the interactions with the proposed LPL Runway 27 VEGUN arrival route from the south following stakeholder feedback It is similar to option 8 but routes further south after Knutsford to reduce noise impact on Northwich.

This option has been assessed against a 4.2nm buffer from this arrival route in line with minimum radar separation criteria of 3nm plus a buffer of 1.2nm (in line with CAP1385) and seeks to resolve the interaction using vertical separation.

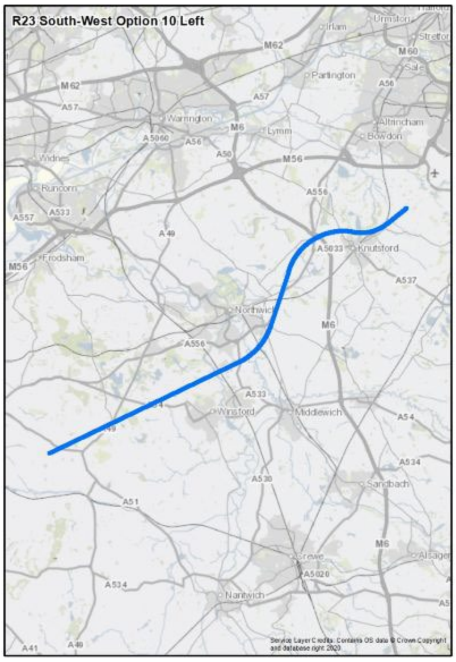
This option uses an RNP1 RF turn initially (1nm DER for Runway 23L) to make a kink around Knutsford before tracking back north of the extended runway centreline. This is like other options, but the radius of the turn is shorter and the subsequent track to the south is longer to create an option that fully avoids Northwich.

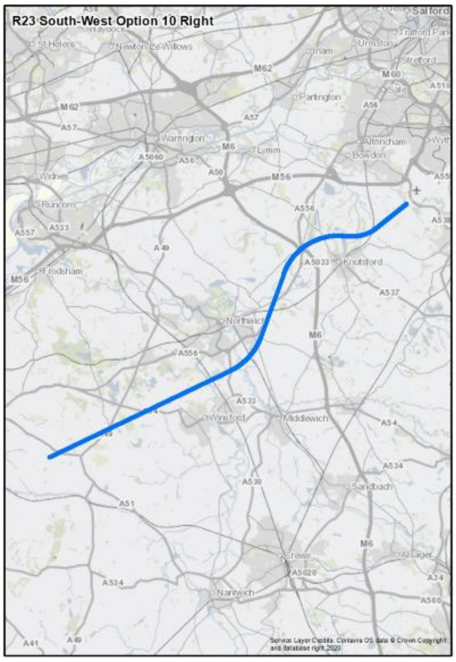
The assessment of the route identifies that a PDG of less than 6% is required for both Runways 23R/23L to achieve 3,500ft at the 4.2nm buffer zone.

The procedure uses radius-to-fix coding, and the climb gradient has been set at 6%.

23L: After departure, the route makes an RF turn to the right 1nm from DER which takes it just to the north of Knutsford. It then turns left and routes south of Northwich where it combines with the option for 23R. It then turns left and routes to the south-west and terminates at 7,000ft south of Kelsall.

23R: After departure, the route makes an RF turn to the right which takes it just to the north of Knutsford. It then turns left and routes south of Northwich where it combines with the option for 23L. It then turns left and





routes to the south-west and terminates at 7,000ft south of Kelsall. A speed restriction of 190 KIAS is applied to the first turn, 210 KIAS to the second turn and 250 KIAS thereafter.				
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, some additional protocols or mitigations may be required to confirm safe operation with LPL, and an assessment against the other FASI-N airports and other MAN routes may be required to confirm safe operation at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 10L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 10R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 10L is estimated to overfly approximately 3,150 households with an approximate population of 7,600. Taking account of planned property developments, this option is estimated to impact a total population of 9,300.

Up to 7,000ft, this option is estimated to overfly approximately 5,050 households with an approximate population of 12,200. Taking account of planned property developments, this option is estimated to impact a total population of 17,300.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Up to 4,000ft, option 10R is estimated to overfly approximately 2,700 households with an approximate population of 6,600. Taking account of planned property developments, this option is estimated to impact a total population of 7,600.

Up to 7,000ft, this option is estimated to overfly approximately 5,050 households with an approximate population of 12,200. Taking account of planned property developments, this option is estimated to impact a total population of 16,700.

This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 10L is estimated to overfly 14 noise sensitive areas.

Up to 7,000ft, option 10L is estimated to overfly 15 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft. Up to 4,000ft, option 10R is estimated to overfly 13 noise sensitive areas. Up to 7,000ft, option 10R is estimated to overfly 15 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 7,000ft, but greater than the 'do nothing' scenario at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

16.18 Runways 23R/23L South-west Viable but Poor Fit Options

<table>
<tr><th>Option</th><th>Safety</th><th>Policy</th><th>Capacity</th></tr>
<tr><td>A11 Replicate the current KUXEM SID but with a termination point further south.</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">Originally designed as option 4a this followed the initial tracks of the KUXEM SID, and then routed more directly to the south-west on a track towards Whitchurch and Shrewsbury.

<u>Safety</u>: This would route aircraft on a trajectory where there is no Controlled Airspace (CAS).</td></tr>
<tr><td>B12: Route south-west earlier after departure.</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">Routes could turn left off departure and then route more south-westerly (to provide a more direct route) shortly after departure to track between Winsford and Sandbach.

<u>Safety</u>: However; a line between the MCT VOR and NANTI classifies a NERL sector boundary with traffic routing in the opposite direction to this departure. Flying in the opposite direction would not align with the Design Principle Safety.</td></tr>
<tr><td>C13 Left-hand wraparound</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">After departure from Runway 23R/23L, aircraft would make a left-hand turn, fly around the airport and route back through the overhead then begin heading south-west towards the SID aiming point.

<u>Safety</u>: This option interacts with other departure/arrival envelopes to the south requiring additional tactical mitigation to safely manage the flow of air traffic.

<u>Policy</u>: This option involves greater track mileage than is necessary by taking traffic west before turning it east, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Additionally, this option may hinder CDAs for arriving aircraft from the south.

<u>Capacity</u>: This option would interact with Runway 23R/23L arrivals from the south and departures in the 23R/23L East Design Envelope, both of which are likely to lead to a restriction in the ability to make best use of runway capacity. In addition, this option does not support one-minute splits between northbound and eastbound departures.</td></tr>
<tr><td>D14 Right-hand wraparound.</td><td>S</td><td>P</td><td>C</td></tr>
<tr><td colspan="4">After departure from Runway 23R/23L, aircraft would make a right-hand turn, fly around the airport and through the overhead and then begin heading south-west towards the SID aiming point.

<u>Safety</u>: This option interacts with the 23 North and 23 East Departure Envelopes and the arrivals from the north. This would require additional tactical mitigation to safely manage the flow of air traffic. Furthermore, this option is expected to interact with the Runway 23R MAP.

<u>Policy</u>: This option involves significantly greater track mileage than is necessary by taking traffic north and east before turning it south-west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Additionally, this option may hinder CDAs for arriving aircraft.</td></tr>
</table>

<u>Capacity</u>: This option is likely to interact with Runway 23R/23L arrivals from the north which is likely to lead to a restriction in the ability to make best use of runway capacity. In addition, this option does not support one-minute splits between northbound and eastbound departures.			
E15: Slight right turn after departure, then south-west.	S	P	C
After departure from Runway 23R/23L, aircraft would make a slight right-hand turn in a westerly direction, towards LPL before heading south-west, towards the SID aiming point. <u>Safety</u>: This option is expected to interact with LPL arrivals from the north and possibly departures from Runway 09 and would require tactical intervention rather than using a systemised approach.			
F16 Left turn after departure, head direct South then turn west	S	P	C
After departure from Runway 23R/23L, aircraft would make a left-hand turn and fly south towards Chelford before making a right-hand turn, south-west, towards the SID aiming point. <u>Safety</u>: There is not expected to be any non-compliances in terms of the Design Principle Safety. <u>Policy</u>: This option involves greater track mileage than is necessary by taking traffic south before turning it west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. <u>Capacity</u>: This option will interact with departures in the south envelope, which would limit the ability to achieve one minute departure splits and not enabling best of runway capacity.			

17 Runways 23R/23L West

17.1 Runways 23R/23L West Option 2

Design Principle Evaluation	Option No: 2 (6%)
Option Name: SID RW 23 L West Option 2	REJECT
Option Name: SID RW 23 R West Option 2	REJECT

Option Description:

Option 2 is an RNAV1 option which provides an initial climb out to a fly-over waypoint and then a right turn to route north of Knutsford and direct towards Wallasey. It has been created to provide the most direct (fuel-efficient) route to the network joining point for westbound traffic at Wallasey.

The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

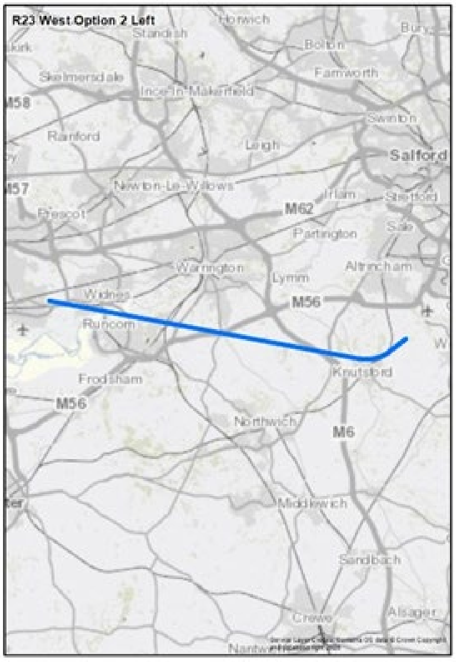
The climb gradient has been set at 6% to design the envelope.

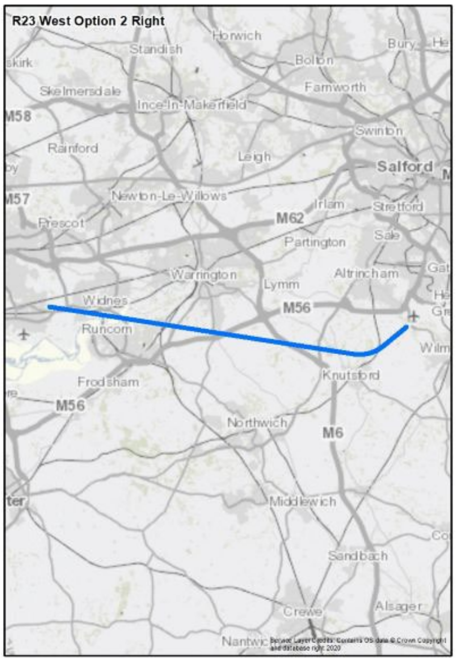
23L: After departure, the route makes a turn to the right 1nm from DER which takes it just to the north of Knutsford through Mere. It then heads in a north-westerly direction routing to the south of Warrington, passing south of Widnes and north of Runcorn and terminates at 7,000ft to the south-east of Liverpool.

23R: Similar to option for 23L, this route makes a right turn following take-off to the north of Knutsford through Mere. It then heads in a north-westerly direction routing to the south of Warrington, passes south of Widnes and north of Runcorn and terminates at 7,000ft to the south-east of Liverpool.

An element of dispersion would be apparent in the turn due to the fly-over waypoint and either CF or DF coding.

A speed restriction of 210 KIAS is applied to the first turn.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria as RNAV1 routes. When assessed in isolation, both these routes are considered to be safe, designable and meets with industry standards and regulations; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 2R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2L is estimated to overfly approximately 550 households with an approximate population of 1,300. Taking account of planned property developments, this option is estimated to impact a total population of 2,500. Up to 7,000ft, this option is estimated to overfly approximately 24,100 households with an approximate population of 55,900. Taking account of planned property developments, this option is estimated to impact a total population of 65,400. Up to 4,000ft, option 2R is estimated to overfly approximately 1,100 households with an approximate population of 2,800. Taking account of planned property developments, this option is estimated to impact a total population of 3,300. Up to 7,000ft, this option is estimated to overfly approximately 23,900 households with an approximate population of 55,500. Taking account of planned property developments, this option is estimated to impact a total population of 63,500. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 2L is estimated to overfly 11 noise sensitive areas. Up to 7,000ft, option 2L is estimated to overfly 15 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft Up to 4,000ft, option 2R is estimated to overfly 9 noise sensitive areas. Up to 7,000ft, option 2R is estimated to overfly 10 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft				
	23L	NOT MET	PARTIAL	MET

Design Principle **Airspace**	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

17.2 Runways 23R/23L West Option 3B

Design Principle Evaluation	Option No: 3B (6%)
Option Name: SID RW 23 L West Option 3B	REJECT
Option Name: SID RW 23 R West Option 3B	REJECT

Option Description:

This is an **RNAV1** option that aims to mimic the tracks taken by aircraft once they have been vectored off the EKLAD SID by ATC. This is done on the existing westerly SIDs once they have reached 3,000ft and so this option formalises the vectored routes flown today.

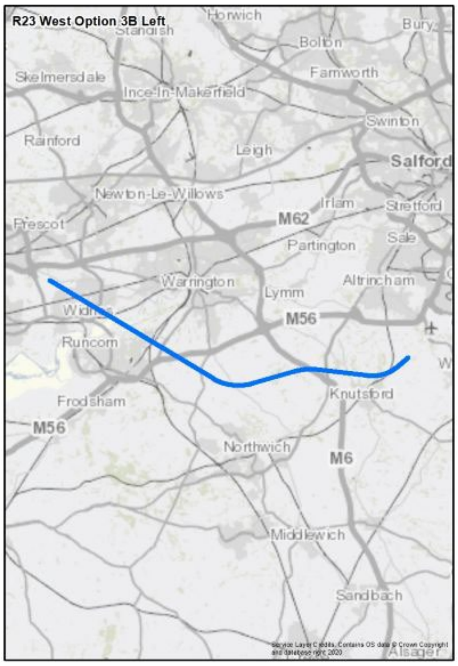
The procedure uses a fly-over to fly-by sequence and the climb gradient has been set at 6%. The fly-over waypoints are positioned to replicate the turn at the existing MCT D3 and D3.2 markers.

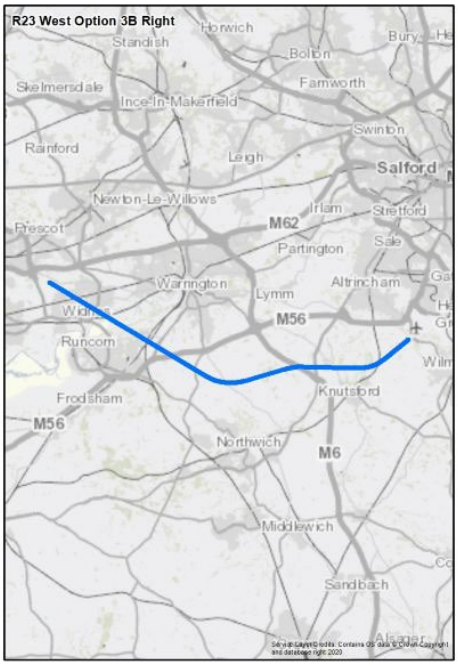
23L: After departure, the route makes a turn to the right at 0.7nm from DER which replicates the turn of the current EKLAD procedure and therefore aligns to the Design Principle Safety. It continues to replicate the EKLAD SID through Mere to the north of Knutsford and Northwich at which point it turns right onto a westerly heading which takes it overhead Widnes where it terminates at 7,000ft.

23R: After departure, the route makes a turn to the right at 1nm from DER and replicates the track of the current EKLAD SID through Mere to the north of Knutsford where it combines with the route for 23L. It then routes north of Northwich at which point it turns right onto a westerly heading which takes it overhead Widnes where it terminates at 7,000ft

An element of dispersion would be apparent in the turn due to the fly-over waypoint and either CF or DF coding.

A speed restriction of 200 KIAS then 250 KIAS is used for the first turn and second turn.





Design Principle **Safety**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide a RNAV1 replication of the current EKLAD procedure. When assessed in isolation, both the routes are considered to be designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised.

Design Principle **Policy**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3B L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 3B R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3B L is estimated to overfly approximately 400 households with an approximate population of 1,000. Taking account of planned property developments, this option is estimated to impact a total population of 1,500.

Up to 7,000ft, this option is estimated to overfly approximately 25,900 households with an approximate population of 60,500. Taking account of planned property developments, this option is estimated to impact a total population of 67,900.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Up to 4,000ft, option 3B R is estimated to overfly approximately 400 households with an approximate population of 1,000. Taking account of planned property developments, this option is estimated to impact a total population of 1,000.

Up to 7,000ft, this option is estimated to overfly approximately 26,100 households with an approximate population of 60,900. Taking account of planned property developments, this option is estimated to impact a total population of 67,900.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3B L is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 3B L is estimated to overfly 10 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 3B R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, option 3B R is estimated to overfly 5 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

17.3 Runways 23R/23L West Option 4

Design Principle Evaluation	Option No: 4 (6%)
Option Name: SID RW 23 L West Option 4	REJECT
Option Name: SID RW 23 R West Option 4	REJECT

Option Description:

This is option is an **RNP1** option with an RF turn that routes north of Knutsford and then direct towards Wallasey. It has been created to provide a direct (fuel-efficient) route to the network joining point for westbound traffic at Wallasey.

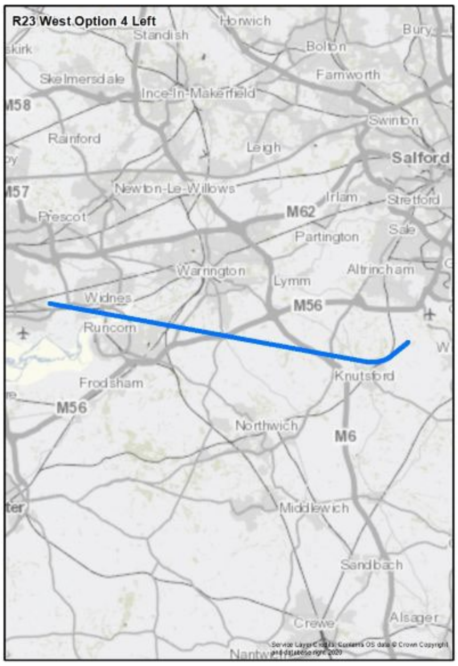
It has an almost identical track across the ground as option 2 but to a higher navigation standard to provide more accurate track keeping.

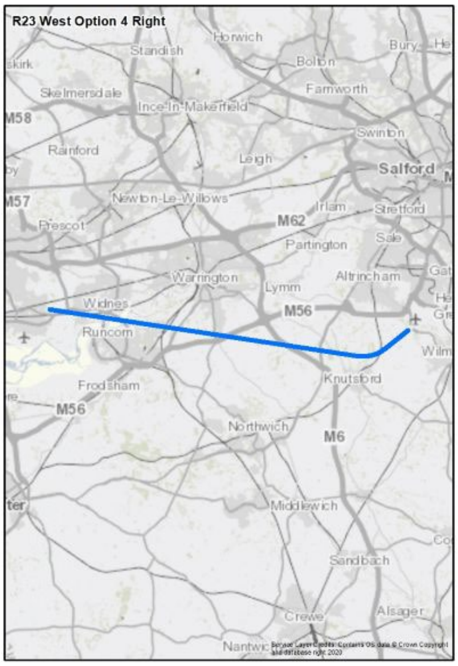
The climb gradient is set at 6%.

23L: After departure, the route makes a turn to the right 1nm from DER which takes it just to the north of Knutsford. It then heads in a north-westerly direction routing to the south of Warrington, passes south of Widnes and north of Runcorn and terminates at 7,000ft to the south-east of Liverpool.

23R: Similar to option for 23L, this route makes a turn to the right which takes it just to the north of Knutsford. It then heads in a north-westerly direction routing to the south of Warrington, passes south of Widnes and north of Runcorn and terminates at 7,000ft to the south-east of Liverpool.

A speed restriction of 190 KIAS is used for the first turn, thereafter 250 KIAS would apply. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 4L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 4R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4L is estimated to overfly approximately 750 households with an approximate population of 1,800. Taking account of planned property developments, this option is estimated to impact a total population of 2,900. Up to 7,000ft, this option is estimated to overfly approximately 23,950 households with an approximate population of 55,500. Taking account of planned property developments, this option is estimated to impact a total population of 64,700. Up to 4,000ft, option 4R is estimated to overfly approximately 1,450 households with an approximate population of 3,800. Taking account of planned property developments, this option is estimated to impact a total population of 4,300. Up to 7,000ft, this option is estimated to overfly approximately 24,100 households with an approximate population of 56,200. Taking account of planned property developments, this option is estimated to impact a total population of 63,900. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 4L is estimated to overfly 10 noise sensitive areas. Up to 7,000ft, option 4L is estimated to overfly 10 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft Up to 4,000ft, option 4R is estimated to overfly 9 noise sensitive areas. Up to 7,000ft, option 4R is estimated to overfly 10 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

17.4 Runways 23R/23L West Option 5A

Design Principle Evaluation	Option No: 5A (6%)
Option Name: SID RW 23 L West Option 5A	REJECT
Option Name: SID RW 23 R West Option 5A	REJECT

Option Description:

This is an **RNP1** option with an RF turn that routes north of Knutsford and then direct towards Wallasey. It is slightly further north than option 4 to route north of LPL and below the current MIRSI hold for Manchester. It has been created to provide a direct (fuel-efficient) route to the network joining point for westbound traffic at Wallasey.

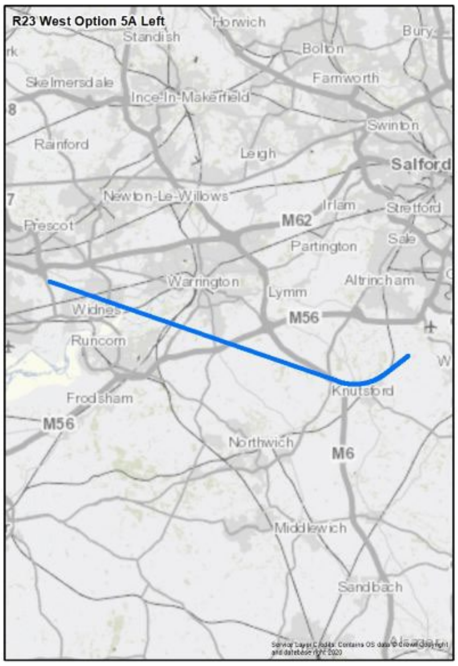
The design speed will permit a larger number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

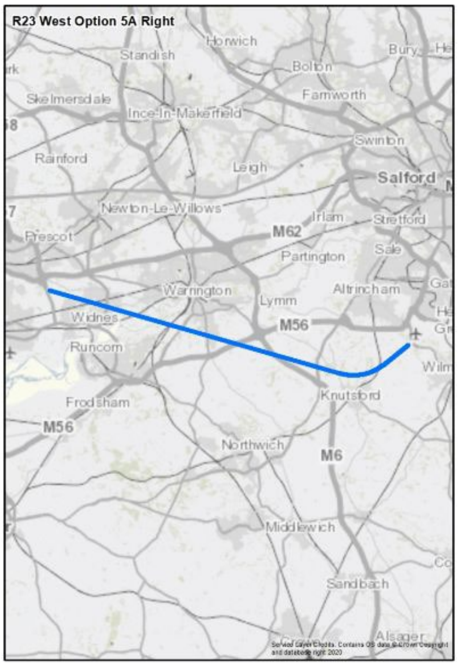
The climb gradient is set at 6%.

23L: After departure, the route makes a turn to the right at 1nm from DER which takes it just to the north of Knutsford. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft just west of Widnes.

23R: After departure, the route makes a turn to the right which takes it over the northern edge of Knutsford. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft just west of Widnes.

A speed restriction of 220 KIAS is used for the first turn, thereafter 250 KIAS would apply.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 5A L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 5A R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle	Runway			
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5A L is estimated to overfly approximately 3,100 households with an approximate population of 7,200. Taking account of planned property developments, this option is estimated to impact a total population of 8,000.

Up to 7,000ft, this option is estimated to overfly approximately 29,000 households with an approximate population of 67,100. Taking account of planned property developments, this option is estimated to impact a total population of 69,700.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 5A R is estimated to overfly approximately 2,850 households with an approximate population of 7,500. Taking account of planned property developments, this option is estimated to impact a total population of 9,000.

Up to 7,000ft, this option is estimated to overfly approximately 28,350 households with an approximate population of 66,400. Taking account of planned property developments, this option is estimated to impact a total population of 69,200.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle	Runway			
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle	Runway			
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5A L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, option 5A L is estimated to overfly 15 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 5A R is estimated to overfly 8 noise sensitive areas.

Up to 7,000ft, option 5A R is estimated to overfly 10 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Design Principle	Runway			
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

17.5 Runways 23R/23L West Option 5B

Design Principle Evaluation	Option No: 5B (6%)
Option Name: SID RW 23 L West Option 5B	REJECT
Option Name: SID RW 23 R West Option 5B	REJECT

Option Description:

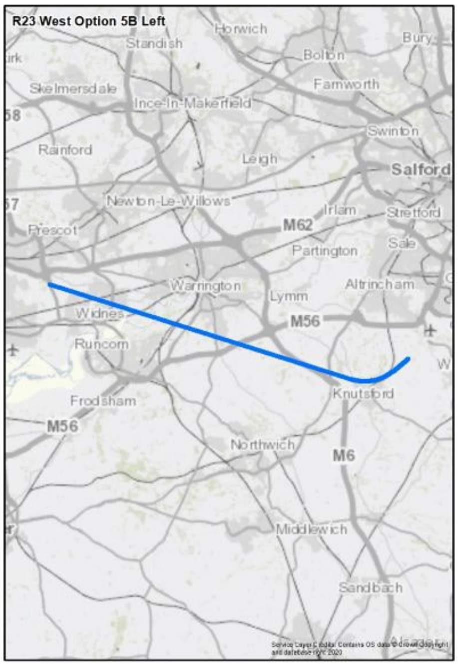
This is an **RNP1** option with an RF turn like option 5A, except that the turn point for Runway 23L is closer to the DER to increase the separation from Knutsford. It has been created to provide a direct (fuel-efficient) route to the network joining point for westbound traffic at Wallasey but with greater emphasis on limiting noise. This earlier turn results in a track for 23L that is slightly further north than option 5A.

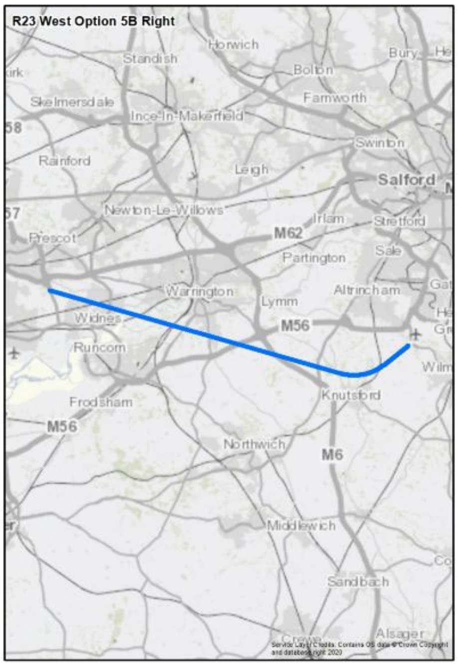
The design speed will permit a larger number of aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: After departure, the route makes a turn to the right at 1nm from DER which takes it to the north of Knutsford. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft just west of Widnes.

23R: After departure, the route makes a turn to the right which takes it just to the north of Knutsford. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft just west of Widnes.

A speed restriction of 220 KIAS is used for the first turn, thereafter 250 KIAS would apply.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 5B L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 5B R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5B L is estimated to overfly approximately 2,400 households with an approximate population of 6,200. Taking account of planned property developments, this option is estimated to impact a total population of 8,600.

Up to 7,000ft, this option is estimated to overfly approximately 28,900 households with an approximate population of 67,600. Taking account of planned property developments, this option is estimated to impact a total population of 71,200.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 5B R is estimated to overfly approximately 2,850 households with an approximate population of 7,500. Taking account of planned property developments, this option is estimated to impact a total population of 9,000.

Up to 7,000ft, this option is estimated to overfly approximately 29,200 households with an approximate population of 68,500. Taking account of planned property developments, this option is estimated to impact a total population of 71,500.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5B L is estimated to overfly 13 noise sensitive areas.

Up to 7,000ft, option 5B L is estimated to overfly 15 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 5B R is estimated to overfly 8 noise sensitive areas.

Up to 7,000ft, option 5B R is estimated to overfly 10 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

17.6 Runways 23R/23L West Option 6

Design Principle Evaluation	Option No: 6 (6%)
Option Name: SID RW 23 L West Option 6	REJECT
Option Name: SID RW 23 R West Option 6	REJECT

Option Description:

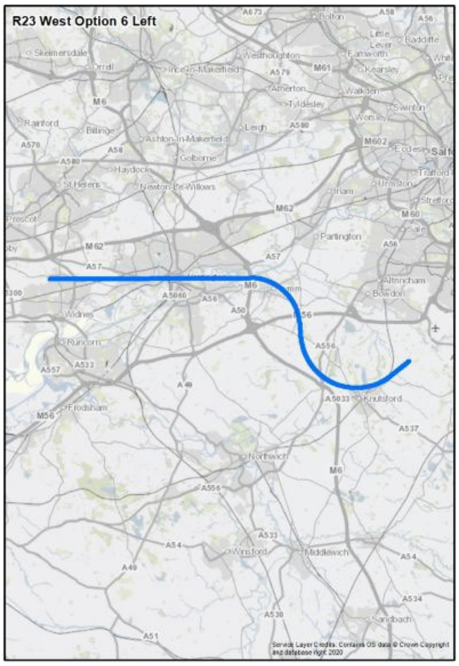
This is an **RNP1** option with an RF turn that initially routes north before making a left turn direct to Wallasey. It has been created as an option that seeks to deconflict MAN westbound departures from traffic to and LPL. This is achieved through an initial north bound route to gain altitude, before turning left towards the network joining point at Wallasey.

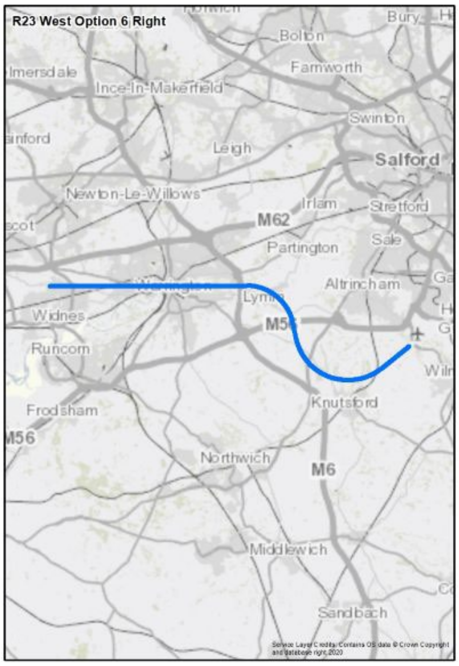
The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

The procedure uses RF coding, and the climb gradient has been set at 6%.

23L: After departure, the route makes a turn to the right at 1nm from DER which takes it to the north of Knutsford through Mere. It then heads north on a short straight segment before making a left turn to the west, just to the north of Lymm where it combines with the option from 23R. The combined routes continue in a westerly direction routing overhead Warrington and terminate at 7,000ft just north of Widnes.

23R: After departure, the route makes a turn to the right which takes it to the north of Knutsford through Mere. It then heads north on a short straight segment before making a left turn to the west, just to the north of Lymm where it combines with the option from 23L. The combined routes continue in a westerly direction routing overhead Warrington and terminate at 7,000ft just north of Widnes.





A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.				
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised.				
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.				
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: The estimated track length of option 6L is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 6R is 44km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 6L is estimated to overfly approximately 6,450 households with an approximate population of 14,900. Taking account of planned property developments, this option is estimated to impact a total population of 15,800. Up to 7,000ft, this option is estimated to overfly approximately 57,550 households with an approximate population of 129,400. Taking account of planned property developments, this option is estimated to impact a total population of 134,000. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 6R is estimated to overfly approximately 5,450 households with an approximate population of 124,00. Taking account of planned property developments, this option is estimated to impact a total population of 12,700. Up to 7,000ft, this option is estimated to overfly approximately 57,550 households with an approximate population of 129,500. Taking account of planned property developments, this option is estimated to impact a total population of 133,400. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 6L is estimated to overfly 38 noise sensitive areas. Up to 7,000ft, option 6L is estimated to overfly 40 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft Up to 4,000ft, option 6R is estimated to overfly 26 noise sensitive areas. Up to 7,000ft, option 6R is estimated to overfly 30 noise sensitive areas.				

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at a minimum climb gradient of 6% and climb to 7,000ft based on a fleet equipage and performance survey and are considered accessible by all aircraft types operating at MAN. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

17.7 Runways 23R/23L West Option 7

Design Principle Evaluation	Option No: 7
Option Name: SID RW 23 L West Option 7	ACCEPT
Option Name: SID RW 23 R West Option 7	ACCEPT

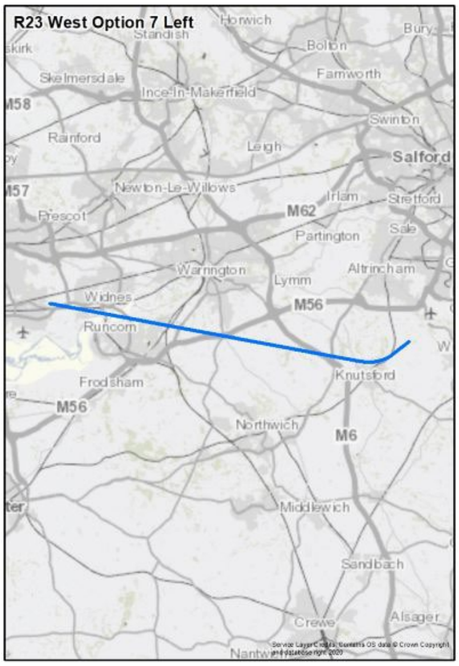
Option Description:

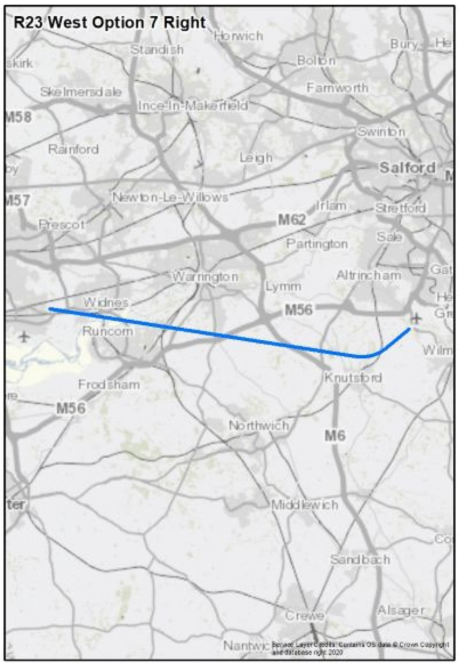
This is an RNAV1 option that modifies option 2 to minimise the interactions with LPL airspace following stakeholder feedback.

It provides an initial climb out to a fly-over waypoint and then a right turn to route north of Knutsford and direct towards Wallasey to align with current operational practice. It follows the same lateral track as option 2 but following stakeholder feedback to eliminate interactions with LPL inbound traffic to Runway 27, it has an increased climb gradient up to the point the LPL delegated airspace is overflown. Thereafter the gradient is reduced to one that will result in the route terminating in the same location as option 2, which has been designed to a constant 6% gradient.

The initial climb gradient in this option is greater than the 6% to 7,000ft that has been adopted for other routes and which was identified as flyable by all aircraft within the fleet equipage survey described in the DOR This survey identified that some aircraft could exceed this 6% gradient, and because this initial climb gradient is only required to 3,500ft it will be assessed with the airlines to confirm viability should it be taken forward.

The initial climb gradient has been set at 11.64% for 23L / 9.81% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 4.2% is applied to terminate at 7,000ft at the same end position as option 2 to give an average gradient of 6%. Waypoints will be placed at the location of the 3nm boundary to specify





that an altitude of 'at or above 3,500ft' is required to ensure safe separation. The design speed may allow aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise. **23L:** After departure, the route makes a turn to the right 1nm from DER which takes it just to the north of Knutsford through Mere. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft to the south-east of Liverpool. **23R:** Similar to option for 23L, this route makes a right turn following take-off to the north of Knutsford through Mere. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft to the south-east of Liverpool. An element of dispersion would be apparent in the turn due to the fly-over waypoint and either CF or DF coding. A speed restriction of 210 KIAS is applied to the first turn.	

Design Principle **Safety**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNAV1. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full

assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.				
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The estimated track length of option 7L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 7R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 7L is estimated to overfly approximately 750 households with an approximate population of 1,700. Taking account of planned property developments, this option is estimated to impact a total population of 2,900. Up to 7,000ft, this option is estimated to overfly approximately 27,450 households with an approximate population of 63,500. Taking account of planned property developments, this option is estimated to impact a total population of 73,900. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 7R is estimated to overfly approximately 250 households with an approximate population of 600. Taking account of planned property developments, this option is estimated to impact a total population of 700.				

Up to 7,000ft, this option is estimated to overfly approximately 26,300 households with an approximate population of 61,300. Taking account of planned property developments, this option is estimated to impact a total population of 69,900.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7L is estimated to overfly 4 noise sensitive areas.

Up to 7,000ft, option 7L is estimated to overfly 5 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 7R is estimated to overfly 4 noise sensitive areas.

Up to 7,000ft, option 7R is estimated to overfly 5 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at an initial climb gradient of 11.64% for 23L and 9.81% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 4.2% is applied to terminate at 7,000ft to give an average gradient of 6%. Because this initial climb gradient is initially greater than the gradient flyable by all aircraft operating from MAN, as evidenced by the fleet equipage survey, it will be assessed with the airlines to confirm viability should it be taken forward. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

17.8 Runways 23R/23L West Option 8

Design Principle Evaluation	Option No: 8
Option Name: SID RW 23 L West Option 8	ACCEPT
Option Name: SID RW 23 R West Option 8	ACCEPT

Option Description:

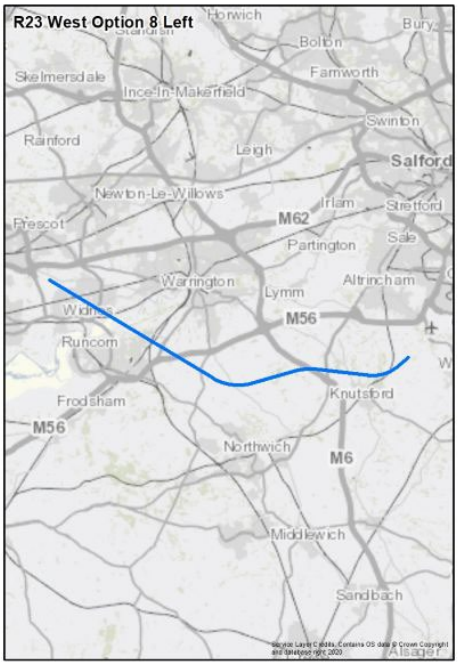
This is an RNAV1 option that modifies option 3B to minimise the interactions with LPL airspace following stakeholder feedback.

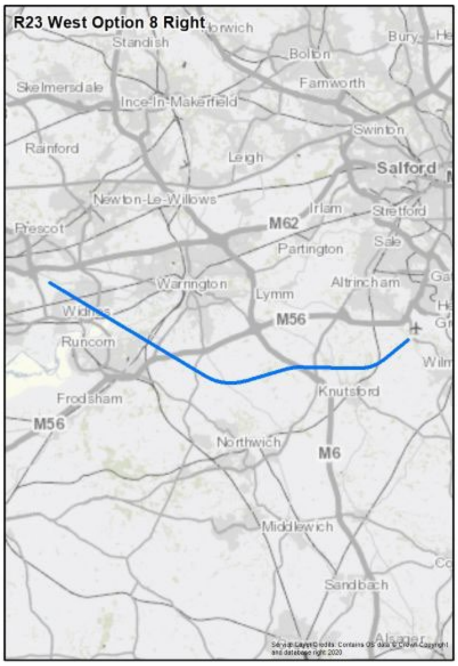
It follows the same lateral track as option 3B but following stakeholder feedback to eliminate interactions with LPL inbound traffic to Runway 27, it has an increased climb gradient up to the point the LPL delegated airspace is overflown. Thereafter the gradient is reduced to one that will result in the route terminating in the same location as option 3B.

The initial climb gradient in this option is greater than the 6% to 7,000ft that has been adopted for other routes and which was identified as flyable by all aircraft within the fleet equipage survey described in the DOR. This survey identified that some aircraft could exceed this 6% gradient, and because this initial climb gradient is only required to 3,500ft it will be assessed with the airlines to confirm viability should it be taken forward.

The initial climb gradient has been set at 12.1% for 23L / 10.3% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 3.7% is applied to terminate at 7,000ft at the same end position as option 3B to give an average gradient of 6%. As the option is within a turn segment at the location of the airspace boundary, a waypoint cannot be placed on the intersection of the nominal track and the boundary. A restriction greater than 3,500 ft would need to be placed upon the second waypoint to follow the profile of the required climb to ensure that the correct altitude is met at the boundary.

23L: After departure, the route makes a turn to the right at 0.7nm from DER which replicates the turn of the current EKLAD procedure and therefore aligns to the Design Principle Safety. It continues to replicate the EKLAD SID to the north of Knutsford through Mere and passes north of Northwich at which point it turns right onto a westerly heading





which takes it overhead Widnes where it terminates at 7,000ft. **23R:** After departure, the route makes a turn to the right and replicates the track of the current EKLAD SID to the north of Knutsford through Mere where it combines with the route for 23L. It then routes north of Northwich at which point it turns right onto a westerly heading which takes it overhead Widnes where it terminates at 7,000ft An element of dispersion would be apparent in the turn due to the fly-over waypoint and either CF or DF coding. A speed restriction of 200 KIAS then 250 KIAS is used for the first turn and second turn.	

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNAV1. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as PBN (RNAV1) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The estimated track length of option 8L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 8R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 8L is estimated to overfly approximately 100 households with an approximate population of 200. Taking account of planned property developments, this option is estimated to impact a total population of 1,000. Up to 7,000ft, this option is estimated to overfly approximately 27,850 households with an approximate population of 65,100. Taking account of planned property developments, this option is estimated to impact a total population of 73,500. This is less than or similar to the ‘do nothing’ scenario at 4,000ft, but greater than the ‘do nothing’ scenario at 7,000ft. Up to 4,000ft, option 8R is estimated to overfly approximately 150 households with an approximate population of 400. Taking account of planned property developments, this option is estimated to impact a total population of 500. Up to 7,000ft, this option is estimated to overfly approximately 27,950 households with an approximate population of 65,300. Taking account of planned property developments, this option is estimated to impact a total population of 72,900. This is less than or similar to the ‘do nothing’ scenario at 4,000ft, but greater than the ‘do nothing’ scenario at 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment:				

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 8L is estimated to overfly 1 noise sensitive areas. Up to 7,000ft, option 8L is estimated to overfly 5 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft. Up to 4,000ft, option 8R is estimated to overfly 2 noise sensitive areas. Up to 7,000ft, option 8R is estimated to overfly 5 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at an initial climb gradient of 12.1% for 23L / 10.3% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 3.7% is applied to terminate at 7,000ft to give an average gradient of 6%. Because this initial climb gradient is initially greater than that required following the fleet equipage and performance survey it will be assessed with the airlines to confirm viability should it be taken forward. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNAV1 routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

17.9 Runways 23R/23L West Option 9

Design Principle Evaluation	Option No: 9
Option Name: SID RW 23 L West Option 9	ACCEPT
Option Name: SID RW 23 R West Option 9	ACCEPT

Option Description:

This is an RNP1 option that modifies option 4 to minimise the interactions with LPL airspace following stakeholder feedback.

It follows the same lateral track as option 4 but following stakeholder feedback to eliminate interactions with LPL inbound traffic to Runway 27, it has an increased climb gradient up to the point the LPL delegated airspace is overflown. Thereafter the gradient is reduced to one that will result in the route terminating in the same location as option 4.

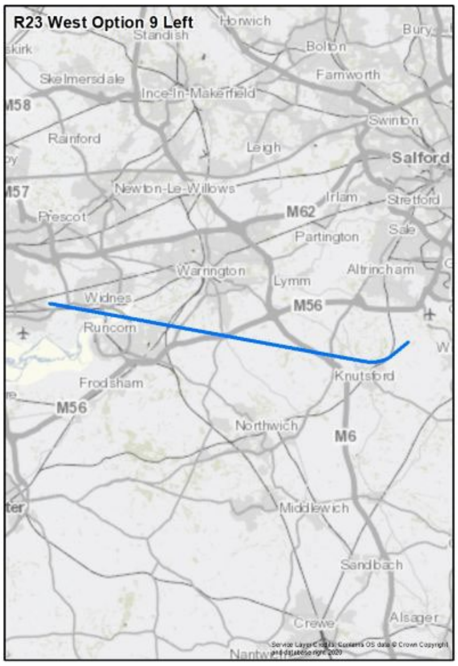
It has an almost identical track across the ground as option 2 but to a higher navigation standard to provide more accurate track keeping.

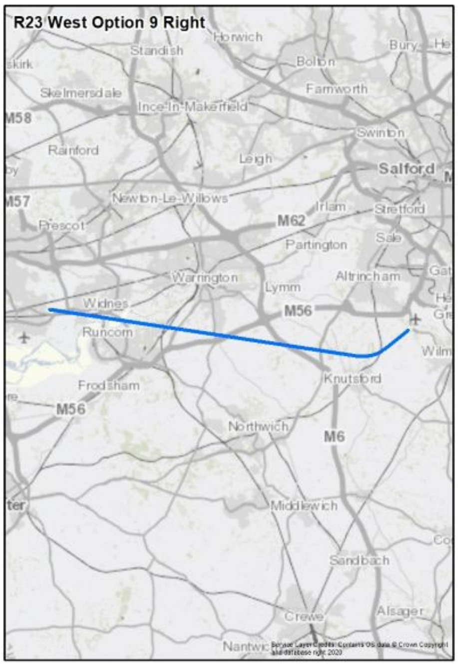
The initial climb gradient in this option is greater than the 6% to 7,000ft that has been adopted for other routes and which was identified as flyable by all aircraft within the fleet equipage survey described in the DOR. This survey identified that some aircraft could exceed this 6% gradient, and because this initial climb gradient is only required to 3,500ft it will be assessed with the airlines to confirm viability should it be taken forward.

The initial climb gradient has been set at 11.7% for 23L / 9.9% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 4.2% is applied to terminate at 7,000ft at the same end position as option 4 to give an average gradient of 6%. Waypoints will be placed at the location of the 3nm boundary to specify that an altitude of 'at or above 3,500ft' is required to ensure safe separation.

23L: After departure, the route makes a turn to the right 1nm from DER which takes it just to the north of Knutsford through Mere. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft to the south-east of Liverpool.

23R: Similar to option for 23L, this route makes a turn to the right which takes it just to the north of Knutsford through Mere. It then heads in a north-





westerly direction routing to the south of Warrington and terminates at 7,000ft to the south-east of Liverpool. A speed restriction of 190 KIAS is used for the first turn, thereafter 250 KIAS would apply. Although PANS-OPS compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616.				
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.				
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.				
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.				

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The estimated track length of option 9L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 9L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 9L is estimated to overfly approximately 450 households with an approximate population of 1,000. Taking account of planned property developments, this option is estimated to impact a total population of 2,200. Up to 7,000ft, this option is estimated to overfly approximately 26,650 households with an approximate population of 61,800. Taking account of planned property developments, this option is estimated to impact a total population of 72,100. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 9R is estimated to overfly approximately 250 households with an approximate population of 600. Taking account of planned property developments, this option is estimated to impact a total population of 600. Up to 7,000ft, this option is estimated to overfly approximately 30,700 households with an approximate population of 72,100. Taking account of planned property developments, this option is estimated to impact a total population of 75,000. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment:				

Up to 4,000ft, option 9L is estimated to overfly 3 noise sensitive areas. Up to 7,000ft, option 9L is estimated to overfly 5 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft. Up to 4,000ft, option 9R is estimated to overfly 4 noise sensitive areas. Up to 7,000ft, option 9R is estimated to overfly 5 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at an initial climb gradient of 11.7% for 23L / 9.9% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 4.2% is applied to terminate at 7,000ft to give an average gradient of 6%. Because this initial climb gradient is initially greater than that required following the fleet equipage and performance survey it will be assessed with the airlines to confirm viability should it be taken forward. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

17.10 Runways 23R/23L West Option 10

Design Principle Evaluation	Option No: 10
Option Name: SID RW 23 L West Option 10	ACCEPT
Option Name: SID RW 23 R West Option 10	ACCEPT

Option Description:

This is an **RNP1** option that modifies option 5A to minimise the interactions with LPL airspace following stakeholder feedback.

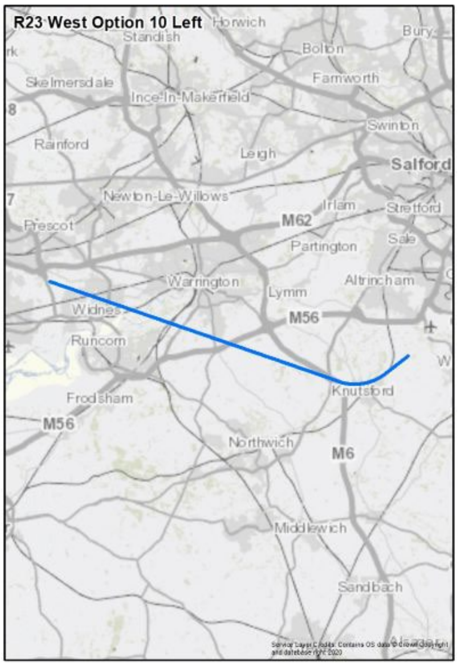
It follows the same lateral track as option 5A with an RF right turn that routes north of Knutsford and then direct towards Wallasey to align with current operational practice. However, to eliminate interactions with LPL inbound traffic to Runway 27, it has an increased climb gradient up to the point the LPL delegated airspace is overflown. Thereafter the gradient is reduced to one that will result in the route terminating in the same position as option 5A, which has been designed to a constant 6% gradient.

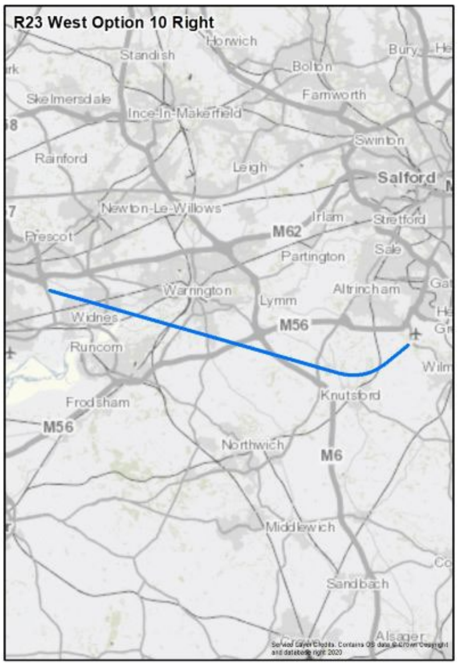
The initial climb gradient in this option is greater than the 6% to 7,000ft that has been adopted for other routes and which was identified as flyable by all aircraft within the fleet equipage survey as described in the DOR. This survey identified that some aircraft could exceed this 6% gradient, and because this initial climb gradient is only required to 3,500ft it will be assessed with the airlines to confirm viability should it be taken forward.

The initial climb gradient has been set at 11.3% for 23L / 9.7% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 4.2% is applied to terminate at 7,000ft at the same end position as option 5A to give an average gradient of 6%.

Waypoints will be placed at the location of the 3nm boundary to specify that an altitude of 'at or above 3,500ft' is required to ensure safe separation. For 23L, placing a waypoint on this boundary may result in a segment length that is too short between the RF turn and the 3nm boundary (in accordance with PANS-OPS requirements). This could either be:

assessed in flight validation for FMS anomalies, or the waypoint can be located at the necessary distance from the RF turn and specified with a higher altitude than 3,500ft to follow the profile of the





required climb to ensure that the correct altitude is met at the boundary. The route followed by the options is as follows: **23L:** After departure, the route makes a turn to the right at 1nm from DER which takes it just to the north of Knutsford through Mere. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft just west of Widnes. **23R:** After departure, the route makes a turn to the right which takes it over the northern edge of Knutsford through Mere. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft just west of Widnes. A speed restriction of 220 KIAS is used for the first turn, thereafter 250 KIAS would apply.					
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET	
	23R	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide RNP1+RF routes . When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.					
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET	
	23R	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Both these departure routes are designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.					
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET	
	23R	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.					

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 10L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 10R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 10L is estimated to overfly approximately 2,550 households with an approximate population of 5,200. Taking account of planned property developments, this option is estimated to impact a total population of 6,000.

Up to 7,000ft, this option is estimated to overfly approximately 31,350 households with an approximate population of 72,400. Taking account of planned property developments, this option is estimated to impact a total population of 76,200.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Up to 4,000ft, option 10R is estimated to overfly approximately 250 households with an approximate population of 600. Taking account of planned property developments, this option is estimated to impact a total population of 1,200.

Up to 7,000ft, this option is estimated to overfly approximately 29,900 households with an approximate population of 70,100. Taking account of planned property developments, this option is estimated to impact a total population of 73,500.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 10L is estimated to overfly 21 noise sensitive areas.

Up to 7,000ft, option 10L is estimated to overfly 25 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 10R is estimated to overfly 2 noise sensitive areas.

Up to 7,000ft, option 10R is estimated to overfly 5 noise sensitive areas.

This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at an initial climb gradient of 11.3% for 23L / 9.7% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 4.2% is applied to terminate at 7,000ft to give an average gradient of 6%. Because this initial climb gradient is initially greater than that required following the fleet equipage and performance survey it will be assessed with the airlines to confirm viability should it be taken forward.

These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

17.11 Runways 23R/23L West Option 11

Design Principle Evaluation	Option No: 11 (6%)
Option Name: SID RW 23 L West Option 11	ACCEPT
Option Name: SID RW 23 R West Option 11	ACCEPT

Option Description:

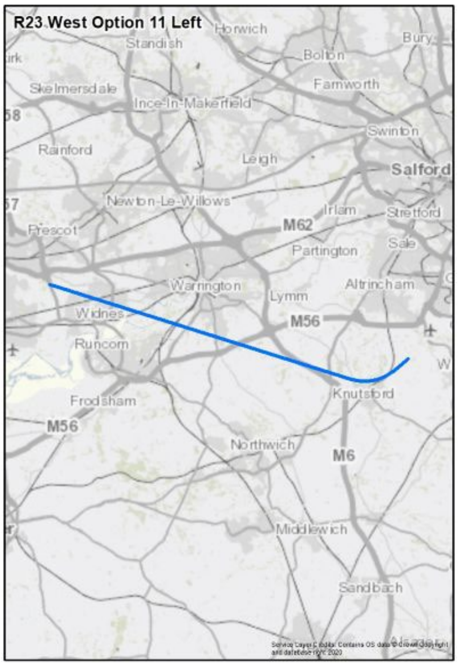
This is an **RNP1** option that modifies option 5B to minimise the interactions with LPL airspace following stakeholder feedback.

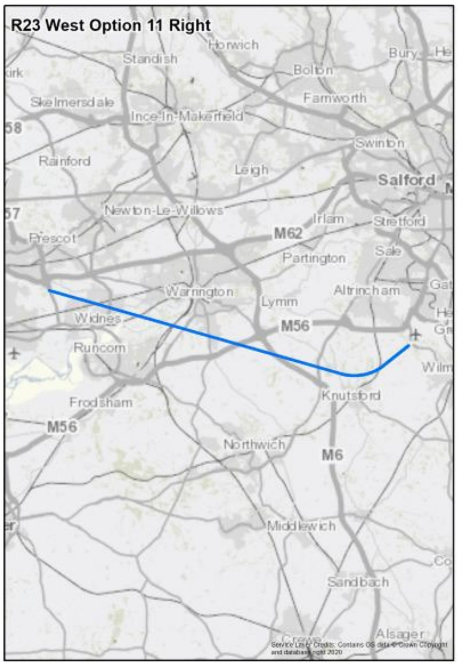
It follows the same lateral track as option 5B with an RF right turn that routes north of Knutsford and then direct towards Wallasey to align with current operational practice. However, to eliminate interactions with LPL inbound traffic to Runway 27, it has an increased climb gradient up to the point the LPL delegated airspace is overflown. Thereafter the gradient is reduced to one that will result in the route terminating in the same position as option 5B.

The initial climb gradient in this option is greater than the 6% to 7,000ft that has been adopted for other routes and which was identified as flyable by all aircraft within the fleet equipage survey described within the DOR.. This survey identified that some aircraft could exceed this 6% gradient, and because this initial climb gradient is only required to 3,500ft it will be assessed with the airlines to confirm viability should it be taken forward.

The initial climb gradient has been set at 11.5% for 23L / 9.7% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace; thereafter a maximum climb gradient of 4.2% would be required to terminate at 7,000ft at the same end position as option 5B to give an average gradient of 6%. Waypoints will be placed at the location of the 3nm boundary to specify that an altitude of 'at or above 3,500ft' is required to ensure safe separation.

The design speed will permit a larger number of aircraft to fly this route in a clean configuration (without the use of flaps)





which has potential benefits in terms of noise. **23L:** After departure, the route makes a turn to the right at 1nm from DER which takes it to the north of Knutsford through Mere. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft just west of Widnes. **23R:** After departure, the route makes a turn to the right which takes it just to the north of Knutsford through Mere. It then heads in a north-westerly direction routing to the south of Warrington and terminates at 7,000ft just west of Widnes. A speed restriction of 220 KIAS is used for the first turn, thereafter 250 KIAS would apply.					
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide routes that use RNP1+RF coding. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.				
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these departure routes are designed as PBN (RNP1+RF) routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.				
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment:				

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The estimated track length of option 11L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 11R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 11L is estimated to overfly approximately 1,000 households with an approximate population of 2,200. Taking account of planned property developments, this option is estimated to impact a total population of 3,400. Up to 7,000ft, this option is estimated to overfly approximately 31,050 households with an approximate population of 72,500. Taking account of planned property developments, this option is estimated to impact a total population of 76,900. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 11R is estimated to overfly approximately 250 households with an approximate population of 600. Taking account of planned property developments, this option is estimated to impact a total population of 1,200. Up to 7,000ft, this option is estimated to overfly approximately 26,200 households with an approximate population of 61,300. Taking account of planned property developments, this option is estimated to impact a total population of 70,200. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment:				

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 11L is estimated to overfly 7 noise sensitive areas. Up to 7,000ft, option 11L is estimated to overfly 10 noise sensitive areas. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft Up to 4,000ft, option 11R is estimated to overfly 2 noise sensitive areas. Up to 7,000ft, option 11R is estimated to overfly 5 noise sensitive areas. This is less than or similar to the 'do nothing' scenario at 4,000ft, but greater than the 'do nothing' scenario at 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed at an initial climb gradient of 11.5% for 23L / 9.7% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 4.2% is applied to terminate at 7,000ft to give an average gradient of 6%. Because this initial climb gradient is initially greater than that required following the fleet equipage and performance survey it will be assessed with the airlines to confirm viability should it be taken forward. These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

Design Principle Evaluation	Option No: 12 (6%)
Option Name: SID RW 23 L West Option 12	ACCEPT
Option Name: SID RW 23 R West Option 12	ACCEPT

Option Description:

This is an **RNP1** option that modifies option 6 to minimise the interactions with LPL airspace following stakeholder feedback.

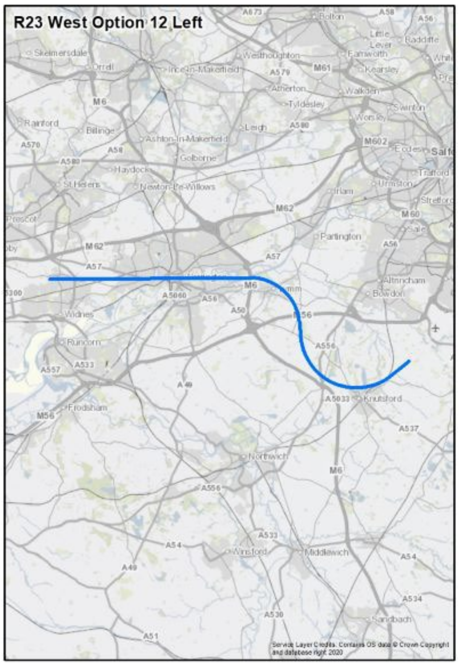
It follows the same lateral track as option 6 with an RF right turn that routes north before turning towards Wallasey. However, to eliminate interactions with LPL inbound traffic to Runway 27, it has an increased climb gradient up to the point the LPL delegated airspace is overflown. Thereafter the gradient is reduced to one that will result in the route terminating in the same position as option 6.

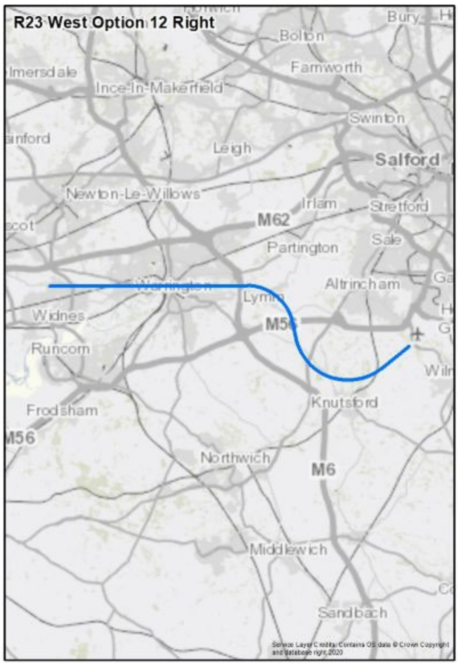
The initial climb gradient in this option is greater than the 6% to 7,000ft that has been adopted for other routes and which was identified as flyable by all aircraft within the fleet equipage survey described within the DOR. This survey identified that some aircraft could exceed this 6% gradient, and because this initial climb gradient is only required to 3,500ft it will be assessed with the airlines to confirm viability should it be taken forward.

The initial climb gradient has been set at 11.0% 23L / 8.9% 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 3.6% 23L/4.4% is applied to terminate at 7,000ft at the same end position as option 6 to give an average gradient of 6%. As the option is within a turn segment at the location of the airspace boundary, a waypoint cannot be placed on the intersection of the nominal track and the boundary. A restriction greater than 3,500ft would need to be placed upon the waypoints at the end of the RF turns to follow the profile of the required climb to ensure that the correct altitude is met at the boundary.

The design speed aligns to the CAP778 recommendation and may permit some aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

23L: After departure, the route makes a turn to the right at 1nm from DER which takes it to the north of Knutsford through Mere. It then heads north on a





short straight segment before making a left turn to the west, just to the north of Lymm where it combines with the option from 23R. The combined routes continue in a westerly direction routing overhead Warrington and terminate at 7,000ft just north of Widnes. **23R:** After departure, the route makes a turn to the right which takes it to the north of Knutsford through Mere. It then heads north on a short straight segment before making a left turn to the west, just to the north of Lymm where it combines with the option from 23L. The combined routes continue in a westerly direction routing overhead Warrington and terminate at 7,000ft just north of Widnes. A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.	

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these routes have been designed by CAA Approved IFP designers in accordance with PANS-OPS criteria to provide RNP1+RF routes. When assessed in isolation, both the routes are considered to be safe, designable and meets with industry standards and regulations. At this stage, we do not believe that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports and other MAN routes may be required to confirm this at a later stage.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these departure routes are designed as RNP1+RF routes and are deemed to be compliant with the UK's obligation for implementing PBN whilst considering the needs of other airspace users. Assessed in isolation, they are considered to be able to deliver CCO. These routes are expected to be able to connect to the existing ATC network structure at a point that is consistent with the anticipated operations of NERL to facilitate integration with the national network. Based on current available information, there is no known confliction with other FASI-N airports but a full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, these routes are not expected to reduce the volume of controlled airspace required.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

When assessed in isolation for Runway 23R, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to ground movement limitations and the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals when Runway 23R is being used for departures. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The estimated track length of option 12L is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 12R is 44km (24nm). When compared to the 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Up to 4,000ft, option 12L is estimated to overfly approximately 1,200 households with an approximate population of 2,500. Taking account of planned property developments, this option is estimated to impact a total population of 3,600. Up to 7,000ft, this option is estimated to overfly approximately 66,500 households with an approximate population of 149,000. Taking account of planned property developments, this option is estimated to impact a total population of 15,5400. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft. Up to 4,000ft, option 12R is estimated to overfly approximately 1,100 households with an approximate population of 2,500. Taking account of planned property developments, this option is estimated to impact a total population of 2,900. Up to 7,000ft, this option is estimated to overfly approximately 63,800 households with an approximate population of 143,000. Taking account of planned property developments, this option is estimated to impact a total population of 148,300. When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 12L is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, option 12L is estimated to overfly 5 noise sensitive areas.

When compared to the 'do nothing' scenario, this is greater at both 4,000ft and 7,000ft

Up to 4,000ft, option 12R is estimated to overfly 6 noise sensitive areas.

Up to 7,000ft, option 12R is estimated to overfly 10 noise sensitive areas.

This is less than or similar to the ‘do nothing’ scenario at 4,000ft, but greater than the ‘do nothing’ scenario at 7,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed at an initial climb gradient of 11.0% for 23L / 8.9% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 3.6% is applied to terminate at 7,000ft to give an average gradient of 6%. Because this initial climb gradient is initially greater than that required following the fleet equipage and performance survey it will be assessed with the airlines to confirm viability should it be taken forward.

These options could be used as part of a network that is consistent with this design principle that do not require any additional CAS; however, in isolation, it cannot be determined whether there is scope to reduce the volume of controlled airspace. The analysis of whether groups of options have potential to deliver CAS reductions will form part of Stage 3 activities.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP1 & RF routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.

17.13 Runways 23R/23L West Viable but Poor Fit Options

Option	Safety	Policy	Capacity
A1 Extended straight ahead then route to WAL	S	P	C
Originally created as **option 1**, this seeks to align with current operations that are managed on a tactical basis by ATC. This assures safe separation between flights. In current operations, aircraft route initially south-west (on the EKLAD SID) before being vectored off the SID by ATC towards Wallasey (WAL). Safety In a systemised environment, there will be minimal ATC intervention. Because of the proximity of LPL to MAN, a route through this area may create interactions between flights from both airports. This would require additional tactical mitigation to safely manage the flow of air traffic. Capacity: Creating interactions would limit the ability to enable best use of runway capacity.			
B13 Combined replication of EKLAD and KUXEM	S	P	C
Originally created as **option 3A** this was a combined EKLAD and KUXEM SID which separated close to the termination point. Safety: This option would have created issues with both flight planning and ATC procedures which may have resulted in safety incidents.			
C14 Left hand wraparound	S	P	C
After departure from Runway 23R/23L, aircraft would make a left-hand turn, fly around the airport, through the overhead and then begin heading west towards the SID aiming point. Safety: From a safety perspective, this option interacts with arrivals from the south and would require additional tactical mitigation to safely manage the flow of air traffic. Policy: This option involves greater track mileage than is necessary by taking traffic east before turning it west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS. Capacity: This option interacts with departures in the north, east and south envelopes, which would limit the ability to enable best use of runway capacity.			
D15 Right hand wraparound	S	P	C
After departure from Runway 23R/23L, aircraft would make a right-hand turn, fly around the airport, though the overhead and then begin heading west towards the SID aiming point. Safety: This option interacts with the 23 North and 23 East Departure Design Envelopes and the arrivals from the north requiring additional tactical mitigation to safely manage the flow of air traffic. Furthermore, this option is expected to interact with the Runway 23R MAP.			

Policy: This option involves greater track mileage than is necessary by taking traffic north and east before turning it west, leading to increased fuel burn and emissions which is not aligned to the aims of the AMS.

Capacity: This option interacts with the north and east envelopes, which would limit the ability to enable best use of runway capacity.

18 Standard Instrument Departures Evaluation Summary

The acceptance / rejection process set out at section 4.2 accepted 124 SID design options that were carried forward to the IOA for further consideration. This process also rejected 82 SID design options.

At this relatively early stage in the process the assessment of the design principles Capacity, Emissions, Noise N2 and Airspace in particular was inevitably limited. A full appreciation of these design principles will only be possible at Stage 3 once the individual design options have been consolidated into networks.

However, and in line with CAP1616, the design option development process considered all of the design principles including the need to align to the “must have” design principles of Policy and Capacity.

- Policy: The Design Principle Policy requires us to take account of the AMS, which addresses the need to maintain safety standards and to create a more efficient, integrated airspace network. To address this, the design process has created options that take account of both the constraints and considerations in the local airspace (including the joining points to and from the NERL upper airspace network), and the potential interactions between MAN arrivals and departures. This has created some options specifically designed to minimise the identified interactions or to align with the network traffic flows.
- Capacity: The Design Principle Capacity requires us to create options that make best use of runway capacity. To address this, the design process created some options in isolation, but created others iteratively by comparing design options with those in adjacent envelopes. The aim of this was to create options that had the ability to be part of a system capable of one-minute departure separations and therefore align with this design principle.

Therefore, to ensure that the MAN airspace change continues to offer the potential to respond to the proposals from other change sponsors, and to ensure that design options that may offer benefits that have not been fully apparent at this early stage are not prematurely discounted, 26 design options, that were initially rejected by the acceptance/rejection process, were carried forward to the IOA for further consideration. This was on the basis of the qualitative judgement by the SME referred to at section 4.2 of this DPE and the ability of these options to align with the requirements of the design principles Policy and Capacity as identified above.

This SME judgement was based upon technical meetings with Manchester ATC and with NATS NERL. In particular the DOR sections 3.3 and 3.4 refer to discussions with NERL regarding the network interface and managing this airspace change within the national airspace master plan. This highlights the need to ensure connectivity to the network against the challenge of a NERL design that has not yet been finalised. It also highlights the potential for misalignment and the need to modify or restore options at a later date. The retention of these options is aimed at reducing or eliminating this likelihood.

As a result, in total 124 SID design options were carried forward to the IOA for further consideration and are detailed in Appendix 1 of this DPE.

19 Transitions - Evaluation

20 Transitions Runways 05L/05R North –3,000ft FAF

20.1 Transition Runways 05L/05R North Option 1A – 3,000ft FAF

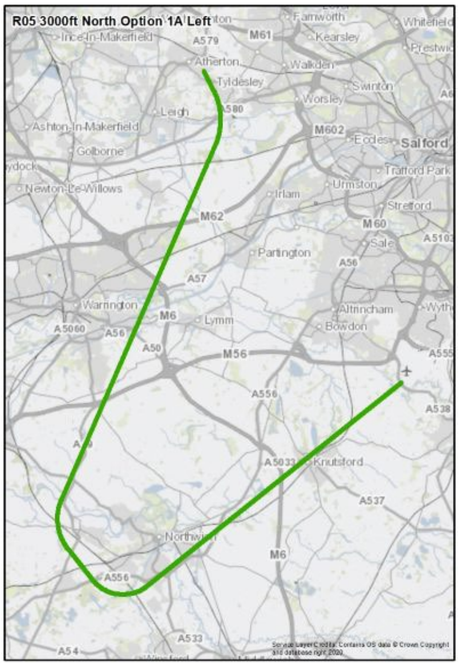
Design Principle Evaluation	Option No: 1A
Option Name: Transition RW 05L North Option 1A – 3,000ft FAF	ACCEPT
Option Name: Transition RW 05R North Option 1A – 3,000ft FAF	REJECT

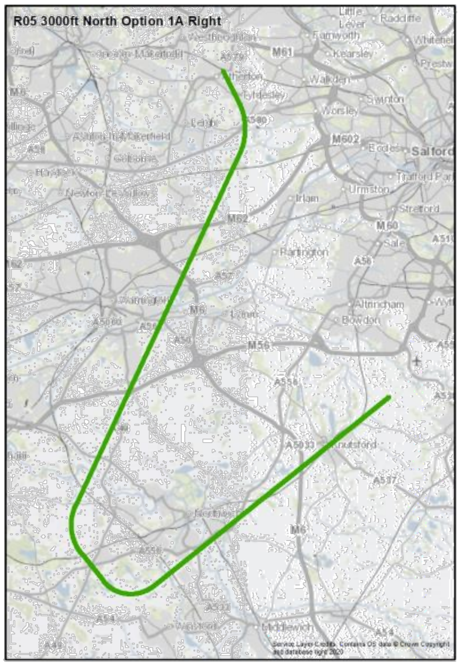
Option Description:

Option 1A has an IAF at 7,000ft to the north-west of the airport in the vicinity of Atherton and is equidistant to easterly or westerly operations. It is designed to facilitate an equal CDA profile to all runways.

From this location the route splits and turns south-west, west of Urmston, Irlam, Partington, Cadishead and then east of Warrington before turning on to the final approach to the west of Northwich at 3,000ft for either Runway 05L or Runway 05R.

The descent gradient to the FAF is 3.5%/2.01° for Runway 05L and 3.28%/1.88° for Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with ICAO PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1A L is 58km (31nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 1A R is 62km (33nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 1A L is estimated to overfly approximately 7,100 households with an approximate population of 16,400. Taking account of planned property developments, this option is estimated to impact a total population of 17,300. From 7,000ft, this option is estimated to overfly approximately 39,950 households with an approximate population of 90,400. Taking account of planned property developments, this option is estimated to impact a total population of 96,900. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 1A R is estimated to overfly approximately 5,850 households with an approximate population of 13,200. Taking account of planned property developments, this option is estimated to impact a total population of 13,700. From 7,000ft, this option is estimated to overfly approximately 44,500 households with an approximate population of 100,700. Taking account of planned property developments, this option is estimated to impact a total population of 106,700. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 1A L is estimated to overfly 44 noise sensitive areas.				

From 7,000ft this option is estimated to overfly 208 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 1A R is estimated to overfly 35 noise sensitive areas. From 7,000ft this option is estimated to overfly 220 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

20.2 Transition Runways 05L/05R North Option 2A – 3,000ft FAF

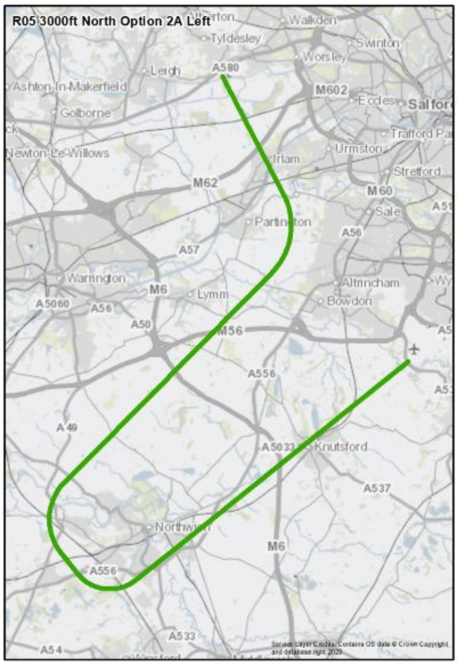
Design Principle Evaluation	Option No: 2A
Option Name: Transition RW 05L North Option 2A – 3,000ft FAF	REJECT
Option Name: Transition RW 05R North Option 2A – 3,000ft FAF	REJECT

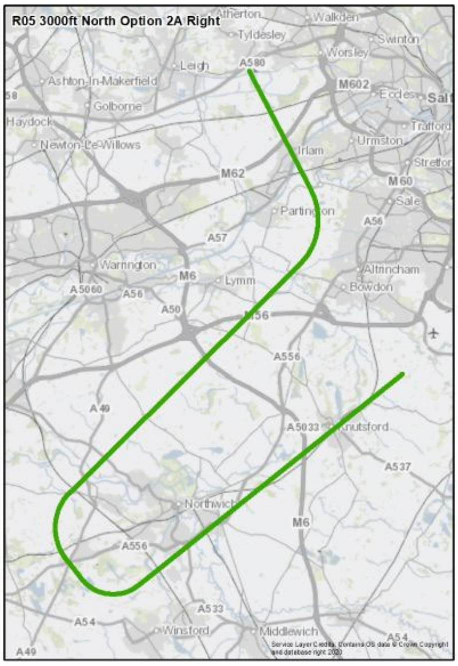
Option Description:

Option 2A has an IAF at 7,000ft to the north-west of the airport in the vicinity of Atherton and is equidistant to easterly or westerly operation. It is designed to facilitate an equal CDA profile to all runways.

From this location the route follows an initial straight segment towards the airport where it splits before turning right on to the downwind leg overflying Partington. Both routes then turn left to establish aircraft on final approach at 3,000ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.13%/1.79° for Runway 05L and 2.92%/1.68° for Runway 05R. These gradients are at the lower end of the optimum for low noise approach but still within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2A L is 59km (32nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 2A R is 62km (33nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 2A L is estimated to overfly approximately 7,150 households with an approximate population of 16,500. Taking account of planned property developments, this option is estimated to impact a total population of 17,400.

From 7,000ft, this option is estimated to overfly approximately 25,250 households with an approximate population of 59,900. Taking account of planned property developments, this option is estimated to impact a total population of 63,500.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 2A R is estimated to overfly approximately 5,900 households with an approximate population of 13,400. Taking account of planned property developments, this option is estimated to impact a total population of 13,800.

From 7,000ft, this option is estimated to overfly approximately 24,900 households with an approximate population of 58,900. Taking account of planned property developments, this option is estimated to impact a total population of 61,800.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 2A L is estimated to overfly 47 noise sensitive areas.

From 7,000ft this option is estimated to overfly 119 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 2A R is estimated to overfly 37 noise sensitive areas. From 7,000ft this option is estimated to overfly 115 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

20.3 Transition Runways 05L/05R North Option 6A – 3,000ft FAF

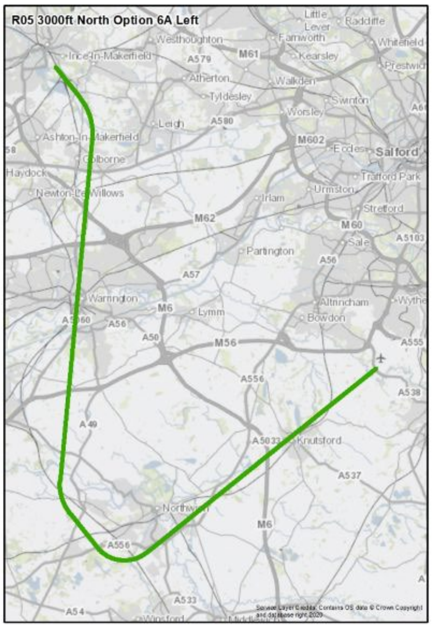
Design Principle Evaluation	Option No: 6A
Option Name: Transition RW 05L North Option 6A – 3,000ft FAF	REJECT
Option Name: Transition RW 05R North Option 6A – 3,000ft FAF	REJECT

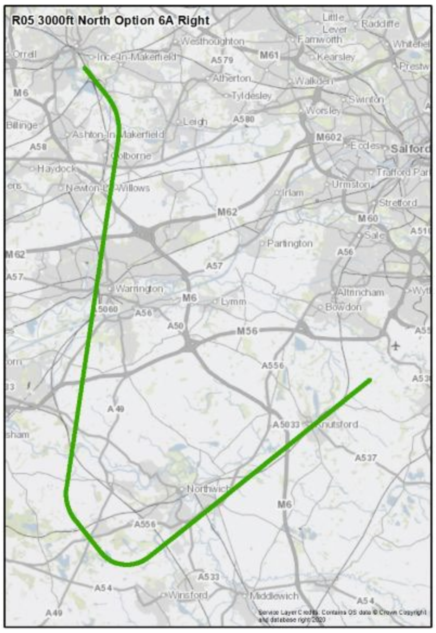
Option Description:

Option 6A has an IAF at 7,000ft to the north-west of the airport in the vicinity of Wigan and has been designed to reduce potential interactions with departures.

From this location the route splits and heads south, overflying Warrington and to the east of Frodsham. Both routes then turn left to establish aircraft on final approach to the west of Northwich at 3,000ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.61%/2.07° Runway 05L and 3.41%/1.95° for Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle	Runway			
Design Principle **Safety**	05L	NOT MET	PARTIAL	**MET**
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle	Runway			
Design Principle **Policy**	05L	NOT MET	PARTIAL	**MET**
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle	Runway			
Design Principle **Capacity**	05L	NOT MET	**PARTIAL**	MET
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle	Runway			
Design Principle **Emissions**	05L	NOT MET	**PARTIAL**	MET
	05R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

The estimated track length of option 6A L is 58km (31nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 6A R is 61km (33nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 6A L is estimated to overfly approximately 7,000 households with an approximate population of 16,200. Taking account of planned property developments, this option is estimated to impact a total population of 17,100.

From 7,000ft, this option is estimated to overfly approximately 60,400 households with an approximate population of 132,600. Taking account of planned property developments, this option is estimated to impact a total population of 144,200.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 6A R is estimated to overfly approximately 5,800 households with an approximate population of 13,200. Taking account of planned property developments, this option is estimated to impact a total population of 13,600.

From 7,000ft, this option is estimated to overfly approximately 52,950 households with an approximate population of 117,200. Taking account of planned property developments, this option is estimated to impact a total population of 127,800.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 6A L is estimated to overfly 41 noise sensitive areas.

From 7,000ft this option is estimated to overfly 338 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 6A R is estimated to overfly 35 noise sensitive areas. From 7,000ft this option is estimated to overfly 313 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

20.4 Transition Runways 05L/05R North Option 7A – 3,000ft FAF

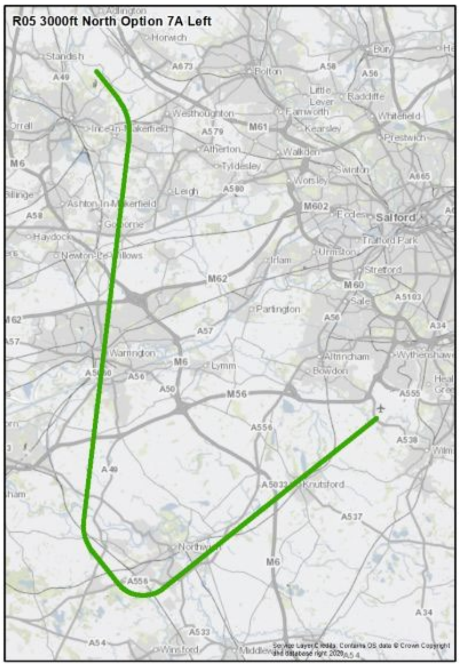
Design Principle Evaluation	Option No: 7A
Option Name: Transition RW 05L North Option 7A – 3,000ft FAF	REJECT
Option Name: Transition RW 05R North Option 7A – 3,000ft FAF	REJECT

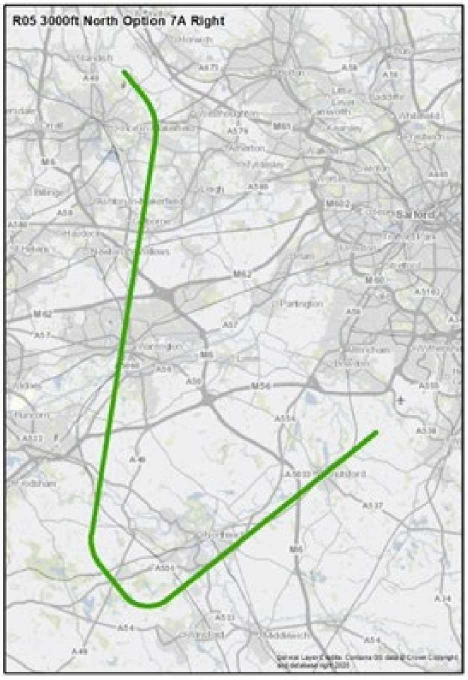
Option Description:

Option 7A has an IAF at 7,000ft to the north-west of the airport in the vicinity of Aspull to the east of Wigan and has been designed to reduce potential interactions with departures. It has a similar track to option 6a but reduces the impact of noise on Wigan. This results in a CDA profile that is similar to option 2A but not as optimal as 1A and 6A.

From this location the route splits and heads south, routing just east of Earlestown and overflying Warrington. Both routes then turn left to establish aircraft on final approach to the west of Northwich at 3,000ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.13%/1.79° for Runway 05L and 2.98%/1.71° for Runway 05R. These gradients are at the lower end of the optimum for low noise approach but still within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7A L is 64km (35nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 7A R is 66km (36nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 7A L is estimated to overfly approximately 6,650 households with an approximate population of 15,400. Taking account of planned property developments, this option is estimated to impact a total population of 16,200. From 7,000ft, this option is estimated to overfly approximately 60,000 households with an approximate population of 133,400. Taking account of planned property developments, this option is estimated to impact a total population of 147,600. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 7A R is estimated to overfly approximately 5,450 households with an approximate population of 12,200. Taking account of planned property developments, this option is estimated to impact a total population of 12,700. From 7,000ft, this option is estimated to overfly approximately 53,600 households with an approximate population of 119,800. Taking account of planned property developments, this option is estimated to impact a total population of 133,400. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 7A L is estimated to overfly 41 noise sensitive areas. From 7,000ft this option is estimated to overfly 328 noise sensitive areas.				

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 7A R is estimated to overfly 32 noise sensitive areas. From 7,000ft this option is estimated to overfly 310 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

20.5 Transition Runways 05L/05R North Option 8A – 3,000ft FAF

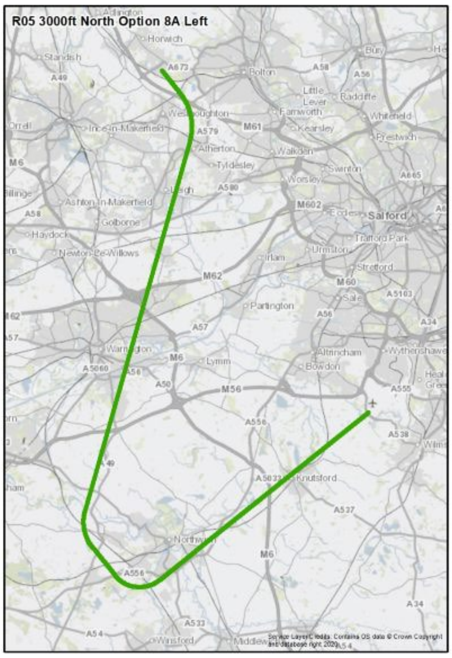
Design Principle Evaluation	Option No: 8A
Option Name: Transition RW 05L North Option 8A – 3,000ft FAF	ACCEPT
Option Name: Transition RW 05R North Option 8A – 3,000ft FAF	ACCEPT

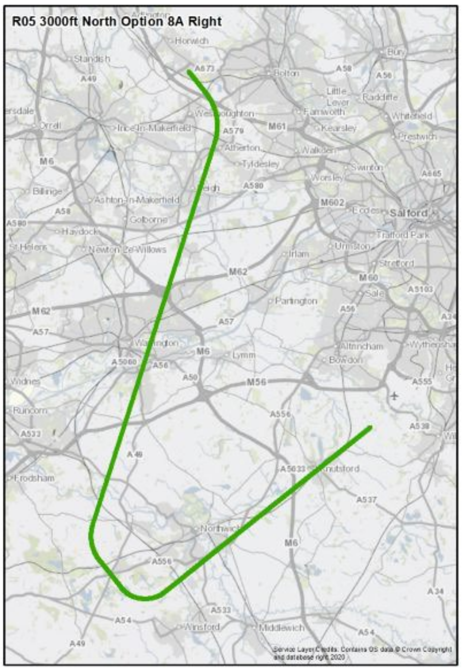
Option Description:

Option 8A has an IAF at 7,000ft to the north-west of the airport in the vicinity of the Middlebrook Retail Park. It has been designed to reduce potential interactions with departures and to facilitate a CDA profile to all runways. It also provides a broadly equal CDA for both runway directions.

From this location the route splits, and heads south-west in the vicinity of Atherton and routes just to the east of central Warrington. Both routes then turn left to establish aircraft on final approach to the west of Northwich at 3,000ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.06%/1.75° for Runway 05L and 2.9%/1.66° for Runway 05R. These gradients are at the lower end of the optimum for low noise approach but still within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8A L is 64km (35nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 8A R is 67km (36nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 8A L is estimated to overfly approximately 7,800 households with an approximate population of 18,200. Taking account of planned property developments, this option is estimated to impact a total population of 19,400. From 7,000ft, this option is estimated to overfly approximately 75,900 households with an approximate population of 172,200. Taking account of planned property developments, this option is estimated to impact a total population of 182,500. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 8A R is estimated to overfly approximately 5,500 households with an approximate population of 12,400. Taking account of planned property developments, this option is estimated to impact a total population of 12,900. From 7,000ft, this option is estimated to overfly approximately 80,600 households with an approximate population of 180,300. Taking account of planned property developments, this option is estimated to impact a total population of 189,800. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 8A L is estimated to overfly 52 noise sensitive areas. From 7,000ft this option is estimated to overfly 390 noise sensitive areas.				

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 8A R is estimated to overfly 33 noise sensitive areas. From 7,000ft this option is estimated to overfly 373 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

20.6 Transition Runways 05L/05R North Option 9A – 3,000ft FAF

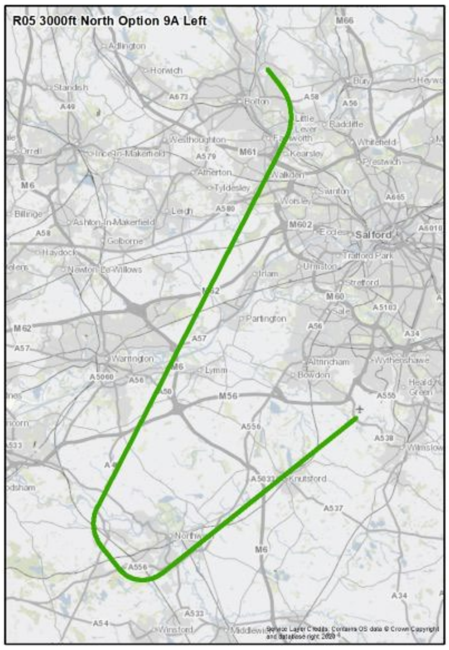
Design Principle Evaluation	Option No: 9A
Option Name: Transition RW 05L North Option 9A – 3,000ft FAF	ACCEPT
Option Name: Transition RW 05R North Option 9A – 3,000ft FAF	ACCEPT

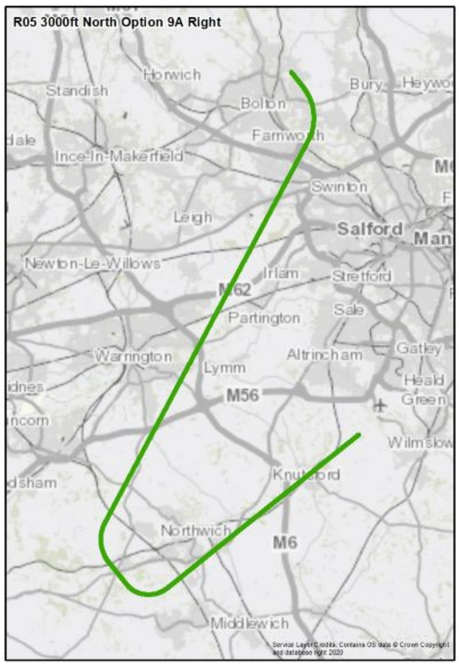
Option Description:

Option 9A has an IAF at 7,000ft to the north of the airport just to the east of Bolton and is designed to facilitate a CDA profile to all runways. This position results in this being the longest transition for Runway 05 and therefore the least optimal CDA profile.

From this location the route splits, heads initially south to avoid Bolton and then turns south-west to and tracks to the east of Warrington. Both routes then turn left to establish aircraft on final approach at 3,000ft for either Runway 05L or 05R.

The descent gradient to the FAF is 2.72%/1.56° for Runway 05L and 2.58%/1.48° for Runway 05R. These gradients are below the optimum for low noise approaches but just within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 9A L is 69km (37nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 9A R is 72km (39nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 9A L is estimated to overfly approximately 6,800 households with an approximate population of 16,000. Taking account of planned property developments, this option is estimated to impact a total population of 17,700. From 7,000ft, this option is estimated to overfly approximately 65,450 households with an approximate population of 149,900. Taking account of planned property developments, this option is estimated to impact a total population of 153,300. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 9A R is estimated to overfly approximately 6,400 households with an approximate population of 15,100. Taking account of planned property developments, this option is estimated to impact a total population of 17,200. From 7,000ft, this option is estimated to overfly approximately 68,200 households with an approximate population of 156,700. Taking account of planned property developments, this option is estimated to impact a total population of 160,500. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 9A L is estimated to overfly 45 noise sensitive areas. From 7,000ft this option is estimated to overfly 272 noise sensitive areas.				

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 9A R is estimated to overfly 47 noise sensitive areas. From 7,000ft this option is estimated to overfly 286 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.

20.7 Transition Runways 05L/05R North 3,000ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity
Transition north option A3	S	P	C
This was initially designed as option 3 and is a route based on an IAF located at the position of a NATS proposed hold close to the current MIRSI hold. Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the separation between MAN arrivals and arrivals to LPL. As a result, this option was deemed to not comply with the Design Principle Safety. Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. By creating interactions with traffic for other airports this option would not comply with this initiative (and therefore the Design Principle Policy) as it has the potential to require ATC intervention to resolve interactions.			
Transition north option B4	S	P	C
This was initially designed as option 4 and is a route based on an IAF located to the east of the current MIRSI hold. Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the separation between MAN arrivals and arrivals to LPL. As a result, this option was deemed to not comply with the Design Principle Safety. Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. By creating interactions with traffic for other airports this option would not comply with this initiative (and therefore the Design Principle Policy) as it has the potential to require ATC intervention to resolve interactions.			
Transition north option C5	S	P	C
This was initially designed as option 5 and is a route based on an IAF located at the position of a NATS proposed hold to the north-west of the current MIRSI hold. Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the separation between MAN arrivals and arrivals to LPL. As a result, this option was deemed to not comply with the Design Principle Safety. Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. By creating interactions with traffic for other airports this option would not comply with this initiative (and therefore the Design Principle Policy) as it has the potential to require ATC intervention to resolve interactions. In addition, the distance of this IAF from the			

runways may result in options being unable to provide a CDA to both runway direction directions, leading to increased fuel burn and noise impact.

Transition north option D10	S	P	C

An arrival procedure could be created to provide a straight-in transition from the west for Runway 05 at MAN.

Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the interaction between MAN arrivals and arrivals to LPL. As a result, this option was deemed to not fully comply with the Design Principle Safety.

Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. This option would create interactions with traffic for LPL and not align to the NATS network traffic flow. As a result, this option would not comply with the AMS and therefore the Design Principle Policy.

Transition north option E11	S	P	C

This option is based on IAF5 which is co-located with the option 23R/23L North 3A. It was considered as an option to facilitate a CDA to both runways; however, the profile for Runways 05L/05R would be sub optimal (<1.5°).

Policy: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as it would not provide a CDA to both runway direction directions, leading to increased fuel burn and noise impact.

Transition north option F12	S	P	C

This option is based on IAF6, it is co-located with option 23R/23L North 6A, which is the approximate position of the current ROSUN hold. It was considered as an option to facilitate a CDA to both runways; however, the profile for Runways 05L/05R would be sub optimal (<1.5°).

Policy: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as it would not provide a CDA to both runway direction directions, leading to increased fuel burn and noise impact.

21 Transitions Runways 05L/05R North – 2,500ft FAF

21.1 Transition Runways 05L/05R North Option 1B – 2,500ft FAF

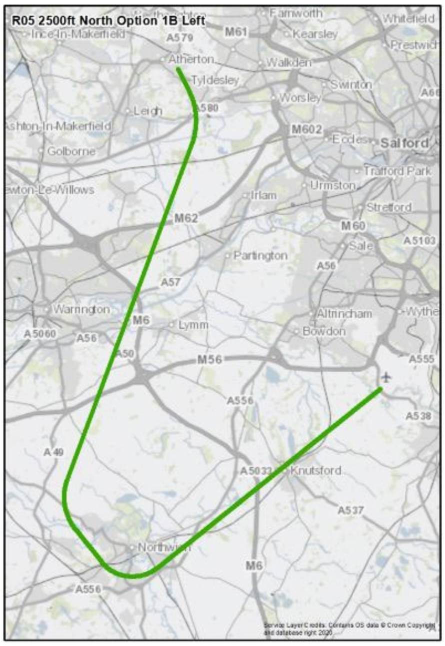
Design Principle Evaluation	Option No: 1B
Option Name: Transition RW 05L North Option 1B – 2,500ft FAF	ACCEPT
Option Name: Transition RW 05R North Option 1B – 2,500ft FAF	ACCEPT

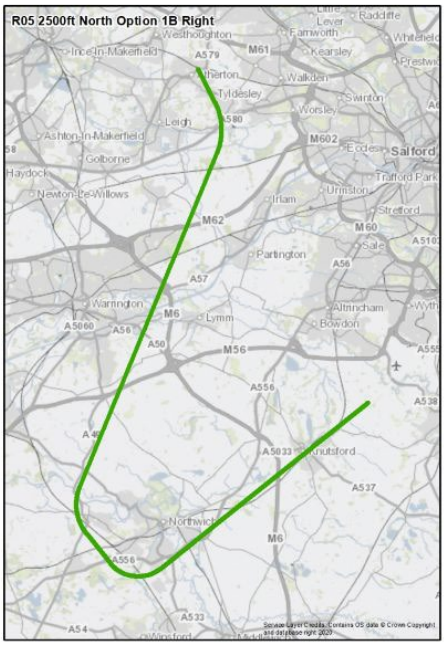
Option Description:

Option 1B has an IAF at 7,000ft to the north-west of the airport in the vicinity of Atherton and is equidistant to easterly or westerly operations. It is designed to facilitate a CDA profile to all runways.

From this location the route turns south-west and splits, heading west of Urmston, Irlam and east of Warrington towards base-leg positions. Both routes then turn left to establish aircraft on final approach at 2,500ft for either Runway 05L or 05R.

The descent gradient to the FAF is 4.24%/2.43° for Runway 05L and 3.96%/2.27° Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1B L is 53km (29nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 1B R is 57km (31nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 1B L is estimated to overfly approximately 10,650 households with an approximate population of 24,800. Taking account of planned property developments, this option is estimated to impact a total population of 26,600. From 7,000ft, this option is estimated to overfly approximately 37,050 households with an approximate population of 83,700. Taking account of planned property developments, this option is estimated to impact a total population of 89,900. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 1B R is estimated to overfly approximately 5,450 households with an approximate population of 12,300. Taking account of planned property developments, this option is estimated to impact a total population of 12,500. From 7,000ft, this option is estimated to overfly approximately 38,000 households with an approximate population of 85,600. Taking account of planned property developments, this option is estimated to impact a total population of 91,300. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 1B L is estimated to overfly 71 noise sensitive areas. From 7,000ft this option is estimated to overfly 190 noise sensitive areas.				

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 1B R is estimated to overfly 34 noise sensitive areas. From 7,000ft this option is estimated to overfly 190 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

21.2 Transition Runways 05L/05R North Option 2B – 2,500ft FAF

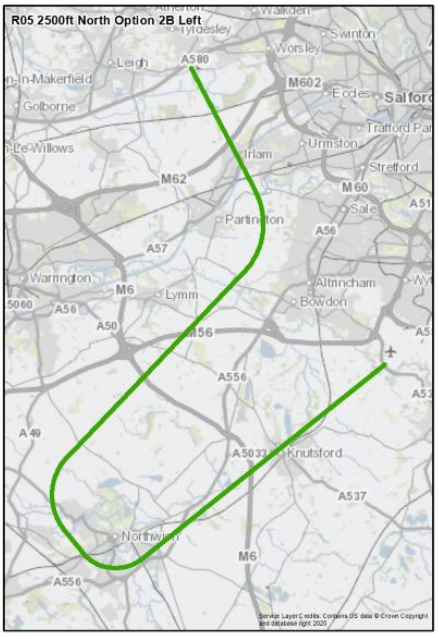
Design Principle Evaluation	Option No: 2B
Option Name: Transition RW 05L North Option 2B – 2,500ft FAF	REJECT
Option Name: Transition RW 05R North Option 2B – 2,500ft FAF	REJECT

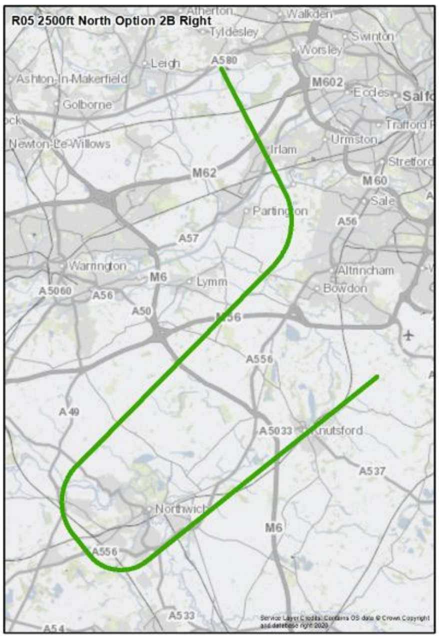
Option Description:

Option 2B has an IAF at 7,000ft to the north-west of the airport in the vicinity of Atherton and is equidistant to easterly or westerly operation. It is designed to facilitate a CDA profile to all runways.

From this location the route follows an initial straight segment towards the airport where it splits before turning right on to the downwind leg overflying Partington. Both routes then turn left to establish aircraft on final approach at 2,500ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.79%/2.17° for Runway 05L and 3.53%/2.02° for Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2B L is 54km (29nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 2B R is 57km (31nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 2B L is estimated to overfly approximately 10,700 households with an approximate population of 24,900. Taking account of planned property developments, this option is estimated to impact a total population of 26,600. From 7,000ft, this option is estimated to overfly approximately 28,500 households with an approximate population of 67,700. Taking account of planned property developments, this option is estimated to impact a total population of 72,100. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 2B R is estimated to overfly approximately 6,000 households with an approximate population of 13,400. Taking account of planned property developments, this option is estimated to impact a total population of 13,600. From 7,000ft, this option is estimated to overfly approximately 24,650 households with an approximate population of 58,200. Taking account of planned property developments, this option is estimated to impact a total population of 60,700. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 2B L is estimated to overfly 74 noise sensitive areas. From 7,000ft this option is estimated to overfly 143 noise sensitive areas.				

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 2B R is estimated to overfly 45 noise sensitive areas.

From 7,000ft this option is estimated to overfly 118 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.

21.3 Transition Runways 05L/05R North Option 6B – 2,500ft FAF

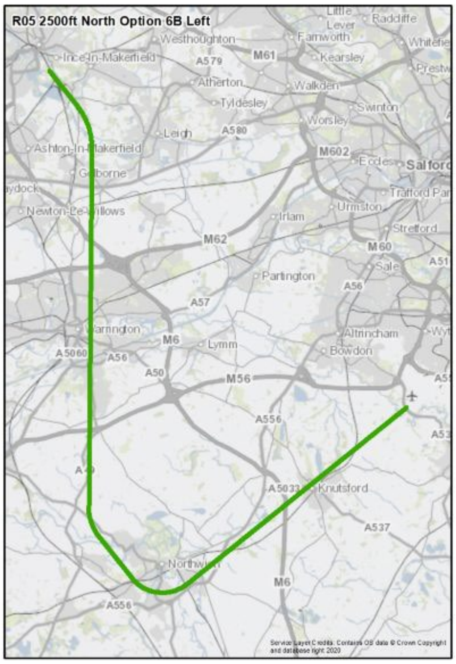
Design Principle Evaluation	Option No: 6B
Option Name: Transition RW 05L North Option 6B – 2,500ft FAF	REJECT
Option Name: Transition RW 05R North Option 6B – 2,500ft FAF	REJECT

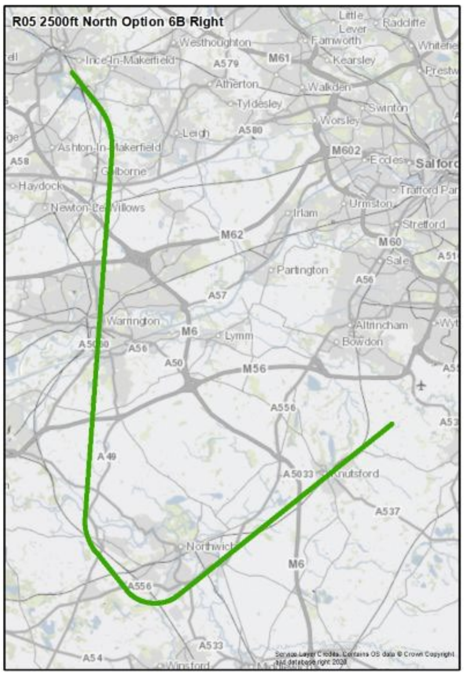
Option Description:

Option 6B has an IAF at 7,000ft to the north-west of the airport in the vicinity of Wigan and has been designed to reduce potential interactions with departures.

From this location the route splits and heads south, overflying Warrington. Both routes then turn left to establish aircraft on final approach at 2,500ft for either Runway 05L or 05R.

The descent gradient to the FAF is 4.3%/2.46° for Runway 05L and 4.06%/2.33° for Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6B L is 54km (29nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 6B R is 56km (30nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 6B L is estimated to overfly approximately 10,550 households with an approximate population of 24,600. Taking account of planned property developments, this option is estimated to impact a total population of 26,300.

From 7,000ft, this option is estimated to overfly approximately 69,550 households with an approximate population of 153,900. Taking account of planned property developments, this option is estimated to impact a total population of 163,200.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 6B R is estimated to overfly approximately 5,500 households with an approximate population of 12,400. Taking account of planned property developments, this option is estimated to impact a total population of 12,600.

From 7,000ft, this option is estimated to overfly approximately 59,050 households with an approximate population of 129,100. Taking account of planned property developments, this option is estimated to impact a total population of 139,400.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 6B L is estimated to overfly 79 noise sensitive areas.

From 7,000ft this option is estimated to overfly 382 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 6B R is estimated to overfly 33 noise sensitive areas.

From 7,000ft this option is estimated to overfly 333 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both options could be used as part of a network that is consistent with this design principle and so we consider it a ‘good fit’. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.

21.4 Transition Runways 05L/05R North Option 7B – 2,500ft FAF

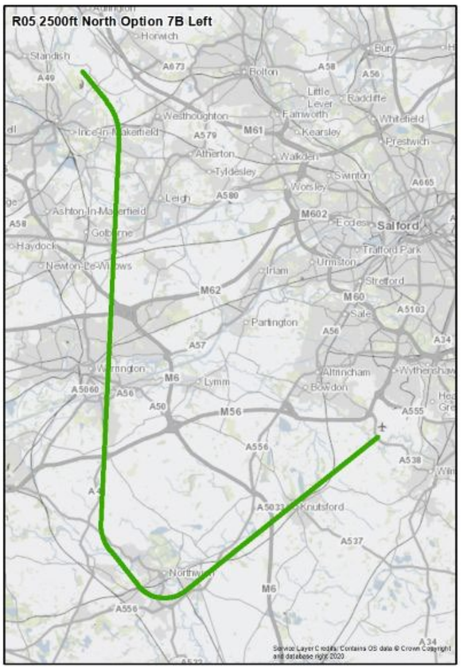
Design Principle Evaluation	Option No: 7B
Option Name: Transition RW 05L North Option 7B – 2,500ft FAF	REJECT
Option Name: Transition RW 05R North Option 7B – 2,500ft FAF	REJECT

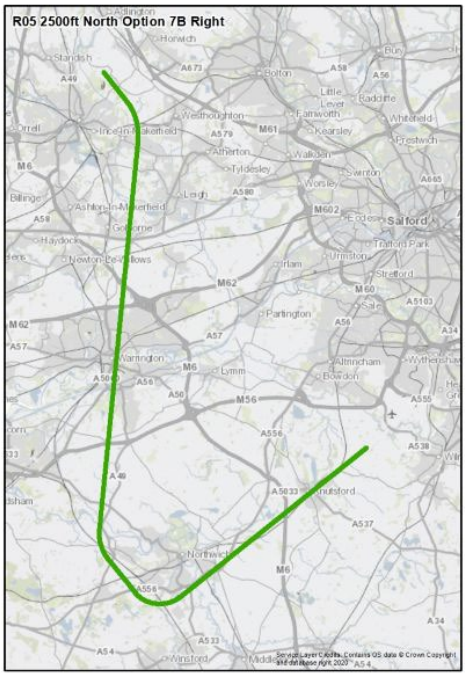
Option Description:

Option 7B has an IAF at 7,000ft to the north-west of the airport in the vicinity of Aspull and has been designed to reduce potential interactions with departures.

From this location the route splits and heads south, overflying Warrington. Both routes then turn left to establish aircraft on final approach at 2,500ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.71%/2.12° for Runway 05L and 3.52%/2.02° for Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7B L is 59km (32nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 7B R is 61km (33nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 7B L is estimated to overfly approximately 13,150 households with an approximate population of 30,800. Taking account of planned property developments, this option is estimated to impact a total population of 32,900. From 7,000ft, this option is estimated to overfly approximately 68,350 households with an approximate population of 154,000. Taking account of planned property developments, this option is estimated to impact a total population of 167,500. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 7B R is estimated to overfly approximately 5,200 households with an approximate population of 11,900. Taking account of planned property developments, this option is estimated to impact a total population of 12,100. From 7,000ft, this option is estimated to overfly approximately 60,100 households with an approximate population of 133,200. Taking account of planned property developments, this option is estimated to impact a total population of 145,900. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment:				

From 4,000ft option 7B L is estimated to overfly 85 noise sensitive areas. From 7,000ft this option is estimated to overfly 324 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 7B R is estimated to overfly 32 noise sensitive areas. From 7,000ft this option is estimated to overfly 313 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.

21.5 Transition Runways 05L/05R North Option 8B – 2,500ft FAF

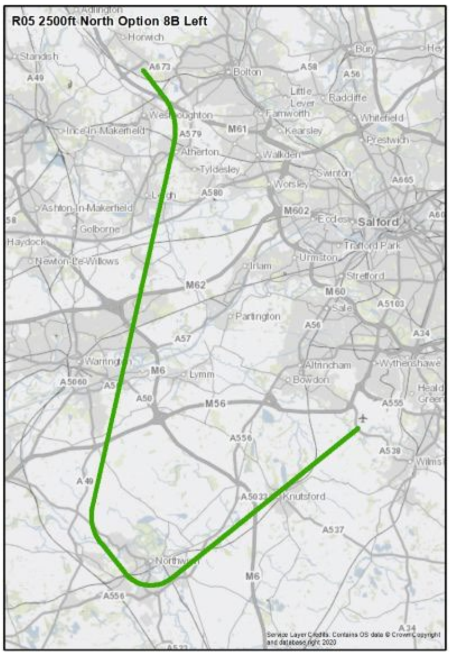
Design Principle Evaluation	Option No: 8B
Option Name: Transition RW 05L North Option 8B – 2,500ft FAF	ACCEPT
Option Name: Transition RW 05R North Option 8B – 2,500ft FAF	REJECT

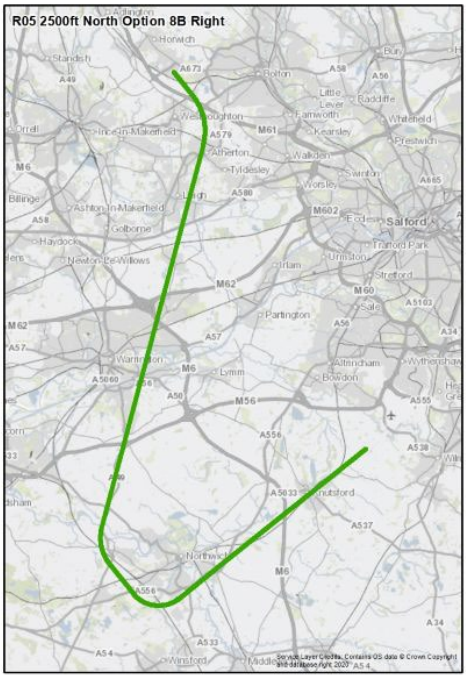
Option Description:

Option 8B has an IAF at 7,000ft to the north-west of the airport in the vicinity of the Middlebrook Retail Park. It has been designed to reduce potential interactions with departures and to facilitate a CDA profile to all runways.

From this location the route splits, heads south-west and routes to the east of Warrington. Both routes then turn left to establish aircraft on final approach at 2,500ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.65%/2.09° for Runway 05L and 3.45%/1.98° for Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8B L is 59km (32nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 8B R is 62km (33nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 8B L is estimated to overfly approximately 11,100 households with an approximate population of 26,700. Taking account of planned property developments, this option is estimated to impact a total population of 29,800.

From 7,000ft, this option is estimated to overfly approximately 69,750 households with an approximate population of 159,400. Taking account of planned property developments, this option is estimated to impact a total population of 170,500.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 8B R is estimated to overfly approximately 7,300 households with an approximate population of 17,000. Taking account of planned property developments, this option is estimated to impact a total population of 18,600.

From 7,000ft, this option is estimated to overfly approximately 71,200 households with an approximate population of 161,900. Taking account of planned property developments, this option is estimated to impact a total population of 172,100.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 8B L is estimated to overfly 72 noise sensitive areas.

From 7,000ft this option is estimated to overfly 356 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 8B R is estimated to overfly 43 noise sensitive areas. From 7,000ft this option is estimated to overfly 364 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a ‘good fit’. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

21.6 Transition Runways 05L/05R North Option 9B – 2,500ft FAF

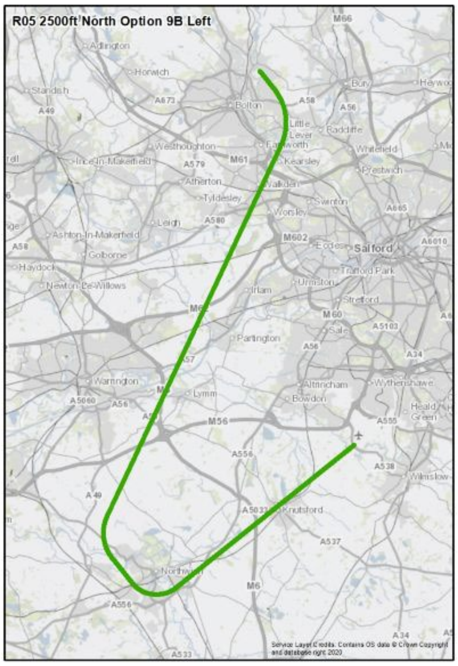
Design Principle Evaluation	Option No: 9B
Option Name: Transition RW 05L North Option 9B – 2,500ft FAF	ACCEPT
Option Name: Transition RW 05R North Option 9B – 2,500ft FAF	REJECT

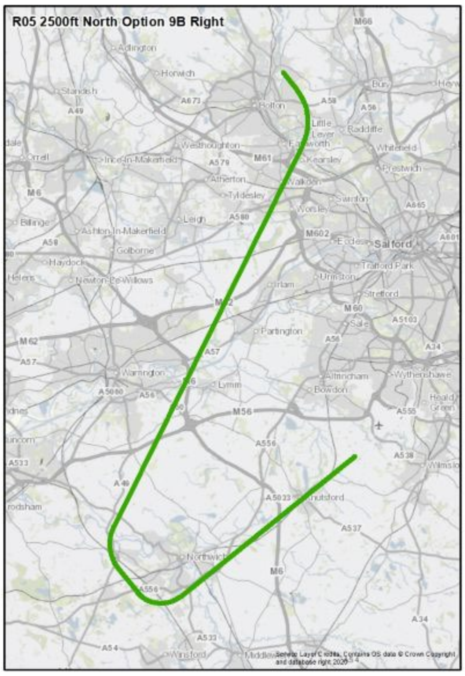
Option Description:

Option 9B has an IAF at 7,000ft to the north of the airport in the vicinity of Bolton and is designed to facilitate a CDA profile to all runways.

From this location the route splits, heads south-west and tracks to the east of Warrington. Both routes then turn left to establish aircraft on final approach at 2,500ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.24%/1.86° for Runway 05L and 3.07%/1.76° for Runway 05R. These gradients at the lower end of the optimum range for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 9B L is 64km (35nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 9B R is 66km (36nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 9B L is estimated to overfly approximately 9,350 households with an approximate population of 21,800. Taking account of planned property developments, this option is estimated to impact a total population of 22,900.

From 7,000ft, this option is estimated to overfly approximately 65,500 households with an approximate population of 150,000. Taking account of planned property developments, this option is estimated to impact a total population of 152,900.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 9B R is estimated to overfly approximately 5,300 households with an approximate population of 12,400. Taking account of planned property developments, this option is estimated to impact a total population of 12,800.

From 7,000ft, this option is estimated to overfly approximately 61,750 households with an approximate population of 141,300. Taking account of planned property developments, this option is estimated to impact a total population of 143,200.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 9B L is estimated to overfly 64 noise sensitive areas.

From 7,000ft this option is estimated to overfly 279 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 9B R is estimated to overfly 33 noise sensitive areas. From 7,000ft this option is estimated to overfly 253 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

21.7 Transition Runways 05L/05R North 2,500ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity
Transition north option A3	S	P	C
This was initially designed as **option 3** and is a route based on an IAF located at the position of a NATS proposed hold close to the current MIRSI hold. Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the interaction between MAN arrivals and arrivals to LPL. As a result, this option was deemed to not fully comply with the Design Principle Safety. Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. This option would create interactions with traffic for LPL and not align to the NATS network traffic flow. As a result, this option would not comply with the AMS and therefore the Design Principle Policy.			
Transition north option B4	S	P	C
This was initially designed as **option 4** and is a route based on an IAF located to the east of the current MIRSI hold. Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the separation between MAN arrivals and arrivals to LPL. As a result, this option was deemed to not comply with the Design Principle Safety. Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. By creating interactions with traffic for other airports this option would not comply with this initiative (and therefore the Design Principle Policy) as it has the potential to require ATC intervention to resolve.			
Transition north option C5	S	P	C
This was initially designed as **option 5** and is a route based on an IAF located at the position of a NATS proposed hold to the north-west of the current MIRSI hold. Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the separation between MAN arrivals and arrivals to LPL. As a result, this option was deemed to not comply with the Design Principle Safety. Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. By creating interactions with traffic for other airports this option would not comply with this initiative (and therefore the Design Principle Policy) as it has the potential to require ATC intervention to resolve.			

In addition, the distance of this IAF from the runways may result in options being unable to provide a CDA to both runway directions, leading to increased fuel burn and noise impact.			
Transition north option D10	S	P	C
An arrival procedure could be created to provide a straight-in transition from the west for Runway 05 at MAN. Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the interaction between MAN arrivals and arrivals to LPL. As a result, this option was deemed to not fully comply with the Design Principle Safety. Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. This option would create interactions with traffic for LPL and not align to the NATS network traffic flow. As a result, this option would not comply with the AMS and therefore the Design Principle Policy.			
Transition north option E11	S	P	C
This option is based on IAF5 which is co-located with the option Runway 23R/23L north 3B. It was considered as an option to facilitate a CDA to both runways; however, the profile for Runway 05L/05R would be sub optimal (<1.5°). Policy: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as it would not provide a CDA to both runway directions, leading to increased fuel burn and noise impact.			
Transition north option F12	S	P	C
This option is based on IAF6, it is co-located with option Runway 23R/23L north 6B, which is the approximate position of the current ROSUN hold. It was considered as an option to facilitate a CDA to both runways; however, the profile for Runway 05L/05R would be sub optimal (<1.5°). Policy: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as it would not provide a CDA to both runway directions, leading to increased fuel burn and noise impact.			

22 Transitions Runways 05L/05R North – 2,000ft FAF

22.1 Runways 05L/05R North Option 7C - 2,000ft FAF Transition

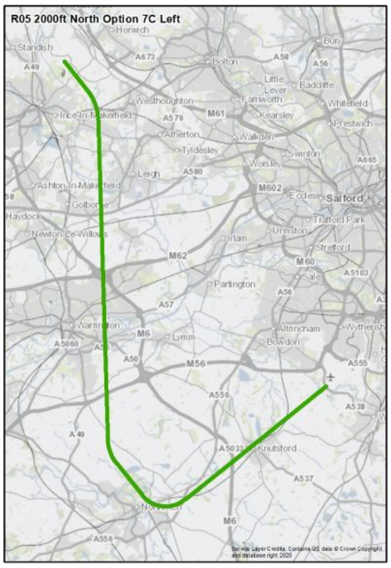
Design Principle Evaluation	Option No: 7C
Option Name: Transition RW 05L North Option 7C – 2,000ft FAF	REJECT
Option Name: Transition RW 05R North Option 7C – 2,000ft FAF	REJECT

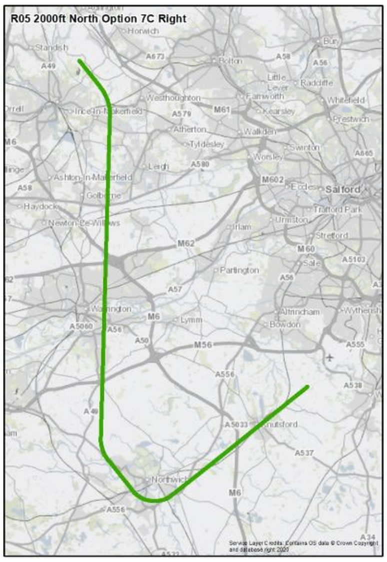
Option Description:

Option 7C has an IAF at 7,000ft to the north-west of the airport in the vicinity of Aspull and has been designed to reduce potential interactions and increase the lateral separation from LPL Runway 27 arrivals.

From the Aspull area, east of Wigan, the route splits, and heads south overflying Warrington. Both routes then turn left to establish aircraft on final approach at 2,000ft for either Runway 05L or 05R.

The descent gradient to the FAF is 4.33%/2.48° for Runway 05L and 4.12%/2.36° for Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7CL is 54km (29nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 7CR is 56km (30nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 7CL is estimated to overfly approximately 10,300 households with an approximate population of 23,600. Taking account of planned property developments, this option is estimated to impact a total population of 25,900.

From 7,000ft, this option is estimated to overfly approximately 49,150 households with an approximate population of 113,100. Taking account of planned property developments, this option is estimated to impact a total population of 126,800.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 7CR is estimated to overfly approximately 17,500 households with an approximate population of 40,700. Taking account of planned property developments, this option is estimated to impact a total population of 44,600.

From 7,000ft, this option is estimated to overfly approximately 66,900 households with an approximate population of 151,900. Taking account of planned property developments, this option is estimated to impact a total population of 167,300.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 7CL is estimated to overfly 67 noise sensitive areas.

From 7,000ft this option is estimated to overfly 251 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 7CR is estimated to overfly 102 noise sensitive areas. From 7,000ft this option is estimated to overfly 300 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

22.2 Runways 05L/05R North Option 12 - 2,000ft FAF Transition

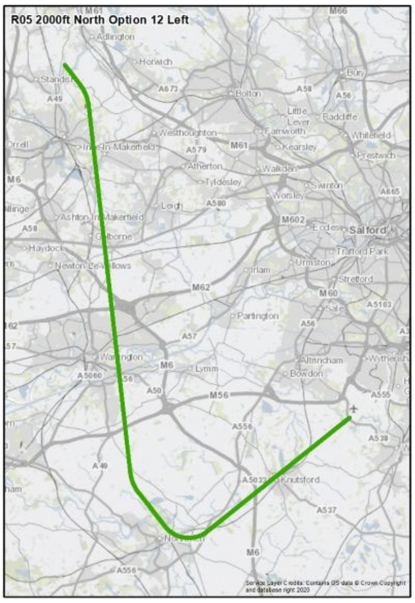
Design Principle Evaluation	Option No: 12
Option Name: Transition RW 05L North Option 12 – 2,000ft FAF	REJECT
Option Name: Transition RW 05R North Option 12 – 2,000ft FAF	REJECT

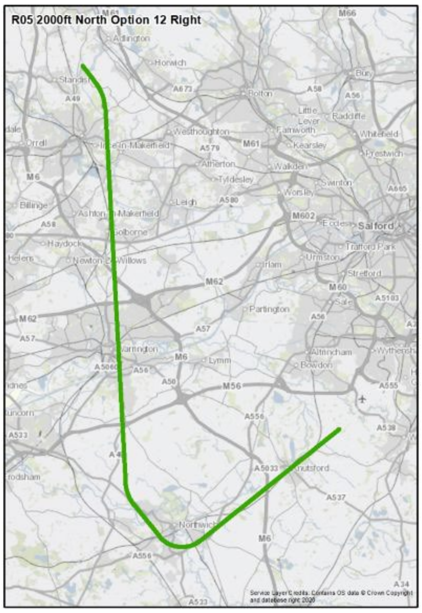
Option Description:

Option 12 has an IAF at 7,000ft to the north-west of the airport in the vicinity of Aspull and has been designed to reduce potential interactions and increase the lateral separation from LPL Runway 27 arrivals.

It is similar to 7C, except the right turn direct to the base leg to join the approach is made earlier and aircraft route more directly overhead Warrington.

The descent gradient to the FAF is 3.94%/2.26° for Runway 05L and 3.77%/2.16° for Runway 05R. These gradients are within the optimum range for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 12L is 56km (30nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 12R is 58km (31nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 12L is estimated to overfly approximately 14,250 households with an approximate population of 32,400. Taking account of planned property developments, this option is estimated to impact a total population of 34,800.

From 7,000ft, this option is estimated to overfly approximately 62,150 households with an approximate population of 141,600. Taking account of planned property developments, this option is estimated to impact a total population of 152,000.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 12R is estimated to overfly approximately 22,100 households with an approximate population of 49,600. Taking account of planned property developments, this option is estimated to impact a total population of 52,500.

From 7,000ft, this option is estimated to overfly approximately 72,350 households with an approximate population of 162,300. Taking account of planned property developments, this option is estimated to impact a total population of 172,400.

When compared to the MIRSI 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 12L is estimated to overfly 82 noise sensitive areas.

From 7,000ft this option is estimated to overfly 283 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 12R is estimated to overfly 126 noise sensitive areas. From 7,000ft this option is estimated to overfly 400 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a ‘good fit’. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

22.3 Runways 05L/05R North Option 13 - 2,000ft FAF Transition

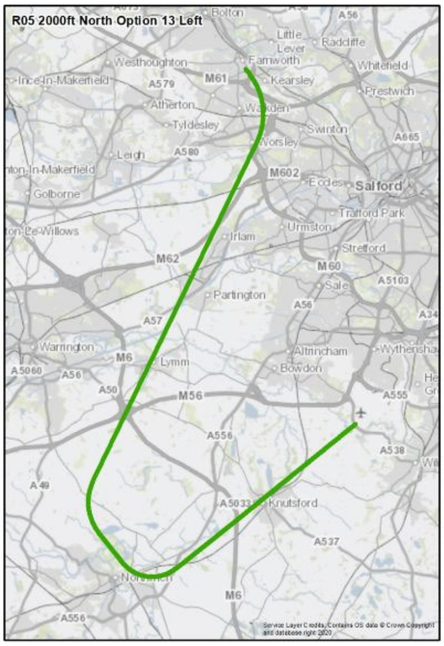
Design Principle Evaluation	Option No: 13
Option Name: Transition RW 05L North Option 13 – 2,000ft FAF	ACCEPT
Option Name: Transition RW 05R North Option 13 – 2,000ft FAF	ACCEPT

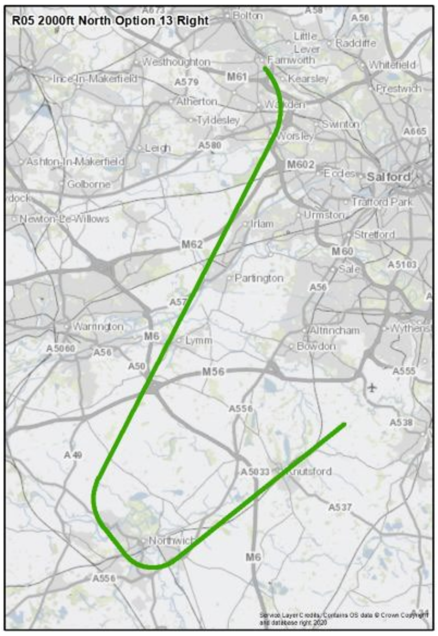
Option Description:

Option 13 has an IAF at 7,000ft to the north-north-west of the airport in the vicinity of Worsley, co-located with the IAF for option 23R/23L North 11A and has been designed to reduce potential interactions and increase the lateral separation from LPL Runway 27 arrivals.

From the Worsley area, west of Prestwich, the route splits, and heads south-west just to the west of Irlam and overflying Cadishead and Lymm. Both routes then turn left to establish aircraft on final approach at 2,000ft for either Runway 05L or 05R.

The descent gradient to the FAF is 4.37%/2.50° for Runway 05L and 4.09%/2.34° for Runway 05R. These gradients are optimum for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	**MET**
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	**MET**
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	**PARTIAL**	MET
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	**PARTIAL**	MET
	05R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

The estimated track length of option 13L is 52km (28nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. When

compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 13R is 55km (30nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 13L is estimated to overfly approximately 4,000 households with an approximate population of 8,800. Taking account of planned property developments, this option is estimated to impact a total population of 9,900.

From 7,000ft, this option is estimated to overfly approximately 51,300 households with an approximate population of 118,700. Taking account of planned property developments, this option is estimated to impact a total population of 122,400.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 13R is estimated to overfly approximately 11,350 households with an approximate population of 26,200. Taking account of planned property developments, this option is estimated to impact a total population of 29,000.

From 7,000ft, this option is estimated to overfly approximately 56,600 households with an approximate population of 131,200. Taking account of planned property developments, this option is estimated to impact a total population of 136,100.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 13L is estimated to overfly 41 noise sensitive areas.

From 7,000ft this option is estimated to overfly 232 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 13R is estimated to overfly 70 noise sensitive areas. From 7,000ft this option is estimated to overfly 259 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

23 Transitions Runways 05L/05R South – 3,000ft FAF

23.1 Transition Runways 05L/05R South Option 1A – 3,000ft FAF

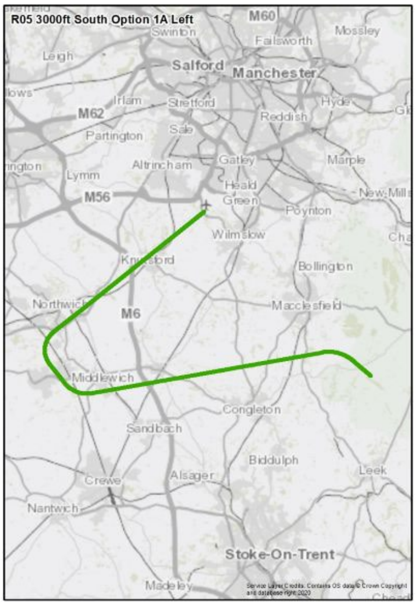
Design Principle Evaluation	Option No: 1A
Option Name: Transition RW 05L South Option 1A – 3,000ft FAF	REJECT
Option Name: Transition RW 05R South Option 1A – 3,000ft FAF	REJECT

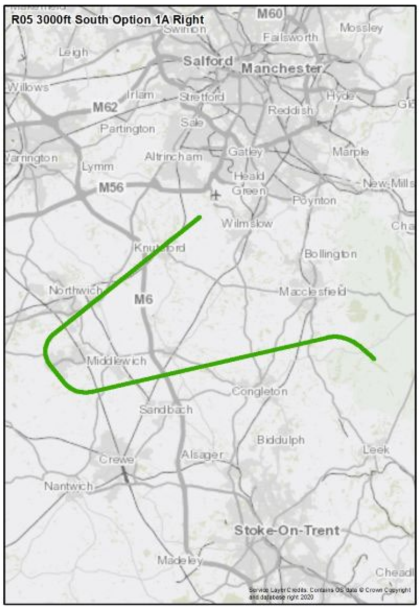
Option Description:

Option 1A has an IAF at 7,000ft to the south-east of the airport in the vicinity of Meerbrook and is equidistant to easterly or westerly operation. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads west, to the south of Macclesfield, north of Congleton. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.45%/1.98° for Runway 05L and 3.28%/1.88° for Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1A L is 60km (32nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1A R is 62km (33nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 1A L is estimated to overfly approximately 13,100 households with an approximate population of 30,600. Taking account of planned property developments, this option is estimated to impact a total population of 34,900. From 7,000ft, this option is estimated to overfly approximately 14,550 households with an approximate population of 34,200. Taking account of planned property developments, this option is estimated to impact a total population of 39,500. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 1A R is estimated to overfly approximately 9,700 households with an approximate population of 22,900. Taking account of planned property developments, this option is estimated to impact a total population of 31,200. From 7,000ft, this option is estimated to overfly approximately 10,800 households with an approximate population of 25,600. Taking account of planned property developments, this option is estimated to impact a total population of 34,100. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 1A L is estimated to overfly 59 noise sensitive areas. From 7,000ft this option is estimated to overfly 73 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 1A R is estimated to overfly 48 noise sensitive areas. From 7,000ft this option is estimated to overfly 62 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

23.2 Transition Runways 05L/05R South Option 6A – 3,000ft FAF

Design Principle Evaluation	Option No: 6A
Option Name: Transition RW 05L South Option 6A – 3,000ft FAF	REJECT
Option Name: Transition RW 05R South Option 6A – 3,000ft FAF	REJECT

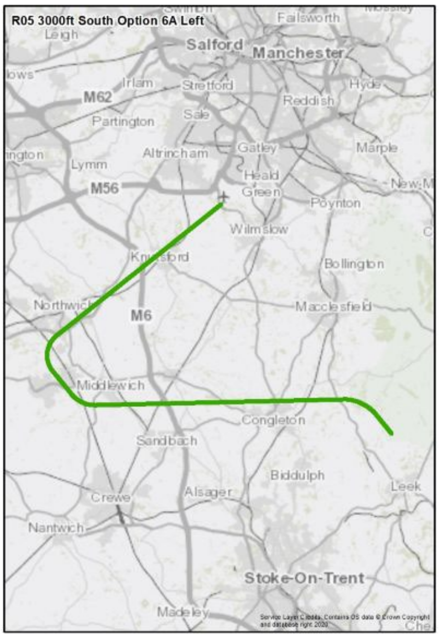
Option Description:

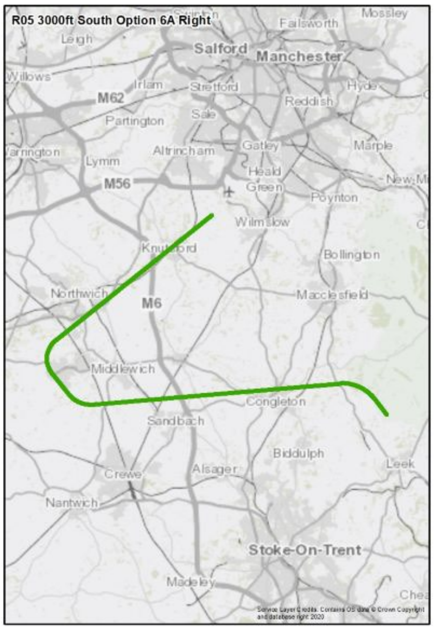
Option 6A has an IAF at 7,000ft to the south-east of the airport, just to the north of Leek. It is co-located with the IAF for the 23R/23L option 9A and is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads west, south of Holmes Chapel, north of Sandbach and over Middlewich. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 05L or 05R.

This is the southernmost option and has been designed to maintain 3nm separation from the boundary of CAS in accordance with the CAA containment policy.

The descent gradient to the FAF is 3.55% 2.03° for Runway 05L and 3.38%/1.94° Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6A L is 59km (32nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 6A R is 61km (33nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 6A L is estimated to overfly approximately 12,450 households with an approximate population of 29,000. Taking account of planned property developments, this option is estimated to impact a total population of 33,100.

From 7,000ft, this option is estimated to overfly approximately 19,700 households with an approximate population of 45,400. Taking account of planned property developments, this option is estimated to impact a total population of 54,700.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 6A R is estimated to overfly approximately 9,350 households with an approximate population of 22,000. Taking account of planned property developments, this option is estimated to impact a total population of 29,400.

From 7,000ft, this option is estimated to overfly approximately 20,200 households with an approximate population of 46,200. Taking account of planned property developments, this option is estimated to impact a total population of 58,900.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 6A L is estimated to overfly 58 noise sensitive areas.

From 7,000ft this option 6A L is estimated to overfly 91 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 6A R is estimated to overfly 48 noise sensitive areas.

From 7,000ft this option 6A R is estimated to overfly 113 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

<table>
<tr><td rowspan="2">Design Principle Airspace</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
Both options could be used as part of a network that is consistent with this design principle and so we consider it a ‘good fit’. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.</td></tr>
<tr><td rowspan="2">Design Principle Technology</td><td>05L</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td>05R</td><td>NOT MET</td><td>PARTIAL</td><td>MET</td></tr>
<tr><td colspan="5">Summary of Qualitative Assessment:
These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.</td></tr>
</table>

23.3 Transition Runways 05L/05R South Option 7A – 3,000ft FAF

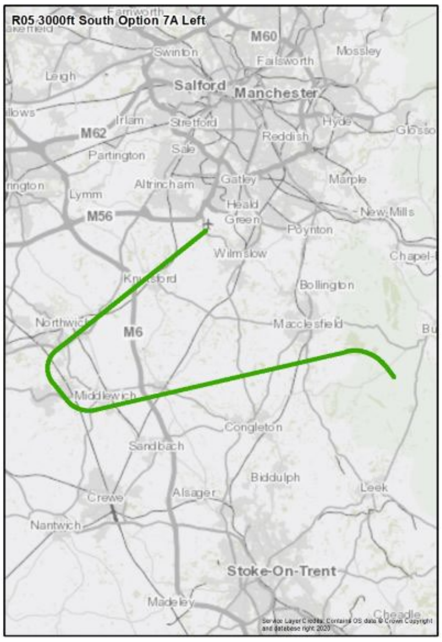
Design Principle Evaluation	Option No: 7A
Option Name: Transition RW 05L South Option 7A – 3,000ft FAF	REJECT
Option Name: Transition RW 05R South Option 7A – 3,000ft FAF	REJECT

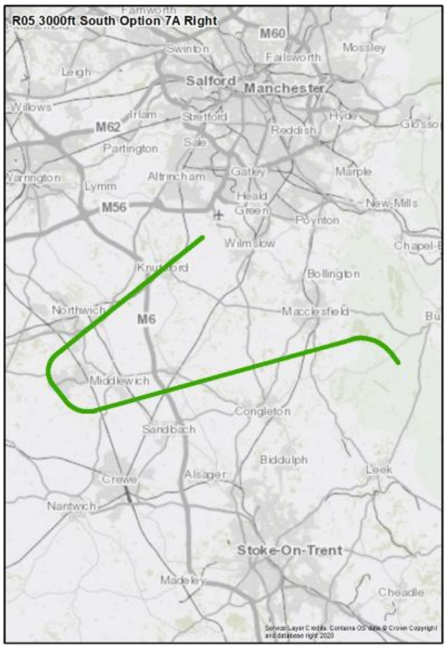
Option Description:

Option 7A has an IAF at 7,000ft co-located at the existing DAYNE hold. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads west, south of Macclesfield, north of Congleton and Sandbach and then over Middlewich. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.17%/1.82° for Runway 05L and 3.01%/1.73° Runway 05R. These gradients are just below the optimum for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with ICAO PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7A L is 63km (34nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 7A R is 65km (35nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 7A L is estimated to overfly approximately 13,450 households with an approximate population of 31,500. Taking account of planned property developments, this option is estimated to impact a total population of 35,900.

From 7,000ft, this option is estimated to overfly approximately 16,650 households with an approximate population of 38,600. Taking account of planned property developments, this option is estimated to impact a total population of 44,800.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 7A R is estimated to overfly approximately 9,800 households with an approximate population of 23,200. Taking account of planned property developments, this option is estimated to impact a total population of 31,000.

From 7,000ft, this option is estimated to overfly approximately 11,650 households with an approximate population of 27,400. Taking account of planned property developments, this option is estimated to impact a total population of 37,000.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 7A L is estimated to overfly 59 noise sensitive areas.

From 7,000ft this option is estimated to overfly 83 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 7A R is estimated to overfly 47 noise sensitive areas.

From 7,000ft this option is estimated to overfly 62 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

23.4 Transition Runways 05L/05R South Option 8A – 3,000ft FAF

Design Principle Evaluation	Option No: 8A
Option Name: Transition RW 05L South Option 8A – 3,000ft FAF	REJECT
Option Name: Transition RW 05R South Option 8A – 3,000ft FAF	REJECT

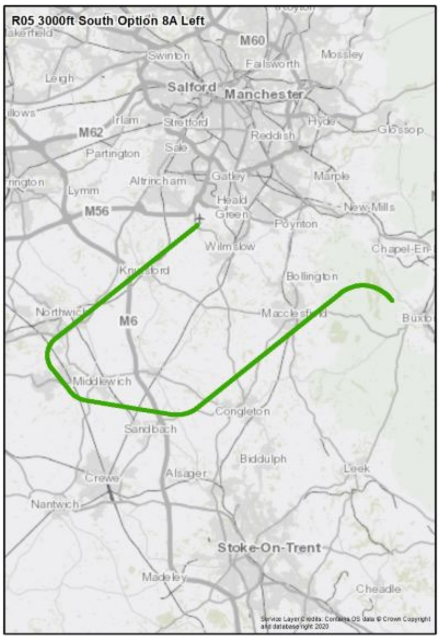
Option Description:

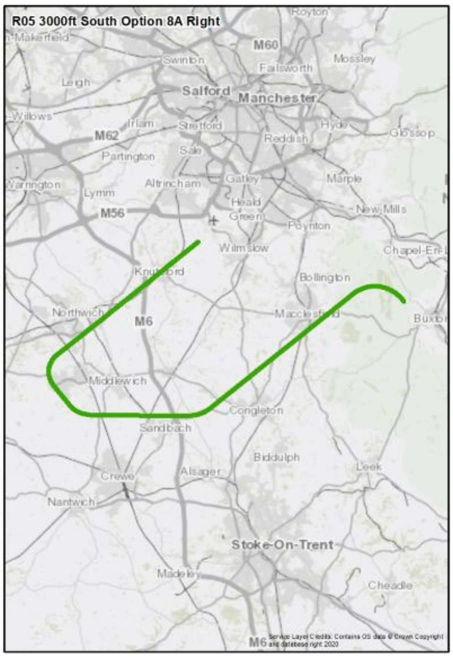
Option 8A has an IAF at 7,000ft to the south-east of the airport in the vicinity of Buxton.

From this location the route splits and turns downwind, to the south of Macclesfield, just north of Congleton, then west just north of Sandbach and over Middlewich to establish aircraft on the final approach at 3,000ft for either Runway 05L or 05R.

The route has been designed to replicate the existing vectoring patterns used by ATC and is anticipated to reduce interactions with Runway 05 southbound departures.

The descent gradient to the FAF is 2.72%/1.56° for Runway 05L and 2.63%/1.51° Runway 05R. These gradients are below the optimum for low noise approaches but just within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8A L is 69km (37nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 8A R is 70km (38nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 8A L is estimated to overfly approximately 9,650 households with an approximate population of 22,400. Taking account of planned property developments, this option is estimated to impact a total population of 27,400.

From 7,000ft, this option is estimated to overfly approximately 22,400 households with an approximate population of 49,600. Taking account of planned property developments, this option is estimated to impact a total population of 60,700.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 8A R is estimated to overfly approximately 11,600 households with an approximate population of 27,100. Taking account of planned property developments, this option is estimated to impact a total population of 34,600.

From 7,000ft, this option is estimated to overfly approximately 24,700 households with an approximate population of 55,000. Taking account of planned property developments, this option is estimated to impact a total population of 68,600.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 8A L is estimated to overfly 51 noise sensitive areas.

From 7,000ft this option is estimated to overfly 123 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 8A R is estimated to overfly 57 noise sensitive areas.

From 7,000ft this option is estimated to overfly 130 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

23.5 Transition Runways 05L/05R South Option 9A – 3,000ft FAF

Design Principle Evaluation	Option No: 9A
Option Name: Transition RW 05L South Option 9A – 3,000ft FAF	REJECT
Option Name: Transition RW 05R South Option 9A – 3,000ft FAF	REJECT

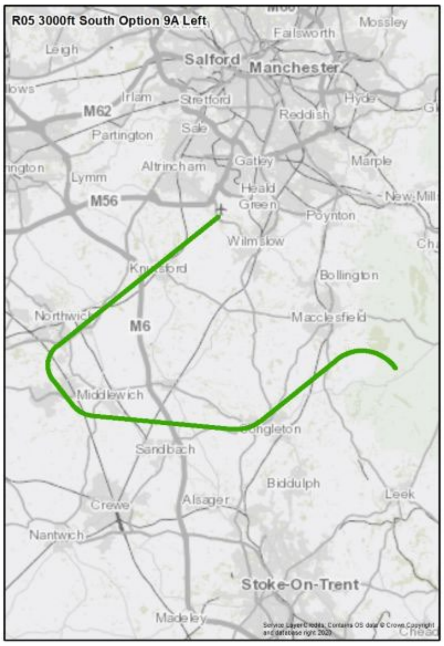
Option Description:

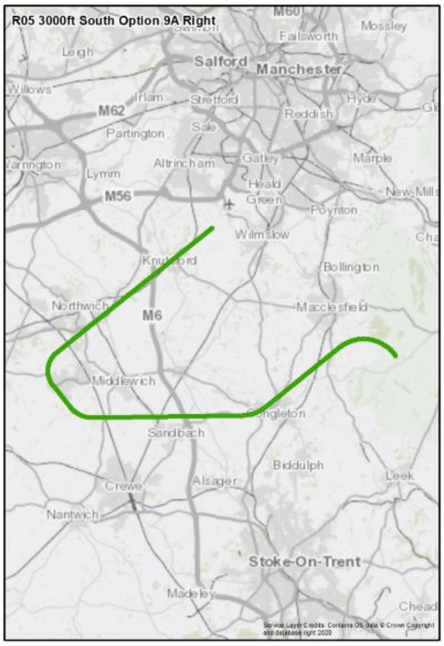
Option 9A has an IAF at 7,000ft to the south-east of the airport in the vicinity of The Roaches. It is co-located with the IAF for the 23R/23L option 8A and is designed to facilitate a CDA profile to all runways.

From this location the route splits and turns downwind, south-west to Congleton, then west just north of Sandbach and over Middlewich before turning on to the final approach at 3,000ft for either Runway 05L or 05R.

The route has been designed to replicate the existing vectoring patterns used by ATC and is anticipated to reduce interactions with Runway 05 southbound departures.

The descent gradient to the FAF is 3.21%/1.84° for Runway 05L and 3.08%/1.77° Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 9A L is 62km (33nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 9A R is 64km (35nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 9A L is estimated to overfly approximately 11,150 households with an approximate population of 26,100. Taking account of planned property developments, this option is estimated to impact a total population of 31,100.

From 7,000ft, this option is estimated to overfly approximately 21,900 households with an approximate population of 49,900. Taking account of planned property developments, this option is estimated to impact a total population of 60,000.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 9A R is estimated to overfly approximately 10,050 households with an approximate population of 23,600. Taking account of planned property developments, this option is estimated to impact a total population of 30,900.

From 7,000ft, this option is estimated to overfly approximately 22,000 households with an approximate population of 50,100. Taking account of planned property developments, this option is estimated to impact a total population of 62,900.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 9A L is estimated to overfly 52 noise sensitive areas.

From 7,000ft this option is estimated to overfly 118 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 9A R is estimated to overfly 51 noise sensitive areas.

From 7,000ft this option is estimated to overfly 121 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

23.6 Transition Runways 05L/05R South 3,000ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity
Transition south option A2	S	P	C
This was initially designed as **option 2** and is a route based on an IAF7 located to the south-east of the airport. The route has an initial straight leg from the IAF towards the airport where aircraft would make a left turn onto a downwind leg. Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the separation between MAN arrivals and MAN Runway 05 southbound departures. As a result, this option was deemed to not comply with the Design Principle Safety.			
Transition south option B3	S	P	C
An arrival procedure could be created to provide a straight-in transition from the west for Runway 05 at MAN. Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the interaction between MAN arrivals and arrivals to LPL. As a result, this option was deemed to not fully comply with the Design Principle Safety. Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. This option would create interactions with traffic for LPL and not align to the NATS network traffic flow. As a result, this option would not comply with the AMS and therefore the Design Principle Policy.			
Transition south option C4	S	P	C
This was initially designed as **option 4** and is a route based on an IAF located south-east of the airport towards the south of Daventry CTA2. Policy: This option would fall outside of the Viable and Good fit design envelope and would also not adhere to the CAA containment policy requiring aircraft to remain within 3nm of the CAS boundary.			
Transition south option D5	S	P	C
This was initially designed as **option 5** and is a route based on an IAF located south-east of the existing DAYNE hold. Policy: This option would not adhere to the CAA containment policy requiring aircraft to remain within 3nm of the CAS boundary.			

24 Transitions Runways 05L/05R South – 2,500ft FAF

24.1 Transition Runways 05L/05R South Option 1B – 2,500ft FAF

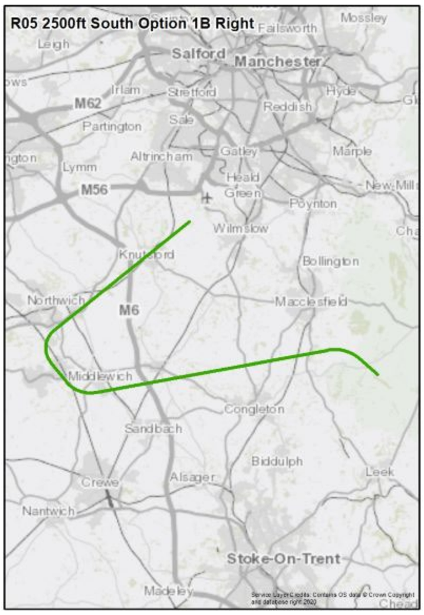
Design Principle Evaluation	Option No: 1B
Option Name: Transition RW 05L South Option 1B – 2,500ft FAF	ACCEPT
Option Name: Transition RW 05R South Option 1B – 2,500ft FAF	ACCEPT

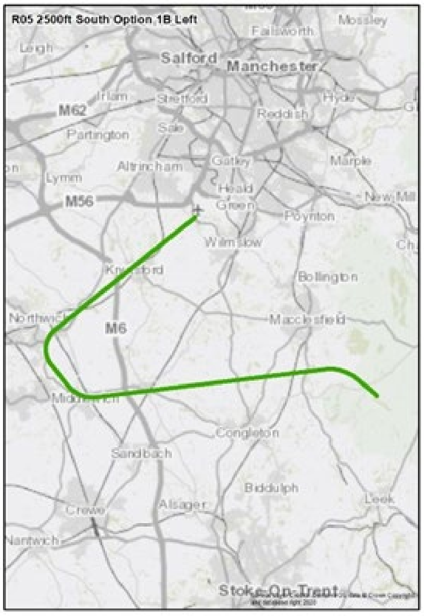
Option Description:

Option 1B has an IAF at 7,000ft to the south-east of the airport in the vicinity of Meerbrook and is equidistant to easterly or westerly operation. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads west, to the south of Macclesfield, north of Congleton and over Middlewich. Both routes then turn right to establish aircraft on final approach at 2,500ft for either Runway 05L or 05R.

The descent gradient to the FAF is 4.17%/2.39° for Runway 05L and 3.95%/2.26° for Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1B L is 55km (30nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 1B R is 57km (31nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 1B L is estimated to overfly approximately 26,100 households with an approximate population of 59,000. Taking account of planned property developments, this option is estimated to impact a total population of 59,000.

From 7,000ft, this option is estimated to overfly approximately 31,250 households with an approximate population of 70,300. Taking account of planned property developments, this option is estimated to impact a total population of 71,600.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 1B R is estimated to overfly approximately 24,000 households with an approximate population of 54,600. Taking account of planned property developments, this option is estimated to impact a total population of 55,100.

From 7,000ft, this option is estimated to overfly approximately 29,250 households with an approximate population of 66,000. Taking account of planned property developments, this option is estimated to impact a total population of 67,900.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 1B L is estimated to overfly 101 noise sensitive areas.

From 7,000ft this option is estimated to overfly 126 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 1B R is estimated to overfly 128 noise sensitive areas.

From 7,000ft this option is estimated to overfly 153 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CCO to be conducted at MAN in accordance with PANS-OPS requirements.				

24.2 Transition Runways 05L/05R South Option 6B – 2,500ft FAF

Design Principle Evaluation	Option No: 6B
Option Name: Transition RW 05L South Option 6B – 2,500ft FAF	ACCEPT
Option Name: Transition RW 05R South Option 6B – 2,500ft FAF	ACCEPT

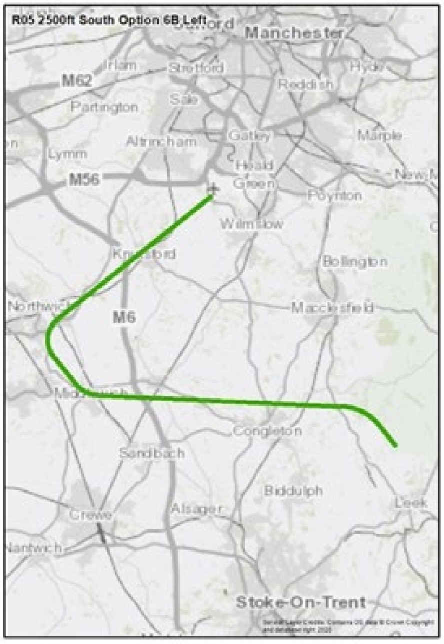
Option Description:

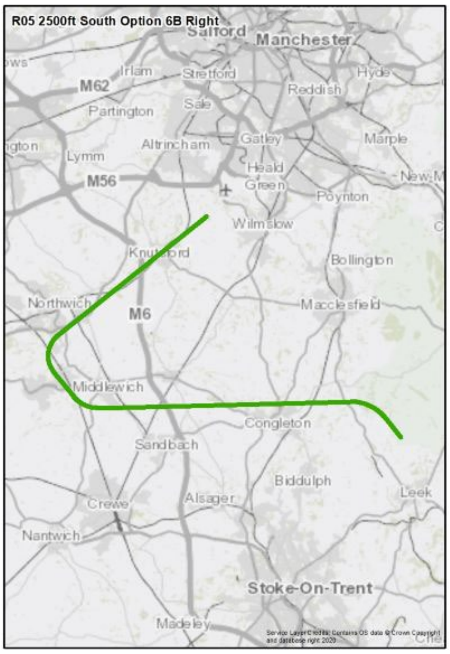
Option 6B has an IAF at 7,000ft to the south-east of the airport, just to the north of Leek. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads west, south of Holmes Chapel, north of Sandbach and over Middlewich. Both routes then turn right to establish aircraft on final approach at 2,500ft for either Runway 05L or 05R.

This is the southernmost option and has been designed to maintain 3nm separation from the boundary of CAS in accordance with the CAA containment policy.

The descent gradient to the FAF is 4.26%/2.44° for Runway 05L and 4.06%/2.33° Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6B L is 54km (29nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 6B R is 56km (30nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 6B L is estimated to overfly approximately 9,250 households with an approximate population of 21,300. Taking account of planned property developments, this option is estimated to impact a total population of 23,300. From 7,000ft, this option is estimated to overfly approximately 13,200 households with an approximate population of 30,400. Taking account of planned property developments, this option is estimated to impact a total population of 37,400. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 6B R is estimated to overfly approximately 11,000 households with an approximate population of 25,700. Taking account of planned property developments, this option is estimated to impact a total population of 29,800. From 7,000ft, this option is estimated to overfly approximately 18,200 households with an approximate population of 41,900. Taking account of planned property developments, this option is estimated to impact a total population of 51,100. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 6B L is estimated to overfly 57 noise sensitive areas. From 7,000ft this option is estimated to overfly 78 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 6B R is estimated to overfly 49 noise sensitive areas. From 7,000ft this option is estimated to overfly 81 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.

24.3 Transition Runways 05L/05R South Option 7B – 2,500ft FAF

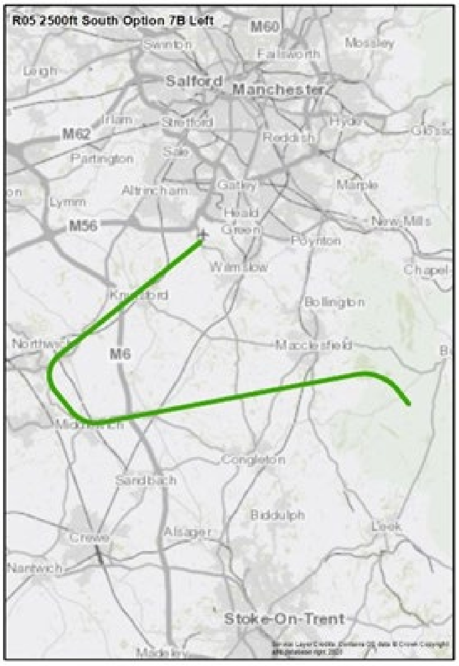
Design Principle Evaluation	Option No: 7B
Option Name: Transition RW 05L South Option 7B – 2,500ft FAF	ACCEPT
Option Name: Transition RW 05R South Option 7B – 2,500ft FAF	ACCEPT

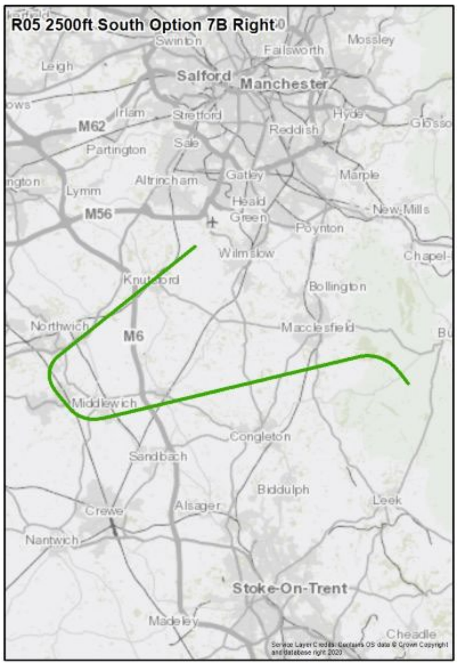
Option Description:

Option 7B has an IAF at 7,000ft co-located at the existing DAYNE hold. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads west, south of Macclesfield, north of Congleton and over Middlewich. Both routes then turn right to establish aircraft on final approach at 2,500ft for either Runway 05L or 05R.

The descent gradient to the FAF is 3.82%/2.19° for Runway 05L and 3.62%/2.08° Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7B L is 57km (31nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 7B R is 60km (32nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 7B L is estimated to overfly approximately 10,600 households with an approximate population of 24,300. Taking account of planned property developments, this option is estimated to impact a total population of 27,300.

From 7,000ft, this option is estimated to overfly approximately 12,500 households with an approximate population of 28,600. Taking account of planned property developments, this option is estimated to impact a total population of 33,000.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 7B R is estimated to overfly approximately 12,650 households with an approximate population of 29,800. Taking account of planned property developments, this option is estimated to impact a total population of 35,100.

From 7,000ft, this option is estimated to overfly approximately 14,550 households with an approximate population of 34,000. Taking account of planned property developments, this option is estimated to impact a total population of 40,200.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 7B L is estimated to overfly 68 noise sensitive areas.

From 7,000ft this option is estimated to overfly 82 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 7B R is estimated to overfly 54 noise sensitive areas.

From 7,000ft this option is estimated to overfly 69 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft. and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

24.4 Transition Runways 05L/05R South Option 8B – 2,500ft FAF

Design Principle Evaluation	Option No: 8B
Option Name: Transition RW 05L South Option 8B – 2,500ft FAF	REJECT
Option Name: Transition RW 05R South Option 8B – 2,500ft FAF	REJECT

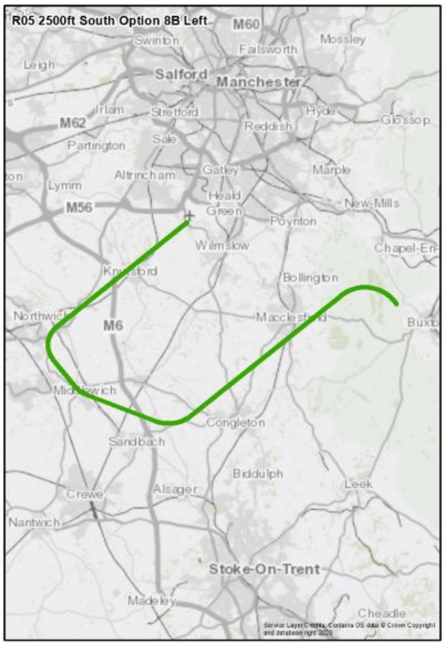
Option Description:

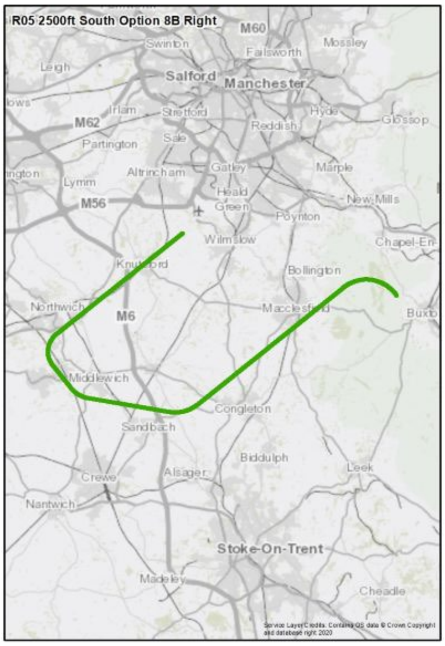
Option 8B has an IAF at 7,000ft to the south-east of the airport in the vicinity of Buxton.

From this location the route splits and turns downwind, to the south of Macclesfield, just north of Congleton, then west just north of Sandbach and over Middlewich to establish aircraft on the final approach at 2,500ft for either Runway 05L or 05R.

The route has been designed to replicate the existing vectoring patterns used by ATC and is anticipated to reduce interactions with Runway 05 southbound departures.

The descent gradient to the FAF is 3.2%/1.83° for Runway 05L and 3.11%/1.78° Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8B L is 64km (35nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 8B R is 65km (35nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 8B L is estimated to overfly approximately 8,300 households with an approximate population of 19,000. Taking account of planned property developments, this option is estimated to impact a total population of 20,300. From 7,000ft, this option is estimated to overfly approximately 20,550 households with an approximate population of 45,100. Taking account of planned property developments, this option is estimated to impact a total population of 52,700. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 8B R is estimated to overfly approximately 9,000 households with an approximate population of 21,200. Taking account of planned property developments, this option is estimated to impact a total population of 26,100. From 7,000ft, this option is estimated to overfly approximately 21,350 households with an approximate population of 47,600. Taking account of planned property developments, this option is estimated to impact a total population of 58,600. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 8B L is estimated to overfly 55 noise sensitive areas. From 7,000ft this option is estimated to overfly 125 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 8B R is estimated to overfly 43 noise sensitive areas. From 7,000ft this option is estimated to overfly 113 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.

Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.

24.5 Transition Runways 05L/05R South Option 9B – 2,500ft FAF

Design Principle Evaluation	Option No: 9B
Option Name: Transition RW 05L South Option 9B – 2,500ft FAF	ACCEPT
Option Name: Transition RW 05R South Option 9B – 2,500ft FAF	ACCEPT

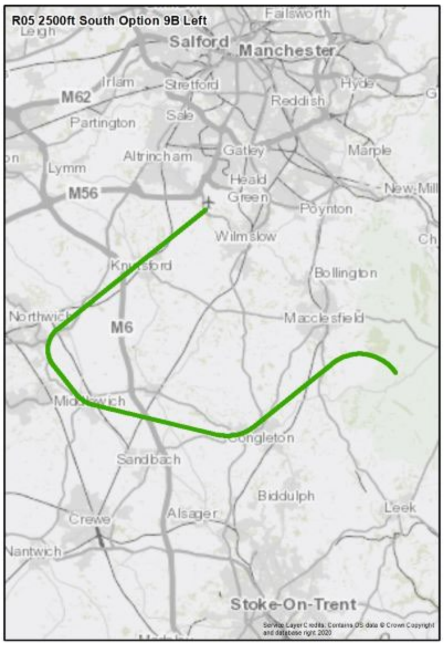
Option Description:

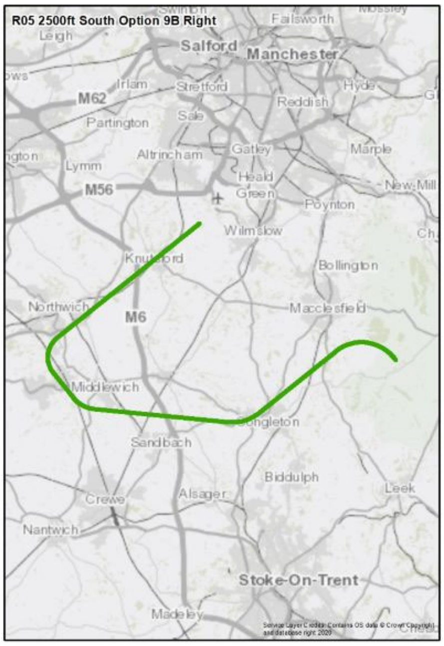
Option 9B has an IAF at 7,000ft to the south-east of the airport in the vicinity of The Roaches.

From this location the route splits and turns downwind, south-west to Congleton, then west just north of Sandbach over Middlewich before turning on to the final approach at 2,500ft for either Runway 05L or 05R.

The route has been designed to replicate the existing vectoring patterns used by ATC and is anticipated to reduce interactions with Runway 05 southbound departures.

The descent gradient to the FAF is 3.82%/2.19° for Runway 05L and 3.67%/2.1° for Runway 05R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 05L, there is a greater likelihood that best use of the capacity of our runways may not be fully attained due to the ATC operational restriction that prohibits the utilisation of Runway 05L for arrivals with Runway 05R being used for departures.

When assessed in isolation for Runway 05R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 9B L is 57km (31nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 9B R is 59km (32nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.				
Design Principle **Noise N1**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 9B L is estimated to overfly approximately 8,900 households with an approximate population of 20,300. Taking account of planned property developments, this option is estimated to impact a total population of 21,900. From 7,000ft, this option is estimated to overfly approximately 19,300 households with an approximate population of 43,300. Taking account of planned property developments, this option is estimated to impact a total population of 50,100. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 9B R is estimated to overfly approximately 9,900 households with an approximate population of 23,300. Taking account of planned property developments, this option is estimated to impact a total population of 28,100. From 7,000ft, this option is estimated to overfly approximately 20,550 households with an approximate population of 46,900. Taking account of planned property developments, this option is estimated to impact a total population of 56,700. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 9B L is estimated to overfly 58 noise sensitive areas. From 7,000ft this option is estimated to overfly 121 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 9B R is estimated to overfly 45 noise sensitive areas. From 7,000ft this option is estimated to overfly 109 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				

Design Principle **Airspace**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a ‘good fit’. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	05L	NOT MET	PARTIAL	MET
	05R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

24.6 Transition Runways 05L/05R South 2,500ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity
Transition south option A2	S	P	C
This was initially designed as **option 2** and is a route based on an IAF7 located to the south-east of the airport. The route has an initial straight leg from the IAF towards the airport where aircraft would make a left turn onto a downwind leg. <u>Safety</u>: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the separation between MAN arrivals and MAN Runway 05 southbound departures. As a result, this option was deemed to not comply with the Design Principle Safety.			
Transition south option B3	S	P	C
An arrival procedure could be created to provide a straight-in transition from the west for Runway 05 at MAN. <u>Safety</u>: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the interaction between MAN arrivals and arrivals to LPL. As a result, this option was deemed to not fully comply with the Design Principle Safety. <u>Policy</u>: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. This option would create interactions with traffic for LPL and not align to the NATS network traffic flow. As a result, this option would not comply with the AMS and therefore the Design Principle Policy.			
Transition south option C4	S	P	C
This was initially designed as **option 4** and is a route based on an IAF located south-east of the airport towards the south of Daventry CTA2. <u>Policy</u>: This option would fall outside of the 'viable and good fit' design envelope and would also not adhere to the CAA containment policy requiring aircraft to remain 3nm or more from the boundary of CAS.			
Transition south option D5	S	P	C
This was initially designed as **option 5** and is a route based on an IAF located south-east of the existing DAYNE hold. <u>Policy</u>: This option would not adhere to the CAA containment policy requiring aircraft to remain 3nm or more from the boundary of CAS.			

25 Transitions Runways 23R/23L North – 3,500ft FAF

25.1 Transition Runways 23R/23L North Option 1A – 3,500ft FAF

<table>
<tr><th>Design Principle Evaluation</th><th>Option No: 1A</th></tr>
<tr><td>Option Name: Transition RW 23L North Option 1A – 3,500ft FAF</td><td>ACCEPT</td></tr>
<tr><td>Option Name: Transition RW 23R North Option 1A – 3,500ft FAF</td><td>ACCEPT</td></tr>
<tr><td>

Option Description:

Option 1A has an IAF at 7,000ft to the north-west of the airport in the vicinity of Aspull. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads east, over Boothstown, Prestwich and Oldham but north of Manchester city centre. Both routes then turn right to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

The descent gradient to the FAF is 2.99%/1.71° for Runway 23L and 2.89%/1.65° for Runway 23R. These gradients are just below the optimum for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.

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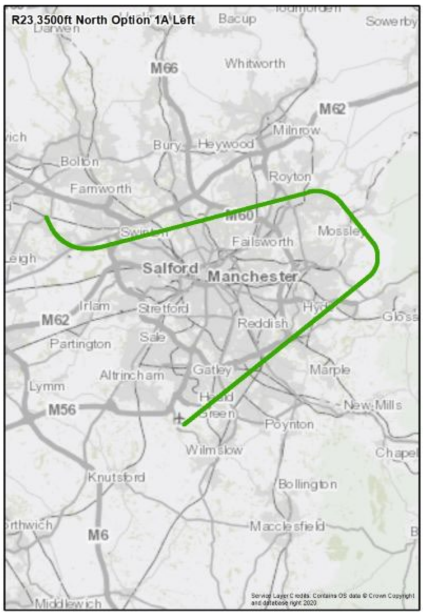

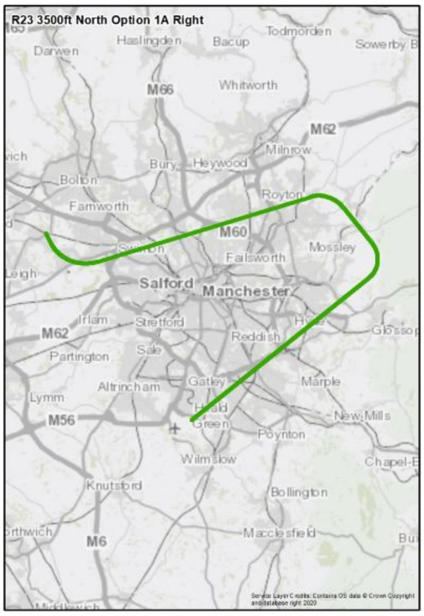

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Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1A L is 63km (34nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. The estimated track length of option 1A R is 64km (35nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 1A L is estimated to overfly approximately 33,000 households with an approximate population of 75,400. Taking account of planned property developments, this option is estimated to impact a total population of 77,100. From 7,000ft, this option is estimated to overfly approximately 132,550 households with an approximate population of 311,900. Taking account of planned property developments, this option is estimated to impact a total population of 320,300. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 1A R is estimated to overfly approximately 24,950 households with an approximate population of 59,000. Taking account of planned property developments, this option is estimated to impact a total population of 59,000. From 7,000ft, this option is estimated to overfly approximately 123,600 households with an approximate population of 292,000. Taking account of planned property developments, this option is estimated to impact a total population of 300,700. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 1A L is estimated to overfly 148 noise sensitive areas.				

From 7,000ft this option is estimated to overfly 627 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 1A R is estimated to overfly 121 noise sensitive areas. From 7,000ft this option is estimated to overfly 565 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

25.2 Transition Runways 23R/23L North Option 3A – 3,500ft FAF

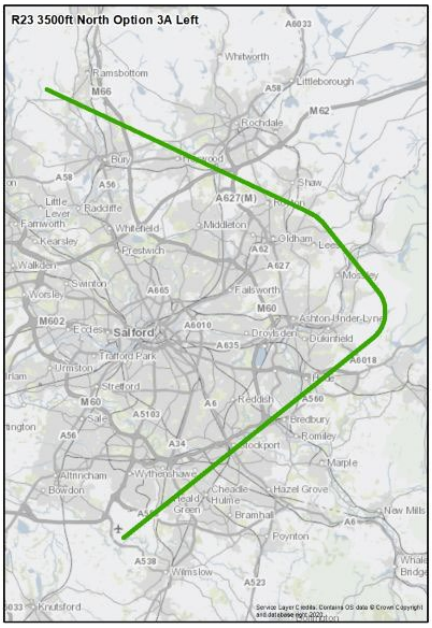
Design Principle Evaluation	Option No: 3A
Option Name: Transition RW 23L North Option 3A – 3,500ft FAF	REJECT
Option Name: Transition RW 23R North Option 3A – 3,500ft FAF	REJECT

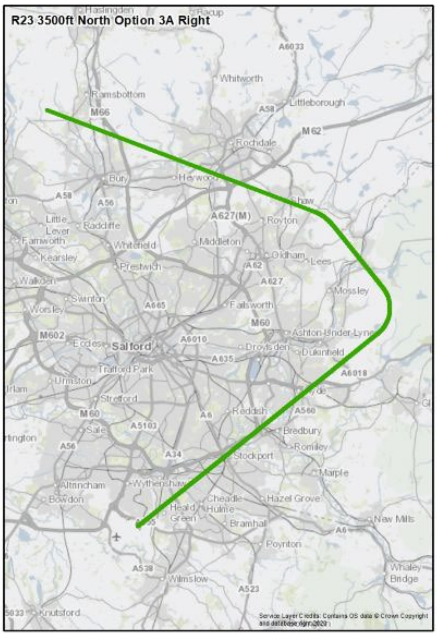
Option Description:

Option 3A has an IAF at 7,000ft to the north of the airport in the vicinity of Hawkshaw approximately 2nm south of the ROSUN hold.

From this location the route splits and heads south-east between Bury and Rochdale. Both routes then turn right to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.35%/1.92° for Runway 23L and 3.3%/1.89° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3A L is 55km (30nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 3A R is 56km (30nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 3A L is estimated to overfly approximately 23,850 households with an approximate population of 54,400. Taking account of planned property developments, this option is estimated to impact a total population of 54,900.

From 7,000ft, this option is estimated to overfly approximately 74,000 households with an approximate population of 171,600. Taking account of planned property developments, this option is estimated to impact a total population of 178,800.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 3R is estimated to overfly approximately 19,650 households with an approximate population of 45,500. Taking account of planned property developments, this option is estimated to impact a total population of 45,700.

From 7,000ft, this option is estimated to overfly approximately 62,200 households with an approximate population of 146,100. Taking account of planned property developments, this option is estimated to impact a total population of 153,000.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 3A L is estimated to overfly 99 noise sensitive areas.

From 7,000ft this option is estimated to overfly 320 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 3A R is estimated to overfly 106 noise sensitive areas. From 7,000ft this option is estimated to overfly 279 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

25.3 Transition Runways23R/23L North Option 6A – 3,500ft FAF

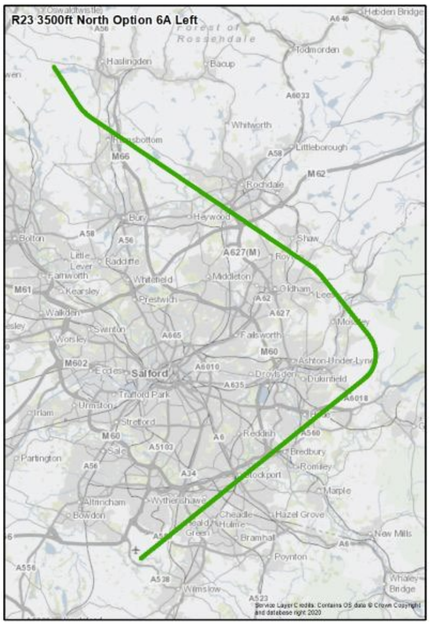
Design Principle Evaluation	Option No: 6A
Option Name: Transition RW 23L North Option 6A – 3,500ft FAF	REJECT
Option Name: Transition RW 23R North Option 6A – 3,500ft FAF	REJECT

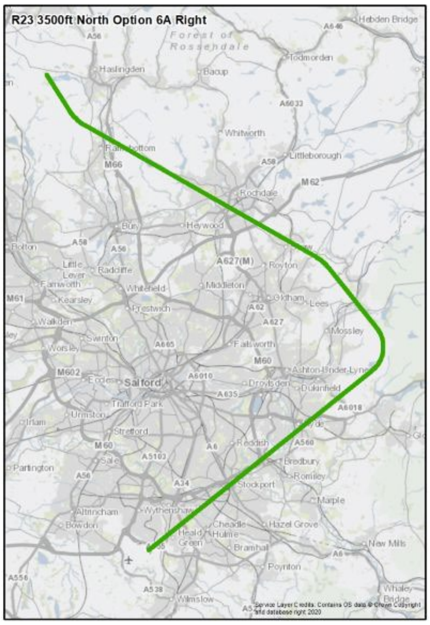
Option Description:

Option 6A has an IAF at 7,000ft to the north-west of the airport co-located with the ROSUN hold.

From this location the route splits and heads south-east, to the east of Bury but overhead Rochdale. Both routes then turn right to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.26%/1.87° for Runway 23L and 3.24%/1.86° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6A L is 60km (32nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. The estimated track length of option 6A R is 60km (32nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 6A L is estimated to overfly approximately 27,300 households with an approximate population of 63,200. Taking account of planned property developments, this option is estimated to impact a total population of 64,600.

From 7,000ft, this option is estimated to overfly approximately 59,500 households with an approximate population of 139,200. Taking account of planned property developments, this option is estimated to impact a total population of 145,200.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 6A R is estimated to overfly approximately 19,400 households with an approximate population of 45,300. Taking account of planned property developments, this option is estimated to impact a total population of 45,400.

From 7,000ft, this option is estimated to overfly approximately 56,500 households with an approximate population of 135,300. Taking account of planned property developments, this option is estimated to impact a total population of 140,200.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 6A L is estimated to overfly 109 noise sensitive areas.

From 7,000ft this option is estimated to overfly 257 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 6A R is estimated to overfly 102 noise sensitive areas. From 7,000ft this option is estimated to overfly 300 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

25.4 Transition Runways 23R/23L North Option 7A – 3,500ft FAF

Design Principle Evaluation	Option No: 7A
Option Name: Transition RW 23L North Option 7A – 3,500ft FAF	ACCEPT
Option Name: Transition RW 23R North Option 7A – 3,500ft FAF	ACCEPT

Option Description:

Option 7A has an IAF at 7,000ft to the north-west of the airport in the vicinity of Harwood. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads south-east between Bolton and Bury but overhead Oldham. Both routes then turn right to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.64%/2.09° for Runway 23L and 3.53%/2.02° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7A L is 57km (31nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared

to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 7A R is 58km (31nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipate

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: From 4,000ft, option 7A L is estimated to overfly approximately 24,450 households with an approximate population of 55,700. Taking account of planned property developments, this option is estimated to impact a total population of 56,200. From 7,000ft, this option is estimated to overfly approximately 102,950 households with an approximate population of 237,600. Taking account of planned property developments, this option is estimated to impact a total population of 257,000. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 7A R is estimated to overfly approximately 19,000 households with an approximate population of 44,000. Taking account of planned property developments, this option is estimated to impact a total population of 44,200. From 7,000ft, this option is estimated to overfly approximately 84,800 households with an approximate population of 195,600. Taking account of planned property developments, this option is estimated to impact a total population of 215,100. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment: From 4,000ft option 7A L is estimated to overfly 100 noise sensitive areas. From 7,000ft this option is estimated to overfly 425 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 7A R is estimated to overfly 105 noise sensitive areas. From 7,000ft this option is estimated to overfly 377 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

25.5 Transition Runways 23R/23L North Option 8A – 3,500ft FAF

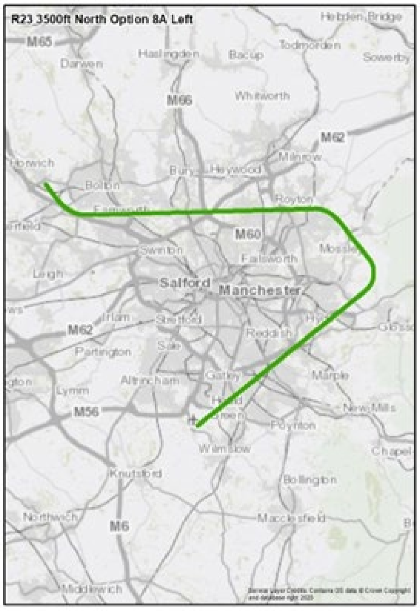
Design Principle Evaluation	Option No: 8A
Option Name: Transition RW 23L North Option 8A – 3,500ft FAF	ACCEPT
Option Name: Transition RW 23R North Option 8A – 3,500ft FAF	ACCEPT

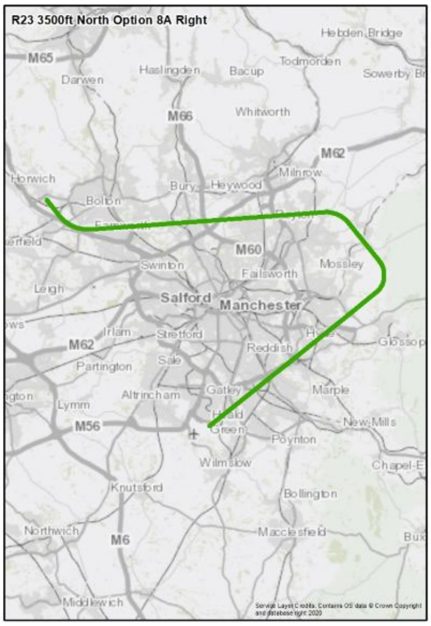
Option Description:

Option 8A has an IAF at 7,000ft to the north-west of the airport in the vicinity of the Middlebrook Retail Park, co-located with the IAF for option 05L/05R North 8A. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads east, to the south of Bury and Rochdale. Both routes then turn right to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

The descent gradient to the FAF is 2.84%/1.63° for Runway 23L and 2.76%/1.58° for Runway 23R. These gradients are below the optimum for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.





Design Principle	Runway			
Design Principle **Safety**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle	Runway			
Design Principle **Policy**	23L	NOT MET	PARTIAL	**MET**
	23R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle	Runway			
Design Principle **Capacity**	23L	NOT MET	**PARTIAL**	MET
	23R	NOT MET	PARTIAL	**MET**

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle	Runway			
Design Principle **Emissions**	23L	NOT MET	**PARTIAL**	MET
	23R	NOT MET	**PARTIAL**	MET

Summary of Qualitative Assessment:

The estimated track length of option 8A L is 65km (35nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. The estimated track length of option 8A R is 66km (36nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 8A L is estimated to overfly approximately 34,900 households with an approximate population of 82,700. Taking account of planned property developments, this option is estimated to impact a total population of 85,000. From 7,000ft, this option is estimated to overfly approximately 122,500 households with an approximate population of 288,300. Taking account of planned property developments, this option is estimated to impact a total population of 304,200. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 8A R is estimated to overfly approximately 27,200 households with an approximate population of 64,000. Taking account of planned property developments, this option is estimated to impact a total population of 65,800. From 7,000ft, this option is estimated to overfly approximately 109,500 households with an approximate population of 257,700. Taking account of planned property developments, this option is estimated to impact a total population of 273,600. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 8A L is estimated to overfly 155 noise sensitive areas.				

From 7,000ft this option is estimated to overfly 534 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 8A R is estimated to overfly 144 noise sensitive areas. From 7,000ft this option is estimated to overfly 491 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

25.6 Transition Runways 23R/23L North Option 11A – 3,500ft FAF

Design Principle Evaluation	Option No: 11A
Option Name: Transition RW 23L North Option 11A – 3,500ft FAF	ACCEPT
Option Name: Transition RW 23R North Option 11A – 3,500ft FAF	ACCEPT

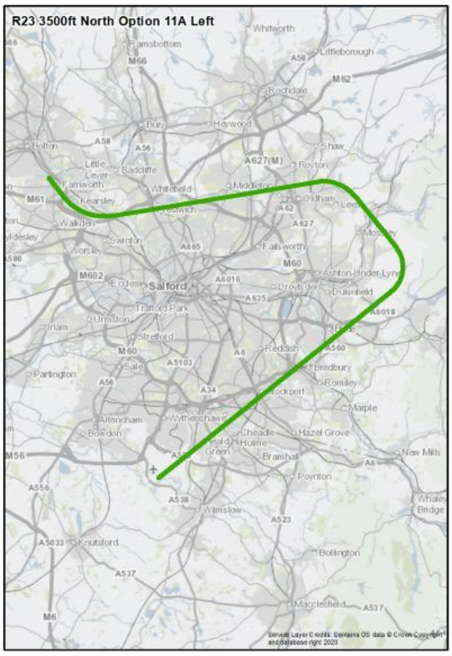
Option Description:

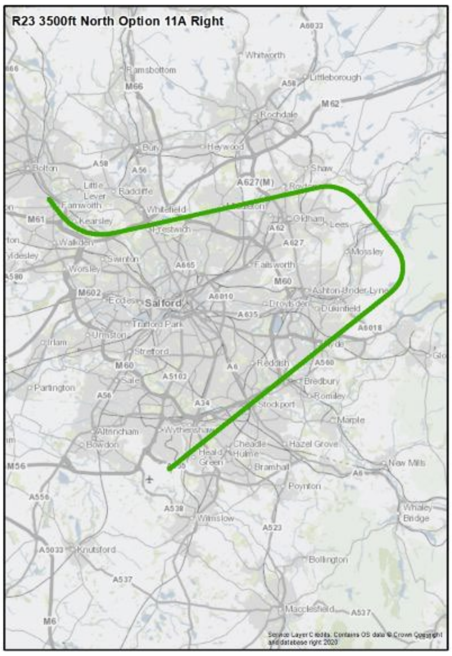
Option 11A has an IAF at 7,000ft to the north-west of the airport in the vicinity of Worsley, co-located with the IAF for option 05L/05R North 13. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads south-east overhead Farnworth, then heads east, just to the north of Prestwich overhead Oldham. Both routes then turn right to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

This option is included to provide a design option from an IAF created specifically for Runways 05L/05R (05L/05R 2,000ft FAF option 13), where design options were required that minimise the impact on LPL Runway 27 arrivals.

The descent gradient to the FAF is 3.59%/2.05° for Runway 23L and 3.44%/1.97° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 11A L is 57km (31nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 11A R is 58km (31nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 11A L is estimated to overfly approximately 24,400 households with an approximate population of 55,600. Taking account of planned property developments, this option is estimated to impact a total population of 56,900.

From 7,000ft, this option is estimated to overfly approximately 119,400 households with an approximate population of 280,300. Taking account of planned property developments, this option is estimated to impact a total population of 287,700.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 11A R is estimated to overfly approximately 19,100 households with an approximate population of 44,400. Taking account of planned property developments, this option is estimated to impact a total population of 44,500.

From 7,000ft, this option is estimated to overfly approximately 109,900 households with an approximate population of 257,200. Taking account of planned property developments, this option is estimated to impact a total population of 263,900.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 11A L is estimated to overfly 103 noise sensitive areas.

From 7,000ft this option is estimated to overfly 512 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 11A R is estimated to overfly 105 noise sensitive areas. From 7,000ft this option is estimated to overfly 496 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

25.7 Transition Runways 23R/23L North 3,500ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity
Transition north option A2	S	P	C
This was initially designed as **option 2** and is a route based on the IAF STEAK located to the north-west of the airport. The route has an initial straight leg from the IAF towards the airport where aircraft would make a left turn onto a downwind leg. Safety: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the separation between MAN arrivals and MAN Runway 23 northbound departures. As a result, this option was deemed to not comply with the Design Principle Safety.			
Transition north option B4	S	P	C
This was initially designed as **option 4** and is a route based on an IAF located north of Blackburn and TMA1. It was considered as an option to facilitate a CDA to both runways; however, the profile for Runway 23R/23L would be sub optimal (<1.5°). Policy: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as it would not provide a CDA to both runway direction directions, leading to increased fuel burn and noise impact.			
Transition north option C5	S	P	C
This was initially designed as **option 5** and is a route based on an IAF located northwest of the ROSUN hold. It was considered as an option to facilitate a CDA to both runways; however, the profile for Runway 23R/23L would be sub optimal (<1.5°). Policy: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as it would not provide a CDA to both runway direction directions, leading to increased fuel burn and noise impact.			
Transitin north option D9	S	P	C
An option was considered with a new IAF co-located with IAF7 for the Runway 05L/05R option north 7A. It was considered as an option to facilitate a CDA to both runways; however, the profile for Runway 23R/23L would be sub optimal (<1.5°). Policy: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as			

it would not provide a CDA to both runway direction directions, leading to increased fuel burn and noise impact.			
Transition north option E10	S	P	C
An option was considered with a new IAF co-located with the IAF for the Runway 05L/05R option north 6A. It was considered as an option to facilitate a CDA to both runways; however, the profile for Runway 23R/23L would be sub optimal (<1.5°). Policy: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as it would not provide a CDA to both runway direction directions, leading to increased fuel burn and noise impact.			
Transition north option F12	S	P	C
This was initially designed as **option 12** and has an IAF co-located with the IAF for the Runway 05L/05R option north 12. It was considered as an option minimise the interactions with LPL Runway 27 arrivals and to facilitate a CDA to both MAN runways; however, the profile for Runway 23R/23L would be sub optimal (<1.5°). Policy: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as it would not provide a CDA to both runway direction directions, leading to increased fuel burn and noise impact.			

26 Transitions Runways 23R/23L North – 3,000ft FAF

26.1 Transition Runways 23R/23L North Option 1B – 3,000ft FAF

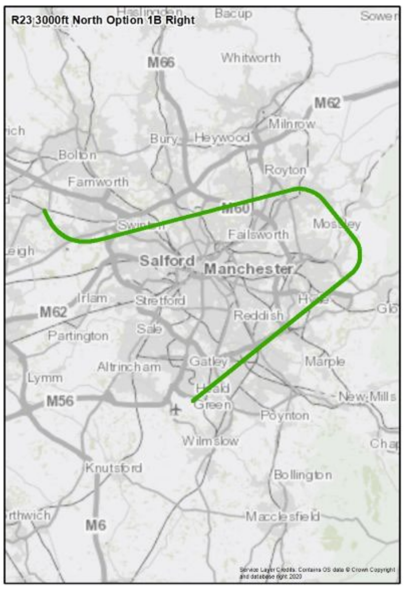
Design Principle Evaluation	Option No: 1A
Option Name: Transition RW 23L North Option 1B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R North Option 1B – 3,000ft FAF	REJECT

Option Description:

Option 1B has an IAF at 7,000ft to the north-west of the airport in the vicinity of Aspull. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads east, over Boothstown, Prestwich and Oldham but north of Manchester City Centre. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.68%/2.11° for Runway 23L and 3.54%/2.03° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1B L is 57km (31nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 1B R is 58km (31nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 1B L is estimated to overfly approximately 44,000 households with an approximate population of 113,600. Taking account of planned property developments, this option is estimated to impact a total population of 115,400. From 7,000ft, this option is estimated to overfly approximately 136,300 households with an approximate population of 334,700. Taking account of planned property developments, this option is estimated to impact a total population of 345,500. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 1B R is estimated to overfly approximately 46,200 households with an approximate population of 112,100. Taking account of planned property developments, this option is estimated to impact a total population of 115,600. From 7,000ft, this option is estimated to overfly approximately 137,250 households with an approximate population of 325,700. Taking account of planned property developments, this option is estimated to impact a total population of 335,400. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 1B L is estimated to overfly 225 noise sensitive areas.				

From 7,000ft this option is estimated to overfly 698 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft. From 4,000ft option 1B R is estimated to overfly 265 noise sensitive areas. From 7,000ft this option is estimated to overfly 671 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

26.2 Transition Runways 23R/23L North Option 3B – 3,000ft FAF

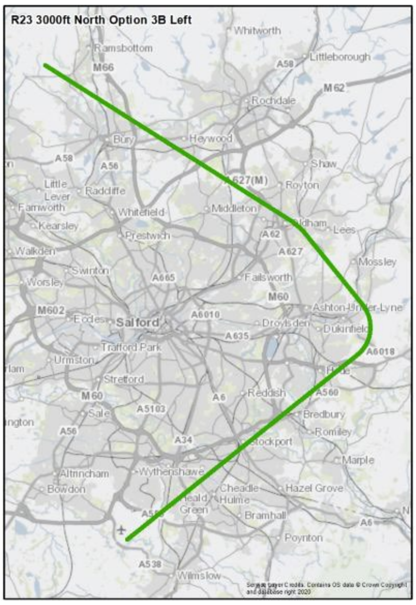
Design Principle Evaluation	Option No: 3B
Option Name: Transition RW 23L North Option 3B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R North Option 3B – 3,000ft FAF	REJECT

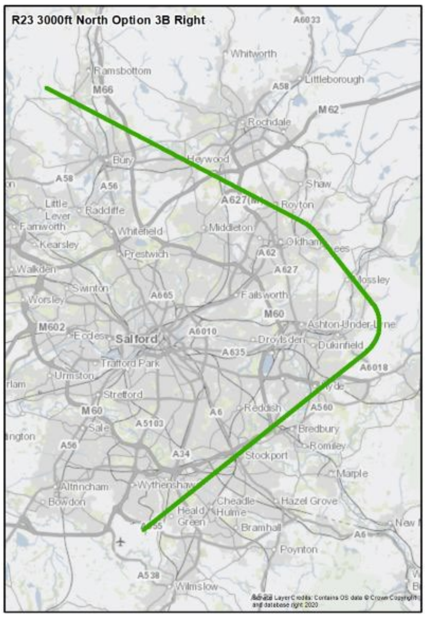
Option Description:

Option 3B has an IAF at 7,000ft to the north of the airport in the vicinity of Hawkshaw approximately 2nm south of the ROSUN hold.

From this location the route splits and heads south-east between Bury and Rochdale. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.96%/2.27° for Runway 23L and 3.93%/2.25° for Runway 23R. These gradients are within the optimum range for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 3B L is 51km (28nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 3B R is 51km (28nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 3B L is estimated to overfly approximately 31,000 households with an approximate population of 73,900. Taking account of planned property developments, this option is estimated to impact a total population of 76,100.

From 7,000ft, this option is estimated to overfly approximately 87,300 households with an approximate population of 213,400. Taking account of planned property developments, this option is estimated to impact a total population of 222,300.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 3B R is estimated to overfly approximately 33,650 households with an approximate population of 78,200. Taking account of planned property developments, this option is estimated to impact a total population of 81,400.

From 7,000ft, this option is estimated to overfly approximately 82,400 households with an approximate population of 192,000. Taking account of planned property developments, this option is estimated to impact a total population of 199,700.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 3B L is estimated to overfly 130 noise sensitive areas.

From 7,000ft this option is estimated to overfly 429 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 3B R is estimated to overfly 158 noise sensitive areas. From 7,000ft this option is estimated to overfly 375 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

26.3 Transition Runways 23R/23L North Option 6B – 3,000ft FAF

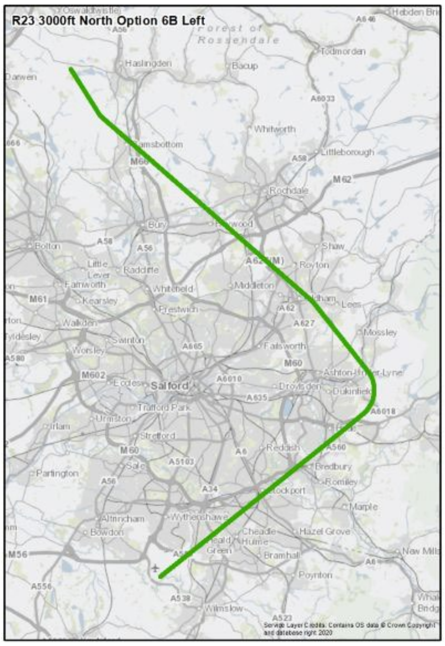
Design Principle Evaluation	Option No: 6B
Option Name: Transition RW 23L North Option 6B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R North Option 6B – 3,000ft FAF	REJECT

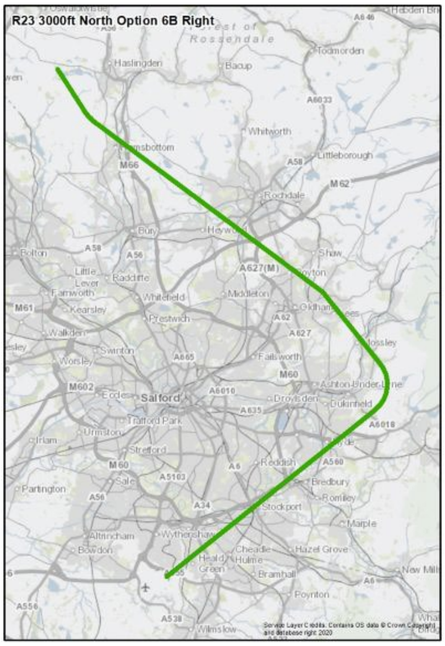
Option Description:

Option 6B has an IAF at 7,000ft to the north-west of the airport co-located with the ROSUN hold.

From this location the route splits and heads south-east, to the east of Bury but overhead Rochdale. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.81%/2.19° for Runway 23L and 3.8%/2.18° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle	Runway			
Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle	Runway			
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle	Runway			
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle	Runway			
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6B L is 57km (31nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 6B R is 57km (31nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 6B L is estimated to overfly approximately 39,250 households with an approximate population of 100,000. Taking account of planned property developments, this option is estimated to impact a total population of 101,500.

From 7,000ft, this option is estimated to overfly approximately 62,650 households with an approximate population of 153,700. Taking account of planned property developments, this option is estimated to impact a total population of 158,100.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 6B R is estimated to overfly approximately 39,800 households with an approximate population of 92,700. Taking account of planned property developments, this option is estimated to impact a total population of 96,400.

From 7,000ft, this option is estimated to overfly approximately 63,200 households with an approximate population of 147,200. Taking account of planned property developments, this option is estimated to impact a total population of 154,600.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 6B L is estimated to overfly 204 noise sensitive areas.

From 7,000ft this option is estimated to overfly 319 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 6B R is estimated to overfly 178 noise sensitive areas. From 7,000ft this option is estimated to overfly 281 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

26.4 Transition Runways 23R/23L North Option 7B – 3,000ft FAF

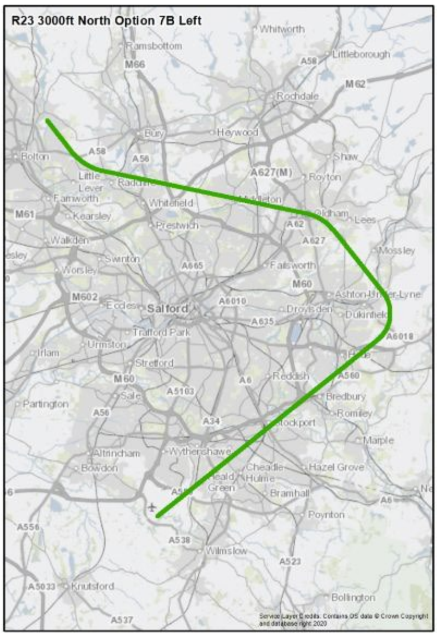
Design Principle Evaluation	Option No: 7B
Option Name: Transition RW 23L North Option 7B – 3,000ft FAF	ACCEPT
Option Name: Transition RW 23R North Option 7B – 3,000ft FAF	ACCEPT

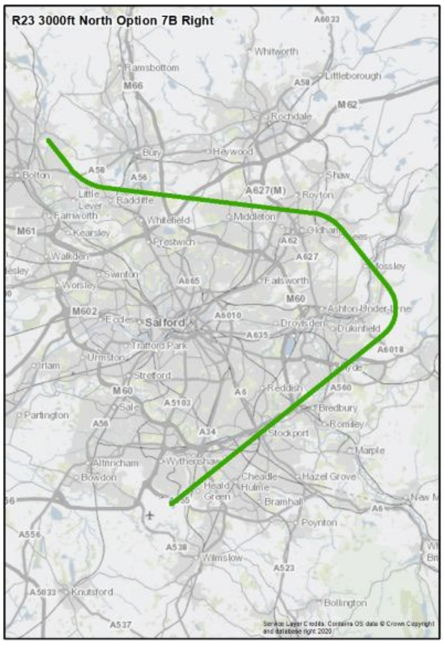
Option Description:

Option 7B has an IAF at 7,000ft to the north-west of the airport in the vicinity of Harwood. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads south-east between Bolton and Bury but overhead Oldham. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 4.45%/2.55° for Runway 23L and 4.32%/2.48° for Runway 23R. These gradients are optimal for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7B L is 52km (28nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 7B R is 53km (29nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 7B L is estimated to overfly approximately 33,150 households with an approximate population of 82,300. Taking account of planned property developments, this option is estimated to impact a total population of 84,400.

From 7,000ft, this option is estimated to overfly approximately 118,050 households with an approximate population of 283,400. Taking account of planned property developments, this option is estimated to impact a total population of 303,000.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 7B R is estimated to overfly approximately 36,700 households with an approximate population of 85,500. Taking account of planned property developments, this option is estimated to impact a total population of 88,700.

From 7,000ft, this option is estimated to overfly approximately 111,900 households with an approximate population of 260,500. Taking account of planned property developments, this option is estimated to impact a total population of 280,000.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 7B L is estimated to overfly 131 noise sensitive areas.

From 7,000ft this option is estimated to overfly 532 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 7B R is estimated to overfly 164 noise sensitive areas. From 7,000ft this option is estimated to overfly 485 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

26.5 Transition Runways 23R/23L North Option 8B – 3,000ft FAF

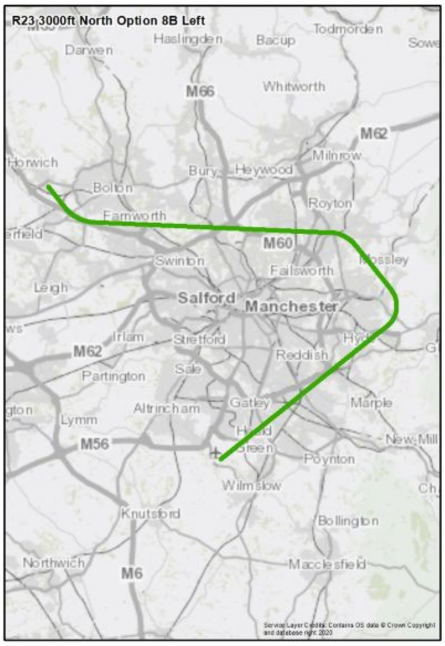
Design Principle Evaluation	Option No: 8B
Option Name: Transition RW 23L North Option 8B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R North Option 8B – 3,000ft FAF	REJECT

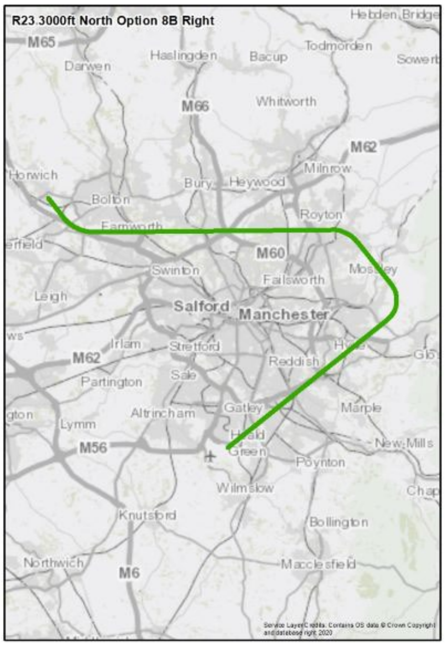
Option Description:

Option 8B has an IAF at 7,000ft to the north-west of the airport co-located with the IAF for option 05L/05R North 8A. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads east, to the south of Bury and Rochdale. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.45%/1.98° for Runway 23L and 3.36%/1.92° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8B L is 60km (32nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

The estimated track length of option 8B R is 61km (33nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 8B L is estimated to overfly approximately 43,550 households with an approximate population of 113,100. Taking account of planned property developments, this option is estimated to impact a total population of 114,700.

From 7,000ft, this option is estimated to overfly approximately 118,900 households with an approximate population of 289,500. Taking account of planned property developments, this option is estimated to impact a total population of 302,000.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 8B R is estimated to overfly approximately 47,750 households with an approximate population of 116,200. Taking account of planned property developments, this option is estimated to impact a total population of 120,100.

From 7,000ft, this option is estimated to overfly approximately 128,450 households with an approximate population of 304,700. Taking account of planned property developments, this option is estimated to impact a total population of 321,200.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 8B L is estimated to overfly 235 noise sensitive areas.

From 7,000ft this option is estimated to overfly 542 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft. From 4,000ft option 8B R is estimated to overfly 234 noise sensitive areas. From 7,000ft this option is estimated to overfly 583 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

26.6 Transition Runways 23R/23L North Option 9B – 3,000ft FAF

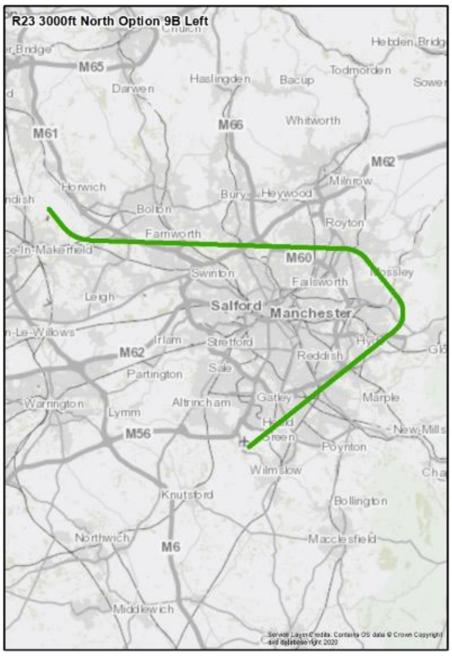
Design Principle Evaluation	Option No: 9B
Option Name: Transition RW 23L North Option 9B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R North Option 9B – 3,000ft FAF	REJECT

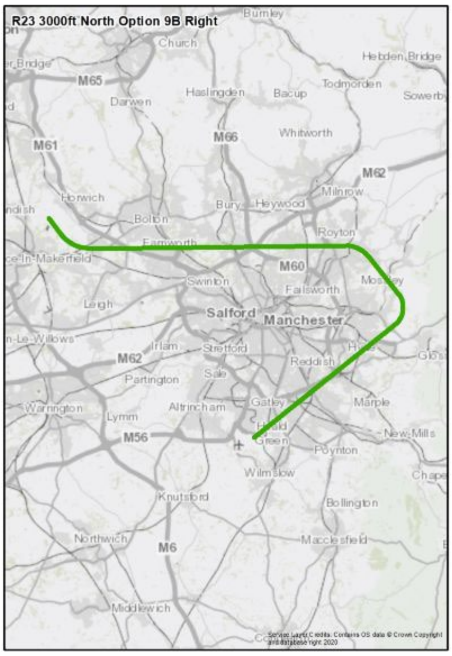
Option Description:

Option 9B has an IAF at 7,000ft to the north-west of the airport co-located with the IAF for option 05L/05R North 7B. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads east, to the south of Bolton and Bury but overhead Oldham. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.01%/1.72° for Runway 23L and 2.93%/1.68° for Runway 23R. These gradients are below the optimum for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 9B L is 65km (35nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. The estimated track length of option 9B R is 66km (36nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 9B L is estimated to overfly approximately 48,300 households with an approximate population of 122,200. Taking account of planned property developments, this option is estimated to impact a total population of 123,600. From 7,000ft, this option is estimated to overfly approximately 115,050 households with an approximate population of 277,800. Taking account of planned property developments, this option is estimated to impact a total population of 287,500. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 9B R is estimated to overfly approximately 57,200 households with an approximate population of 136,600. Taking account of planned property developments, this option is estimated to impact a total population of 141,100. From 7,000ft, this option is estimated to overfly approximately 127,850 households with an approximate population of 302,700. Taking account of planned property developments, this option is estimated to impact a total population of 316,000. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 9B L is estimated to overfly 248 noise sensitive areas.				

From 7,000ft this option is estimated to overfly 514 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft. From 4,000ft option 9B R is estimated to overfly 269 noise sensitive areas. From 7,000ft this option is estimated to overfly 561 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

26.7 Transition Runways 23R/23L North Option 10B – 3,000ft FAF

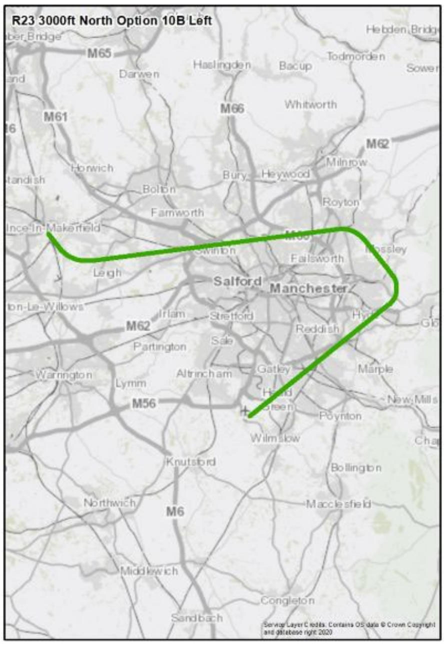
Design Principle Evaluation	Option No: 10B
Option Name: Transition RW 23L Option 10B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R North Option 10B – 3,000ft FAF	REJECT

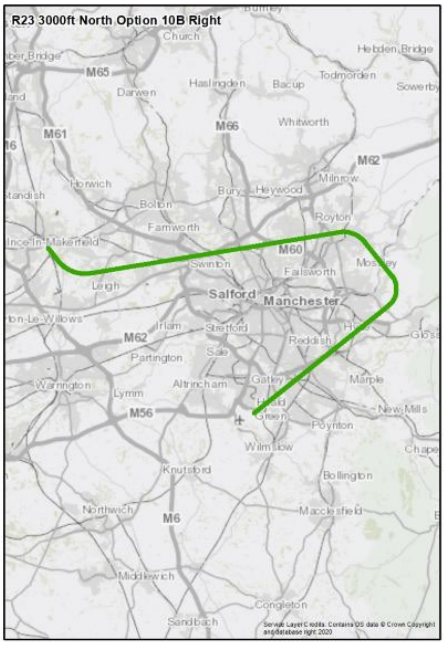
Option Description:

Option 10B has an IAF at 7,000ft to the north-west of the airport co-located with the IAF for option 05L/R North 6B. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads east, overhead Prestwich, Chadderton and Oldham but north of Manchester City Centre. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 2.92%/1.67° for Runway 23L and 2.84%/1.63° for Runway 23R. These gradients are below the optimum for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 10B L is 66km (36nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

The estimated track length of option 10B R is 67km (36nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 10B L is estimated to overfly approximately 49,800 households with an approximate population of 126,200. Taking account of planned property developments, this option is estimated to impact a total population of 128,100.

From 7,000ft, this option is estimated to overfly approximately 140,200 households with an approximate population of 332,000. Taking account of planned property developments, this option is estimated to impact a total population of 348,200.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.

From 4,000ft, option 10B R is estimated to overfly approximately 56,700 households with an approximate population of 136,400. Taking account of planned property developments, this option is estimated to impact a total population of 140,900.

From 7,000ft, this option is estimated to overfly approximately 144,600 households with an approximate population of 332,900. Taking account of planned property developments, this option is estimated to impact a total population of 353,100.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 10B L is estimated to overfly 256 noise sensitive areas.

From 7,000ft this option is estimated to overfly 685 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.

From 4,000ft option 10B R is estimated to overfly 281 noise sensitive areas.

From 7,000ft this option is estimated to overfly 676 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.

Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.

Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.

26.8 Transition Runways 23R/23L North Option 11B – 3,000ft FAF

Design Principle Evaluation	Option No: 11B
Option Name: Transition RW 23L North Option 11B – 3,000ft FAF	ACCEPT
Option Name: Transition RW 23R North Option 11B – 3,000ft FAF	ACCEPT

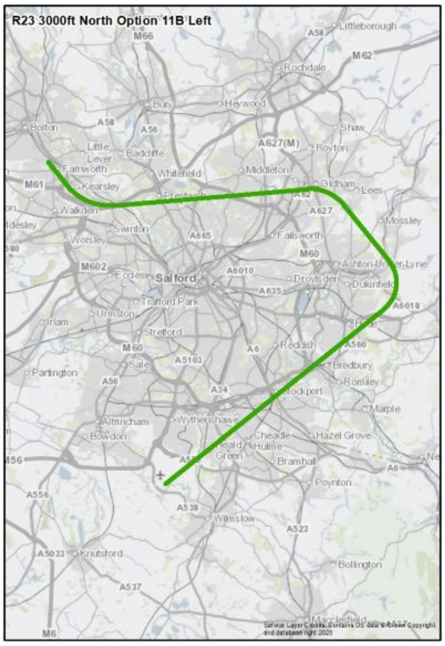
Option Description:

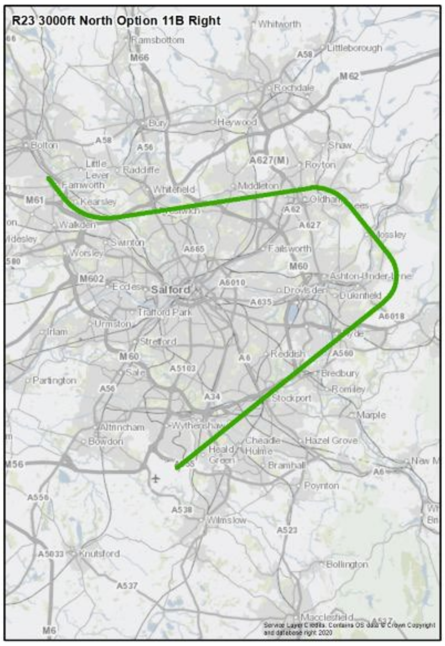
Option 11B has an IAF at 7,000ft to the north-west of the airport in the vicinity of Worsley, co-located with the IAF for option 05L/05R North 13. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads south-east overhead Farnworth, then heads east, just to the north of Prestwich overhead Oldham. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

This option is included to provide a design option from an IAF created specifically for Runways 05L/05R (05L/05R 2,000ft FAF option 13), where design options were required that minimise the impact on LPL Runway 27 arrivals.

The descent gradient to the FAF is 4.45%/2.55° for Runway 23L and 4.27%/2.45° for Runway 23R. These gradients are optimal for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations. At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.				
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.				
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised. When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment:				

The estimated track length of option 11B L is 52km (28nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 11B R is 53km (29nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 11B L is estimated to overfly approximately 32,950 households with an approximate population of 81,600. Taking account of planned property developments, this option is estimated to impact a total population of 83,700.

From 7,000ft, this option is estimated to overfly approximately 124,100 households with an approximate population of 304,100. Taking account of planned property developments, this option is estimated to impact a total population of 309,800.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 11B R is estimated to overfly approximately 37,550 households with an approximate population of 87,600. Taking account of planned property developments, this option is estimated to impact a total population of 90,900.

From 7,000ft, this option is estimated to overfly approximately 123,350 households with an approximate population of 291,100. Taking account of planned property developments, this option is estimated to impact a total population of 299,800.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 11B L is estimated to overfly 130 noise sensitive areas.

From 7,000ft this option is estimated to overfly 545 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 11B R is estimated to overfly 164 noise sensitive areas. From 7,000ft this option is estimated to overfly 553 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

26.9 Transition Runways 23R/23L North Option 12B – 3,000ft FAF

Design Principle Evaluation	Option No: 12B
Option Name: Transition RW 23L North Option 12B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R North Option 12B – 3,000ft FAF	ACCEPT

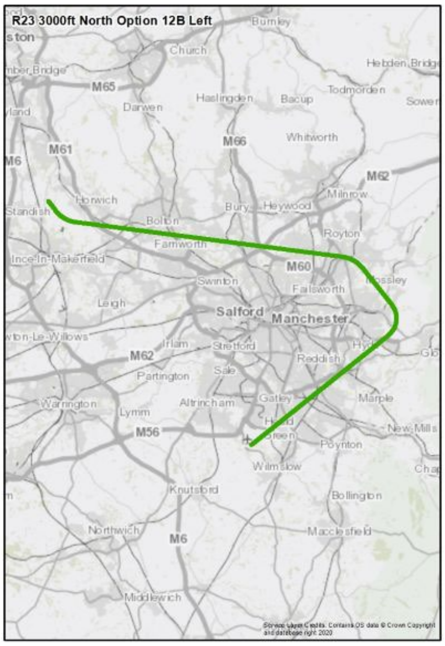
Option Description:

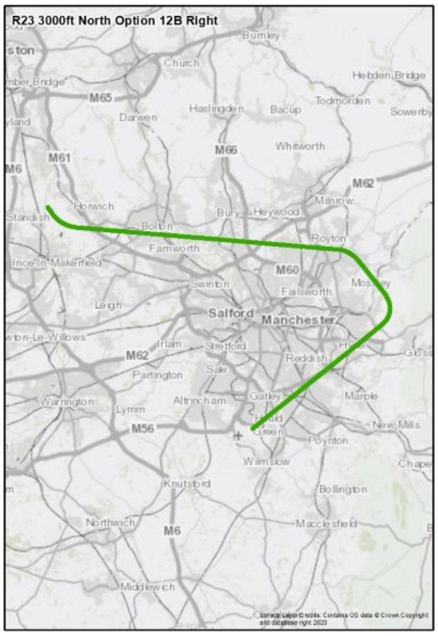
Option 12B has an IAF at 7,000ft to the north-west of the airport in the vicinity of Bolton, co-located with the IAF for option 05L/05R North 12.

From this location the route splits and heads east overhead Bolton and Oldham but north of Manchester City Centre. Both routes then turn right to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

This option is included to provide a design option from an IAF created specifically for Runways 05L/05R (05L/05R 2,000ft FAF option 12), where design options were required that minimise the impact on LPL Runway 27 arrivals.

The descent gradient to the FAF is 2.80%/1.61° for Runway 23L and 2.75%/1.57° for Runway 23R. These gradients are below the optimum for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 12B L is 67km (36nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated. The estimated track length of option 12B R is 67km (36nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 12B L is estimated to overfly approximately 51,600 households with an approximate population of 128,900. Taking account of planned property developments, this option is estimated to impact a total population of 130,900.

From 7,000ft, this option is estimated to overfly approximately 121,200 households with an approximate population of 296,000. Taking account of planned property developments, this option is estimated to impact a total population of 309,000.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.

From 4,000ft, option 12B R is estimated to overfly approximately 56,550 households with an approximate population of 133,600. Taking account of planned property developments, this option is estimated to impact a total population of 138,700.

From 7,000ft, this option is estimated to overfly approximately 127,500 households with an approximate population of 303,400. Taking account of planned property developments, this option is estimated to impact a total population of 321,600.

When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.

Design Principle **Noise N2**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**				
	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 12B L is estimated to overfly 264 noise sensitive areas.

From 7,000ft this option is estimated to overfly 601 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft. From 4,000ft option 12B R is estimated to overfly 254 noise sensitive areas. From 7,000ft this option is estimated to overfly 621 noise sensitive areas. When compared to the MIRSI 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. When compared to the ROSUN 'do nothing' scenario, this is less than or similar at 7,000ft, but greater at 4,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

26.10 Transition Runways 23R/23L North 3,000ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity
Transition north option A2	S	P	C
This was initially designed as **option 2** and is a route based on the IAF STEAK located to the northwest of the airport. The route has an initial straight leg from the IAF towards the airport where aircraft would make a left turn onto a downwind leg. <u>Safety</u>: The Design Principle Safety requires design options to be safe in accordance with national and international industry standards and regulations. This option raised safety concerns with regards to the separation between MAN arrivals and MAN Runway 23 northbound departures. As a result, this option was deemed to not comply with the Design Principle Safety.			
Transition north option B4	S	P	C
This was initially designed as **option 4** and is a route based on an IAF located north of Blackburn and TMA1. It was considered as an option to facilitate a CDA to both runways; however, the profile for Runway 23R/23L would be sub optimal (<1.5°). <u>Policy</u>: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as it would not provide a CDA to both runway direction directions, leading to increased fuel burn and noise impact.			
Transition north option C5	S	P	C
This was initially designed as **option 5** and is a route based on an IAF located north-west of the ROSUN hold. It was considered as an option to facilitate a CDA to both runways; however, the profile for Runway 23R/23L would be sub optimal (<1.5°). <u>Policy</u>: Within the AMS, one of the initiatives that revised airspace must deliver is improved environmental performance. This option would not comply with this initiative (and therefore the Design Principle Policy) as it would not provide a CDA to both runway direction directions, leading to increased fuel burn and noise impact.			

27 Transitions Runways 23R/23L South – 3,500ft FAF

27.1 Transition Runways 23R/23L South Option 1A – 3,500ft FAF

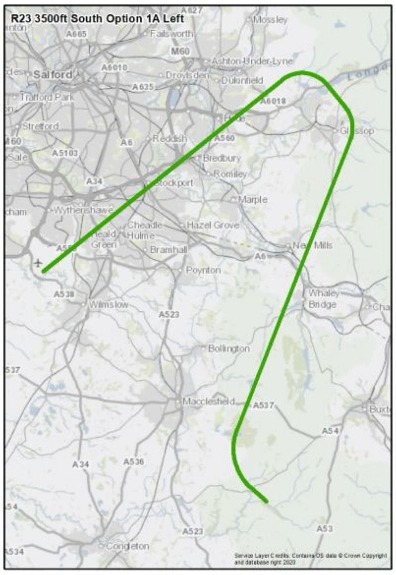
Design Principle Evaluation	Option No: 1A
Option Name: Transition RW 23L South Option 1A – 3,500ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 1A – 3,500ft FAF	ACCEPT

Option Description:

Option 1A has an IAF at 7,000ft to the south-east of the airport in the vicinity of Sutton. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads north-east, just to the west of Whaley Bridge and then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.15%/1.80° for Runway 23L and 3.02%/1.73° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.



Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1A L is 61km (33nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 1A R is 62km (33nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 1A L is estimated to overfly approximately 19,500 households with an approximate population of 43,800. Taking account of planned property developments, this option is estimated to impact a total population of 43,800. From 7,000ft, this option is estimated to overfly approximately 25,000 households with an approximate population of 55,800. Taking account of planned property developments, this option is estimated to impact a total population of 57,200. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 1A R is estimated to overfly approximately 17,000 households with an approximate population of 39,600. Taking account of planned property developments, this option is estimated to impact a total population of 39,600. From 7,000ft, this option is estimated to overfly approximately 22,600 households with an approximate population of 51,800. Taking account of planned property developments, this option is estimated to impact a total population of 53,200. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 1A L is estimated to overfly 77 noise sensitive areas. From 7,000ft this option is estimated to overfly 102 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 1A R is estimated to overfly 80 noise sensitive areas. From 7,000ft this option is estimated to overfly 105 noise sensitive areas.				

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

27.2 Transition Runways 23R/23L South Option 2A – 3,500ft FAF

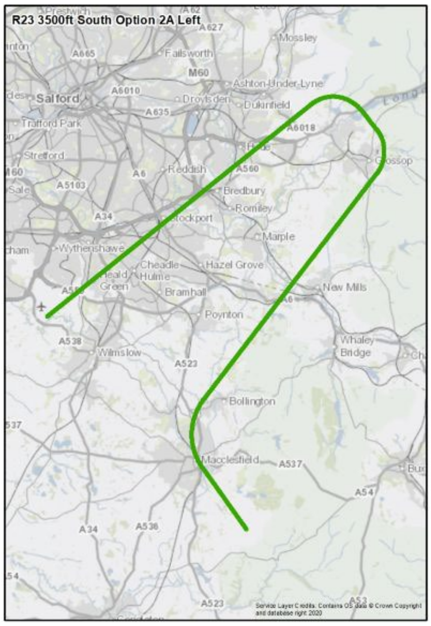
Design Principle Evaluation	Option No: 2A
Option Name: Transition RW 23L South Option 2A – 3,500ft FAF	REJECT
Option Name: Transition RW 23R South Option 2A – 3,500ft FAF	REJECT

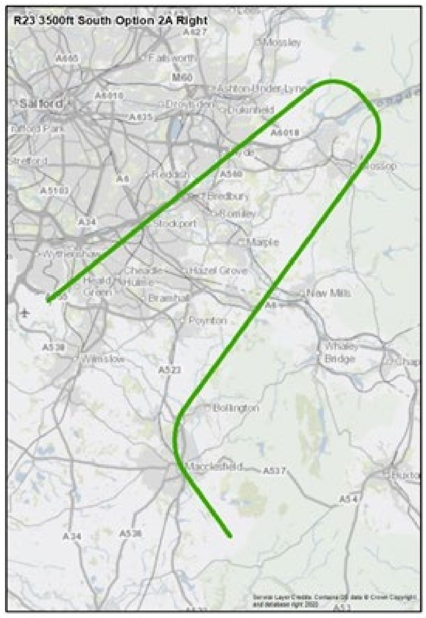
Option Description:

Option 2A has an IAF at 7,000ft to the south-east of the airport in the vicinity of Sutton. It is designed to facilitate a CDA profile to all runways.

From this location the route overflies Macclesfield, splits and heads north-east, just to the west of Whaley Bridge and then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

The descent gradient to the FAF is 2.83%/1.62° for Runway 23L and 2.73%/1.56° for Runway 23R. These gradients are below the optimum for low noise approaches but just within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2A L is 61km (33nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 2A R is 62km (33nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 2A L is estimated to overfly approximately 21,450 households with an approximate population of 47,800. Taking account of planned property developments, this option is estimated to impact a total population of 47,800.

From 7,000ft, this option is estimated to overfly approximately 47,450 households with an approximate population of 104,200. Taking account of planned property developments, this option is estimated to impact a total population of 106,300.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 2A R is estimated to overfly approximately 20,600 households with an approximate population of 47,200. Taking account of planned property developments, this option is estimated to impact a total population of 47,200.

From 7,000ft, this option is estimated to overfly approximately 46,450 households with an approximate population of 103,100. Taking account of planned property developments, this option is estimated to impact a total population of 105,200.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 2A L is estimated to overfly 88 noise sensitive areas.

From 7,000ft this option is estimated to overfly 236 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 2A R is estimated to overfly 108 noise sensitive areas.

From 7,000ft this option is estimated to overfly 257 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

27.3 Transition Runways 23R/23L South Option 6A – 3,500ft FAF

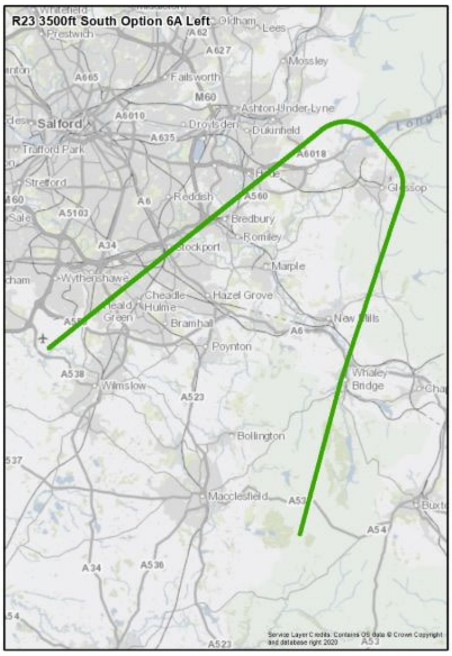
Design Principle Evaluation	Option No: 6A
Option Name: Transition RW 23L South Option 6A – 3,500ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 6A – 3,500ft FAF	ACCEPT

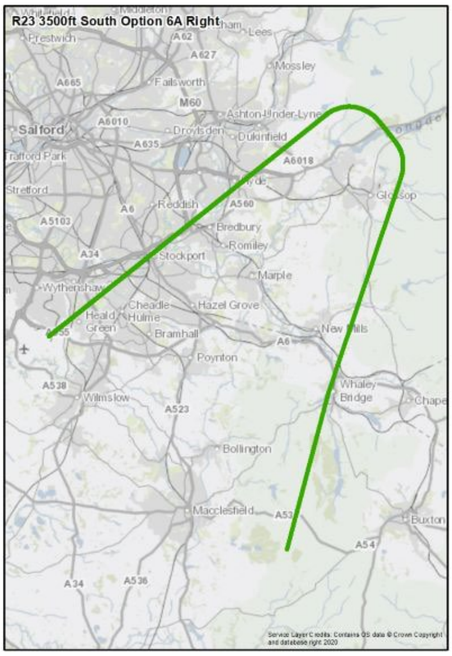
Option Description:

Option 6A has an IAF at 7,000ft to the south-east of the airport co-located with the DAYNE hold. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads north-east, to the west of Whaley Bridge and then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.41%/1.96° for Runway 23L and 3.27%/1.87° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6A L is 55km (30nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated. The estimated track length of option 6A R is 56km (30nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 6A L is estimated to overfly approximately 21,650 households with an approximate population of 48,900. Taking account of planned property developments, this option is estimated to impact a total population of 49,000. From 7,000ft, this option is estimated to overfly approximately 27,200 households with an approximate population of 60,900. Taking account of planned property developments, this option is estimated to impact a total population of 62,200. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 6A R is estimated to overfly approximately 17,850 households with an approximate population of 41,500. Taking account of planned property developments, this option is estimated to impact a total population of 41,500. From 7,000ft, this option is estimated to overfly approximately 23,400 households with an approximate population of 53,500. Taking account of planned property developments, this option is estimated to impact a total population of 54,600. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 6A L is estimated to overfly 88 noise sensitive areas. From 7,000ft this option is estimated to overfly 111 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 6A R is estimated to overfly 88 noise sensitive areas. From 7,000ft this option is estimated to overfly 111 noise sensitive areas.				

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

27.4 Transition Runways 23R/23L South Option 7A – 3,500ft FAF

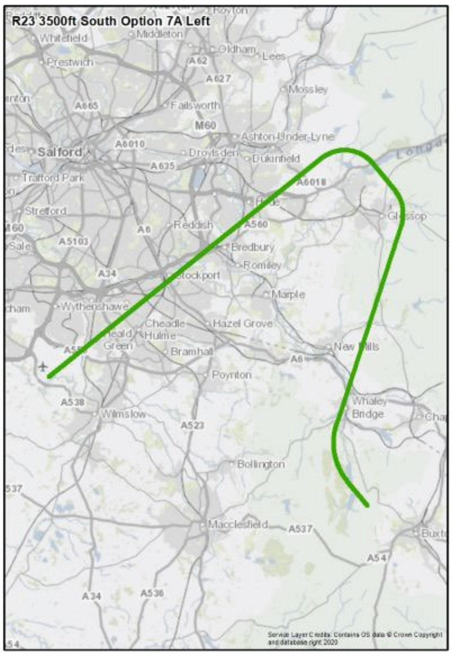
Design Principle Evaluation	Option No: 7A
Option Name: Transition RW 23L South Option 7A – 3,500ft FAF	REJECT
Option Name: Transition RW 23R South Option 7A – 3,500ft FAF	REJECT

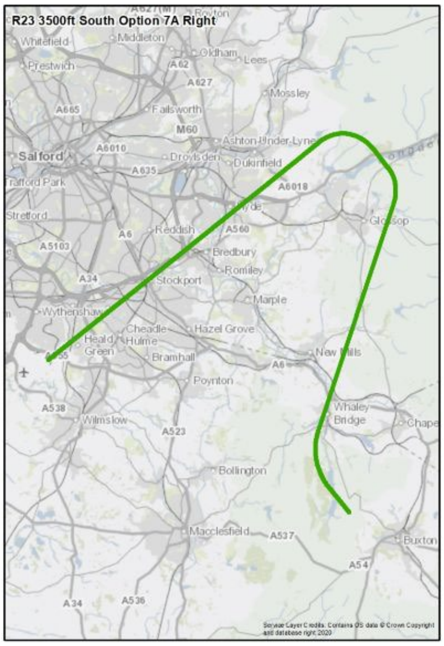
Option Description:

Option 7A has an IAF at 7,000ft to the south-east of the airport in the vicinity of Goyt Valley. It is co-located with the IAF for the 05L/05R option 8A and is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads north-east, just to the west of Whaley Bridge and then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

The descent gradient to the FAF is 4.48%/2.57° for Runway 23L and 4.24%/2.43° for Runway 23R. These gradients are optimal for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7A L is 51km (28nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 7A R is 52km (28nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 7A L is estimated to overfly approximately 21,600 households with an approximate population of 48,600. Taking account of planned property developments, this option is estimated to impact a total population of 48,900.

From 7,000ft, this option is estimated to overfly approximately 29,650 households with an approximate population of 66,200. Taking account of planned property developments, this option is estimated to impact a total population of 67,700.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 7A R is estimated to overfly approximately 17,100 households with an approximate population of 39,600. Taking account of planned property developments, this option is estimated to impact a total population of 39,600.

From 7,000ft, this option is estimated to overfly approximately 24,850 households with an approximate population of 56,600. Taking account of planned property developments, this option is estimated to impact a total population of 57,800.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 7A L is estimated to overfly 98 noise sensitive areas.

From 7,000ft this option is estimated to overfly 120 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 7A R is estimated to overfly 91 noise sensitive areas.

From 7,000ft this option is estimated to overfly 113 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

27.5 Transition Runways 23R/23L South Option 8A – 3,500ft FAF

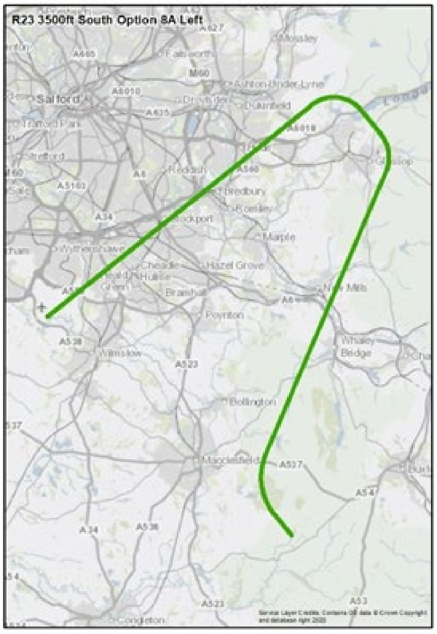
Design Principle Evaluation	Option No: 8A
Option Name: Transition RW 23L South Option 8A – 3,500ft FAF	REJECT
Option Name: Transition RW 23R Option 8A – 3,500ft FAF	ACCEPT

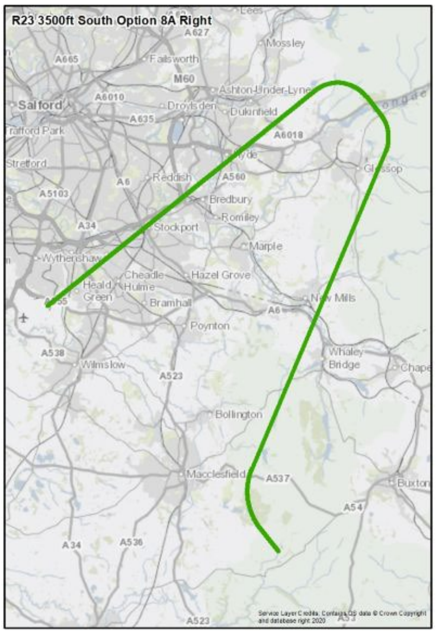
Option Description:

Option 8A has an IAF at 7,000ft to the south-east of the airport in the vicinity of the Roaches. It is co-located with the IAF for the 05L/05R option 9A and is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads north-east, just to the west of Whaley Bridge and then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.42%/1.96° for Runway 23L and 3.28%/1.88° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8A L is 59km (32nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 8A R is 60km (32nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 8A L is estimated to overfly approximately 20,350 households with an approximate population of 45,700. Taking account of planned property developments, this option is estimated to impact a total population of 45,700.

From 7,000ft, this option is estimated to overfly approximately 26,250 households with an approximate population of 58,700. Taking account of planned property developments, this option is estimated to impact a total population of 60,000.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 8A R is estimated to overfly approximately 17,850 households with an approximate population of 41,300. Taking account of planned property developments, this option is estimated to impact a total population of 41,300.

From 7,000ft, this option is estimated to overfly approximately 23,800 households with an approximate population of 54,400. Taking account of planned property developments, this option is estimated to impact a total population of 55,800.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 8A L is estimated to overfly 85 noise sensitive areas.

From 7,000ft this option is estimated to overfly 114 noise sensitive areas.

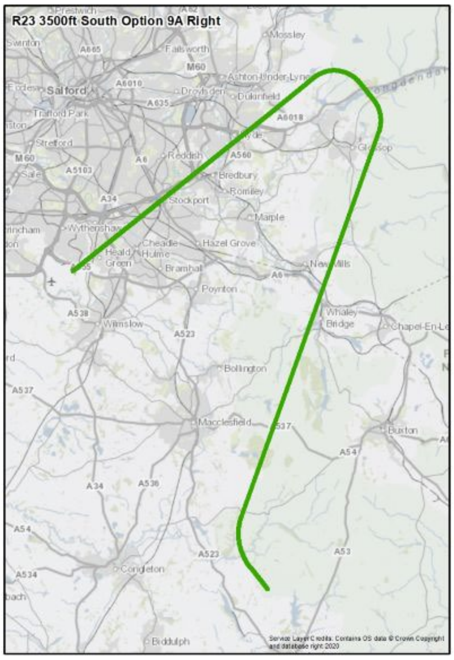
When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 8A R is estimated to overfly 88 noise sensitive areas.

From 7,000ft this option is estimated to overfly 117 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

27.6 Transition Runways 23R/23L South Option 9A – 3,500ft FAF

Design Principle Evaluation	Option No: 9A
Option Name: Transition RW 23L South Option 9A – 3,500ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 9A – 3,500ft FAF	ACCEPT
Option Description: Option 9A has an IAF at 7,000ft to the south-east of the airport, just to the north of Leek. It is co-located with the IAF for the 05L/05R option 6A and is designed to facilitate a CDA profile to all runways. From this location the route splits and heads north-east between Macclesfield and Buxton, overhead Whaley Bridge and Glossop. Both routes then turn left to establish aircraft on final approach at 3,500ft for either Runway 23L or 23R. The descent gradient to the FAF is 2.78%/1.59° for Runway 23L and 2.69%/1.54° for Runway 23R. These gradients are below the optimum range for low noise approaches but just within the acceptable range for CDAs defined within ICAO guidance.	 

Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				
Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The estimated track length of option 9A L is 66km (36nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated. The estimated track length of option 9A R is 67km (36nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.				
Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft, option 9A L is estimated to overfly approximately 17,800 households with an approximate population of 39,900. Taking account of planned property developments, this option is estimated to impact a total population of 39,900. From 7,000ft, this option is estimated to overfly approximately 21,950 households with an approximate population of 48,800. Taking account of planned property developments, this option is estimated to impact a total population of 49,900. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft, option 9A R is estimated to overfly approximately 15,950 households with an approximate population of 37,400. Taking account of planned property developments, this option is estimated to impact a total population of 37,400. From 7,000ft, this option is estimated to overfly approximately 20,350 households with an approximate population of 46,900. Taking account of planned property developments, this option is estimated to impact a total population of 48,000. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.				
	23L	NOT MET	PARTIAL	MET

Design Principle **Noise N3**	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: From 4,000ft option 9A L is estimated to overfly 71 noise sensitive areas. From 7,000ft this option is estimated to overfly 92 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 9A R is estimated to overfly 77 noise sensitive areas. From 7,000ft this option is estimated to overfly 100 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

27.7 Transition Runways 23R/23L South 3,500ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity
Transition south option A3	S	P	C
This option was the result of early concept work in collaboration with NERL but was not developed due to perceived Network connection issues to the south-east of the airport. Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. This option would not align to the NATS network traffic flow. As a result, this option would not comply with the AMS and therefore the Design Principle Policy.			
Transition south option B4	S	P	C
This was initially designed as option 4 and is a route based on an IAF located south-east of the existing DAYNE hold. Policy: This option would not adhere to the CAA containment policy requiring aircraft to remain 3nm or more from the CAS boundary (Daventry CTA10).			
Transition south option C5	S	P	C
This was initially designed as option 5 and is a route based on an IAF located south of the existing DAYNE hold. Policy: This option would not adhere to the CAA containment policy requiring aircraft to remain 3nm or more from the CAS boundary (Daventry CTA10).			

28 Transitions Runways 23R/23L South – 3,000ft FAF

28.1 Transition Runways 23R/23L South Option 1B – 3,000ft FAF

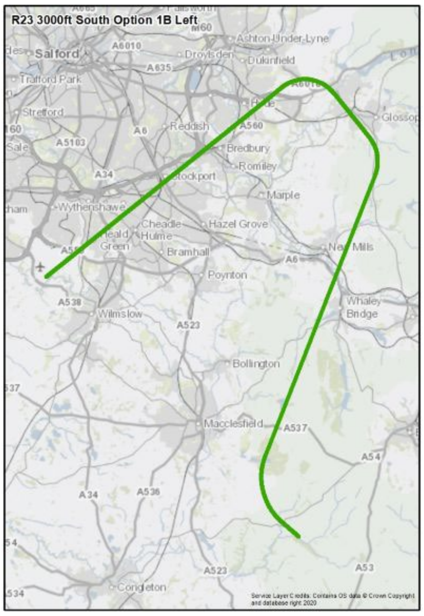
Design Principle Evaluation	Option No: 1B
Option Name: Transition RW 23L South Option 1B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R South Option 1B – 3,000ft FAF	ACCEPT

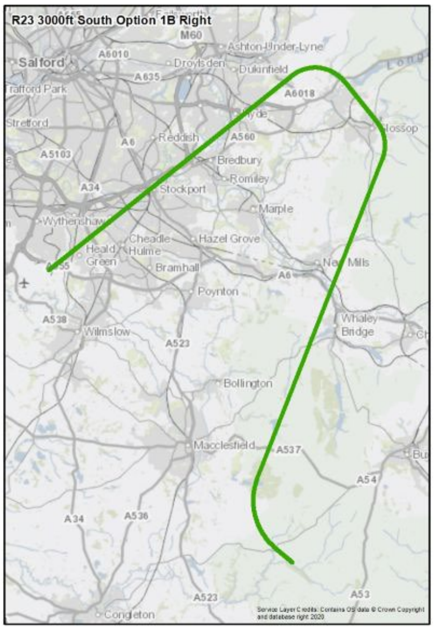
Option Description:

Option 1B has an IAF at 7,000ft to the south-east of the airport in the vicinity of Danebridge. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads north-east, just to the west of Whaley Bridge and then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.78%/2.17° for Runway 23L and 3.63%/2.08° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 1B L is 57km (31nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 1B R is 58km (31nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 1B L is estimated to overfly approximately 26,100 households with an approximate population of 59,000. Taking account of planned property developments, this option is estimated to impact a total population of 59,000.

From 7,000ft, this option is estimated to overfly approximately 31,250 households with an approximate population of 70,300. Taking account of planned property developments, this option is estimated to impact a total population of 71,600.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 1B R is estimated to overfly approximately 24,000 households with an approximate population of 54,600. Taking account of planned property developments, this option is estimated to impact a total population of 55,100.

From 7,000ft, this option is estimated to overfly approximately 29,250 households with an approximate population of 66,000. Taking account of planned property developments, this option is estimated to impact a total population of 67,900.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 1B L is estimated to overfly 101 noise sensitive areas.

From 7,000ft this option is estimated to overfly 126 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 1B R is estimated to overfly 128 noise sensitive areas. From 7,000ft this option is estimated to overfly 153 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

28.2 Transition Runways 23R/23L South Option 2B – 3,000ft FAF

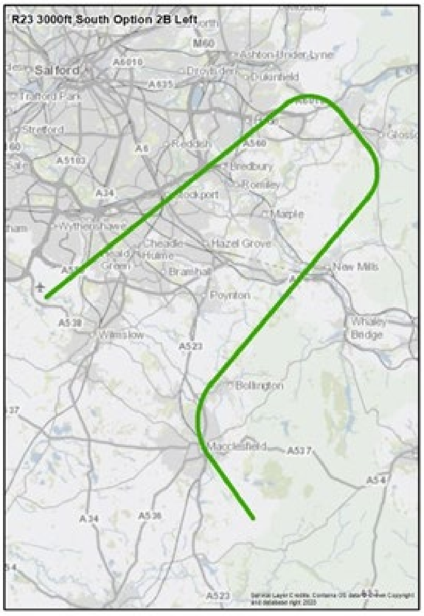
Design Principle Evaluation	Option No: 2B
Option Name: Transition RW 23L South Option 2B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R South Option 2B – 3,000ft FAF	REJECT

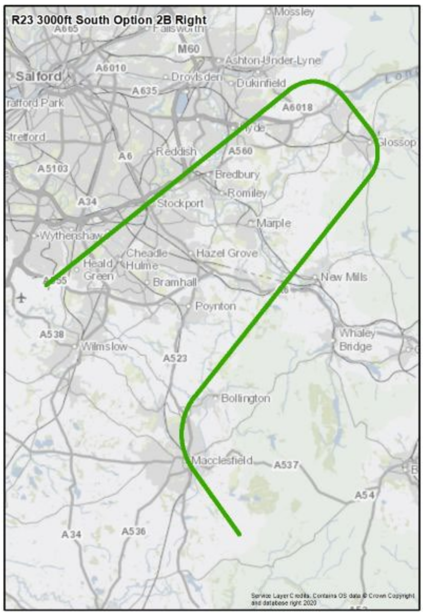
Option Description:

Option 2B has an IAF at 7,000ft to the south-east of the airport in the vicinity of Sutton. It is designed to facilitate a CDA profile to all runways.

From this location the route overflies Macclesfield, splits, and heads north-east, just to the west of Whaley Bridge and then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.38%/1.94° for Runway 23L and 3.26%/1.87° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 2B L is 57km (31nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 2B R is 58km (31nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 2B L is estimated to overfly approximately 26,000 households with an approximate population of 58,900. Taking account of planned property developments, this option is estimated to impact a total population of 58,900.

From 7,000ft, this option is estimated to overfly approximately 53,400 households with an approximate population of 117,800. Taking account of planned property developments, this option is estimated to impact a total population of 120,200.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 2B R is estimated to overfly approximately 24,600 households with an approximate population of 55,800. Taking account of planned property developments, this option is estimated to impact a total population of 56,400.

From 7,000ft, this option is estimated to overfly approximately 50,600 households with an approximate population of 111,900. Taking account of planned property developments, this option is estimated to impact a total population of 114,600.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 2B L is estimated to overfly 101 noise sensitive areas.

From 7,000ft this option is estimated to overfly 263 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 2B R is estimated to overfly 130 noise sensitive areas. From 7,000ft this option is estimated to overfly 283 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

28.3 Transition Runways 23R/23L South Option 6B – 3,000ft FAF

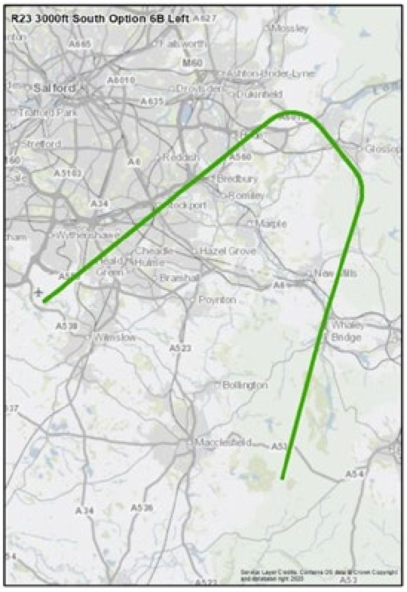
Design Principle Evaluation	Option No: 6B
Option Name: Transition RW 23L South Option 6B – 3,000ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 6B – 3,000ft FAF	ACCEPT

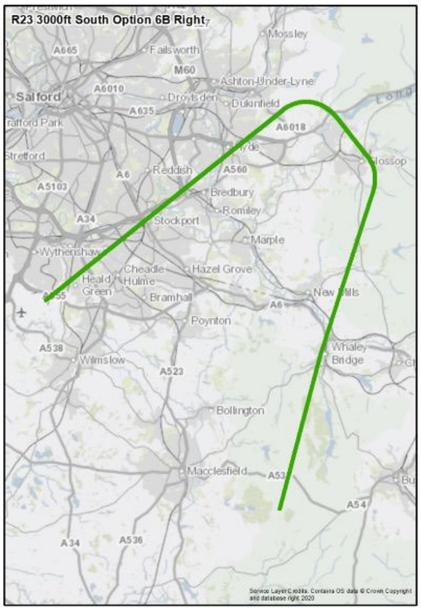
Option Description:

Option 6B has an IAF at 7,000ft to the south-east of the airport co-located with the DAYNE hold. It is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads north-east, to the west of Whaley Bridge and then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 4.12%/2.36° for Runway 23L and 3.94%/2.26° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 6B L is 50km (27nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 6B R is 51km (28nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 6B L is estimated to overfly approximately 29,850 households with an approximate population of 67,300. Taking account of planned property developments, this option is estimated to impact a total population of 67,300.

From 7,000ft, this option is estimated to overfly approximately 35,150 households with an approximate population of 78,800. Taking account of planned property developments, this option is estimated to impact a total population of 80,100.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 6B R is estimated to overfly approximately 26,300 households with an approximate population of 59,700. Taking account of planned property developments, this option is estimated to impact a total population of 60,200.

From 7,000ft, this option is estimated to overfly approximately 31,450 households with an approximate population of 70,800. Taking account of planned property developments, this option is estimated to impact a total population of 72,600.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 6B L is estimated to overfly 122 noise sensitive areas.

From 7,000ft this option is estimated to overfly 145 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 6B R is estimated to overfly 138 noise sensitive areas. From 7,000ft this option is estimated to overfly 161 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

28.4 Transition Runways 23R/23L South Option 7B – 3,000ft FAF

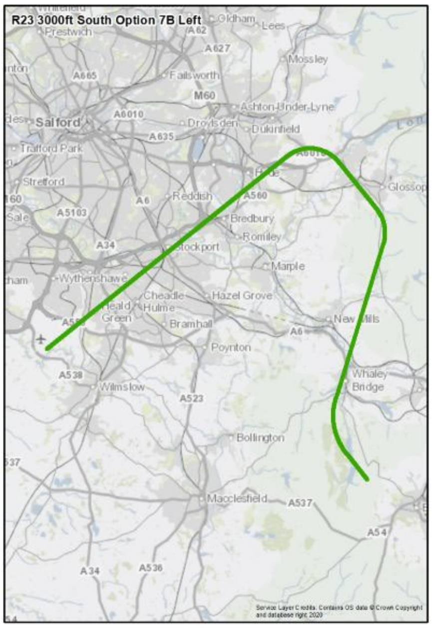
Design Principle Evaluation	Option No: 7B
Option Name: Transition RW 23L South Option 7B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R South Option 7B – 3,000ft FAF	REJECT

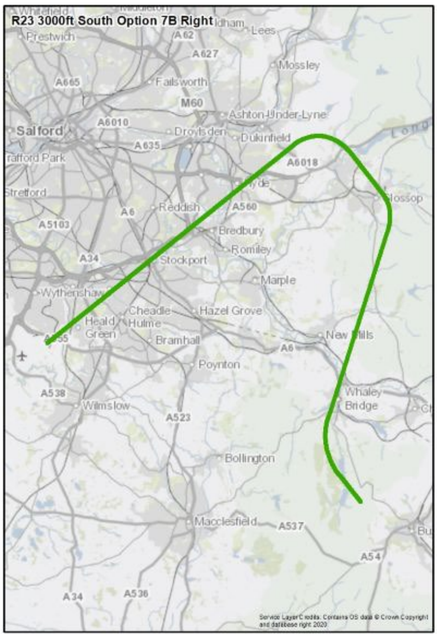
Option Description:

Option 7B has an IAF at 7,000ft to the south-east of the airport in the vicinity of Goyt Valley. It is co-located with the IAF for the 05L/R option 8B and is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads north-east, just to the west of Whaley Bridge and then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 5.5%/3.15° for Runway 23L and 5.19%/2.97° for Runway 23R. These gradients are just above the range for low noise approaches but are still within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 7B L is 47km (25nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 7B R is 48km (26nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 7B L is estimated to overfly approximately 31,250 households with an approximate population of 70,500. Taking account of planned property developments, this option is estimated to impact a total population of 70,500.

From 7,000ft, this option is estimated to overfly approximately 37,600 households with an approximate population of 84,300. Taking account of planned property developments, this option is estimated to impact a total population of 85,500.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 7B R is estimated to overfly approximately 27,600 households with an approximate population of 62,500. Taking account of planned property developments, this option is estimated to impact a total population of 63,100.

From 7,000ft, this option is estimated to overfly approximately 33,550 households with an approximate population of 75,300. Taking account of planned property developments, this option is estimated to impact a total population of 77,100.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 7B L is estimated to overfly 137 noise sensitive areas.

From 7,000ft this option is estimated to overfly 159 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 7B R is estimated to overfly 144 noise sensitive areas. From 7,000ft this option is estimated to overfly 166 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

28.5 Transition Runways 23R/23L South Option 8B – 3,000ft FAF

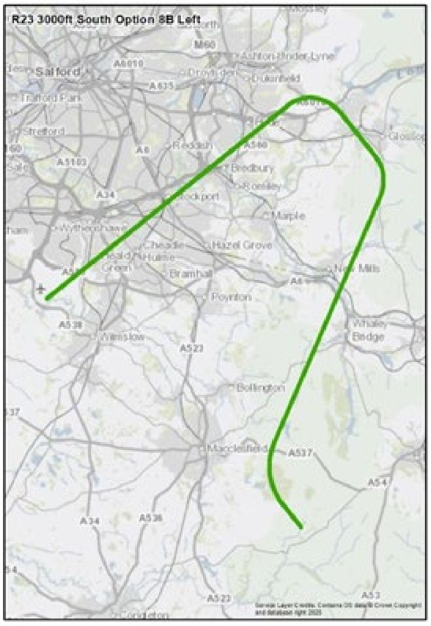
Design Principle Evaluation	Option No: 8B
Option Name: Transition RW 23L South Option 8B – 3,000ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 8B – 3,000ft FAF	ACCEPT

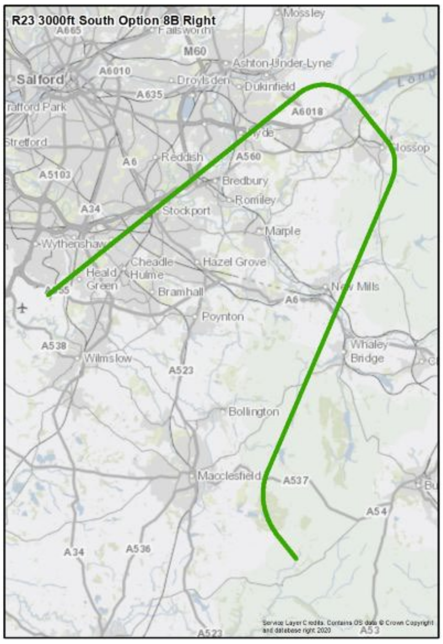
Option Description:

Option 8B has an IAF at 7,000ft to the south-east of the airport in the vicinity of the Roaches. It is co-located with the IAF for the 05L/05R option 9B and is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads north-east, just to the west of Whaley Bridge and then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 4.14%/2.37° for Runway 23L and 3.95%/2.26° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations.

At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.

Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage.

In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.

Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised.

When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this.

Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports.

Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 8B L is 54km (29nm). When compared to the DAYNE 'do nothing' scenario this option is shorter in length and a decrease in emissions would be anticipated.

The estimated track length of option 8B R is 55km (30nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 8B L is estimated to overfly approximately 27,600 households with an approximate population of 62,300. Taking account of planned property developments, this option is estimated to impact a total population of 62,300.

From 7,000ft, this option is estimated to overfly approximately 32,900 households with an approximate population of 73,900. Taking account of planned property developments, this option is estimated to impact a total population of 75,300.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 8B R is estimated to overfly approximately 24,900 households with an approximate population of 56,500. Taking account of planned property developments, this option is estimated to impact a total population of 57,100.

From 7,000ft, this option is estimated to overfly approximately 30,500 households with an approximate population of 68,700. Taking account of planned property developments, this option is estimated to impact a total population of 70,700.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 8B L is estimated to overfly 108 noise sensitive areas.

From 7,000ft this option is estimated to overfly 129 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft option 8B R is estimated to overfly 130 noise sensitive areas. From 7,000ft this option is estimated to overfly 153 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

28.6 Transition Runways 23R/23L South Option 9B – 3,000ft FAF

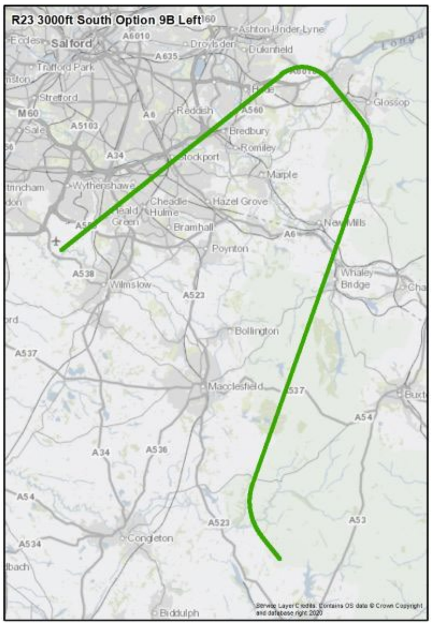
Design Principle Evaluation	Option No: 9B
Option Name: Transition RW 23L South Option 9B – 3,000ft FAF	REJECT
Option Name: Transition RW 23R South Option 9B – 3,000ft FAF	ACCEPT

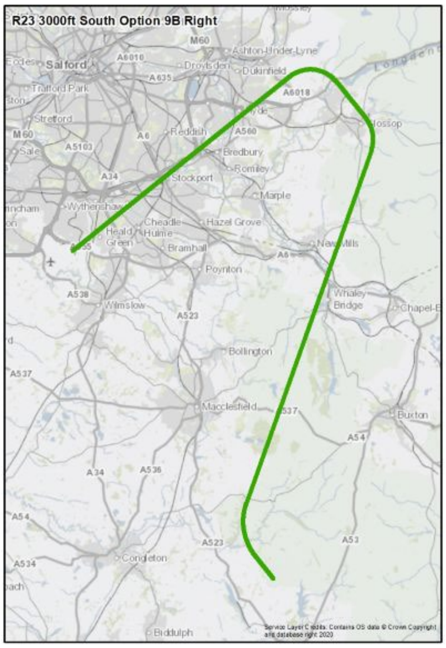
Option Description:

Option 9B has an IAF at 7,000ft to the south-east of the airport, just to the north of Leek. It is co-located with the IAF for the 05L/05R option 6B and is designed to facilitate a CDA profile to all runways.

From this location the route splits and heads north-east between Macclesfield and Buxton, overhead Whaley Bridge and Glossop. Both routes then turn left to establish aircraft on final approach at 3,000ft for either Runway 23L or 23R.

The descent gradient to the FAF is 3.33%/1.91° for Runway 23L and 3.21%/1.84° for Runway 23R. These gradients are within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAO guidance.





Design Principle **Safety**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both these options have been designed by CAA Approved IFP designers in accordance with PANS-OPS requirements. Assessed in isolation, they are considered to be safe, designable and meets with industry standards and regulations. At this stage, it is not believed that additional protocols or mitigations are required to confirm safe operation, although an assessment against the other FASI-N airports will be required, at Stage 3, to confirm this.				
Design Principle **Policy**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These options have been designed as PBN routes and are deemed to be compliant with the UK's obligation for implementing PBN. Assessed in isolation, it is considered that they are able to deliver CDA operations and takes into account the needs of other airspace users. Based on current information, there is no known confliction with other FASI-N airports. Full assessment against the FASI-N Masterplan cannot be conducted at this stage. In isolation, it cannot be determined whether the scope to reduce the volume of controlled airspace is offered by these options.				
Design Principle **Capacity**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, there is a greater likelihood of a reduction in capacity caused by the ATC operational restriction that prohibits the utilisation of Runway 23L for arrivals with Runway 23R being used for departures. In addition, due to the lack of taxiway infrastructure, there is also a greater likelihood of restricted capacity caused by ground movement limitations due to the time taken for aircraft to backtrack Runway 23L after arrival should this runway be utilised. When assessed in isolation for Runway 23R, this option is deemed to be capable of enabling the best use of the capacity of our existing runways and could be used operationally in conjunction with another runway, or as a single runway operation to achieve this. Based on current information, these options should not affect adversely affect operations within airspace that is shared with adjacent airports. Further assessments would be conducted at Stage 3 of the ACP process, and will consider whether, as part of a combination of routes, these design options continue to satisfy the Design Principle Capacity.				

Design Principle **Emissions**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

The estimated track length of option 9B L is 61km (33nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and similar emissions would be anticipated.

The estimated track length of option 9B R is 62km (33nm). When compared to the DAYNE 'do nothing' scenario this option is longer in length and an increase in emissions would be anticipated.

Design Principle **Noise N1**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft, option 9B L is estimated to overfly approximately 24,950 households with an approximate population of 56,400. Taking account of planned property developments, this option is estimated to impact a total population of 57,200.

From 7,000ft, this option is estimated to overfly approximately 28,600 households with an approximate population of 64,400. Taking account of planned property developments, this option is estimated to impact a total population of 65,600.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

From 4,000ft, option 9B R is estimated to overfly approximately 23,400 households with an approximate population of 53,300. Taking account of planned property developments, this option is estimated to impact a total population of 54,000.

From 7,000ft, this option is estimated to overfly approximately 27,200 households with an approximate population of 61,600. Taking account of planned property developments, this option is estimated to impact a total population of 63,200.

When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.

Design Principle **Noise N2**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

It has not been possible to evaluate the impact of dispersion and/or respite at this stage. This will only become possible when the design options have been grouped into systemised networks in Stage 3. Therefore, this option has been evaluated to meet this design principle.

Design Principle **Noise N3**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:

From 4,000ft option 9B L is estimated to overfly 89 noise sensitive areas.

From 7,000ft this option is estimated to overfly 110 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft. From 4,000ft option 9B R is estimated to overfly 121 noise sensitive areas. From 7,000ft this option is estimated to overfly 142 noise sensitive areas. When compared to the DAYNE 'do nothing' scenario, this is less than or equal to at both 4,000ft and 7,000ft.				
Design Principle **Airspace**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Both options could be used as part of a network that is consistent with this design principle and so we consider it a 'good fit'. Separate arrangements will be in place for aircraft that are not equipped or capable of flying PBN approaches.				
Design Principle **Technology**	23L	NOT MET	PARTIAL	MET
	23R	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: These routes have been designed as RNP APCH routes and are therefore useable by all PBN compliant aircraft and enables CDA operations to be conducted at MAN in accordance with PANS-OPS requirements.				

28.7 Transition Runways 23R/23L South 3,000ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity
Transition south option A3	S	P	C
This option was the result of early concept work in collaboration with NERL but was not developed due to perceived network connection issues to the south-east of the airport. Policy: Within the AMS, revised airspace must deliver efficiency and the expeditious flow of traffic including greater runway throughput. This option would not align to the NATS network traffic flow. As a result, this option would not comply with the AMS and therefore the Design Principle Policy.			
Transition south option B4	S	P	C
This was initially designed as option 4 and is a route based on an IAF located south-east of the existing DAYNE hold. Policy: This option would not adhere to the CAA containment policy requiring aircraft to remain 3nm or more from the CAS boundary (Daventry CTA10).			
Transition south option C5	S	P	C
This was initially designed as option 5 and is a route based on an IAF located south of the existing DAYNE hold. Policy: This option would not adhere to the CAA containment policy requiring aircraft to remain 3nm or more from the CAS boundary (Daventry CTA10).			

29 Transitions Evaluation Summary

The acceptance / rejection process set out at section 4.3 accepted 44 transition design options that were carried forward to the IOA for further consideration. This process also rejected 60 transition design options.

As with departures, at this relatively early stage in the process our assessment of the design principles Capacity, Emissions Noise N2 and Airspace in particular was inevitably limited. A full appreciation of these design principles will only be possible at Stage 3 once the individual design options have been consolidated into networks.

However, and in line with CAP1616, the design option development process considered all of the design principles including the need to align to the "must have" design principles of Policy and Capacity.

- Policy: The Design Principle Policy requires us to take account of the AMS, which addresses the need to maintain safety standards and to create a more efficient, integrated airspace network. To address this, the design process has created options that take account of both the constraints and considerations in the local airspace (including the joining points to and from the NERL upper airspace network), and the potential interactions between MAN arrivals and departures. As described in section 3 of the DOR, we have also collaborated closely with NERL to help us create a comprehensive list of departure and arrival design options that provide flexibility and have the ability to integrate with a new MTMA network as part of their emerging design. This is in line with the national airspace masterplan and has created some options specifically designed to minimise known interactions or to align with the network traffic flows.
- Capacity: The Design Principle Capacity requires us to create options that make best use of runway capacity. To address this, the design process created some options in isolation, but created others iteratively by comparing design options with those in adjacent envelopes. The aim of this was to create options that had the ability to be part of a system capable of one-minute departure separations and therefore align with this design principle.

Section 3.5 of the DOR refers to the management of the MAN Future Airspace project within the national airspace masterplan, and the possibility that as the NERL designs progress, it is possible that some of our design options will either be misaligned or conflict with their designs (or those of other airports). Some design options may need to be further refined or modified in response to the progress of this work. Alternatively, some options that have not been carried forward from either the DPE or IOA process may need to be restored as working options.

Therefore, to mitigate this and ensure that the MAN airspace change continues to offer the potential to respond to these proposals, and ensure that design options that may offer benefits that have not been fully apparent at this early stage are not prematurely discounted, seven further design options, that were initially rejected by the acceptance/rejection process, were carried forward to the IOA for further consideration. This was on the basis of the qualitative SME judgement referred to at section 4.3 of this DPE and the ability of these options to align with the requirements of the design principles Policy and Capacity as identified above.

As a result, in total 44 transition design options were carried forward to the IOA for further consideration.

The 'best-performing' and professionally adjudged transition design options are listed in Appendix 2 against their IAF design procedure. Options which form part of a complete set (Runways 23R, 05L, 05R and 23L) within an IAF will be progressed to the IOA at Step 2B.

30 Next Steps

We have undertaken a design process that is consistent with the requirements of CAP1616, to identify a comprehensive list of design options that were published in the DOR. In Step 2A, these design options have been evaluated against the design principles that were identified through stakeholder engagement in Stage 1. This work is reported separately in this DPE. Those that best align with the design principles were carried forward in the process to Step 2B.

Design options carried forward to Step 2B have been subject to an initial appraisal. The findings are set out in the IOA and the accompanying assessment tables.

The IOA is the first of three appraisals required under the CAP1616 process. Subject to the approval of the CAA, the shortlisted options identified in the IOA will be considered in greater detail as part of Stage 3. This further assessment will increasingly make use of quantitative data and will explore local factors in greater detail than the level of assessment has allowed to date. The next stages in the appraisal will be guided by the requirements set out in CAP1616, including the metrics set out in Appendix B and Appendix E. In particular, further assessment will account for:

- Ten-year traffic forecasts (including all intermediate years)
- Safety
- Biodiversity
- Tranquillity

The shortlist of design options has benefited from extensive engagement with stakeholders, including the general public. Amongst the stakeholders were other sponsors of airspace change including NATS as the en route airspace provider. Therefore, there is confidence that the proposals are flexible enough to provide compatibility with proposals emerging from other change sponsors, in so far as they are known at this time. As these separate but dependent airspace changes continue to mature it will be important to understand more fully how proposals from other airports, within the MTMA cluster, might interact with the Manchester Airport proposals. It will then be necessary to understand how, collectively, the developing design options are best integrated into the network at higher altitudes. Work with other change sponsors, including NATS, will continue so that our decisions are informed by the best available information and are consistent with the developing masterplan for the MTMA cluster. As part of this, MAN have already provided route information to NERL in order to populate their visualisation simulations to advance the latest proof of concept developments and will continue to work with NATS as operating networks are developed. If required, the work we have undertaken to date will be reviewed to reflect emerging information.

The next step in considering airspace change is for individual design options to be combined into operating networks. This will support ongoing engagement and, in turn, will allow for a more detailed evaluation against the design principles Noise N2, Capacity and Emissions. The assessment of operating networks will allow the frequency of aircraft operations to form part of the assessment and in this regard, we have noted the CAP1616 requirement to consider future air traffic forecasts for a period of ten years post implementation.

In addition, as the shortlisted design options are combined into operating networks, it is likely that some of the design options will respond less well to the design principles. For example, they may prove to be incompatible with other design options; may conflict with the proposals from other change sponsors; or may result in a higher cumulative impact. This may mean that certain design options will be discounted, because they are highly unlikely to perform as well as other options. As such, they would not be taken forward to the full options appraisal or public consultation at Stage 3. Consistent with the developing masterplan for the MTMA cluster, it is recognised that trade-offs may be identified by ACP sponsors during the development of the initial and full options appraisals (Steps 2B and 3A of the CAP1616 process) and in collaboration with ACOG when assessing the combined and net impacts of interdependent options.

The Design Principle Airspace states that the amount of Controlled Airspace (CAS) required should be minimised, to ensure the needs of other airspace users are considered. Because of the potential for routes to be refined or amended, as referred to earlier, it would be premature to define future CAS requirements at this stage. As such, CAS requirements for groups of design options will be identified during Stage 3. All stakeholders will be provided with an indication of the CAS requirements within the Step 3C consultation material, and the comments received will be considered as part of the consultation analysis activities in Step 3D. More details of this approach are provided in the DOR section 4.5.

Further refinement of design options, whereby certain design options are not to be appraised fully at Stage 3, will be fully explained in preparing for Stage 3. Affected stakeholders will be consulted and will have the opportunity to provide feedback prior to the full options appraisal.

The completion of the work required at Stage 2 'Develop and Assess' has developed and refined the design options available at Manchester Airport, as well as expanding the understanding of stakeholders' views on those options. While it is not a requirement of the CAP1616 process, all stakeholders that have participated in engagement activities to date, will be provided with the information submitted to the CAA at the conclusion of Stage 2, to ensure that they remain informed of the development of the Airspace Change Proposal at Manchester Airport ahead of the full public consultation at Stage 3.

31 Glossary

ACOG	Airspace Change Organisation Group formed in 2019 as a fully independent organisation within NATS under the direction of the UK Government Department for Transport and Civil Aviation Authority, who are the co-sponsors of the AMS.
ACP	Airspace Change Proposal.
ADWR	Airspace Development Workshop Record - the output from bilateral discussions with NERL to record and inform their comprehensive list of options for the network that interfaces with MAN traffic.
Agl	Above ground level.
AIP	Aeronautical Information Publication - A document published by the UK CAA which contains information essential to air navigation (www.aurora.nats.co.uk/htmlAIP/Publications/2022-07-14-AIRAC/html/index-en-GB.html).
Altitude Based Priorities	The ANG sets out a framework of 'Altitude Based Priorities', to be taken into account when considering the potential environmental impact of airspace changes.
AMS	Airspace Modernisation Strategy (CAP1711) - this is the Government's strategy and plan for the use of UK airspace, including the modernisation of airspace (www.caa.co.uk/cap1711).
Amsl	Above mean sea level.
ANG	Air Navigation Guidance 2017 - Guidance to the CAA (from DfT) on its environmental objectives when carrying out its air navigation functions, and to the CAA and wider industry on airspace and noise management (www.gov.uk/government/publications/uk-air-navigation-guidance-2017).
ANSP	Air Navigation Service Provider - an organisation which operates the technical system, infrastructure, procedures, and rules of an air navigation service system, which includes air traffic control.
AONB	Area of Outstanding Natural Beauty - an area of countryside which has been designated for conservation because of its significant landscape value, recognising its national importance.
AQMA	Air Quality Management Area - designated by a local authority and subject to a Local Air Quality Management Plan.
ASMIM[4]	A navigation fix to the north-west of Manchester used by departing aircraft.
ATC	Air Traffic Control - service from an air navigation service provider providing guidance to aircraft through Controlled Airspace.
ATM	Air Transport Movement - an aircraft operation for commercial purposes, as opposed to a flight for recreational or personal reasons.
ATS	Air Traffic Services.
Biodiversity	The variability among living things from all ecosystems (including terrestrial, marine, and aquatic amongst others) and the ecological complexes of which they are part, including diversity within species, between species and of ecosystems.
CAA	Civil Aviation Authority -the aviation industry's regulator.
CAP	Civil Aviation Publication - a document published by the UK CAA which can provide information, guidance or policy depending on the subject covered. The list of all CAPs is published on the CAA website (www.caa.co.uk/our-work/publications).
CAP1385	The CAA's PBN enhanced route spacing guidance (www.caa.co.uk/cap1385).

[4] The language to communicate between a pilot and an Air Traffic Controller needs to be clear and avoid misunderstanding. Names need to sound different and be incapable of confusion with others, particularly others close by.

CAP1498	The CAA's definition of overflight - the report defines overflight as it relates to airspace regulation; and an overflight metric which may be used to quantitatively compare different airspace options (www.caa.co.uk/cap1498).
CAP1616	The CAA's airspace change guidance document - it sets out the regulatory process which all airspace change proposals must follow (www.caa.co.uk/cap1616).
CAP1616a	A technical annex to CAP1616- guidance on the regulatory process for changing airspace design including community engagement requirements. This annex outlines relevant methodologies for use in environmental assessments relating to airspace change (www.caa.co.uk/cap1616a).
CAP1781	The CAA's DVOR/DME/NDB Rationalisation - guidance for the use of RNAV Substitution (www.caa.co.uk/cap1781).
CAP1711	Airspace Modernisation Strategy - this is the Government's strategy and plan for the use of UK airspace, including the modernisation of airspace (www.caa.co.uk/cap1711).
CAP1991	Procedure for the CAA to review the classification of airspace (www.caa.co.uk/cap1991).
CAP2091	CAA Policy on Minimum Standards for Noise Modelling -document defines categories of noise modelling sophistication and sets out requirements of the minimum category which different stakeholder or sponsor groups should use when providing noise calculations to the CAA. (www.caa.co.uk/cap2091).
CAP2156A	Airspace change masterplan - CAA acceptance criteria, the criteria against which the CAA will make the decision whether to accept the airspace change masterplan into the Airspace Modernisation Strategy (www.caa.co.uk/cap2156A).
CAP2302	A Low Noise Arrival CAP2302 - a report that makes recommendations to implement low noise arrivals (www.caa.co.uk/cap2303).
CAP493	Manual of Air Traffic Services - contains procedures, instructions and information which are intended to form the basis of air traffic services within the United Kingdom (www.caa.co.uk/cap493).
CAP725	The CAA's airspace change process guidance document that preceded CAP1616 (www.caa.co.uk/cap725).
CAP760	CAA's Guidance on the Conduct of Hazard Identification, Risk Assessment, and the Production of Safety Cases (www.caa.co.uk/cap760).
CAP778	The CAA's Policy and Guidance for the Design and Operation of Departure Procedures in UK Airspace (www.caa.co.uk/cap778).
CAA Controlled Airspace Containment Policy Statement	The CAA Controlled Airspace Containment Policy Statement (January 2014 superseded in August 2022) sets out the minimum criteria applicable to containment of instrument flight procedures for airports already within Controlled Airspace (CAS). Annex B provides the design criteria that have been applied to the arrival and departure routes in this ACP. (https://publicapps.caa.co.uk/docs/33/Policy%20for%20the%20Design%20of%20Controlled%20Airspace%20Structures%20110822.pdf).
CAS	Controlled Airspace is airspace within which air traffic services are provided. There are different classifications which define the air traffic control service provided and the requirements of aircraft flying within it. All commercial (passenger) flights fly within Controlled Airspace.
CCO	Continuous Climb Operations - allows departing aircraft to climb continuously, which reduces the level of noise heard on the ground, reduces fuel burn and emissions.
CDA	Continuous Descent Approach - allows arriving aircraft to descend continuously which reduces the level of noise heard on the ground, reducing fuel burn and emissions.
CF	Course to Fix - a path that terminates at a fix with a specified course at that fix.

Change sponsor	An organisation that proposes, or sponsors, a change to the airspace design in accordance with the CAA's airspace change process.
Comprehensive list	The full list of design options that are viable designs as required by Stage 2 of the CAP1616 process and which are detailed in the Design Options Report.
CONOPS	Concept of Operations - a document that outlines how we want the airspace system to work in the future and the standards that we will use.
COVID-19	Coronavirus disease 19 is a contagious disease caused by a virus that was identified in 2019 and which resulted in a pandemic in the year 2020.
CP	Country Park - areas of land designated and protected by local authorities to provide access to the countryside.
Cumulative Impact	Where an environmental topic/receptor is affected by impacts from more than one source/project at the same time and the impacts act together.
CTA	Control Area - the controlled airspace that exists in the vicinity of an airport
DAYNE	One of three existing hold stacks used at Manchester Airport.
dB	Decibels - a unit used to measure noise levels.
DEFRA	Department for the Environment, Food and Rural Affairs (UK Government).
DER	Departure End of Runway - a term that, when used in PANS-OPS 8168, determines the start point for the design of a departure procedure.
DESIG	A navigation fix to the north-east of Manchester used by departing aircraft.
Design envelopes	Broad areas where it is possible to design routes and which are the areas where we have created design options for arriving and departing aircraft.
Design option	An output from the route design process that responds to the design principles and the Statement of Need (SoN). Design options are a requirement of the CAP1616 process. During the engagement carried out at Stage 2, design options were also referred to as "route options".
Design principles	The principles encompassing the safety, environmental and operational criteria, and the strategic policy objectives that the change sponsor seeks to achieve in developing the airspace change proposal. They are an opportunity to combine local context with technical considerations and are therefore drawn up through discussion with affected stakeholders and in Manchester's case - members of the public. The design principles at Manchester Airport were established during Stage 1 of the CAP1616 process.
DF Coding	Direct to Fix coding - type of waypoint used in the design of PBN procedures.
DfT	Department for Transport.
DME	Distance Measuring Equipment - a ground-based beacon that allows aircraft to measure their precise distance from its location, often used to define a turn point.
DOE	Design Options Evolution - shows the evolution of the design options through Stages 2A and 2B of the CAP1616 process. Included as Appendix A to the Stage 2 Summary Document.
DOR	Design Options Report - this responds to the requirements of CAP1616 to develop a comprehensive list of options that address the SoN and that align with the design principles. It details the design process and the output of that process in the form of design options for both departures and arrivals.
DPE	Design Principle Evaluation - the document that undertakes an evaluation of the viable and good fit options described in this report against the design principles.
DVOR	Doppler VHF Omni-directional Range - ground-based radio navigation beacon used by pilots to assist in aircraft navigation.
EASA	European Union Aviation Safety Agency.

Education (facilities)	For our analysis we have used the 'Ordnance Survey Address Base' count of educations facilities, details of which they receive from the local government contributing authority. These include all educational services including College, Further Education, Higher Education, Children's Nursery / Crèche, Preparatory / First / Primary / Infant / Junior / Middle School, Non State Primary / Preparatory School, Secondary / High School, Non State Secondary School, University, Special Needs Establishment and Other Educational Establishments.
EGCC	The four-letter ICAO code for Manchester Airport.
EU	The European Union - an economic and political union of 27 countries.
EKLAD[4]	A navigation fix to the west of Manchester used by departing aircraft.
FAF	Final Approach Fix - The point at which an aircraft starts its final approach to land.
FASI-N	Future Airspace Strategy Implementation – North: The programme of airspace changes across the northern part of the UK, including Manchester, that is implementing the Governments Airspace Modernisation Strategy.
FIR	Flight Information Region - airspace delegated to a country by ICAO. In the UK there are two FIRs, London and Scottish.
FL85	FL means 'Flight Level' and uses the standard international pressure (1013.2 hPa) to express altitude in hundreds of feet. FL85 equates to 8,500ft calculated according to the 'constant' pressure altitude rather than local pressure (QNH). So FL90 would mean 9,000ft.
Flat segment	A defined period of level flight as required by a PANS-OPS PBN Approach procedure.
Flightpath	The routes taken by aircraft within airspace.
Flight Level	A means to separate aircraft (above the transition altitude) by using a standard pressure setting for all aircraft.
FMS	Flight Management System - a specialised computer system that automates a wide variety of in-flight tasks, reducing the workload on the flight crew.
FOA	Full Options Appraisal - the options appraisal carried out at Stage 3 of the CAP1616 process.
Focus group	Group of representative stakeholders brought together to discuss proposals and offer feedback.
Ft	Feet.
Future housing sites	Future housing sites with a reasonable prospect of being developed based on Local Plan allocations and Local Authority five-year Housing Land Supply Assessment data. During engagement we have used the term 'Future Housing Sites' to represent the broader phrase of Planned Property Development as we are not aware of other future noise sensitive developments that would sit within this category. Data was collated by CBRE and supplied to MAN on 17th March 2022 with updates included to the Cheshire East Borough Council and Staffordshire Moorlands District Council areas in July and August 2022.
GA	General Aviation - defined by ICAO as 'all civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire.
GBAS	Ground Based Augmentation System - augments the existing GPS by providing corrections to aircraft in the vicinity of an airport to improve the accuracy of, and provide integrity for, the aircrafts' GPS navigational position.
GDPR	The General Data Protection Regulations.
GIS	Geographic Information System.
GNSS	Global Navigation Satellite System - a term used to describe a system that uses satellites for position fixing.
GPS	Global Positioning System - a satellite-based radionavigation system owned by the United States government and operated by the United States Space Force.

HAZID Workshop	Hazard Identification workshop - held with air traffic control experts from the Future Airspace team, NATS Manchester, NATS En Route and Liverpool John Lennon Airport as well as airline representatives operating from Manchester Airport.
HON	Abbreviation for the HONILEY DVOR navigation beacon that is to the south of Manchester and is used by departing aircraft as a navigation point.
IAF	Initial Approach Fix - the start of the approach phase of flight. For the Manchester arrival design options, the IAF is at 7,000ft unless stated otherwise.
IATA	The International Air Transport Association - a trade association that supports aviation with global standards for airline safety, security, efficiency and sustainability.
ICAO	International Civil Aviation Organisation - an agency of the United Nations
IFP	Instrument Flight Procedure.
ILS	Instrument Landing System - a radio navigation system that provides vertical and horizontal guidance to arriving aircraft to help them land safely, especially in bad weather.
Instrument Approach Procedures (IAPs)	A series of predetermined manoeuvres for the orderly transfer of an aircraft operating under instrument flight rules from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.
IOA	Initial Options Appraisal - the document that is the first iteration of the three option appraisals required by CAP1616 - the design options appraised within the IOA are the outputs from the DPE.
KIAS	Knots of indicated airspeed - the number shown on the airspeed indicator.
KUXEM[4]	A navigation fix to the south-west of Manchester used by departing aircraft.
LISTO[4]	A navigation fix to the south of Manchester used by departing aircraft.
LBA	The three letter IATA code for Leeds Bradford Airport.
LDA	Localiser Directional Aid - an assisted approach not aligned with the landing runway, used in places where terrain or other factors prevent the localiser antenna from being aligned with the runway that it serves.
LLR	Low-Level Route - the Manchester LLR is Class D airspace within which the CAA have exempted aircraft from requiring an ATC clearance to fly within the route (http://publicapps.caa.co.uk/docs/33/ORS4%20No.1545%20Correction.pdf).
LOAEL	Lowest Observed Adverse Effect Level - below this level, there is no detectable effect on health and quality of life due to the noise.
LNAV	Lateral Navigation - a term for lateral (left/right) navigation used within Performance Based Navigation.
LPL	The three letter IATA code for Liverpool John Lennon Airport.
m	Metres.
MAGIC map	Interactive map managed by DEFRA containing authoritative geographic information about the natural and built environment from across Government.
MAP	Missed Approach Procedure - on occasions, inbound aircraft are unable to land successfully on their first approach and perform an action known as a 'Go-Around'. The Missed Approach Procedure outlines a mechanism to route the aircraft, without conflict with departing or arriving aircraft, and re-establish on to the arrivals path for another approach.
MAN	The three letter IATA code for Manchester Airport.
MANTIS	Manchester Airport Noise and Track Information System - a system that monitors and records the path and noise of aircraft arriving and departing from Manchester Airport.
Masterplan	The strategic plan for the coordinated national programme of airspace change, created by the ACOG under the direction of the CAA and DfT.

MCT	Abbreviation for the Manchester DVOR navigation beacon and routes that use that as a navigation point.
Medical (facilities)	For our analysis we have used the 'Ordnance Survey Address Base' count of 'Medical', details of which they receive from the local government contributing authority. These include Dentist, General Practice Surgery / Clinic, Health Centre, Health Care Services, Hospital, Hospice, Medical / Testing / Research Laboratory, Professional Medical Service, Assessment / Development Services. Not all of these are 'noise sensitive' receptors and in Stage 3 those which are not 'noise sensitive' will be removed from future analysis.
MIRSI	One of three existing hold stacks used at Manchester Airport.
MONTY[4]	A navigation fix to the south-west of Manchester used by departing aircraft.
MSD	Minimum Stabilisation Distance - a design criteria within PANS-OPS 8168 that ensures aircraft stability when flying a procedure.
MTMA	Manchester Terminal Manoeuvring Area - the designated area of Controlled Airspace for Manchester Airport.
NANTI	A navigation fix to the south-west of Manchester used by Liverpool aircraft.
NATS	The air navigation service provider for the UK, formerly National Air Traffic Services. NATS 'En Route' manage the traffic in the upper airspace and climbing and descending to land in the Manchester area.
NERL	NATS En Route Ltd - the part of NATS that delivers en route air traffic control.
Nm	Nautical miles.
NNR	National Nature Reserves - designated under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981 to protect important habitats, species or geology.
Noise abatement	Activity to reduce the emission of noise from a given source (aircraft operations).
Noise-sensitive receptors	Specific locations or developments identified as likely to be adversely affected by noise from or due to aircraft operations. Individual locations will have varying degrees of sensitivity (measured noise exposure levels) depending upon their use. These provide a useful reference to the design principles N1, N2 and N3 where the number of people affected by noise, noise effects and noise sensitive areas are referenced.
NP	National Park - designated areas under the National Parks and Access to the Countryside Act 1949 to protect landscapes because of their special qualities.
Overflight	According to CAP1498, the definition of overflight is 'an aircraft in flight passing an observer at an elevation angle (approximately the angle between the horizon and the aircraft) that is greater than an agreed threshold, and at an altitude below 7,000ft.'
PANS-OPS	An ICAO document that stands for Procedures for Air Navigation Services Document 8168 outlines the rules and criteria for designing aircraft flying procedures - commonly shorted to PANS-OPS.
PBN	Performance Based Navigation - a range of specifications that requires aircraft to navigate to specific accuracy standards, mainly by using satellite-based navigation systems. It is designed to improve track-keeping accuracy for departing and arriving aircraft. The transition to PBN is a UK and International policy requirement and a foundation of the AMS and this ACP.
PBN IR	The PBN IR introduces the gradual implementation of PBN flight procedures to support safer, greener, and more efficient aircraft operations. The Regulation is binding in its entirety and directly applicable in all EU Member States.
Peak District	The Peak District - an upland area in England at the southern end of the Pennines. Mostly in Derbyshire, it extends into Cheshire, Greater Manchester, Staffordshire, West Yorkshire and South Yorkshire.

PDG	Procedure Design Gradient.
Places of Worship	For our analysis we have used the 'Ordnance Survey Address Base' count of 'Places of Worship', details of which they receive from the local government contributing authority. These include any Abbey, Baptistery, Cathedral, Church, Chapel, Citadel, Gurdwara, Kingdom Hall, Methodist, Mosque, Minster, Stupa, Succah, Synagogue, Tabernacle or Temple.
PNR	Preferred Noise Route - lines of tolerances widen from the runway ends out to 1.5km each side of the Standard Instrument Departure route. The area encompassed by these 1.5km tolerances is commonly recognised as the PNR.
Point Merge	Is based on a specific precision-area navigation (P-RNAV) route structure, consisting of a point (the merge point) and pre-defined legs (the sequencing legs) equidistant from this point. The sequencing is achieved with a "direct-to" instruction to the merge point at the appropriate time.
POL	Abbreviation for the Pole Hill DVOR navigation beacon and routes that is to the north of Manchester and is used by departing aircraft as a navigation point
Q&A	Question and Answer - a list of questions (and their answers) that help the reader understand the subject material.
Radius to fix	Radius to Fix (RF) is defined as a constant radius circular path around a defined turn centre that terminates at a fix.
RAG	Red, Amber, Green - a means of assessing a project's status using the traffic light colours.
RF	Radius to Fix is defined as a constant radius path around a defined turn centre. It is a type of waypoint used in PBN procedures and provides highly accurate track keeping in a turn.
RNAV1	Area Navigation 1 is one of the specifications within PBN. Aircraft must maintain specific navigational accuracy within the flight. The '1' suffix refers to the accuracy requirement in the procedure, in this case aircraft must fly within +/-1 nautical mile of the centreline of the designed route.
RNP APCH	Required Navigation Performance Approach - a type of RNP procedure used in the descent phase of flight.
RNP1	Required Navigation Performance - one of the specifications under PBN. Aircraft must maintain specific navigation accuracy, and in RNP are aided by on-board performance monitoring and alerting. It provides slightly more predictable track-keeping when compared to RNAV1. The '1' suffix refers to the accuracy requirement in the procedure, in this case aircraft must fly within +/-1 nautical mile of the centreline of the designed route.
RNP1+RF	Required Navigation Performance with Radius to Fix turns.
ROSUN	One of three existing hold stacks used at Manchester Airport.
Route option	A term used in engagement to describe the design options that have been created in this step of the Airspace Change Process.
SAC	Special Area of Conservation - Designated under the Conservation of Habitats and Species Regulations 2017 as making a significant contribution to the conserving of the habitats of protected species.
Safety Case	A written demonstration of evidence and due diligence provided by a corporation to demonstrate the ability to operate safely and effectively control hazards.
SANBA[4]	A navigation fix to the south of Manchester used by departing aircraft.
SARG	Safety and Airspace Regulation Group which drives UK Civil Aviation Authority (CAA) safety standards including overseeing aircraft, airlines and air traffic controllers. They are also responsible for the planning and regulation of UK airspace.
Secretary of State	The title typically held by Cabinet Ministers in charge of Government Departments.

SESAR	The Europe-wide Single European Sky Air Traffic Management Research programme - a joint undertaking is an institutionalised European partnership between private and public sector partners set up to accelerate through research and innovation the delivery of the Digital European Sky (www.sesarju.eu).
SID	Standard Instrument Departure - pre-determined flightpath set by Air Traffic Control that aircraft follow when departing an airport.
SME	Subject Matter Expert(s) is a person (are people) who has (have) accumulated great knowledge in a particular field or topic.
SoN	Statement of Need - the means by which the change sponsor sets out what airspace issue or opportunity it is seeking to address and what outcome it wishes to achieve, without specifying solutions, technical or otherwise. Manchester Airport's SoN can be found online (airspacechange.caa.co.uk/documents/download/602).
SONEX[4]	A navigation fix to the east of Manchester used by departing aircraft.
SPA	Special Protection Area - protected areas for birds classified under the Wildlife and Countryside Act 1981 and protected under the Conservation of Habitats and Species Regulations 2017.
SSSI	Sites of Special Scientific Interest - areas of importance designated and protected by Natural England under the Wildlife and Countryside Act 1981 to recognise the land's wildlife, geology or landform is of special interest.
STAR	Standard Terminal Arrival Route - a pre-determined flightpath set by Air Traffic Control that aircraft follow when arriving at an airport.
Step 1B Design Principles Report	A document that formed part of Manchester Airport's Stage 1 submission to the CAA (https://airspacechange.caa.co.uk/documents/download/1382).
T-Bar	A name given to a type of RNAV final approach procedure. There is a final approach based on an extended centreline from the runway and then perpendicular to that, two Initial Approach Segments are connected to form a 'T' shape.
TABLY	A navigation fix to the south-west of Manchester used by departing aircraft.
Technical Coordination Group	Created by ACOG the Group regularly meet to discuss and resolve policy and technical issues affecting airspace design across all airports.
TODA	Take off Distance Available - The length of the paved surface of the take-off runway plus the length of the clearway.
TOS	Traffic Orientation Structure ensures smooth traffic flows and decrease the safety risks associated with crossing traffic.
Track to fix	A Track to Fix (TF) leg is used in PBN procedures to create a line between two waypoints. It is defined by the flight track to the following waypoint and Track to a Fix leg are sometimes called point-to-point legs for this reason.
Tranquillity	There is no universally accepted definition of tranquillity and therefore no accepted metric by which it can be measured. In general terms it can be defined as a state of calm. The consideration of impacts upon tranquillity for airspace change is with specific reference to National Parks and Areas of Outstanding Natural Beauty (AONB), plus any locally identified 'tranquil' areas that are identified through community engagement and are subsequently reflected within an airspace change proposal's design principles.
Transition	The part of the arrival route from the IAF at 7,000ft where aircraft are descending prior to joining the final approach at the FAF.
Transition Altitude	The altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes. Above this, the reference is to a Flight Level.

Transport Act 2000	The Transport Act 2000 is an Act of the Parliament of the United Kingdom. The Act provided for a number of measures across the transport industry. In the aviation sector, the Act set a framework for creation of a public-private partnership of National Air Traffic Services.
Uncontrolled Airspace	Uncontrolled airspace is airspace where an ATC service is not deemed necessary or cannot be provided for practical reasons.
Unviable	Options which would not comply with the rules or for flight procedure design, specifically the requirements of ICAO PANS-OPS 8168, or if they are not compliant with these rules, did not have a supporting safety justification.
VHF	Very High Frequency.
Viable and good fit	Options that are viable to design and which would be expected to meet the three design principles with which all design options 'must' comply (design principles Safety, Policy, and Capacity).
Viable but poor fit	Options that are viable to design, but which would not be expected to meet the requirements of the design principles Safety, Policy and Capacity.
VNAV	Vertical Navigation - a term for vertical (up/down) navigation used within Performance Based Navigation.
VRP	Visual reference point.
WAL	Abbreviation for the Wallasey DVOR navigation beacon that is to the west of Manchester and is used by departing aircraft as a navigation point.
XORBO[4]	A navigation fix to the north-east of Manchester used by departing aircraft.
XUMAT[4]	A navigation fix to the north of Manchester used by departing aircraft.

32 Appendices

32.1 Appendix 1 – Departures Evaluation Summary Table

Envelope	Option Name	Justification
23L East (Right Turn)	SID RW 23 L EAST OPTION 1A	Replication
23L East (Right Turn)	SID RW 23 L EAST OPTION 1C	'Best-Performing'
23L East (Right Turn)	SID RW 23 L EAST OPTION 4B	SME Judgement
23L East (Left Turn)	SID RW 23 L EAST OPTION 6A	'Best-Performing'
23L East (Left Turn)	SID RW 23 L EAST OPTION 6B	'Best-Performing'
23L East (Left Turn)	SID RW 23 L EAST OPTION 6C	'Best-Performing'
23L East (Left Turn)	SID RW 23 L EAST OPTION 8A	'Best-Performing'
23L East (Left Turn)	SID RW 23 L EAST OPTION 8C	'Best-Performing'
23R East (Right Turn)	SID RW 23 R EAST OPTION 1A	Replication
23R East (Right Turn)	SID RW 23 R EAST OPTION 4A	'Best-Performing'
23R East (Right Turn)	SID RW 23 R EAST OPTION 4B	SME Judgement
23R East (Right Turn)	SID RW 23 R EAST OPTION 5	'Best-Performing'
23R East (Left Turn)	SID RW 23 R EAST OPTION 6B	SME Judgement
23R East (Left Turn)	SID RW 23 R EAST OPTION 6C	'Best-Performing'
23L North	SID RW 23 L NORTH OPTION 1A	Replication
23L North	SID RW 23 L NORTH OPTION 2B	'Best-Performing'

23L North	SID RW 23 L NORTH OPTION 3	'Best-Performing'
23L North	SID RW 23 L NORTH OPTION 4A	'Best-Performing'
23L North	SID RW 23 L NORTH OPTION 4B	'Best-Performing'
23L North	SID RW 23 L NORTH OPTION 6A	SME Judgement
23L North	SID RW 23 L NORTH OPTION 6B	'Best-Performing'
23L North	SID RW 23 L NORTH OPTION 7	'Best-Performing'
23R North	SID RW 23 R NORTH OPTION 1A	Replication
23R North	SID RW 23 R NORTH OPTION 1B	'Best-Performing'
23R North	SID RW 23 R NORTH OPTION 2B	'Best-Performing'
23R North	SID RW 23 R NORTH OPTION 3	'Best-Performing'
23R North	SID RW 23 R NORTH OPTION 4A	'Best-Performing'
23R North	SID RW 23 R NORTH OPTION 4B	'Best-Performing'
23R North	SID RW 23 R NORTH OPTION 6A	'Best-Performing'
23R North	SID RW 23 R NORTH OPTION 6B	'Best-Performing'
23R North	SID RW 23 R NORTH OPTION 7	'Best-Performing'
23L South (SANBA)	SID RW 23 L SOUTH OPTION 1	Replication
23L South (SANBA)	SID RW 23 L SOUTH OPTION 4A	SME Judgement
23L South (SANBA)	SID RW 23 L SOUTH OPTION 4C	'Best-Performing'

23L South (SANBA)	SID RW 23 L SOUTH OPTION 5C	'Best-Performing'
23L South (SANBA)	SID RW 23 L SOUTH OPTION 6	SME Judgement
23R South (SANBA)	SID RW 23 R SOUTH OPTION 1	Replication
23R South (SANBA)	SID RW 23 R SOUTH OPTION 4A	SME Judgement
23R South (SANBA)	SID RW 23 R SOUTH OPTION 4C	'Best-Performing'
23R South (SANBA)	SID RW 23 R SOUTH OPTION 6	SME Judgement
23L South (LISTO)	SID RW 23 L SOUTH OPTION 2A	Replication
23L South (LISTO)	SID RW 23 L SOUTH OPTION 2B	'Best-Performing'
23L South (LISTO)	SID RW 23 L SOUTH OPTION 5A	'Best-Performing'
23L South (LISTO)	SID RW 23 L SOUTH OPTION 5B	'Best-Performing'
23R South (LISTO)	SID RW 23 R SOUTH OPTION 2A	Replication
23R South (LISTO)	SID RW 23 R SOUTH OPTION 2B	'Best-Performing'
23R South (LISTO)	SID RW 23 R SOUTH OPTION 5A	'Best-Performing'
23R South (LISTO)	SID RW 23 R SOUTH OPTION 5B	'Best-Performing'
23L South-West (MONTY)	SID RW 23 L SOUTH-WEST OPTION 1A	Replication
23R South-West (MONTY)	SID RW 23 R SOUTH-WEST OPTION 1A	Replication
23L South-West (EKLAD)	SID RW 23 L SOUTH-WEST OPTION 1D	Replication
23R South-West (EKLAD)	SID RW 23 R SOUTH-WEST OPTION 1D	Replication
23L South-West (KUXEM)	SID RW 23 L SOUTH-WEST OPTION 1C	Replication

23L South-West (KUXEM)	SID RW 23 L SOUTH-WEST OPTION 6	SME Judgement
23L South-West (KUXEM)	SID RW 23 L SOUTH-WEST OPTION 7A	'Best-Performing'
23L South-West (KUXEM)	SID RW 23 L SOUTH-WEST OPTION 7B	'Best-Performing'
23L South-West (KUXEM)	SID RW 23 L SOUTH-WEST OPTION 8	SME Judgement
23R South-West (KUXEM)	SID RW 23 R SOUTH-WEST OPTION 1B	'Best-Performing'
23R South-West (KUXEM)	SID RW 23 R SOUTH-WEST OPTION 1C	Replication
23R South-West (KUXEM)	SID RW 23 R SOUTH-WEST OPTION 3B	'Best-Performing'
23R South-West (KUXEM)	SID RW 23 R SOUTH-WEST OPTION 3C	'Best-Performing'
23R South-West (KUXEM)	SID RW 23 R SOUTH-WEST OPTION 6	SME Judgement
23R South-West (KUXEM)	SID RW 23 R SOUTH-WEST OPTION 7A	'Best-Performing'
23R South-West (KUXEM)	SID RW 23 R SOUTH-WEST OPTION 7B	'Best-Performing'
23R South-West (KUXEM)	SID RW 23 R SOUTH-WEST OPTION 8	SME Judgement
23R South-West (KUXEM)	SID RW 23 R SOUTH-WEST OPTION 10	'Best-Performing'
23L West	SID RW 23 L WEST OPTION 7	SME Judgement
23L West	SID RW 23 L WEST OPTION 8	'Best-Performing'
23L West	SID RW 23 L WEST OPTION 9	SME Judgement
23L West	SID RW 23 L WEST OPTION 10	SME Judgement

23L West	SID RW 23 L WEST OPTION 11	SME Judgement
23L West	SID RW 23 L WEST OPTION 12	SME Judgement
23R West	SID RW 23 R WEST OPTION 7	'Best-Performing'
23R West	SID RW 23 R WEST OPTION 8	'Best-Performing'
23R West	SID RW 23 R WEST OPTION 9	'Best-Performing'
23R West	SID RW 23 R WEST OPTION 10	SME Judgement
23R West	SID RW 23 R WEST OPTION 11	SME Judgement
23R West	SID RW 23 R WEST OPTION 12	SME Judgement
05L East	SID RW 05 L EAST OPTION 1	Replication
05L East	SID RW 05 L EAST OPTION 4	'Best-Performing'
05L East	SID RW 05 L EAST OPTION 5	'Best-Performing'
05L East	SID RW 05 L EAST OPTION 6	'Best-Performing'
05L East	SID RW 05 L EAST OPTION 7	'Best-Performing'
05L East	SID RW 05 L EAST OPTION 8	'Best-Performing'
05R East	SID RW 05 R EAST OPTION 1	Replication
05R East	SID RW 05 R EAST OPTION 4	'Best-Performing'
05R East	SID RW 05 R EAST OPTION 5	'Best-Performing'
05R East	SID RW 05 R EAST OPTION 6	'Best-Performing'

05R East	SID RW 05 R EAST OPTION 7	'Best-Performing'
05R East	SID RW 05 R EAST OPTION 8	'Best-Performing'
05L North	SID RW 05 L NORTH OPTION 1	Replication
05L North	SID RW 05 L NORTH OPTION 4	'Best-Performing'
05R North	SID RW 05 R NORTH OPTION 1	Replication
05R North	SID RW 05 R NORTH OPTION 4	'Best-Performing'
05L South (Right Turn)	SID RW 05 L SOUTH OPTION 1	Replication
05L South (Right Turn)	SID RW 05 L SOUTH OPTION 3	'Best-Performing'
05L South (Right Turn)	SID RW 05 L SOUTH OPTION 6A	SME Judgement
05L South (Left Turn)	SID RW 05 L SOUTH OPTION 7A	SME Judgement
05L South (Left Turn)	SID RW 05 L SOUTH OPTION 8	'Best-Performing'
05L South (Left Turn)	SID RW 05 L SOUTH OPTION 9	'Best-Performing'
05L South (Left Turn)	SID RW 05 L SOUTH OPTION 10	'Best-Performing'
05R South (Right Turn)	SID RW 05 R SOUTH OPTION 1	Replication
05R South (Right Turn)	SID RW 05 R SOUTH OPTION 3	'Best-Performing'
05R South (Right Turn)	SID RW 05 R SOUTH OPTION 6A	'Best-Performing'
05R South (Left Turn)	SID RW 05 R SOUTH OPTION 7A	SME Judgement
05R South (Left Turn)	SID RW 05 R SOUTH OPTION 8	'Best-Performing'

05R South (Left Turn)	SID RW 05 R SOUTH OPTION 9	'Best-Performing'
05R South (Left Turn)	SID RW 05 R SOUTH OPTION 10	'Best-Performing'
05L South-west	SID RW 05 L SOUTH-WEST OPTION 4B	SME Judgement
05L South-west	SID RW 05 L SOUTH-WEST OPTION 5	'Best-Performing'
05R South-west	SID RW 05 R SOUTH-WEST OPTION 1	'Best-Performing'
05R South-west	SID RW 05 R SOUTH-WEST OPTION 2A	'Best-Performing'
05R South-west	SID RW 05 R SOUTH-WEST OPTION 2B	'Best-Performing'
05R South-west	SID RW 05 R SOUTH-WEST OPTION 3A	'Best-Performing'
05R South-west	SID RW 05 R SOUTH-WEST OPTION 3B	'Best-Performing'
05R South-west	SID RW 05 R SOUTH-WEST OPTION 4B	'Best-Performing'
05R South-west	SID RW 05 R SOUTH-WEST OPTION 5	'Best-Performing'
05L West	SID RW 05 L WEST OPTION 1	Replication
05L West	SID RW 05 L WEST OPTION 6A	SME Judgement
05L West	SID RW 05 L WEST OPTION 7	'Best-Performing'
05R West	SID RW 05 R WEST OPTION 1	Replication
05R West	SID RW 05 R WEST OPTION 4B	'Best-Performing'
05R West	SID RW 05 R WEST OPTION 6A	SME Judgement
05R West	SID RW 05 R WEST OPTION 7	'Best-Performing'

32.2 Appendix 2 – Transitions Evaluation Summary Table

<u>North Transitions</u>

IAF	Option Name	Justification
IAF 1	Runway 05L 3,000ft FAF Transition North Option 6A	'Best-Performing'
IAF 1	Runway 05L 2,500ft FAF Transition North Option 6B	'Best-Performing'
IAF 1	Runway 05R 2,500ft Transition North Option 6B	'Best-Performing'
	No Runway 23R or 23L Design Options	
Reject		

IAF 2	Runway 05L 3,000ft FAF Transition North Option 7A	'Best-Performing'
IAF 2	Runway 05L 2,500ft FAF Transition North Option 7B	'Best-Performing'
IAF 2	Runway 05L 2,000ft FAF Transition North Option 7C	'Best-Performing'
IAF 2	Runway 05R 2,000ft FAF Transition North Option 7C	'Best-Performing'
	No Runway 23R or 23L Design Options	
Reject		

IAF 3	Runway 23L 3,500ft FAF Transition North Option 8A	SME Judgement
IAF 3	Runway 23R 3,500ft FAF Transition North Option 8A	SME Judgement
IAF 3	Runway 05L 3,000ft FAF Transition North Option 8A	'Best-Performing'
IAF 3	Runway 05R 3,000ft FAF Transition North Option 8A	SME Judgement
IAF 3	Runway 05L 2,500ft FAF Transition North Option 8B	'Best-Performing'
Accept		

IAF 4	Runway 23L 3,500ft FAF Transition North Option 7A	'Best-Performing'
IAF 4	Runway 23R 3,500ft FAF Transition North Option 7A	'Best-Performing'
IAF 4	Runway 23L 3,000ft FAF Transition North Option 7B	'Best-Performing'
IAF 4	Runway 23R 3,000ft FAF Transition North Option 7B	'Best-Performing'
IAF 4	Runway 05R 3,000ft FAF Transition North Option 9A	SME Judgement
IAF 4	Runway 05R 3,000ft FAF Transition North Option 9A	'Best-Performing'
IAF 4	Runway 05L 2,500ft FAF Transition North Option 9B	'Best-Performing'
Accept		

IAF 5	Runway 23L 3,500ft FAF Transition North Option 3A	'Best-Performing'
IAF 5	Runway 23R 3,500ft FAF Transition North Option 3A	'Best-Performing'
IAF 5	Runway 23L 3,000ft FAF Transition North Option 3B	'Best-Performing'
IAF 5	Runway 23R 3,000ft FAF Transition North Option 3B	'Best-Performing'
	No Runway 05L or 05R Design Options	
Reject		

IAF 6	Runway 23R 3,500ft FAF Transition North Option 6A	'Best-Performing'
IAF 6	Runway 23L 3,000ft FAF Transition North Option 6B	'Best-Performing'
	No Runway 05L or 05R Design Options	
Reject		

IAF 11	Runway 05L 2,000ft FAF Transition North Option 12	'Best-Performing'
	No Runway 23R, 05R or 23L Design Options	
Reject		

IAF 12	Runway 23L 3,500ft FAF Transition North Option 11A	'Best-Performing'
IAF 12	Runway 23R 3,500ft FAF Transition North Option 11A	'Best-Performing'
IAF 12	Runway 23L 3,000ft FAF Transition North Option 11B	'Best-Performing'
IAF 12	Runway 23R 3,000ft FAF Transition North Option 11B	'Best-Performing'
IAF 12	Runway 05L 2,000ft FAF Transition North Option 13	'Best-Performing'
IAF 12	Runway 05R 2,000ft FAF Transition North Option 13	'Best-Performing'
Accept		

IAF STEAK	Runway 23L 3,500ft FAF Transition North Option 1A	SME Judgement
IAF STEAK	Runway 23R 3,500ft FAF Transition North Option 1A	'Best-Performing'
IAF STEAK	Runway 05L 3,000ft FAF Transition North Option 1A	'Best-Performing'
IAF STEAK	Runway 05L 2,500ft FAF Transition North Option 1B	'Best-Performing'
IAF STEAK	Runway 05R 2,500ft FAF Transition North Option 1B	'Best-Performing'
Accept		

IAF STEAK	Runway 05L 3,000ft FAF Transition North Option 2A	'Best-Performing'
IAF STEAK	Runway 05L 2,500ft FAF Transition North Option 2B	'Best-Performing'
IAF STEAK	Runway 05R 2,500ft FAF Transition North Option 2B	'Best-Performing'
	No Runway 23R or 23L Design Options	
Reject		

South Transitions

IAF	Option Name	Justification
IAF 7	Runway 23L 3,500ft FAF Transition South Option 9A	SME Judgement
IAF 7	Runway 23R 3,500ft FAF Transition South Option 9A	'Best-Performing'
IAF 7	Runway 23R 3,000ft FAF Transition South Option 9B	'Best-Performing'
IAF 7	Runway 05L 2,500ft FAF Transition South Option 6B	'Best-Performing'
IAF 7	Runway 05R 2,500ft FAF Transition South Option 6B	'Best-Performing'
Accept		

IAF 8	Runway 23L 3,500ft FAF Transition South Option 6A	'Best-Performing'
IAF 8	Runway 23R 3,500ft FAF Transition South Option 6A	'Best-Performing'
IAF 8	Runway 23L 3,000ft FAF Transition South Option 6B	'Best-Performing'
IAF 8	Runway 23R 3,000ft FAF Transition South Option 6B	'Best-Performing'
IAF 8	Runway 05L 2,500ft FAF Transition South Option 7B	'Best-Performing'
IAF 8	Runway 05R 2,500ft FAF Transition South Option 7B	'Best-Performing'
Accept		

IAF 9	Runway 23L 3,500ft FAF Transition South Option 7A	'Best-Performing'
IAF 9	Runway 23R 3,500ft FAF Transition South Option 7A	'Best-Performing'
IAF 9	Runway 23L 3,000ft FAF Transition South Option 7B	'Best-Performing'
IAF 9	Runway 23R 3,000ft FAF Transition South Option 7B	'Best-Performing'
	No Runway 05L or 05R Design Options	
Reject		

IAF 10	Runway 23R 3,500ft FAF Transition South Option 8A	'Best-Performing'
IAF 10	Runway 23L 3,000ft FAF Transition South Option 8B	'Best-Performing'
IAF 10	Runway 23R 3,000ft FAF Transition South Option 8B	'Best-Performing'
IAF 10	Runway 05L 2,500ft FAF Transition South Option 9B	'Best-Performing'
IAF 10	Runway 05R 2,500ft FAF Transition South Option 9B	'Best-Performing'
Accept		

IAF TURKY	Runway 23L 3,500ft FAF Transition South Option 1A	SME Judgement
IAF TURKY	Runway 23R 3,500ft FAF Transition South Option 1A	'Best-Performing'
IAF TURKY	Runway 23R 3,000ft FAF Transition South Option 1B	'Best-Performing'
IAF TURKY	Runway 05L 2,500ft FAF Transition South Option 1B	'Best-Performing'
IAF TURKY	Runway 05R 2,500ft FAF Transition South Option 1B	'Best-Performing'
Accept		

IAF TURKY	Runway 23R 3,000ft FAF Transition South Option 2B	'Best-Performing'
	No Runway 05L, 05R or 23L Design Options	
Reject		

MAG Manchester Airport