Design Principle Evaluation – V2 CAP1616 Stage 2 Develop and Assess



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	, <u>26.10</u> ,
-	Appendices 1 and 2 have been removed as this information is now detailed in the summary tables following each design envelope/transitions FAF altitude group

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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 <u>www.airspacechange.caa.co.uk</u>.

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 <u>Design Principles Report.</u>

Design Principle Designation	Design Principle Description		
	Safety		
S	Our routes must be safe and must comply with industry standards and regulations.		
	Policy		
Р	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.		
	Capacity		
C	Our future airspace must enable best use of the capacity of our existing runways, in line with Government policy.		
	Emissions		
E	We will minimise and where possible, reduce emissions when we design routes. This may be achieved by selecting the most direct routes.		
	Noise 1		
N1	Our route designs should seek to minimise, and where possible, reduce the number of people affected by noise from our flights.		
	Noise 2		
N2	Where practical, noise effects should be shared. The use of dispersion and/or respite, especially at night, will be considered to achieve this.		
	Noise 3		
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.		
	Airspace		
A	Our route designs should minimise the impacts on other airspace users by limiting Controlled Airspace (CAS).		
	Technology		
Т	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.

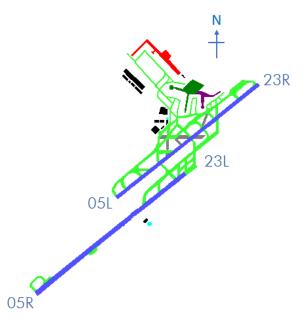


Figure 1: MAN runway orientation

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 are¹:
 - Mon Fri 06.30 to10.30 and 16.00 to 20.00,
 - Sat 06.30 to 10.30
 - Sun 16.00 to 20.00

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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 are²:
 - 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.

2.1 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 <u>Statement of Need.</u>

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 O5 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 LPL
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 Airspace Change Organising Group (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

3.1 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 aircraft operations, a modal average path³ (a single line that delineates those locations on the ground that have experienced the greatest number of overflights) has been created for each of the existing arrival patterns and 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 tactically vectored, either away from the SID or prior to final approach, 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 is known as the 'do nothing' scenario, for comparisons in this DPE and the Initial Options Appraisal (IOA).

The limitations of overflight assessment are described in CAP1498, which recognises that it does not set out to directly assess noise impacts. Instead, it provides a means to quantify the number of people, dwellings and sensitive areas overflown. This has been used to present the possible effect of proposals on local communities that are exposed to noise from aircraft up to 7,000 feet.

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.

4.1 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, the following professional judgement was applied:

- 1. As a minimum, accepted options must at least partially meet the 'must have' design principles of Safety, Policy, and Capacity.
- 2. Within each design envelope the option with the greatest number of 'greens' was deemed to be 'bestperforming' and was accepted. In the summary tables, this is denoted as 'Best'. 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

- 3. Any other options evaluated as equal to the 'best-performing' option were accepted. In the summary tables, this is denoted as 'Best'.
- 4. All 'do minimum' (Replication) departure options were accepted, to enable their continued consideration. In the summary tables, this is denoted as 'Do Minimum (Replication)'.
- 5. Design options not identified as 'best performing', equal to the 'best performing' or 'do minimum' were reconsidered to establish whether the population overflown up to 4,000ft was less than that of an option already accepted. Any identified options were subsequently accepted. In the summary tables, this is denoted as '4,000ft beneficial.

A hypothetical example is shown below.

	Accept / Reject under steps 1,2,3 and 4.	Approximate total population overflown up to 4,000ft	Additional options accepted under step 5
Option 1	'do minimum'	19,300	
Option 2	Equal best-performing	21,100	
Option 3	Best-performing	17,500	
Option 4		20,900	Yes as 20,900 is less than the 21,100 population over flown by Option 2
Option 5		28,200	
Option 6	Equal best-performing	19,200	

- 6. Any option which does not accord with the criteria above was rejected. In the summary tables, this is denoted as 'Rejected'.
- 7. 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, as shown below.

Runway	Criteria	SONEX 'Do Nothing' Scenario
23L	Emissions	Estimated track length: 45km (24nm)
23L	Noise 1, 4,000ft	Estimate of total population overflown: 1,900
23L	Noise 1, 7,000ft	Estimate of total population overflown: 121,000
23L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 3
23L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 193
23R	Emissions	Estimated track length: 48km (26nm)
23R	Noise 1, 4,000ft	Estimate of total population overflown: 7,800
23R	Noise 1, 7,000ft	Estimate of total population overflown: 207,600
23R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 11
23R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 355

 North was compared against POL 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	POL 'Do Nothing' Scenario
23L	Emissions	Estimated track length: 39km (21nm)
23L	Noise 1, 4,000ft	Estimate of total population overflown: 7,500
23L	Noise 1, 7,000ft	Estimate of total population overflown: 115,200
23L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 10
23L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: [209]
23R	Emissions	Estimated track length: 41km (22nm)
23R	Noise 1, 4,000ft	Estimate of total population overflown: 3,900
23R	Noise 1, 7,000ft	Estimate of total population overflown: 222,400
23R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 6
23R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 390

 South was compared against LISTO 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	LISTO 'Do Nothing' Scenario
23L	Emissions	Estimated track length: 39km (21nm)
23L	Noise 1, 4,000ft	Estimate of total population overflown: 2,500
23L	Noise 1, 7,000ft	Estimate of total population overflown: 33,300
23L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 5
23L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 70
23R	Emissions	Estimated track length: 40km (22nm)
23R	Noise 1, 4,000ft	Estimate of total population overflown: 3,300
23R	Noise 1, 7,000ft	Estimate of total population overflown: 33,700
23R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 12
23R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 70

South was compared against SANBA 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	SANBA 'Do Nothing' Scenario
23L	Emissions	Estimated track length: 48km (26nm)
23L	Noise 1, 4,000ft	Estimate of total population overflown: 3,900
23L	Noise 1, 7,000ft	Estimate of total population overflown: 8,300
23L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 6
23L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 12
23R	Emissions	Estimated track length: 49km (26nm)
23R	Noise 1, 4,000ft	Estimate of total population overflown: 3,400
23R	Noise 1, 7,000ft	Estimate of total population overflown: 16,200
23R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 2
23R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 42

• South-west was compared against **EKLAD** 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	EKLAD 'Do Nothing' Scenario
23L	Emissions	Estimated track length: 41km (22nm)
23L	Noise 1, 4,000ft	Estimate of total population overflown: 1,500
23L	Noise 1, 7,000ft	Estimate of total population overflown: 7,100
23L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 3
23L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 21
23R	Emissions	Estimated track length: 42km (23nm)
23R	Noise 1, 4,000ft	Estimate of total population overflown: 800
23R	Noise 1, 7,000ft	Estimate of total population overflown: 13,200
23R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 6
23R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 36

• South-west was compared against **KUXEM** 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	KUXEM 'Do Nothing' Scenario
23L	Emissions	Estimated track length: 40km (22nm)
23L	Noise 1, 4,000ft	Estimate of total population overflown: 1,200
23L	Noise 1, 7,000ft	Estimate of total population overflown: 17,300
23L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 5
23L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 51
23R	Emissions	Estimated track length: 42km (23nm)
23R	Noise 1, 4,000ft	Estimate of total population overflown: 500
23R	Noise 1, 7,000ft	Estimate of total population overflown: 16,400
23R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 2

 West was compared against EKLAD 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	EKLAD 'Do Nothing' Scenario
23L	Emissions	Estimated track length: 41km (22nm)
23L	Noise 1, 4,000ft	Estimate of total population overflown: 1,500
23L	Noise 1, 7,000ft	Estimate of total population overflown: 7,100
23L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 3
23L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 21
23R	Emissions	Estimated track length: 42km (23nm)
23R	Noise 1, 4,000ft	Estimate of total population overflown: 800
23R	Noise 1, 7,000ft	Estimate of total population overflown: 13,200
23R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 6
23R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 36

• Runway 05:

 East was compared against DESIG 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	DESIG 'Do Nothing' Scenario
05L	Emissions	Estimated track length: 40km (22nm)
05L	Noise 1, 4,000ft	Estimate of total population overflown: 61,000
05L	Noise 1, 7,000ft	Estimate of total population overflown: 104,700
05L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 143
05L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 200
05R	Emissions	Estimated track length: 41km (22nm)
05R	Noise 1, 4,000ft	Estimate of total population overflown: 60,200
05R	Noise 1, 7,000ft	Estimate of total population overflown: 147,000
05R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 161
05R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 314

• North was compared against **POL** 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	POL 'Do Nothing' Scenario
05L	Emissions	Estimated track length: 41km (22nm)
05L	Noise 1, 4,000ft	Estimate of total population overflown: 46,900
05L	Noise 1, 7,000ft	Estimate of total population overflown: 195,900
05L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 143
05L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 389
05R	Emissions	Estimated track length: 42km (23nm)
05R	Noise 1, 4,000ft	Estimate of total population overflown: 51,900
05R	Noise 1, 7,000ft	Estimate of total population overflown: 224,300
05R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 139
05R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 487

 South was compared against LISTO 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	LISTO 'Do Nothing' Scenario
05L	Emissions	Estimated track length: 39km (21nm)
05L	Noise 1, 4,000ft	Estimate of total population overflown: 15,100
05L	Noise 1, 7,000ft	Estimate of total population overflown: 73,300
05L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 35
05L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 149
05R	Emissions	Estimated track length: 40km (22nm)
05R	Noise 1, 4,000ft	Estimate of total population overflown: 24,500
05R	Noise 1, 7,000ft	Estimate of total population overflown: 33,200
05R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 50
05R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 70

• South-west was compared against **ASMIM** 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	ASMIM 'Do Nothing' Scenario
05L	Emissions	Estimated track length: 40km (22nm)
05L	Noise 1, 4,000ft	Estimate of total population overflown: 72,200
05L	Noise 1, 7,000ft	Estimate of total population overflown: 245,500
05L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 160
05L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 465
05R	Emissions	Estimated track length: 42km (23nm)
05R	Noise 1, 4,000ft	Estimate of total population overflown: 63,000
05R	Noise 1, 7,000ft	Estimate of total population overflown: 250,100
05R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 145
05R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 457

• West was compared against **ASMIM** 'do nothing' scenarios for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	ASMIM 'Do Nothing' Scenario
05L	Emissions	Estimated track length: 40km (22nm)
05L	Noise 1, 4,000ft	Estimate of total population overflown: 72,200
05L	Noise 1, 7,000ft	Estimate of total population overflown: 245,500
05L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 160
05L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 465
05R	Emissions	Estimated track length: 42km (23nm)
05R	Noise 1, 4,000ft	Estimate of total population overflown: 63,000
05R	Noise 1, 7,000ft	Estimate of total population overflown: 250,100
05R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 145
05R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 457

The 'do nothing' (baseline) scenarios are mapped in section 3.3 of the Initial Options Appraisal.

4.2.1 Additionally Qualified Options

To allow the ACP at MAN to retain sufficient flexibility to respond to other, emerging airspace change proposals and to avoid the premature rejection of any design options, considered likely to offer benefits (for example as a part of a network) not fully apparent at this stage, 23 additional design options have also been retained. These were based upon the qualitative judgement of the SME which examined the potential for options to make best use of runway

capacity and to reduce the interaction with arrivals and departures at both MAN and adjacent airports. In this respect this SME judgement was aligned with the requirements of the design principle Capacity, and with the efficiency ends of the AMS (through the design principle Policy).

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. In the summary tables, options which have been additionally qualified are denoted as 'Add Qual.'

In addition, 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 the following professional judgement was applied:

1. As a minimum, accepted options must at least partially meet the 'must have' design principles of Safety, Policy, and Capacity.

2. The option with the greatest number of 'greens' was deemed to be 'best-performing' and was shortlisted for acceptance. In the summary tables, this is denoted as 'Best'. 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

- 3. Within each design envelope any other options evaluated as equal to the 'best-performing' option were also shortlisted for acceptance. In the summary tables, this is denoted as 'Best'.
- 4. Design options not identified as 'best performing', equal to the 'best performing' or 'do minimum' were reconsidered to establish whether the population overflown up to 4,000ft was less than that of an option already accepted. Any identified options were subsequently accepted. In the summary tables, this is denoted as '4,000ft beneficial'. A hypothetical example is shown below.

	Accept / Reject under steps 1,2, and 3	Approximate total population overflown up to 4,000ft	Additional options accepted under step 4
Option 1	'do minimum'	19,300	
Option 2	Equal best-performing	21,100	
Option 3	Best-performing	17,500	
Option 4		20,900	Yes as 20,900 is less than the 21,100 population over flown by Option 2
Option 5		28,200	
Option 6	Equal best-performing	19,200	

- 5. Any option which does not accord with the criteria above was rejected. In the summary tables, this is denoted as 'Rejected'.
- 6. The shortlist of 'best-performing' (steps 2 and 3 above) and beneficial up to 4,000ft (step 4 above) 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 was not complimented by each of these four options and a further qualitative professional judgement could not be applied, the shortlisted accepted option(s) were subsequently rejected. In the summary tables, this is denoted as either 'Best but incomplete IAF' or '4,000ft beneficial but incomplete IAF'. Options which were evaluated as 'best-performing' and also form part of a complete set within an IAF were accepted.
- 7. 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 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, as shown below.

Runway	Criteria	MIRSI 'Do Nothing' Scenario
23L	Emissions	Estimated track length: 86km (46nm)
23L	Noise 1, 4,000ft	Estimate of total population overflown: 133,300
23L	Noise 1, 7,000ft	Estimate of total population overflown: 793,400
23L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 271
23L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 1604

Runway	Criteria	ROSUN 'Do Nothing' Scenario
23L	Emissions	Estimated track length: 54km (29nm)
23L	Noise 1, 4,000ft	Estimate of total population overflown: 113,300
23L	Noise 1, 7,000ft	Estimate of total population overflown: 427,200
23L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 192
23L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 812

 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, as shown below.

Runway	Criteria	MIRSI 'Do Nothing' Scenario
23R	Emissions	Estimated track length: 72km (39nm)
23R	Noise 1, 4,000ft	Estimate of total population overflown: 161,600
23R	Noise 1, 7,000ft	Estimate of total population overflown: 755,500
23R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 289
23R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 1,474

Runway	Criteria	ROSUN 'Do Nothing' Scenario
23R	Emissions	Estimated track length: 59km (32nm)
23R	Noise 1, 4,000ft	Estimate of total population overflown: 88,800
23R	Noise 1, 7,000ft	Estimate of total population overflown: 381,600
23R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 159
23R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 718

 South L 3,500ft and 3,000ft was compared against DAYNE 'do nothing' scenario for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	DAYNE 'Do Nothing' Scenario
23L	Emissions	Estimated track length: 63km (34nm)
23L	Noise 1, 4,000ft	Estimate of total population overflown: 77,600
23L	Noise 1, 7,000ft	Estimate of total population overflown: 149,300
23L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 155
23L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 301

• South R 3,5000ft and 3,000ft was compared against **DAYNE** 'do nothing' scenario for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	DAYNE 'Do Nothing' Scenario
23R	Emissions	Estimated track length: 41km (22nm)
23R	Noise 1, 4,000ft	Estimate of total population overflown: 84,200
23R	Noise 1, 7,000ft	Estimate of total population overflown: 137,400
23R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 157
23R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 267

- 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, as shown below.

Runway	Criteria	MIRSI 'Do Nothing' Scenario
05L	Emissions	Estimated track length: 43km (23nm)
05L	Noise 1, 4,000ft	Estimate of total population overflown: 73,000
05L	Noise 1, 7,000ft	Estimate of total population overflown: 467,800
05L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 186
05L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 921

Runway	Criteria	ROSUN 'Do Nothing' Scenario
05L	Emissions	Estimated track length: 76km (41nm)
05L	Noise 1, 4,000ft	Estimate of total population overflown: 69,600
05L	Noise 1, 7,000ft	Estimate of total population overflown: 999,600
05L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 181
05L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 2,153

 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, as shown below.

Runway	Criteria	MIRSI 'Do Nothing' Scenario
05R	Emissions	Estimated track length: 55km (30nm)
05R	Noise 1, 4,000ft	Estimate of total population overflown: 45,700
05R	Noise 1, 7,000ft	Estimate of total population overflown: 389,900
05R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 118
05R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 907

Runway	Criteria	ROSUN 'Do Nothing' Scenario
05R	Emissions	Estimated track length: 79km (43nm)
05R	Noise 1, 4,000ft	Estimate of total population overflown: 52,500
05R	Noise 1, 7,000ft	Estimate of total population overflown: 1,003,500
05R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 138
05R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 2,243

 South L 3,000ft and 2,500ft was compared against DAYNE 'do nothing' scenario for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	DAYNE 'Do Nothing' Scenario
05L	Emissions	Estimated track length: 64km (35nm)
05L	Noise 1, 4,000ft	Estimate of total population overflown: 104,300
05L	Noise 1, 7,000ft	Estimate of total population overflown: 274,400
05L	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 235
05L	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 600

 South R 3,000ft and 2,500ft was compared against DAYNE 'do nothing' scenario for design principles Emissions, Noise N1 and Noise N3, as shown below.

Runway	Criteria	DAYNE 'Do Nothing' Scenario
05R	Emissions	Estimated track length: 66km (36nm)
05R	Noise 1, 4,000ft	Estimate of total population overflown: 68,900
05R	Noise 1, 7,000ft	Estimate of total population overflown: 182,000
05R	Noise 3, 4,000ft	Estimate of total noise sensitive areas overflown: 173
05R	Noise 3, 7,000ft	Estimate of total noise sensitive areas overflown: 407

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' (baseline) scenarios are mapped in section 3.3 of the Initial Options Appraisal.

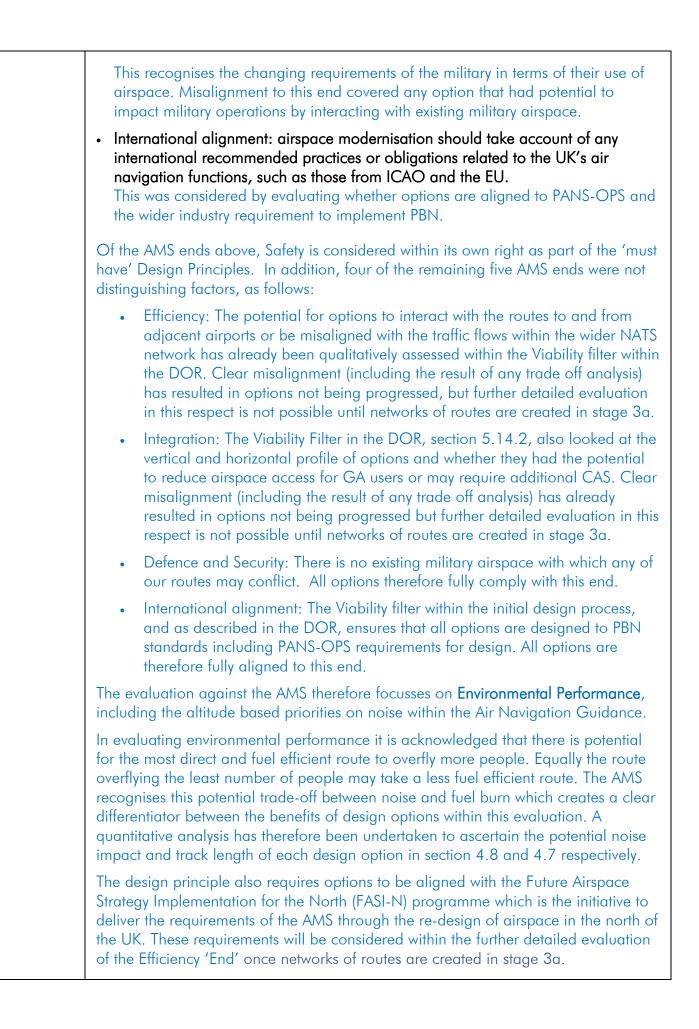
The full DOE can be found in Stage 2 Summary Document Appendix A - Design Options Evolution (DOE) - V2.

Design Principle	Safety Our routes must be safe and must comply with industry standards and regulations.		irds and regulations.
J	Not met When assessed in isolation, this option is designable however is not considered to be safe or to comply with industry standards and regulations.	Partial When assessed in isolation, this option may be considered as safe, designable and meet with industry standards and regulations; however, additional safety mitigations or processes would be required.	Met When assessed in isolation, this option is considered to be safe, designable and meet with industry standards and regulations, including PANS-OPS.
Evaluation assessment summary	 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 o new procedures is a Safety Case. The Safety Case will be developed in accordance wit guidance provided in the CAA's Guidance on the Conduct of Hazard Identification, Ri Assessment and the Production of Safety Cases (CAP760) as mandated in the Manche 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 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 be 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		Hoped in accordance with the Hazard Identification, Risk nandated in the Manchester 16 process. And Identification (HazID) held e ATC and airlines. This on process, and it has been . As the process moves

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.

Design	Policy		
Principle	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.		
	Not met	Partial	Met
	 When assessed in isolation, the option does not meet the ends of the AMS. For the purpose of the DPE, an option will not meet the environmental ends of the AMS if it is expected to increase the population affected by noise both between 0ft and 4,000ft and 0ft and 7,000ft, as well as having a longer track length (and therefore assumed greater emissions) than the relevant 'do nothing' scenario. Increase is defined as being greater than 110% of the 'do nothing' value for the respective metric. 	Assessed in isolation, the option is considered likely to be consistent with some of the ends of the AMS. For the purpose of the DPE, an option will partially meet the environmental ends of the AMS if it is expected to reduce or limit the impact of no more than two of the following metrics: the population affected by noise between Oft and 4,000ft; the population affected by noise between Oft and 7,000ft; track length (and therefore assumed emissions) compared to the relevant 'do nothing' scenario. Limit is defined as being within plus or minus 10% of the 'do nothing' value for the respective metric. Reduce is defined as being less than 90% of the 'do nothing' value for the respective metric.	Assessed in isolation, this options accords with the ends of the AMS. For the purpose of the DPE, an option will meet the environmental ends of the AMS if it is expected to reduce or limit the population affected by noise both between Oft and 4,000ft and Oft and 7,000ft, as well as reducing the track length (and therefore assumed lesser emissions) than the relevant 'do nothing' scenario. Limit is defined as being within plus or minus 10% of the 'do nothing' value for the respective metric. Reduce is defined as being less than 90% of the 'do nothing' value for the respective metric.
Evaluation assessment summary	deliver to achieve the Gove	sets out the 'Ends' that airspo rnment's objectives in relation headings, of which MAN note	to airspace modernisation.
	 Safety: maintaining a hig achieved by airspace mo 	h standard of safety has prior dernisation.	ity over all other ends to be

	This highlights the priority that safety has in airspace change. However, in addition to the consideration of Safety within this design principle, MAN also have a stand-alone Design Principle Safety. Rather than considering safety twice, the approach that has been taken is to consider Safety in its own right as one of the 'must have' design principles. This ensured there was a clear focus on safety as the highest priority and that the risk of a "double evaluation", which may have caused confusion for stakeholders, was removed.
	This approach was initially applied within the DOR Viability filter and to ensure consistency, was also applied throughout the analysis within this DPE. As a result, Safety was not considered within the Design Principle Policy assessment, but as part of the Design Principle Safety assessment.
•	 Efficiency: consistent with the safe operation of aircraft, airspace modernisation should secure the most efficient use of airspace and the expeditious flow of traffic. The provision of runway throughput to make best use of the capacity of the runways at MAN is captured within the "must have" Design Principle Capacity. Therefore, the consideration of the Efficiency end within this DPE focused on the potential for design options to: Align to the routes to and from adjacent airports or Align with the traffic flows within the wider NATS network and the airspace being developed within the FASI-N programme.
•	Integration: airspace modernisation should satisfy the requirements of operators and owners of all classes of aircraft across the commercial, General Aviation and military sectors. The AMS calls for a transition towards greater integration of air traffic including GA and the military. It should facilitate the greatest possible access to all users and seek to 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 2017 (ANG), which sets out how carbon emissions, air quality and noise should be considered. This covers the creation of options that offer more efficient, shorter and cost- effective flightpaths, and options that seek to reduce noise impact in line with the Altitude Based Priorities within the ANG.
	Reducing carbon emissions was evaluated by identifying routes that had the shortest track length in relation to their joining or leaving point with the upper airspace network, resulting in lower fuel burn and emissions. Reducing noise impact was evaluated through the use of overflight analysis to identify the total population overflown in line with the criteria within the 'Altitude based priorities' within the ANG.
•	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.



	 FASI-N requires coordination between various airspace change sponsors. This coordination will be delivered through the 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 but resolution 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 meets to discuss and resolve policy and technical issues affecting airspace design across all airports.
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. The focus of the evaluation has been on the Environmental Performance (noise and fuel burn) ends of the AMS as these are the ends that can be evaluated for isolated routes and provide differentiators between options. The DOR Viability Filter has already excluded options which have been identified as being clearly misaligned to the 'Ends' of the AMS in terms of efficiency, integration, defence and security and international alignment. 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.

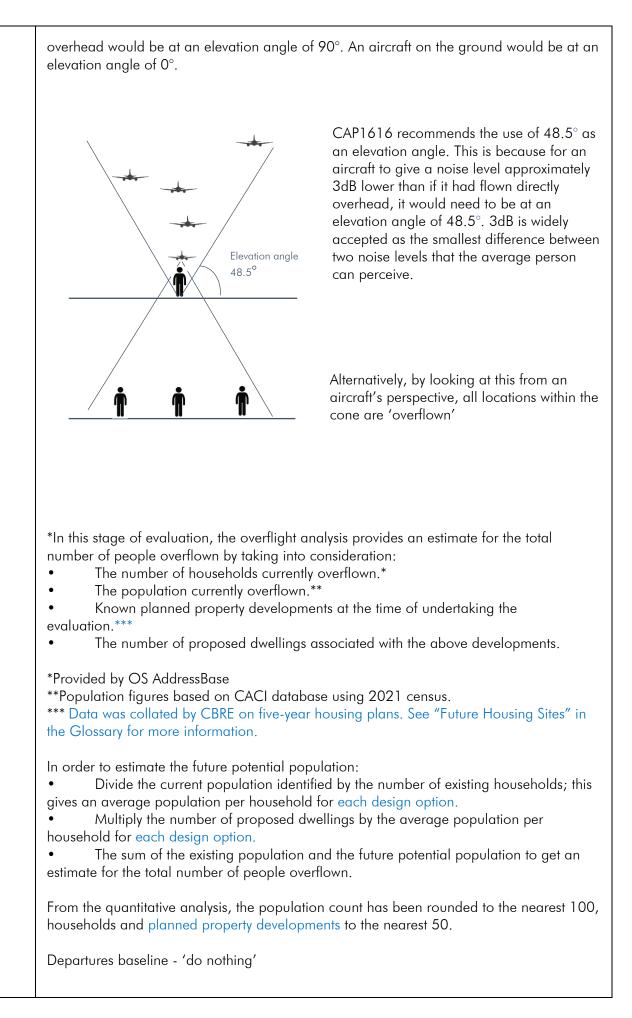
Design Principle	Capacity Our future airspace must enable best use of the capacity of our existing runways, in line with government policy.		
	Not met	Partial	Met
	Assessed in isolation, this design option could be used operationally in conjunction with another runway, or as a single runway operation, but will not enable the best use of the capacity of our existing runways.	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.	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.
Evaluation assessment summary			expected to continue to grow nester Core Strategy. g the airport, and this is
			he best use of existing runway
			ver, because at this stage this system) the analysis looks at
	The analysis therefore assesses	the ability of the route to opera	te:
	 airports. Independently from the ar To support optimal depart CAA minimum. Arrivals and departures in 	rborne holds, arrival routes and rival structure or arrival design o rure splits of no more than one n compliance with comply with cu /or safety restrictions to ensure t	pptions for MAN. ninute which is the current urrent ATC published

	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.

Design Principle	Emissions We will minimise and where possible reduce, emissions when we design routes. This may be achieved by selecting the most direct routes.		
	Not met When assessed in isolation, this option performs worse than the 'do nothing' scenario with respect to track distance flown.	Partial When assessed in isolation, this option performs similar (+/- 10%) to the 'do nothing' scenario with respect to track distance flown.	Met When assessed in isolation, this option performs better than the 'do nothing' scenario with respect to track distance flown.
Evaluation assessment summary	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.		
Summary of evaluation	track distance flown will be mi Further assessments will be co	assessed against the Design Prin nimised or wherever possible rec nducted at a later stage of the A es this design principle. See sectio	duced. CP process that will consider

4.8 Design Principle Criteria - Noise N1

Design Principle	Noise Our route designs should seek to minimise, and where possible reduce, the number of people affected by noise from our flights.		
	Not met	Partial	Met
	The estimated total future population overflown up to both 4,000ft and 7,000ft is increased when compared to the to the 'do nothing' scenario. Increase is defined as being greater than 110% of the 'do nothing' value for the respective metric.	The estimate of total future population overflown up to either 4,000ft or 7,000ft is similar (+/- 10%) to the 'do nothing' scenario.	The estimated total future population overflown up to both 4,000ft and 7,000ft is reduced when compared to the to the 'do nothing' scenario. Reduce is defined as being less than 90% of the 'do nothing' value for the respective metric.
Evaluation assessment summary			o be assessed is significant and not require the change sponsor orehensive list'. Instead, the
It is recognised however, that in assessing the comprehensive list, such a quapproach may not always adequately reflect the extent to which an option redesign principles. Therefore, the following quantitative assessment has been all the design options and these have been compared against that of a 'do scenario.		hich an option reflects the ssment has been carried out on	
	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		



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.

* A single line that delineates those locations on the ground that have experienced the greatest number of overflights) for each of the current SIDs, during a given period (summer 2019). The modal average paths depict the line over the ground, most commonly followed by aircraft flying a particular route.

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.

Design Principle N2	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.		
	N/A	Partial N/A	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.
Evaluation assessment summary	 headings: Safety Efficiency Integration Environmental performand Defence and security International alignment: In relation to environmental performant stakeholders affected by the upper stakeholders affected by the	ment's objectives in relation to as that airspace modernisation ance: erformance, CAP1711 states to se of airspace, should be take ance provided by the Governm Guidance 2017, sets out how ed. This includes the considero enabling CCO and CDA, the noise impacts to be redistribut uction of respite (routes). Planned and notified periods w v communities undisturbed tim opic stating that - if multiple ro that the views of local commu	hat the interests of all n into account when it is nent on environmental carbon emissions, air quality ation of more efficient, shorter re-design of arrival and ed away from more noise where overflight or noise impact e.'

	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	As stated, there will be further assessments conducted at a later stage of the ACP, see
of	section 30, Next Steps, when we will consider whether combinations of routes still satisfy this
Evaluation	design principle.

d number of e areas to 4,000ft is considered than the 'do nario.	Partial The estimated number of noise sensitive areas overflown up to 4,000ft or 7,000ft is less than or similar	Met The number of noise sensitive areas overflown up
fined as than 110% thing' value ctive metric.	to (+/- 10%) the 'do nothing' scenario.	to both 4,000ft and 7,000ft is less than or equal to the 'do nothing' scenario. Less than is defined as being less than 90% of the 'do nothing' value for the respective metric.
We have applied the same overflight tool used in Design Principle Noise N1, to estimin impact upon noise sensitive areas. CAP 1616 recommends the use of 48.5° as an eleangle. This is because for an aircraft to give a noise approximately 3dB lower than if it had flown direct overhead, it would need to be at an elevation ang 48.5°. 3dB is widely accepted as the smallest difference between two noise levels that the average person of perceive. Alternatively, by looking at this from an aircraft's		
Medical fcPlaces of V	perspective, all buildings an 'overflown'. In this stage of evaluation, t provide an estimate for the areas overflown by taking in al facilities* acilities* Worship* e gagement phases, no additional	d locations within the cone are he overflight analysis will total number of noise sensitive ito consideration: areas were accounted for in
1	 Medical for Places of Y OS AddressBas e stakeholder en 	In this stage of evaluation, t provide an estimate for the areas overflown by taking in Educational facilities* Medical facilities* Places of Worship* OS AddressBase e stakeholder engagement phases, no additional on. This includes cultural or historic assets, tranqu

	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.

Design	Airspace					
Principle	Our route designs should minimise the impacts on other airspace users by limiting					
A	Controlled Airspace.					
	Not met The option is likely to require additional controlled airspace to provide containment in accordance with the CAA policy.	Partial The option does not require additional controlled airspace but may require ATC intervention to resolve/deconflict the interactions with aircraft from other airports.	Met The option does not require additional controlled airspace.			
Evaluation assessment summary	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.					
Summary of	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.					
evaluation	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.					

Design Principle T	Technology Our route designs should be based on the latest aircraft navigational technology widely available.					
	Not met Assessed in isolation, this design option does not utilise latest aircraft technology and is not PBN compliant.	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.	Met Assessed in isolation, this design option has been designed to utilise latest aircraft technology and is PBN compliant.			
Evaluation assessment summary	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 as RNAV1, with 97% capable of using the more advanced 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.

6 Runways 05L/05R North

6.1 Runways 05L/05R North Option 1

Design Principle Evaluation			Option No: 1
Option Name: SID RW 05L NORTH Option 1			ACCEPT
Option Name: SID RW 05R NORTH Option 1			ACCEPT
Option Description: Option 1 is an RNAV1 replication of the current de to POL and uses fly-by waypoints to create a replic the existing conventional POL 4S/1Z departure. As a replicated route it follows a similar track over ground as the current published departure. The rou- combine shortly after departure and fly straight and overflying Stockport where they commence a left tu north. This takes the routes west of Ashton-under-L close to Oldham and they terminate at 7,000ft to the of Rochdale. The design speed will permit a large number of air fly this route in a clean configuration (without the u 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 below FL100 would apply. Due to the track-to-fix of and simplicity of the route, dispersion is likely to be even with maximum speeds.	the the vetes ead vrn to the yne and the east the east craft to use of e KIAS coding	Kearsley Pre- den Swinten Sreley PE odes – Sairto Trafford F - Urmston Strefford M 60	
	05L		MET

Design Principle Safety	O5R	MET		
Summary of Qualitative Assessment:	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 Dringin la Policy	05L	PARTIAL		
Design Principle Policy Summary of Qualitative Assessment:	05R	PARTIAL		
Up to 4,000ft, option 1 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 1 L is estimated to limit the total population affected by noise. Option 1 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy. Up to 4,000ft, option 1 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 1 R is estimated to limit the total population affected by noise. Option 1 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.				
	05L	MET		
Design Principle Capacity	05R	PARTIAL		
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 Bringiala Emissiona	05L	PARTIAL		
	05R	PARTIAL		
Design Principle Emissions 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 therefore 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 therefore similar emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L 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 an approximate total population of 79,900.

Up to 7,000ft, option 1 L 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 an approximate total population of 213,600.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 1 R 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 an approximate total population of 80,700.

Up to 7,000ft, option 1 R 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 an approximate total population of 223,300.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Design Principle Noise N2	05L	MET
	05R	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.

Desire Driesinte Noize N2	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL

Up to 4,000ft, this option1 L is estimated to overfly 180 noise sensitive areas.

Up to 7,000ft, this option1 L is estimated to overfly 425 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1 R is estimated to overfly 195 noise sensitive areas.

Up to 7,000ft, this option 1 R is estimated to overfly 450 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed in accordance with PANS-OPS requirements.

6.2 Runways 05L/05R North Option 3

Design Principle Evaluation

Option Name: SID RW 05L NORTH Option 3

Option Name: SID RW 05R NORTH Option 3

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 flyby 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.

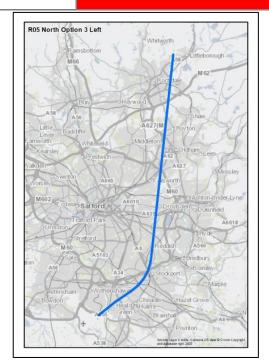
• **05R**: After departure this route flies straight ahead and commences a left turn north just to the west of Stockport, at which point it combines with the option for 05L. The routes continue north, flying to the west of Audenshaw reservoir, Ashton-under-Lyne and Oldham and terminate at 7,000ft just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

Option No: 3

REJECT

REJECT





D. C. D. C. Cafate	05L	MET
Design Principle Satety	05R	MET

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.

D. C. D. C. Dalian	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 3 L is estimated to increase the total population affected by noise. Option 3 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3 L is evaluated to be partially consistent with the environmental performance

'End' and Design Principle Policy.

Up to 4,000ft, option 3 R is estimated to increase the total population affected by noise.

Up to 7,000ft, option 3 R is estimated to increase the total population affected by noise.

Option 3 R is similar in length and it is anticipated that emissions would be

limited.

At this stage of the process, option 3 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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

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

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

Summary of Qualitative Assessment:

Up to 4,000ft, option 3 L 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 an approximate total population of 95,000.

Up to 7,000ft, option 3 L 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 an approximate total population of 239,200.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 3 R 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 an approximate total population of 97,500.

Up to 7,000ft, option 3 R 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 an approximate total population of 249,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	NOT MET
Design Principle Noise N3	05R	PARTIAL

Up to 4,000ft, this option 3 L is estimated to overfly 205 noise sensitive areas.

Up to 7,000ft, this option 3 L is estimated to overfly 485 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3 R is estimated to overfly 210 noise sensitive areas.

Up to 7,000ft, this option 3 R is estimated to overfly 510 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Dut a Diatala Airangeo	05L	MET
Design Principle Airspace	05R	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.

Dute Divid Technology	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed in accordance with PANS-OPS requirements.

6.3 Runways 05L/05R North Option 4

Design Principle Evaluation		Option No: 4
Option Name: SID RW 05L NORTH Option 4		ACCEPT
Option Name: SID RW 05R NORTH Option 4		ACCEPT
 Option Name: SiD KW OSK NOKTH Option 4 Option Description: This is an RNAV1 option that has a turn mid-way b options 1 and 3. It has been created in line with th Principle Noise N1 by following the course of the N motorway which already generates a level of ambie This option has a direct routing to the north followi initial turn, which due to the track-to-fix coding and waypoint, would result in repeatable ground tracks low level of dispersal. The design speed will permit a large number of air fly this route in a clean configuration (without the u flaps) which has potential benefits in terms of noise The route has been designed using fly-by waypoint O5L: After departure, this route combines w option for O5R and flies straight ahead and comme left turn just to the east of Stockport. It continues no broadly following the route of the M60 motorway v takes it over Audenshaw reservoir and west of Ashtu under-Lyne. It passes overhead Oldham and termin 7,000ft just to the east of Rochdale. O5R: After departure, this route combines v option for O5L and flies straight ahead overflying H Green and commences a left turn just to the east of Stockport. It continues north, broadly following the the M60 motorway which takes it over Audenshaw and west of Ashton-under-Lyne. It passes overhead and terminates at 7,000ft just to the east of Rochdel. 	e Design A60 ent noise. ng the d a fly-by and a craft to se of s. with the ences a orth, which on- nates at with the leald f route of reservoir Oldham ale KIAS coding	<figure></figure>
Design Principle Safety	05L	MET
Summary of Qualitative Assessment:	05R	MET

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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4 L is estimated to limit the total population affected by noise. Option 4 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4 R is estimated to increase the total population affected by noise.

Up to 7,000ft, option 4 R is estimated to limit the total population affected by noise.

Option 4 R is similar in length and it is anticipated that emissions would be limited.

At this stage of the process, option 4 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL
		-

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

The estimated track length of option 4 R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

Summary of Qualitative Assessment:

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

Up to 7,000ft, option 4 L 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 an approximate total population of 213,200.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 4 R 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 an approximate total population of 61,400.

Up to 7,000ft, option 4 R 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 an approximate total population of 223,200.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	PARTIAL
Design Principle Noise N3	O5R	MET

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

Up to 7,000ft, this option 4 L is estimated to overfly 435 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 7,000ft, this option 4 R is estimated to overfly 455 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Dut a Diatala Airangea	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. Tachaology	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed in accordance with PANS-OPS requirements.

6.4 Runways 05L/05R North Summary

	Option 1L	Option 3L	Option 4L
S	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET
E	PARTIAL	PARTIAL	PARTIAL
N1	PARTIAL	NOT MET	PARTIAL
N2	MET	MET	MET
N3	PARTIAL	NOT MET	PARTIAL
Α	MET	MET	MET
т	MET	MET	MET
	Do Minimum (Replication)	Rejected	Best

	Option 1R	Option 3R	Option 4R
S	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL
E	PARTIAL	PARTIAL	PARTIAL
N1	PARTIAL	NOT MET	PARTIAL
N2	MET	MET	MET
N3	PARTIAL	PARTIAL	MET
Α	MET	MET	MET
т	MET	MET	MET
	Do Minimum (Replication)	Rejected	Best

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

Option	Safety	Policy	Capacity
A2 Early left turn	S	Р	с
Originally designed as Optior POL. The route was designed			and a more direct route to
<u>Capacity</u> : This option would ir envelopes and Runway 05 arr departure splits and not enabl	ivals from the north. This	would limit the ability t	
B5 Straight ahead then gradual left turn north	S	Ρ	С
After departure from Runways before gradually turning left to			to beyond Stockport
Policy: This option fails to alig	n with the ends of the AN	IS with respect to:	
the second se	by taking traffic east befor	re turning it north leadi	ve greater track mileage ng to increased fuel burn terial noise benefit below
Similarly, the trade-off analysis to offset a red categorisation.	s against other AMS ends	did not identify other r	naterial benefits sufficient
<u>Capacity</u> : This option would to departure design envelope wh enable best use of runway cap	ich would limit the ability	and the second	
C6 Left Wraparound	S	Ρ	С
After departure from Runways through the overhead and the			A second s
<u>Safety</u> : This option is expected	to interact with the Runw	ay 05R Missed Approa	ch Procedure (MAP).
Policy: This option fails to alig	n with the ends of the AN	IS with respect to:	
the second se	by taking traffic south and ssions.	east before turning it n	ve greater track mileage orth leading to increased erial noise benefit below
Similarly, the trade-off analysis to offset a red categorisation.	s against other AMS ends	did not identify other r	naterial benefits sufficient

<u>Capacity</u> : This option would inter 05 arrivals from the north. This w enable best use of runway capaci	ould limit the ability to		
D7 Right Wraparound	S	Р	С
After departure from Runways 05 through the overhead and then b		-	· · · · · · · · · · · · · · · · · · ·
<u>Safety</u> : This option is expected to	conflict with the Runw	ay 05R MAP.	
Policy: This option fails to align w	rith the ends of the AM	S with respect to:	
 Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic south and west before turning it north leading to increased fuel burn and emissions. The trade-off analysis between emissions and noise, did not identify a material noise benefit below 			
4,000ft. Similarly, the trade-off analysis ag to offset a red categorisation.	gainst other AMS ends	did not identify other mat	erial benefits sufficient
<u>Capacity</u> : This option would inter 05 arrivals from the south. This w			

enable best use of runway capacity.

7 Runways 05L/05R East

7.1 Runways 05L/05R East Option 1

Design Principle Evaluation			Option No: 1
Option Name: SID RW 05L EAST Option 1			ACCEPT
Option Name: SID RW 05R EAST Option 1			ACCEPT
Option Description: Option 1 is an RNAV1 replication of the current DI 1S/1Z SID and uses fly-over waypoints. As a replicated route it follows a similar track over ground as the current published route. After depar takes it straight ahead on a runway heading in a st line to 7,000ft. This takes it overhead Stockport an and to the north of Glossop and it terminates south Holmfirth. There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 below FL100 would apply. This design speed will p many aircraft to fly this route in a clean configurati (without the use of flaps) which has potential benefit terms of noise. Due to the track-to-fix coding and simplicity of the dispersion is likely to be low even with maximum sp	the rure this raight d Hyde, n-west of KIAS vermit on its in route,	Ros East Option and Citien (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	Ministri Act Bornstein Mat Old Crass Act Crass
Design Principle Safety	05L 05R		MET 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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 1 L is estimated to limit the total population affected by noise. Option 1 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1 L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1 R is estimated to limit the total population affected by noise.

Up to 7,000ft, option 1 R is estimated to limit the total population affected by noise.

Option 1 R is similar in length and it is anticipated that emissions would be limited.

At this stage of the process, option 1 R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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

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

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L 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 an approximate total population of 58,200.

Up to 7,000ft, option 1 L 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 an approximate total population of 58,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 7,000ft, option 1 R 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 an approximate total population of 65,700.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

Up to 4,000ft, this option 1 L is estimated to overfly 125 noise sensitive areas.

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

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1 R is estimated to overfly 150 noise sensitive areas.

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

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and asmaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

During Directole Airpage	05L	MET
Design Principle Airspace	05R	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.

Duty Divid Technology	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

7.2 Runways 05L/05R East Option 4

Design Principle Evaluation

Option Name: SID RW 05L EAST Option 4

Option Name: SID RW 05R EAST Option 4

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.

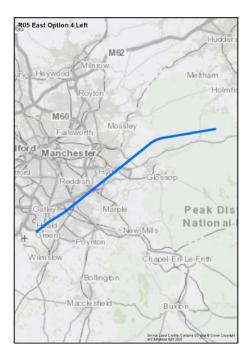
05R: After departure this route combines with the option for 05L and flies straight ahead overflying Stockport and the southern edge of Hyde. It routes to the north-west of Glossop at which point it makes a right turn to route north of Glossop and terminates at 7,000ft just to the north and east of the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

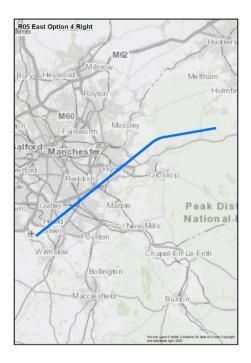
There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply.

Option No: 4

ACCEPT

ACCEPT





D. C. D. C. Cafat	05L	MET
Design Principle Satety	05R	MET

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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 4 L is estimated to limit the total population affected by noise. Option 4 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4 L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4 R is estimated to limit the total population affected by noise.

Up to 7,000ft, option 4 R is estimated to limit the total population affected by noise.

Option 4 R is similar in length and it is anticipated that emissions would be

limited.

At this stage of the process, option 4 R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL
		·

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

The estimated track length of option 4 R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4 L 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 an approximate total population of 58,200.

Up to 7,000ft, option 4 L 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 an approximate total population of 58,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 7,000ft, option 4 R is estimated to overfly approximately 29,000 households with an approximate population of 65,400. Taking account of planned property developments, this option is estimated to impact an approximate total population of 65,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

Up to 4,000ft, this option 4 L is estimated to overfly 125 noise sensitive areas.

Up to 7,000ft, this option 4 L is estimated to overfly 125 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4 R is estimated to overfly 150 noise sensitive areas.

Up to 7,000ft, this option 4 R is estimated to overfly 150 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and asmaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

Desire Principle Technology	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

7.3 Runways 05L/05R East Option 5

Design Principle Evaluation

Option Name: SID RW 05L EAST Option 5

Option Name: SID RW 05R EAST Option 5

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.

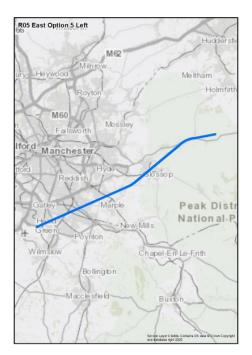
05R: After passing the DER this route has a 15° track adjustment to the right which routes it south of Stockport. This track continues until just to the south-west of Glossop where it combines with the option for 05L and returns to a runway heading. After overflying Glossop it makes a right turn to the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

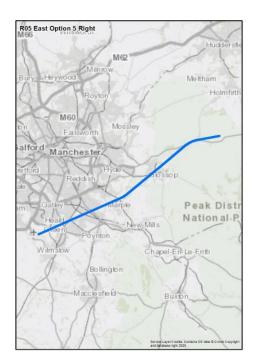
There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply. Due to the track-to-fix coding and simplicity of the route, dispersion is likely to be low even with maximum speeds.

Option No: 5

ACCEPT

ACCEPT





D. C. D. C. Salat	05L	MET
Design Principle Satety	05R	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.

D. C. D. C. L. Dallar	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 5 L is estimated to limit the total population affected by noise. Option 5 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5 L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5 R is estimated to limit the total population affected by noise.

Up to 7,000ft, option 5 R is estimated to limit the total population affected by noise.

Option 5 R is similar in length and it is anticipated that emissions would be limited.

At this stage of the process, option 5 R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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

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

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5 L 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 an approximate total population of 36,100.

Up to 7,000ft, option 5 L 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 an approximate total population of 51,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 5 R is estimated to overfly approximately 15,800 households with an approximate population of 37,700. Taking account of planned property developments, this option is estimated to impact an approximate total population of 38,400.

Up to 7,000ft, option 5 R 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 an approximate total population of 56,900.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

Up to 4,000ft, this option 5 L is estimated to overfly 105 noise sensitive areas.

Up to 7,000ft, this option 5 L is estimated to overfly 135 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 5 R is estimated to overfly 115 noise sensitive areas.

Up to 7,000ft, this option 5 R is estimated to overfly 155 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

7.4 Runways 05L/05R East Option 6

Design Principle Evaluation

Option Name: SID RW 05L EAST Option 6

Option Name: SID RW 05R EAST Option 6

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.

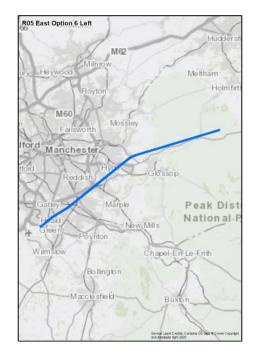
05R: After departure, this route combines with the option for 05L and flies straight ahead overflying Stockport and the southern edge of Hyde. It routes to the west of Glossop at which point it makes a right turn to the east to the north of Glossop and terminates at 7,000ft overhead the Woodhead reservoir.

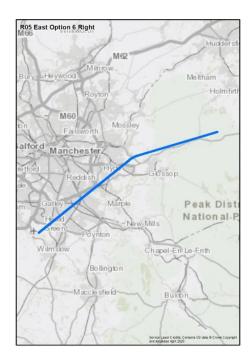
There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KIAS below FL100 would apply.

Option No: 6

ACCEPT

ACCEPT





D. C. D. C. Cafat.	05L	MET
Design Principle Satety	05R	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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 6 L is estimated to limit the total population affected by noise. Option 6 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6 L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6 R is estimated to limit the total population affected by noise.

Up to 7,000ft, option 6 R is estimated to limit the total population affected by noise.

Option 6 R is similar in length and it is anticipated that emissions would be limited.

At this stage of the process, option 6 R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

During Direct la Canacit a	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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

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

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6 L 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 an approximate total population of 58,200.

Up to 7,000ft, option 6 L 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 an approximate total population of 60,900.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 6 R 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 an approximate total population of 65,000.

Up to 7,000ft, option 6 R 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 an approximate total population of 68,000.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

Up to 4,000ft, this option 6 L is estimated to overfly 125 noise sensitive areas.

Up to 7,000ft, this option 6 L is estimated to overfly 130 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6 R is estimated to overfly 150 noise sensitive areas.

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

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and asmaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Detter District Airongco	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

7.5 Runways 05L/05R East Option 7

Design Principle Evaluation		Op	tion No: 7
Option Name: SID RW 05L EAST Option 7			ACCEPT
Option Name: SID RW 05R EAST Option 7			ACCEPT
Option Description: This is an RNAV1 option that seeks to provide the (most fuel efficient) route to the network joining po- using the earliest turn to the east, taking account of constraints created by the base of controlled airspo- It has a similar profile to options 4 and 6 except a make the first right turn just north of Stockport to re the network joining point. The position of this first dictated by the dimensions of the controlled airspo- east of Glossop which do not permit a turn and a route from an earlier point. The design speed will permit many aircraft to fly th a clean configuration (without the use of flaps) wh potential benefits in terms of noise. The route has been designed using fly-by waypoint OSL: After departure, this route combines with the OSR and flies straight ahead overflying Stockport. I reaching Bredbury the route turns right to route so Hyde and routes direct to the east to terminates at to the east of the Woodhead reservoir. OSR: After departure, this route combines with the OSL and flies straight ahead overflying Stockport. I reaching Bredbury the route turns right to route so Hyde and routes direct to the east to terminates at to the east of the Woodhead reservoir. There would be no speed restrictions applied to th procedure; therefore, the maximum speed of 250 below FL100 would apply.	int by of the ace. ircraft oute to turn is ice to the direct is route in ich has ts. option for Upon uth of 7,000ft option for Jpon uth of 7,000ft	Royt Bury Heywood Dn Failsworth Gatey Im Gatey Im Gatey Im Gatey Im Gatey Im Gatey Im Field North National Content National C	Huddersh Huddersh
Design Principle Safety	05L 05R		MET 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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 7 L is estimated to limit the total population affected by noise. Option 7 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 7 L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7 R is estimated to limit the total population affected by noise.

Up to 7,000ft, option 7 R is estimated to limit the total population affected by noise.

Option 7 R is similar in length and it is anticipated that emissions would be limited.

At this stage of the process, option 7 R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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

The estimated track length of option 7 R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7 L 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 an approximate total population of 51,300.

Up to 7,000ft, option 7 L 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 an approximate total population of 64,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 7 R 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 an approximate total population of 57,400.

Up to 7,000ft, option 7 R 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 an approximate total population of 71,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

Up to 4,000ft, this option 7 L is estimated to overfly 115 noise sensitive areas.

Up to 7,000ft, this option 7 L is estimated to overfly 130 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 7 R is estimated to overfly 130 noise sensitive areas.

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

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and asmaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

Deter Division Technology	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

7.6 Runways 05L/05R East Option 8

Design Principle Evaluation

Option Name: SID RW 05L EAST Option 8

Option Name: SID RW 05R EAST Option 8

Option Description:

This is an **RNAV1** option created to provide a 45° track divergence from northbound departures and enable a oneminute 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 flyover 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 2.1 nm 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.

Option No: 8

ACCEPT

ACCEPT





D. S. D. S. J. C. fat.	05L	MET
Design Principle Satety	05R	MET

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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 8 L is estimated to limit the total population affected by noise. Option 8 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 8 L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8 R is estimated to limit the total population affected by noise. Up to 7,000ft, option 8 R is estimated to limit the total population affected by noise. Option 8 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 8 R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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

The estimated track length of option 8 R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8 L 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 an approximate total population of 21,300.

Up to 7,000ft, option 8 L 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 an approximate total population of 39,800.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 8 R 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 an approximate total population of 26,100.

Up to 7,000ft, option 8 R 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 an approximate total population of 44,700.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

Up to 4,000ft, this option 8 L is estimated to overfly 55 noise sensitive areas.

Up to 7,000ft, this option 8 L is estimated to overfly 90 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 8 R is estimated to overfly 65 noise sensitive areas.

Up to 7,000ft, this option 8 R is estimated to overfly 100 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and asmaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Design Principle Airspace	05L	MET
	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

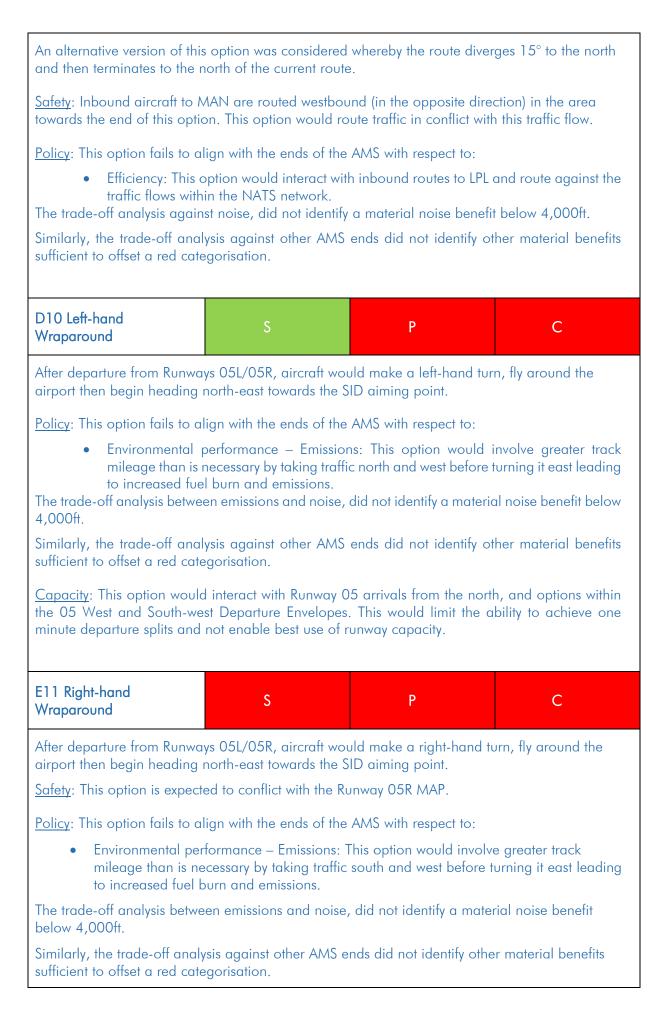
7.7 Runways 05L/05R East Summary

	Option 1L	Option 4L	Option 5L	Option 6L	Option 7L	Option 8L
S	MET	MET	MET	MET	MET	MET
Ρ	MET	MET	MET	MET	MET	MET
С	MET	MET	MET	MET	MET	MET
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Best	Best	Best	Best	Best

	Option 1R	Option 4R	Option 5R	Option 6R	Option 7R	Option 8R
S	MET	MET	MET	MET	MET	MET
Р	MET	MET	MET	MET	MET	MET
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Best	Best	Best	Best	Best

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

Option	Safety	Policy	Capacity			
A2 Track divergence 15° to the south then continue north-east.	S	Ρ	С			
	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.					
<u>Safety</u> : Inbound aircraft to b the end of this option. This o this conflict, this option was to avoid the conflict.	option would route traffi	c in conflict with this traf	fic flow. Because of			
Policy: This option fails to al	ign with the ends of the	AMS with respect to:				
	pption would interact wit c flows within the NATS	h inbound routes to LPL network	airport and route			
The trade-off analysis betwe benefit below 4,000ft which			for a material noise			
The trade-off analysis again	The trade-off analysis against other AMS ends did not identify other material benefits.					
B3 Route directly to the east above 4,000ft	S	Р	С			
Originally Option 3, this was considered to formalise tracks that are representative of current tactical operations, where ATC provide a heading direct to the east following take off and reaching the correct altitude permitted for vectors.						
in particular for slower clime the risk of conflicts between	<u>Safety</u> : The design of this option would not be compliant with airspace containment requirements, in particular for slower climbing aircraft. Systemising this tactical operational practice introduces the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy.					
Additional options that are f option offering no material present.						
Policy: This option fails to al	ign with the ends of the	AMS with respect to:				
 Integration: This option has the potential to reduce airspace access for GA users because of the need to reduce the base of CAS to allow its use. The trade-off analysis against noise, did not identify a material noise benefit below 4,000ft 						
Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.						
C9 Track divergence 15° to the north then route direct north-east.	S	Р	С			



<u>Capacity</u>: This option would interact with Runway 05 arrivals from the south, and options within the 05 South Departure Envelope. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

Ρ

С

F12: Left turn towards north then right-hand turn back to east

After departure from Runways 05L/05R, aircraft would make a left turn to head north before turning right to head east towards the SID aiming point.

Policy: This option fails to align with the ends of the AMS with respect to:

• Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic north before turning it east leading to increased fuel burn and emissions.

The trade-off analysis between emissions and noise, did not identify a noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: This option would follow the same track as departures in the 05 North Design Envelope which would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

8 Runways 05L/05R South

8.1 Runways 05L/05R South Option 1

Option Name: SID RW 05R SOUTH Right Turn O Option Description: Option 1 is included to provide an RNAV1 replic		Design Principle Evaluation	
Dption Description: Dption 1 is included to provide an RNAV1 replic	Option Name: SID RW 05L SOUTH Right Turn Option 1		ACCEPT
Dption 1 is included to provide an RNAV1 replic	ption 1		ACCEPT
ne existing conventional LISTO 2S/2Z SID. As a repute it follows a similar track over the ground urrent route to connect to the NATS network. he fly-over waypoints for the right turn to the sositioned at the position of the existing mark unway 05L this is at the MCT D1.2 point which nm from DER but as this replicates the turn of the rocedure it aligns to the Design Principle Safety. After departure the routes turn right to pass of Cheadle Hulme at which point they combine. The assigns to the west of Woodford and Macclest verfly Congleton and terminate at 7,000ft just iddulph. An element of dispersion will be present in the right to pass recedure. A speed restriction of 185 KIAS is used for the first of the first of the south for the first of the first of the first of the south for the first of th	eplicated d as the outh are cers. For less than e current overhead hey then field and west of nt turn to bles that ventional	RUS South Opti- Libraria Di Krustord Ass Sansbach Bordon Bordon Bordon Bordon Mith Altinic Bordon Bordon Mith Altinic	AT WHEN HAVE CHARTER AND
Design Principle Safety	05L 05R		MET 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.

D. C. D. C. Dalian	05L	MET
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 1 L is estimated to limit the total population affected by noise. Option 1 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1 L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1 R is estimated to limit the total population affected by noise. Up to 7,000ft, option 1 R is estimated to increase the total population affected by noise. Option 1 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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

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

	05L	MET
Design Principle Noise N1	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L 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 an approximate total population of 15,000.

Up to 7,000ft, option 1 L 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 an approximate total population of 46,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 1 R 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 an approximate total population of 21,000.

Up to 7,000ft, option 1 R 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 an approximate total population of 52,400.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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 Bringinta Nicion N2	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL

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

Up to 7,000ft, this option 1 L is estimated to overfly 110 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1 R is estimated to overfly 45 noise sensitive areas.

Up to 7,000ft, this option 1 R is estimated to overfly 115 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

8.2 Runways 05L/05R South Option 2A

Design Principle Evaluation

Option Name: SID RW 05L SOUTH Right Turn Option 2A

Option Name: SID RW 05R SOUTH Right Turn Option 2A

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.

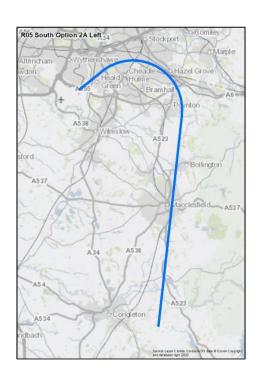
The wider track allows a greater speed in the turn which permits aircraft to be in a clean configuration (without the use of flaps). This has potential benefits in terms of noise. The wider arc may also aid vertical separation from MAN arriving traffic from the south by allowing aircraft to climb higher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

Option No: 2A REJECT REJECT





D. C. D. C. Safat	05L	MET
Design Principle Satety	05R	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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 2A L is estimated to limit the total population affected by noise. Option 2A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 2A R is estimated to increase the total population affected by noise. Option 2A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

Dutu Diata Noine N1	05L	PARTIAL
Design Principle Noise N1	05R	NOT 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 an approximate total population of 37,900.

Up to 7,000ft, option 2A L 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 an approximate total population of 73,300.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 30,900.

Up to 7,000ft, option 2A R 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 an approximate total population of 65,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	NOT MET
Design Principle Noise N3	O5R	NOT MET

Up to 4,000ft, this option 2A L is estimated to overfly 95 noise sensitive areas.

Up to 7,000ft, this option 2A L is estimated to overfly 195 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2A R is estimated to overfly 75 noise sensitive areas.

Up to 7,000ft, this option 2A R is estimated to overfly 175 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

8.3 Runways 05L/05R South Option 2B

Design Principle Evaluation

Option Name: SID RW 05L SOUTH Right Turn Option 2B

Option Name: SID RW 05R SOUTH Right Turn Option 2B

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.

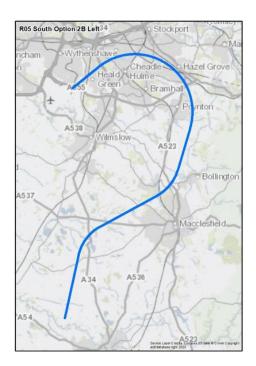
05R: After departure this route turns right in a track that is inside the route for 05L and that passes overhead Cheadle Hulme and Poynton where it combines with the route for 05R. The routes continue south passing overhead Macclesfield and terminate at 7,000ft to the east of Congleton.

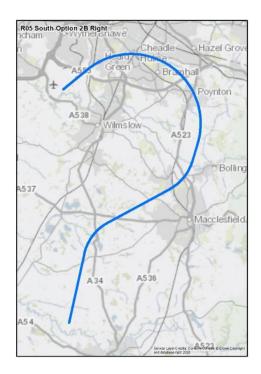
A speed restriction of 220 KIAS is applied to the first turn.

Option No: 2B

REJECT

REJECT





D. C. D. C. Cafat.	05L	MET
Design Principle Satety	05R	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	PARTIAL
	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 2B L is estimated to limit the total population affected by noise. Option 2B L is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 2B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 2B R is estimated to limit the total population affected by noise. Option 2B R is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 2B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity	05L	MET
	05R	PARTIAL

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
	05R	NOT MET

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 therefore greater 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 therefore greater emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 34,500.

Up to 7,000ft, option 2B L 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 an approximate total population of 43,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 29,400.

Up to 7,000ft, option 2B R 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 an approximate total population of 36,100.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	PARTIAL
Design Principle Noise N3	O5R	NOT MET

Up to 4,000ft, this option 2B L is estimated to overfly 85 noise sensitive areas.

Up to 7,000ft, this option 2B L is estimated to overfly 105 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2B R is estimated to overfly 70 noise sensitive areas.

Up to 7,000ft, this option 2B R is estimated to overfly 80 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and agreater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

8.4 Runways 05L/05R South Option 3

Design Principle Evaluation

Option Name: SID RW 05 L SOUTH Right Turn Option 3

Option Name: SID RW 05R SOUTH Right Turn Option 3

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 recreates 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.

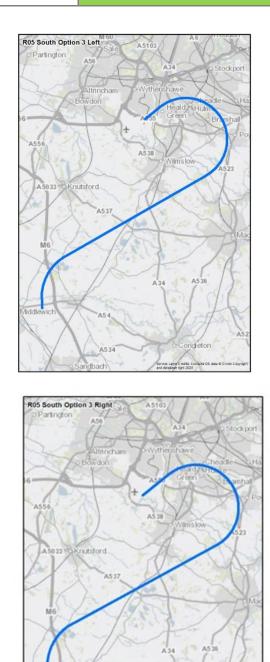
05L: After departure this route turns right shortly after Heald Green in a tight radius turn that routes it inside of Poynton. This turn is continued onto a south-west heading to take it south of Wilmslow and Alderley Edge. It makes a left turn to head south to the north of Holmes Chapel and terminates 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. Option No: 3

ACCEPT

ACCEPT



D. C. D. C. Cafat.	05L	MET
Design Principle Satety	05R	MET

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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 3 L is estimated to limit the total population affected by noise. Option 3 L is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 3 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3 R is estimated to limit the total population affected by noise. Up to 7,000ft, option 3 R is estimated to limit the total population affected by noise. Option 3 R is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 3 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	NOT MET
Design Principle Emissions	O5R	NOT MET

The estimated track length of option 3 L is 55km (30nm). When compared to the 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated.

The estimated track length of option 3 R is 56km (30nm). When compared to the 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3 L 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 an approximate total population of 12,200.

Up to 7,000ft, option 3 L 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 an approximate total population of 17,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 3 R 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 an approximate total population of 17,300.

Up to 7,000ft, option 3 R 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 an approximate total population of 22,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	NOT MET
		·

Up to 4,000ft, this option 3 L is estimated to overfly 35 noise sensitive areas.

Up to 7,000ft, this option 3 L is estimated to overfly 50 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3 R is estimated to overfly 110 noise sensitive areas.

Up to 7,000ft, this option 3 R is estimated to overfly 125 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Design Principle Airspace	05L	MET
Design Principle Airspace	05R	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.

Deter Diet La Technology	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

8.5 Runways 05L/05R South Option 4

Design Principle Evaluation

Option Name: SID RW 05L SOUTH Right Turn Option 4

Option Name: SID RW 05R SOUTH Right Turn Option 4

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.

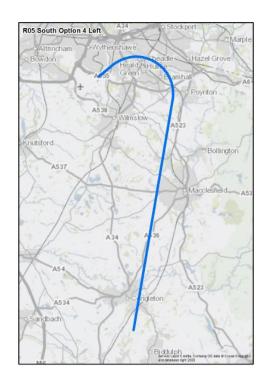
05L: After departure, the route turns right to pass just north of Cheadle Hulme and combines with the option for 05R just west of Poynton. They then pass just to the west of Macclesfield and just east of Congleton and terminate at 7,000ft just north of Biddulph.

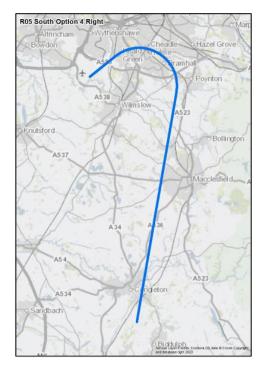
05R: After departure the route turns right to pass just north of Cheadle Hulme and combines with the option for 05L just west of Poynton. They then pass just to the west of Macclesfield and just east of Congleton and terminate at 7,000ft just north of Biddulph.

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. Option No: 4

REJECT

REJECT





D. C. D. C. Cafat	05L	MET
Design Principle Satety	05R	MET

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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4 L is estimated to limit the total population affected by noise. Option 4 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 4 R is estimated to increase the total population affected by noise. Option 4 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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

The estimated track length of option 4 R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

Desta Disetale Noice NI	05L	PARTIAL
Design Principle Noise N1	05R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4 L 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 an approximate total population of 25,100.

Up to 7,000ft, option 4 L 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 an approximate total population of 54,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 4 R 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 an approximate total population of 29,000.

Up to 7,000ft, option 4 R 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 an approximate total population of 60,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	PARTIAL
Design Principle Noise N3	O5R	PARTIAL

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

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

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4 R is estimated to overfly 55 noise sensitive areas.

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

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and agreater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

Deter Diet La Technology	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

8.6 Runways 05L/05R South Option 5

Design Principle Evaluation Option No: 5 Option Name: SID RW 05L SOUTH Right Turn Option 5 REJECT Option Name: SID RW 05R SOUTH Right Turn 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 R05 South Option 5 Left 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. Bollington 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 Biddulph 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 R05 South Option 5 Right and track miles to a minimum. Bollington Biddulp 05L MET Design Principle Safety 05R 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.

D. J. D. J. Daltar	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 5 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 5 L is estimated to limit the total population affected by noise. Option 5 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5 R is estimated to increase the total population affected by noise.

Up to 7,000ft, option 5 R is estimated to increase the total population affected by noise.

Option 5 R is similar in length and it is anticipated that emissions would be limited.

At this stage of the process, option 5 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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

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

Dute Diate Noise N1	05L	PARTIAL
Design Principle Noise N1	05R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5 L 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 an approximate total population of 27,300.

Up to 7,000ft, option 5 L 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 an approximate total population of 55,800.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 5 R 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 an approximate total population of 30,200.

Up to 7,000ft, option 5 R 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 an approximate total population of 60,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

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

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

Up to 7,000ft, this option 5 L is estimated to overfly 120 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 5 R is estimated to overfly 65 noise sensitive areas.

Up to 7,000ft, this option 5 R is estimated to overfly 125 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and agreater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

8.7 Runways 05L/05R South Option 6A

Design Principle Evaluation Option No: 6 Option Name: SID RW 05L SOUTH Right Turn Option 6 ACCEPT Option Name: SID RW 05R SOUTH Right Turn Option 6 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 R05 South Option 6 Right incham operational practice. It is similar to option 3 initially but Hazel uses a higher speed in the initial turn which allow aircraft to climb more quickly, and it then turns south earlier. Poyntor This design speed aligns to the CAP778 recommendation A538 and may permit some aircraft to fly this route in a clean ilmslo 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 A537 resolve interactions between flights on the LISTO departure and MAN arrivals from the south. This option therefore re-Maccles 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 A536 CAP778. The turn point for Runway 05R is located at a point roughly perpendicular to Runway 05L, to create a A54 similar ground track in the turn and subsequent leg. 05L: After departure, this route turns right shortly after R05 South Option 6 Left Heald Green to route overhead Poynton. This turn is trinchan continued onto a south-west heading to take it south of Hazel G Wilmslow and Alderley Edge and west of Macclesfield. It SHuln makes a left turn to head south at Chelford and terminates at 7,000ft east of Holmes Chapel. ovnton A538 05R: After departure, this route turns right shortly after Vilmslow Heald Green to route overhead Poynton. This turn is continued onto a south-west heading to take it south of rd Bo Wilmslow and Alderley Edge and west of Macclesfield. It A537 makes a left turn to head south at Chelford and terminates at 7,000ft east of Holmes Chapel. Macclesfi A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed. A536 A54 051 MFT Design Principle Safety 05R 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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6 L is estimated to limit the total population affected by noise. Option 6 L is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 6 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6 R is estimated to limit the total population affected by noise.

Up to 7,000ft, option 6 R is estimated to limit the total population affected by noise.

Option 6 R is longer in length and it is anticipated that emissions would be increased.

At this stage of the process, option 6 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	NOT MET
Design Principle Emissions	05R	NOT MET

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

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

	05L	PARTIAL
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6 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 an approximate total population of 21,300.

Up to 7,000ft, option 6 L 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 an approximate total population of 25,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 6 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 an approximate total population of 23,300.

Up to 7,000ft, option 6 R 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 an approximate total population of 27,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	PARTIAL
Design Principle Noise N3	05R	NOT MET

Up to 4,000ft, this option 6 L is estimated to overfly 55 noise sensitive areas.

Up to 7,000ft, this option 6 L is estimated to overfly 145 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6 R is estimated to overfly 60 noise sensitive areas.

Up to 7,000ft, this option 6 R is estimated to overfly 155 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and agreater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Deter Divide Airpage	05L	MET
Design Principle Airspace	05R	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.

Dute Divide Technology	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

8.8 Runways 05L/05R South Option 6B

Design Principle Evaluation

Option Name: SID RW 05L SOUTH Right Turn Option 6B

Option Name: SID RW 05R SOUTH Right Turn Option 6B

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 recreates common operational practice above 4,000ft.

In the case of 05L, the turn point is at a minimum distance of 1 nm 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.

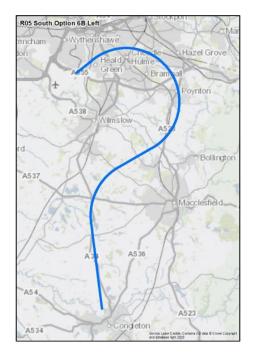
05R: After departure, this route turns right shortly after Heald Green to route overhead Poynton. This turn is continued onto a south-west heading to take it south of Wilmslow and Alderley Edge and west of Macclesfield. It makes a left turn to head south between Chelford and Macclesfield, roughly following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

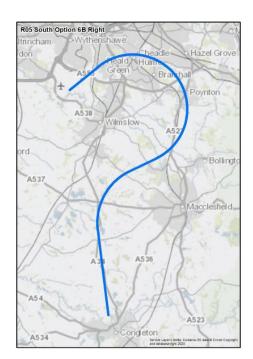
A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed.

Option No: 6B

REJECT

ACCEPT





D. C. D. C. Cafat	05L	MET
Design Principle Satety	05R	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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6B L is estimated to limit the total population affected by noise. Option 6B L is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 6B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6B R is estimated to limit the total population affected by noise. Up to 7,000ft, option 6B R is estimated to increase the total population affected by noise. Option 6B R is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 6B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	NOT MET
Design Principle Emissions	05R	NOT MET

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 therefore greater 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 therefore greater emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 21,300.

Up to 7,000ft, option 6B L 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 an approximate total population of 41,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 23,300.

Up to 7,000ft, option 6B R 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 an approximate total population of 43,400.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	NOT MET
Design Principle Noise N3	O5R	NOT MET

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

Up to 7,000ft, this option 6B L is estimated to overfly 190 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6B R is estimated to overfly 60 noise sensitive areas.

Up to 7,000ft, this option 6B R is estimated to overfly 195 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and agreater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

Dute Divide Technology	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

8.9 Runways 05L/05R South Right Turn Summary

	Option 1L	Option 2AL	Option 2BL	Option 3L	Option 4L	Option 5L	Option 6AL	Option 6BL
S	MET	MET	MET	MET	MET	MET	MET	MET
Р	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET	MET	MET
E	PARTIAL	PARTIAL	NOT MET	NOT MET	PARTIAL	PARTIAL	NOT MET	NOT MET
N1	MET	PARTIAL	PARTIAL	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N2	MET	MET	MET	MET	MET	MET	MET	MET
N3	PARTIAL	NOT MET	PARTIAL	MET	PARTIAL	PARTIAL	PARTIAL	NOT MET
Α	MET	MET	MET	MET	MET	MET	MET	MET
Т	MET	MET	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Rejected	Rejected	Add. Qual.	Rejected	Rejected	Add. Qual.	Rejected

	Option 1R	Option 2AR	Option 2BR	Option 3R	Option 4R	Option 5R	Option 6AR	Option 6BR
S	MET	MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	PARTIAL	PARTIAL	NOT MET	NOT MET	PARTIAL	PARTIAL	NOT MET	NOT MET
N1	PARTIAL	NOT MET	PARTIAL	MET	NOT MET	NOT MET	MET	PARTIAL
N2	MET	MET	MET	MET	MET	MET	MET	MET
N3	PARTIAL	NOT MET	NOT MET	NOT MET	PARTIAL	NOT MET	NOT MET	NOT MET
Α	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Rejected	Rejected	Best	Rejected	Rejected	Best	4,000ft beneficial

8.10 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.

Option	Safety	Policy	Capacity		
A11 Extended straight ahead then right towards south	S	Р	С		
After departure from Runway making a 180-degree right-		0			
Policy: This option fails to a	ign with the ends of the	AMS with respect to:			
mileage than is ne		This option would involve a significant distance ec emissions.	0		
The trade-off analysis betwee below 4,000ft.	en emissions and noise,	, did not identify a mater	rial noise benefit		
Similarly, the trade-off analy sufficient to offset a red cate	-	nds did not identify othe	r material benefits		
<u>Capacity</u> : This option would which would limit the ability runway capacity.			-		
B12 Extended straight ahead then left towards south	S	Р	С		
After departure from Runway making a 180-degree left-h west, towards the SID aimin	nand turn, south-west, a				
Policy: This option fails to a	ign with the ends of the	AMS with respect to:			
mileage than is ne	• Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic east before turning it west leading to increased fuel burn and emissions.				
The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.					
Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.					
<u>Capacity</u> : This option would the 05 East and North Dep departure splits and not end	arture Envelopes. This v	would limit the ability to	and the second		

C13 Extended straight ahead then extended left towards south	S	Р	С
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After departure from Runways 05L/05R, aircraft would continue straight ahead beyond Stockport before making a gradual 180-degree 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 fails to align with the ends of the AMS with respect to:

• Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic a significant distance east before turning it west leading to increased fuel burn and emissions.

The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: This option would interact with Runway 05 arrivals from the north, and options within the 05 East and North Departure Envelopes. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

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

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

Design Principle Evaluation
Option Name: SID RW 05L SOUTH Left Turn Option 7A
Option Name: SID RW 05R SOUTH Left Turn Option 7A
 Dption Name: SID RW 05R SOUTH Left Turn Option 7A Dption 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. D5L: 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 poverhead Stretford where it combines with the option for D5R. 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. D5L: 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 poverhead Stretford where it combines with the option for D5R. 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.

D. C. D. C. Cafat.	05L	MET
Design Principle Satety	05R	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.

D. J. D. J. Dalim	05L	NOT MET
Design Principle Policy	05R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 7A L is estimated to increase the total population affected by noise. Option 7A L is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 7A L is evaluated to be not be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 7A R is estimated to increase the total population affected by noise. Option 7A R is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 7A R is evaluated to be not be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	NOT MET
Design Principle Emissions	05R	NOT MET

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 therefore greater 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 therefore greater emissions would be anticipated.

	05L	NOT MET
Design Principle Noise N1	05R	NOT 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 an approximate total population of 117,600.

Up to 7,000ft, option 7A L 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 an approximate total population of 134,300.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 106,100.

Up to 7,000ft, option 7A R 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 an approximate total population of 122,800.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

Derive Directly Noise N2	05L	NOT MET
Design Principle Noise N3	05R	NOT MET

Up to 4,000ft, this option 7A L is estimated to overfly 210 noise sensitive areas.

Up to 7,000ft, this option 7A L is estimated to overfly 235 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 7A R is estimated to overfly 185 noise sensitive areas.

Up to 7,000ft, this option 7A R is estimated to overfly 210 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and agreater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. Tachaology	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

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

Design Principle Evaluation

Option Name: SID RW 05L SOUTH Left Turn Option 7B

Option Name: SID RW 05R SOUTH Left Turn Option 7B

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.

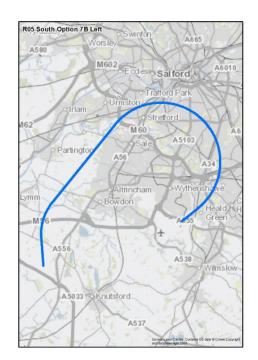
The design speed will permit many aircraft to fly this route in a clean configuration (without the use of flaps) which has potential benefits in terms of noise.

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.

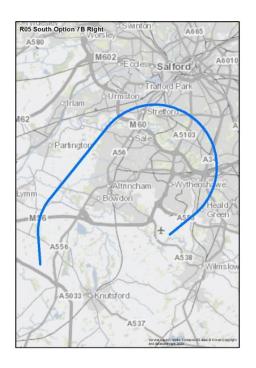
A speed restriction of 220 KIAS has been applied to the first turn which allows most aircraft to fly in a clean configuration.



Option No: 7B

REJECT

REJECT



D D Calat.	05L	MET
Design Principle Satety	05R	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.

D. J. D. J. Paling	05L	NOT MET
Design Principle Policy	05R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 7B L is estimated to increase the total population affected by noise. Option 7B L is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 7B L is evaluated to be not be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 7B R is estimated to increase the total population affected by noise. Option 7B R is longer in length and it is anticipated that emissions would be increased. At this stage of the process, option 7B R is evaluated to be not be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	NOT MET
Design Principle Emissions	05R	NOT MET

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 therefore greater 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 therefore greater emissions would be anticipated.

	05L	NOT MET
Design Principle Noise N1	05R	NOT 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 an approximate total population of 117,600.

Up to 7,000ft, option 7B L 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 an approximate total population of 132,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 106,100.

Up to 7,000ft, option 7B R 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 an approximate total population of 121,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

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

Up to 4,000ft, this option 7B L is estimated to overfly 210 noise sensitive areas.

Up to 7,000ft, this option 7B L is estimated to overfly 230 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 7B R is estimated to overfly 185 noise sensitive areas.

Up to 7,000ft, this option 7B R is estimated to overfly 205 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Desire Bright Airongco	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

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

Design Principle Evaluation

Option Name: SID RW 05L SOUTH Left Turn Option 8

Option Name: SID RW 05R SOUTH Left Turn Option 8

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.

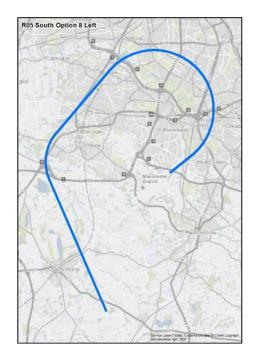
05L: After departure this route turns left shortly after Heald Green to route overhead Cheadle, West Didsbury and Sale. It then heads south-west for a straight segment and passes just north of Altrincham where it turns slightly southeast and combines with the route for 05R to pass east of Knutsford and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

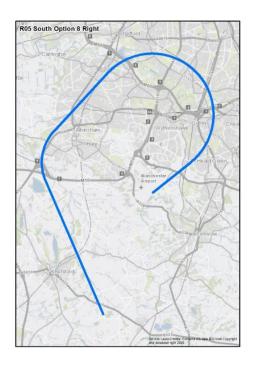
05R: After departure this route turns left shortly after Heald Green to route overhead Cheadle, West Didsbury and Sale. It then heads south-west for a straight segment and passes just north of Altrincham where it turns slightly south-east and combines with the route for 05L to pass east of Knutsford 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.
 Option No: 8

 ACCEPT

 ACCEPT





D. C. D. C. Cafat.	05L	MET
Design Principle Satety	05R	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	PARTIAL
	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 8 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 8 L is estimated to increase the total population affected by noise. Option 8 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 8 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8 R is estimated to increase the total population affected by noise.

Up to 7,000ft, option 8 R is estimated to increase the total population affected by noise.

Option 8 R is similar in length and it is anticipated that emissions would be limited.

At this stage of the process, option 8 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity	05L	MET
	05R	PARTIAL

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	PARTIAL
	05R	PARTIAL

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

The estimated track length of option 8 R is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

Dutu Diata Noine N1	05L	NOT MET
Design Principle Noise N1	05R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8 L 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 an approximate total population of 99,500.

Up to 7,000ft, option 8 L 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 an approximate total population of 116,100.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 8 R 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 an approximate total population of 98,200.

Up to 7,000ft, option 8 R 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 an approximate total population of 118,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. S. D. S. J. Nation N2	05L	NOT MET
Design Principle Noise N3	O5R	NOT MET

Up to 4,000ft, this option 8 L is estimated to overfly 190 noise sensitive areas.

Up to 7,000ft, this option 8 L is estimated to overfly 220 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 8 R is estimated to overfly 190 noise sensitive areas.

Up to 7,000ft, this option 8 R is estimated to overfly 235 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

9.4 Runways 05L/05R South Option 9

Design Principle Evaluation

Option Name: SID RW 05L SOUTH Left Turn Option 9

Option Name: SID RW 05R SOUTH Left Turn Option 9

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.

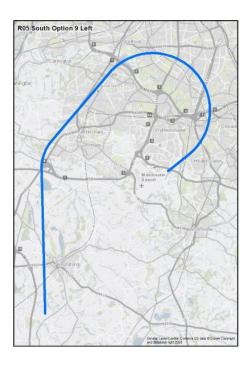
05L: After departure this route turns left shortly after Heald Green to route overhead Cheadle, West Didsbury and Sale. It then heads south-west for a straight segment and passes just north of Altrincham where it turns south and combines with the route for 05R to pass west of Knutsford and terminates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

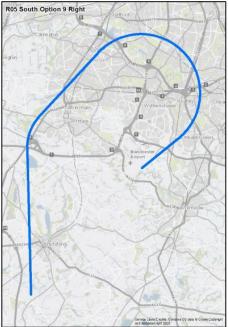
05R: After departure this route turns left shortly after Heald Green to route overhead Cheadle, West Didsbury and Sale. It then heads south-west for a straight segment and passes just north of Altrincham where it turns south and combines with the route for 05L to pass west of Knutsford and terminates 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. Option No: 9

ACCEPT

ACCEPT





D. C. D. C. Cafat.	05L	MET
Design Principle Satety	05R	MET
	-	

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.

Deter District Policy	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 9 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 9 L is estimated to increase the total population affected by noise. Option 9 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 9 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 9 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 9 R is estimated to increase the total population affected by noise. Option 9 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 9 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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

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

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

Summary of Qualitative Assessment:

Up to 4,000ft, option 9 L 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 an approximate total population of 99,600.

Up to 7,000ft, option 9 L 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 an approximate total population of 117,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 9 R 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 an approximate total population of 98,500.

Up to 7,000ft, option 9 R 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 an approximate total population of 118,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. S. D. S. J. Nation N2	05L	NOT MET
Design Principle Noise N3	O5R	NOT MET

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

Up to 7,000ft, this option 9 L is estimated to overfly 250 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 7,000ft, this option 9 R is estimated to overfly 265 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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	MET
	05R	MET

Summary of Qualitative Assessment:

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

Design Principle Evaluation

Option Name: SID RW 05L SOUTH Left Turn Option 10

Option Name: SID RW 05R SOUTH Left Turn Option 10

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.

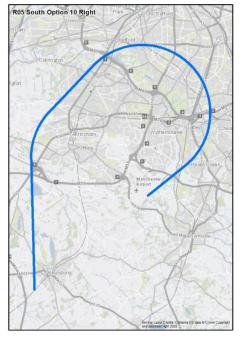
In the case of 05L, the turn point is at a minimum distance of 1nm from the DER, in accordance with PANS-OPS and CAP778. The turn point for Runway 05R is located at a point roughly perpendicular to Runway 05L, to create a similar ground track in the turn and subsequent leg.

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.

Ro South Option 10 Left Para Contraction (Contraction (Co



D. C. D. C. Cafat	05L	MET
Design Principle Satety	05R	MET

Summary of Qualitative Assessment:

ACCEPT

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	PARTIAL
	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 10 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 10 L is estimated to increase the total population affected by noise. Option 10 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 10 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 10 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 10 R is estimated to increase the total population affected by noise. Option 10 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 10 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity	05L	MET
	05R	PARTIAL

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	PARTIAL	
	05R	PARTIAL	

The estimated track length of option 10 L is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 10 R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

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

Summary of Qualitative Assessment:

Up to 4,000ft, option 10 L 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 an approximate total population of 108,400.

Up to 7,000ft, option 10 L 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 an approximate total population of 132,200.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 10 R 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 an approximate total population of 101,200.

Up to 7,000ft, option 10 R 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 an approximate total population of 130,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 4,000ft, this option 10 L is estimated to overfly 180 noise sensitive areas.

Up to 7,000ft, this option 10 L is estimated to overfly 235 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 10 R is estimated to overfly 195 noise sensitive areas.

Up to 7,000ft, this option 10 R is estimated to overfly 250 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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	MET
	05R	MET

Summary of Qualitative Assessment:

	Option 7AL	Option 7BL	Option 8L	Option 9L	Option 10L
S	MET	MET	MET	MET	MET
Р	NOT MET	NOT MET	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET
Е	NOT MET	NOT MET	PARTIAL	PARTIAL	PARTIAL
N1	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET
N2	MET	MET	MET	MET	MET
N3	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET
Α	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET
	Rejected	Rejected	Best	Best	Best

9.6 Runways 05L/05R South Left Turn Summary

	Option 7AR	Option 7BR	Option 8R	Option 9R	Option 10R
S	MET	MET	MET	MET	MET
Р	NOT MET	NOT MET	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	NOT MET	NOT MET	PARTIAL	PARTIAL	PARTIAL
N1	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET
N2	MET	MET	MET	MET	MET
N3	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET
Α	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET
	Rejected	Rejected	Best	Best	Best

9.7 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	S	Р	С				
	After departure from Runways 05L/05R, aircraft would continue straight ahead to Stockport before making a 180-degree right-hand turn, south-west, towards the SID aiming point.						
Policy: This option fails to a	ign with the ends of th	ne AMS with respect to:					
mileage than is ne		: This option would involv ic a significant distance e d emissions.	-				
The trade-off analysis betwee below 4,000ft.	en emissions and nois	se, did not identify a mate	erial noise benefit				
Similarly, the trade-off analy sufficient to offset a red cate	_	ends did not identify oth	er material benefits				
<u>Capacity:</u> This option would which would limit the ability runway capacity.							
B12 Extended straight ahead then left towards south	S	Р	с				
After departure from Runway making a 180-degree left-h west, towards the SID aimin	and turn, south-west,						
Policy: This option fails to a	ign with the ends of th	ne AMS with respect to:					
mileage than is ne	• Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic east before turning it west leading to increased fuel burn and emissions.						
The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.							
		olse, dia nor ideniny a i	material noise benetit				
	lysis against other AN						
below 4,000ft. Similarly, the trade-off ana	lysis against other AN egorisation. I interact with Runway arture Envelopes. This	IS ends did not identify c 05 arrivals from the nor s would limit the ability to	other material benefits th, and options within				

C13 Extended straight ahead then extended left towards south	S	Ρ	С
--	---	---	---

After departure from Runways 05L/05R, aircraft would continue straight ahead beyond Stockport before making a gradual 180-degree 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 fails to align with the ends of the AMS with respect to:

• Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic a significant distance east before turning it west leading to increased fuel burn and emissions.

The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: This option would interact with Runway 05 arrivals from the north, and options within the 05 East and North Departure Envelopes. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

Runways 05L/05R West 10

Design Principle Evaluation	Option No: 1
Option Name: SID RW 05L WEST Option 1	ACCEPT
Option Name: SID RW 05R 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	R05 West Option 1 Left Provide standarb Adv Adv Adv Adv Adv Adv Adv Adv
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.	Alter
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.	A 0 A 12 A
valuation process within Slage 4 of CALTUTO.	ROS West Option 1 Right Hond Asia Asia Asia Asia Asia Asia Asia Asia

		ASA contractor Albandinical Albandinical Contractor
D. C. D. C. Cafat.	05L	MET
Design Principle Safety	05R	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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 1 L is estimated to limit the total population affected by noise. Option 1 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1 L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1 R is estimated to limit the total population affected by noise.

Up to 7,000ft, option 1 R is estimated to limit the total population affected by noise.

Option 1 R is similar in length and it is anticipated that emissions would be limited.

At this stage of the process, option 1 R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

The estimated track length of option 1 L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 1 R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L 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 an approximate total population of 57,300.

Up to 7,000ft, option 1 L 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 an approximate total population of 88,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 1 R 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 an approximate total population of 63,000.

Up to 7,000ft, option 1 R 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 an approximate total population of 95,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. S. D. S. I. Nation N2	05L	MET
Design Principle Noise N3	O5R	MET

Up to 4,000ft, this option 1 L is estimated to overfly 120 noise sensitive areas.

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

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1 R is estimated to overfly 140 noise sensitive areas.

Up to 7,000ft, this option 1 R is estimated to overfly 210 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	MET

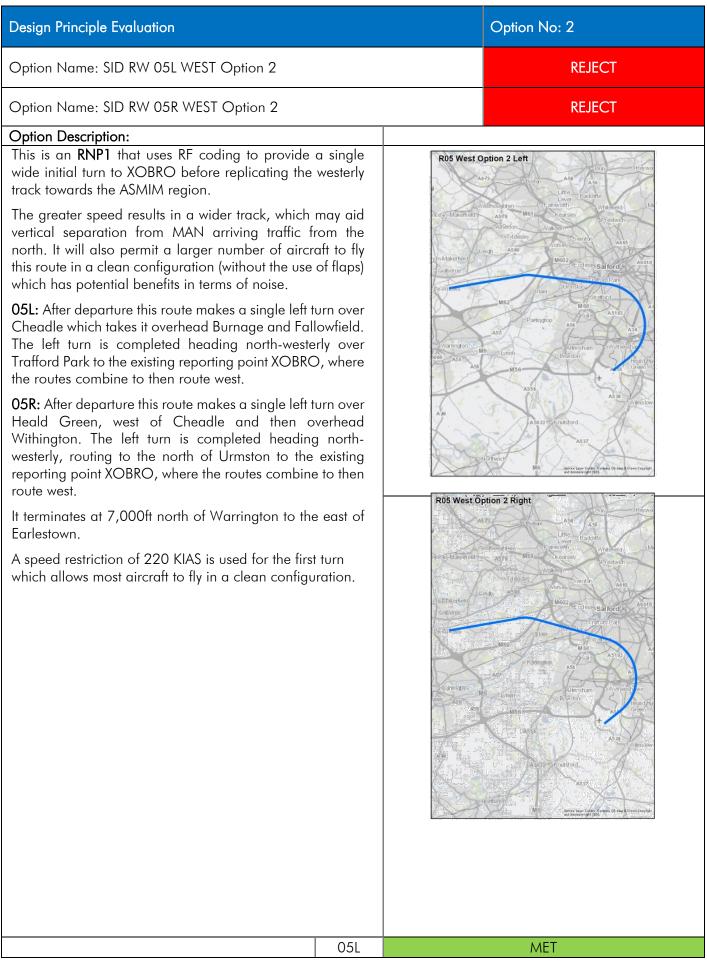
Summary of Qualitative Assessment:

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.

	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

10.2 Runways 05L/05R West Option 2



D D		
Design Principle Satety	05R	MET
	issessed in regulations fe operatio	n, although an assessment against the other FASI-
	05L	PARTIAL
Design Principle Policy	05R	PARTIAL
<i>Summary of Qualitative Assessment:</i> Up to 4,000ft, option 2 L is estimated to increase		
Up to 4,000ft, option 2 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 2 R is estimated to limit the total population affected by noise. Option 2 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.		
	d to be par	
'End' and Design Principle Policy.		tially consistent with the environmental performance
	d to be par 05L 05R	
'End' and Design Principle Policy. Design Principle Capacity <i>Summary of Qualitative Assessment:</i>	05L 05R	tially consistent with the environmental performance MET PARTIAL
'End' and Design Principle Policy. Design Principle Capacity <u>Summary of Qualitative Assessment:</u> When assessed in isolation for Runway 05L, this of capacity of our existing runways and could be used single runway operation to achieve this. When assessed in isolation for Runway 05R there is attained due to ground movement limitations and for a Runway 05R departure.	05L 05R ption is dee d operation s a greater the time ta d not adver 3 of the AC	MET PARTIAL PARTIAL emed to be capable of enabling the best use of the nally in conjunction with another runway, or as a likelihood that best use of capacity may not be fully ken for aircraft to enter and backtrack the runway sely affect operations within airspace that is shared

Summary of Qualitative Assessment:

The estimated track length of option 2 L is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 2 R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2 L is estimated to overfly approximately 37,150 households with an approximate population of 99,300. Taking account of planned property developments, this option is estimated to impact an approximate total population of 110,800.

Up to 7,000ft, option 2 L is estimated to overfly approximately 48,450 households with an approximate population of 125,000. Taking account of planned property developments, this option is estimated to impact an approximate total population of 141,100.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 2 R is estimated to overfly approximately 39,950 households with an approximate population of 102,300. Taking account of planned property developments, this option is estimated to impact an approximate total population of 102,700.

Up to 7,000ft, option 2 R is estimated to overfly approximately 49,000 households with an approximate population of 123,500. Taking account of planned property developments, this option is estimated to impact an approximate total population of 129,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL

Up to 4,000ft, this option 2 L is estimated to overfly 210 noise sensitive areas.

Up to 7,000ft, this option 2 L is estimated to overfly 255 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2 R is estimated to overfly 195 noise sensitive areas.

Up to 7,000ft, this option 2 R is estimated to overfly 235 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. Technology	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

10.3 Runways 05L/05R West Option 3

Design Principle Evaluation	Option No: 3
Option Name: SID RW 05L WEST Option 3	REJECT
Option Name: SID RW 05R 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.	R05 West Option 3 Left - Enn - Enn
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.	Land Association and Associati
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%.	Partington 5 star Normandon 45 Jan Normandon 6 Lumin 9 Dillingham 9 Witherstor 1 Star 1 Star

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.

AB <td

D. C. D. C. Cafat.	05L	MET
Design Principle Satety	05R	MET

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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 3 L is estimated to limit the total population affected by noise. Option 3 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 3 R is estimated to limit the total population affected by noise. Option 3 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

The estimated track length of option 3 L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 3 R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3 L 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 an approximate total population of 109,600.

Up to 7,000ft, option 3 L 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 an approximate total population of 159,100.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 3 R 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 an approximate total population of 106,400.

Up to 7,000ft, option 3 R 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 an approximate total population of 158,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. S. D. S. I. Nation N2	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL

Up to 4,000ft, this option 3 L is estimated to overfly 205 noise sensitive areas.

Up to 7,000ft, this option 3 L is estimated to overfly 285 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3 R is estimated to overfly 210 noise sensitive areas.

Up to 7,000ft, this option 3 R is estimated to overfly 295 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. Tachaology	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

10.4 Runways 05L/05R West Option 4A

Design Principle Evaluation Option No: 4A Option Name: SID RW 05L WEST Option 4A REJECT Option Name: SID RW 05R 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 R05 West Option 4A Left 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 R05 West Option 4A Right compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616. 05L MET Design Principle Safety 05R MET

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.

	05L	MET
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4A L is estimated to limit the total population affected by noise. Up to 7,000ft, option 4A L is estimated to limit the total population affected by noise. Option 4A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 4A R is estimated to limit the total population affected by noise. Option 4A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 73,000.

Up to 7,000ft, option 4A L 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 an approximate total population of 139,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 84,100.

Up to 7,000ft, option 4A R 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 an approximate total population of 153,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. C. D. C. Maine N2	05L	MET
Design Principle Noise N3	05R	PARTIAL

Up to 4,000ft, this option 4A L is estimated to overfly 155 noise sensitive areas.

Up to 7,000ft, this option 4A L is estimated to overfly 275 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4A R is estimated to overfly 165 noise sensitive areas.

Up to 7,000ft, this option 4A R is estimated to overfly 295 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. Taskaslamı	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

10.5 Runways 05L/05R West Option 4B

Design Principle Evaluation

Option Name: SID RW 05L WEST Option 4B

Option Name: SID RW 05R WEST Option 4B

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.

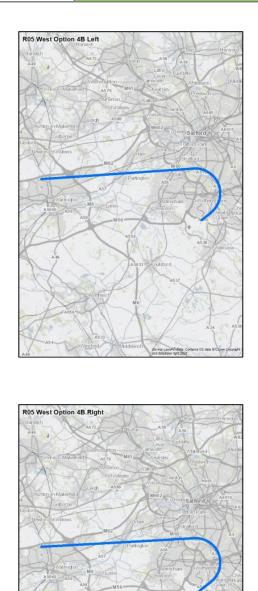
05L: After departure this route turns left at the earliest PANS-OPS compliant position (1nm from DER). This is a single left turn that takes it overhead Cheadle and West Didsbury before completing the left turn heading in a westerly direction to the south of Chorlton. It continues west to route just 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. Option No: 4B

ACCEPT

ACCEPT



D. C. D. C. Cafat	05L	MET
Design Principle Satety	05R	MET

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.

D. C. D. C. Dollar	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4B L is estimated to limit the total population affected by noise. Up to 7,000ft, option 4B L is estimated to limit the total population affected by noise. Option 4B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4B R is estimated to limit the total population affected by noise. Up to 7,000ft, option 4B R is estimated to limit the total population affected by noise. Option 4B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 56,800.

Up to 7,000ft, option 4B L 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 an approximate total population of 132,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 68,700.

Up to 7,000ft, option 4B R 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 an approximate total population of 147,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. C. D. C. Maina N2	05L	MET
Design Principle Noise N3	05R	MET

Up to 4,000ft, this option 4B L is estimated to overfly 110 noise sensitive areas.

Up to 7,000ft, this option 4B L is estimated to overfly 245 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4B R is estimated to overfly 140 noise sensitive areas.

Up to 7,000ft, this option 4B R is estimated to overfly 270 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

10.6 Runways 05L/05R West Option 5A

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

Option Description:

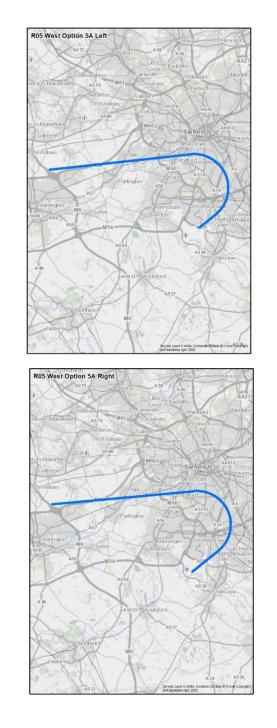
This is an **RNP1** that uses RF coding to provide a single initial turn based on the position of the current turn to create a fuel-efficient route to the network joining point to the west.

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.



D. C. D. C. Cafat	05L	MET
Design Principle Satety	05R	MET

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	PARTIAL
	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 5A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 5A L is estimated to limit the total population affected by noise. Option 5A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 5A R is estimated to limit the total population affected by noise. Option 5A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity	05L	MET
	05R	PARTIAL

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	PARTIAL
	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

Design Principle Noise N1	05L	PARTIAL
	05R	PARTIAL

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 an approximate total population of 135,300.

Up to 7,000ft, option 5A L 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 an approximate total population of 189,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 137,200.

Up to 7,000ft, option 5A R 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 an approximate total population of 197,100.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Design Principle Noise N2	05L	MET
	05R	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	PARTIAL
	05R	PARTIAL

Up to 4,000ft, this option 5A L is estimated to overfly 235 noise sensitive areas.

Up to 7,000ft, this option 5A L is estimated to overfly 330 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 5A R is estimated to overfly 215 noise sensitive areas.

Up to 7,000ft, this option 5A R is estimated to overfly 320 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. Tachaology	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

10.7 Runways 05L/05R West Option 5B

Design Principle Evaluation Option No: 5B Option Name: SID RW 05L WEST Option 5B REJECT Option Name: SID RW 05R WEST Option 5B REJECT **Option Description:** This is an **RNP1** that uses RF coding to provide a single R05 West Option 5B Left 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 R05 West Option 5B Right 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. 05L MET Design Principle Safety 05R MET

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.

D. C. D. C. L. Dalian	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 5B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 5B L is estimated to limit the total population affected by noise. Option 5B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 5B R is estimated to limit the total population affected by noise. Option 5B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 103,300.

Up to 7,000ft, option 5B L 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 an approximate total population of 156,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 99,500.

Up to 7,000ft, option 5B R 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 an approximate total population of 155,900.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. S. D. S. I. Nation N2	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL

Up to 4,000ft, this option 5B L is estimated to overfly 180 noise sensitive areas.

Up to 7,000ft, this option 5B L is estimated to overfly 260 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 5B R is estimated to overfly 200 noise sensitive areas.

Up to 7,000ft, this option 5B R is estimated to overfly 290 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

Dutu Divid Technology	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

10.8 Runways 05L/05R West Option 6A

Design Principle Evaluation

Option Name: SID RW 05L WEST Option 6A

Option Name: SID RW 05R WEST Option 6A

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.

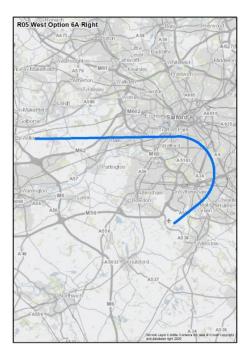
A speed restriction of 220 KIAS is used for the first turn which allows most aircraft to fly in a clean configuration.

Option No: 6A

ACCEPT

ACCEPT





D. C. D. C. Cafat.	05L	MET
Design Principle Satety	05R	MET
		·

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.

D. C. D. C. L. Dalian	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6A L is estimated to limit the total population affected by noise. Option 6A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 6A R is estimated to limit the total population affected by noise. Option 6A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

Dute Diate Noine N1	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 124,900.

Up to 7,000ft, option 6A L 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 an approximate total population of 173,300.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 133,800.

Up to 7,000ft, option 6A R 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 an approximate total population of 191,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. S. D. S. I. Nation N2	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL

Up to 4,000ft, this option 6A L is estimated to overfly 250 noise sensitive areas.

Up to 7,000ft, this option 6A L is estimated to overfly 345 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6A R is estimated to overfly 245 noise sensitive areas.

Up to 7,000ft, this option 6A R is estimated to overfly 355 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

10.9 Runways 05L/05R West Option 6B

Design Principle EvaluationOption No: 6BOption Name: SID RW 05L WEST Option 6BREJECTOption Name: SID RW 05R WEST Option 6BREJECT

Option Description:

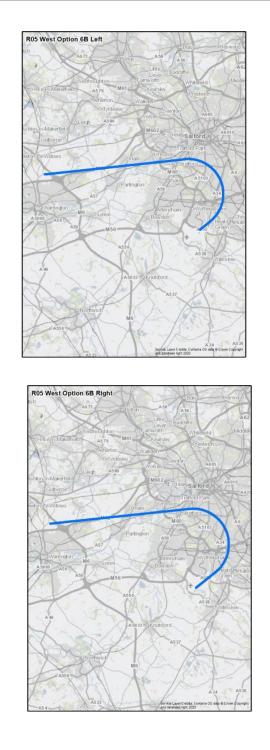
This is an **RNP1** that uses RF coding to provide a single initial turn to create a fuel-efficient route to the network joining point to the west. It differs from option 6A in that the turn is at the earliest PANS-OPS compliant position from Runway 05L to create a shorter route for this design speed.

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 (1 nm 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.



D. C. D. C. L. Safat	05L	MET
Design Principle Satety	05R	MET

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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6B L is estimated to limit the total population affected by noise. Option 6B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 6B R is estimated to limit the total population affected by noise. Option 6B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 121,100.

Up to 7,000ft, option 6B L 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 an approximate total population of 170,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 127,700.

Up to 7,000ft, option 6B R 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 an approximate total population of 184,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. S. D. S. I. Nation N2	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL

Up to 4,000ft, this option 6B L is estimated to overfly 215 noise sensitive areas.

Up to 7,000ft, this option 6B L is estimated to overfly 285 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6B R is estimated to overfly 230 noise sensitive areas.

Up to 7,000ft, this option 6B R is estimated to overfly 320 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

10.10 Runways 05L/05R West Option 7

Design Principle Evaluation Option No: 7 Option Name: SID RW 05L WEST Option 7 ACCEPT Option Name: SID RW 05R WEST Option 7 ACCEPT **Option Description:** This is an **RNP1** option that uses RF coding to provide a R05 West Option 7 Left 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 O5R. 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 R05 West Option 7 Right 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.



D D Calat.	05L	MET
Design Principle Satety	O5R	MET

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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 7 L is estimated to limit the total population affected by noise. Option 7 L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 7 L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7 R is estimated to limit the total population affected by noise. Up to 7,000ft, option 7 R is estimated to limit the total population affected by noise. Option 7 R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 7 R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	MET
Design Principle Emissions	05R	PARTIAL

The estimated track length of option 7 L is 36km (19nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

The estimated track length of option 7 R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7 L 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 an approximate total population of 57,100.

Up to 7,000ft, option 7 L 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 an approximate total population of 131,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 7 R 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 an approximate total population of 63,200.

Up to 7,000ft, option 7 R 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 an approximate total population of 148,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. C. D. C. Maina N2	05L	MET
Design Principle Noise N3	05R	MET

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

Up to 7,000ft, this option 7 L is estimated to overfly 230 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 7 R is estimated to overfly 140 noise sensitive areas.

Up to 7,000ft, this option 7 R is estimated to overfly 275 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

10.11 Runways 05L/05R West Summary

	Option 1L	Option 2L	Option 3L	Option 4AL	Option 4BL	Option 5AL	Option 5BL	Option 6AL	Option 6BL	Option 7L
S	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
Р	MET	PARTIAL	PARTIAL	MET	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET
С	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET
N1	MET	PARTIAL	PARTIAL	MET	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET
N2	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
N3	MET	PARTIAL	PARTIAL	MET	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET
Α	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Rejected	Rejected	Rejected	4,000ft beneficial	Rejected	Rejected	Add. Qual.	Rejected	Best

	Option 1R	Option 2R	Option 3R	Option 4AR	Option 4BR	Option 5AR	Option 5BR	Option 6AR	Option 6BR	Option 7R
S	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
Ρ	MET	PARTIAL	PARTIAL	PARTIAL	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	MET	PARTIAL	PARTIAL	PARTIAL	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET
N2	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
N3	MET	PARTIAL	PARTIAL	PARTIAL	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET
Α	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Rejected	Rejected	Rejected	Best	Rejected	Rejected	Add. Qual.	Rejected	Best

10.12 Runways 05L/05R West Viable but Poor Fit Options

Option	Safety	Policy	Capacity					
A8 Extended straight ahead then gradual left turn towards west	S	Ρ	С					
	After departure from Runways 05L/05R, aircraft would fly straight ahead beyond Stockport before making a left-hand turn, heading west towards the SID aiming point.							
 Policy: This option fails to align with the ends of the AMS with respect to: Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic a significant distance east before turning it west leading to increased fuel burn and emissions. The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft. Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation. Capacity: This option would initially take the same track as departure options within the 05 East envelope and would also interact with departures in the 05 North and South-west envelopes. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity. 								
B9 Right-hand wraparound S P C								
After departure from Runways 05L/05R, aircraft would make a right-hand turn, before making a second 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 conflict with the Runway 05R MAP.								
	Policy: This option fails to align with the ends of the AMS with respect to:							
• Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic a south before turning it north and then west leading to increased fuel burn and emissions.								
The trade-off analysis between emissions and noise, identified a potential noise benefit below 4,000ft which resulted in an amber categorisation.								
The trade-off analysis against	other AMS ends did no	ot identify other benefits						
<u>Capacity</u> : This option interact interact with arrivals from the splits and not enable best use	south. This would limit	-	and the second					

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 05L SOUTH-WEST Option 1	REJECT
Option Name: SID RW 05R 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 southwest. 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. O5L: 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. O5R: After departure this route turns left at a point that is perpendicular 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 west pidsbury 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. 	<figure></figure>
051	MET

D. C. D. C. Cafat.	05L	MET
Design Principle Satety	05R	MET

Summary of	Qualitative A	Assessment:
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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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 1 L is estimated to limit the total population affected by noise. Option 1 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 1 R is estimated to limit the total population affected by noise. Option 1 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Decise Districts Canacity	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore similar emissions would be anticipated.

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

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L 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 an approximate total population of 80,000.

Up to 7,000ft, option 1 L 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 an approximate total population of 86,000.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 1 R 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 an approximate total population of 90,100.

Up to 7,000ft, option 1 R 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 an approximate total population of 97,300.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	PARTIAL
$\int (O - i') di $		

Up to 4,000ft, this option 1 L is estimated to overfly 160 noise sensitive areas.

Up to 7,000ft, this option 1 L is estimated to overfly 175 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1 R is estimated to overfly 190 noise sensitive areas.

Up to 7,000ft, this option 1 R is estimated to overfly 200 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Dute Bistale Airpage	05L	MET
Design Principle Airspace	05R	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.

Dute Divide Technology	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

11.2 Runways 05L/05R South-west Option 2A

Design Principle Evaluation		Option No: 2A
Option Name: SID RW 05L SOUTH-WEST Option 2A		REJECT
Option Name: SID RW 05R SOUTH-WEST Opt	ion 2A	ACCEPT
Option Description:		
 Cprion Description: This is an RNP1 option that uses RF coding to p a single left turn starting at the position of the oturn to create a fuel-efficient route. The design results in a tight radius turn to create a shor length to join the NATS network to the south-wee OSL: After departure this route makes a single left just after Cheadle which takes it overhead Bu and Withington where it combines with the opt OSR. The left turn is completed heading in a westerly direction in the vicinity of Chorlton continues in this direction to terminate at 7,000f of the Lymm interchange between the M56 a M6. OSR: After departure this route makes a single left just after Cheadle which takes it overhead Bu and Withington where it combines with the opt OSL. The left turn is completed heading in a westerly direction in the vicinity of Sale and it cort in this direction to terminate at 7,000ft south Lymm interchange between the M56 and the M A speed restriction of 190 KIAS is used for the fi which allows the smallest radius. Although PAN compliant it should be assessed for flyability as the procedure validation process within Stage CAP1616. 	current speed t track est. eff turn urnage ion for south- and it t south nd the eff turn urnage ion for south- ntinues of the 6. rst turn S-OPS part of	<figure></figure>
	05L	MET
Design Principle Safety	05R	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.

D. S. D. S. L. Dalian	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 2A L is estimated to limit the total population affected by noise. Option 2A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 2A R is estimated to limit the total population affected by noise. Option 2A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. C. D Canacity	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 110,600.

Up to 7,000ft, option 2A L 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 an approximate total population of 125,800.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 118,500.

Up to 7,000ft, option 2A R 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 an approximate total population of 145,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 2A L is estimated to overfly 195 noise sensitive areas.

Up to 7,000ft, this option 2A L is estimated to overfly 220 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2A R is estimated to overfly 205 noise sensitive areas.

Up to 7,000ft, this option 2A R is estimated to overfly 235 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

Dute Divide Technology	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

11.3 Runways 05L/05R South-west Option 2B

Design Principle Evaluation			Option No: 2B
Option Name: SID RW 05L SOUTH-WEST Option	on 2B		REJECT
Option Name: SID RW 05R SOUTH-WEST Opti	on 2B		ACCEPT
Option Description:			
 Option Description: This is an RNP1 that uses RF coding to provide a initial turn to create a fuel-efficient route to the nei joining point to the west. It differs from option that the turn is at the earliest PANS-OPS composition from Runway 05L to create the shortest possible at this design speed. O5L: After departure this route turns left at the e PANS-OPS compliant position (1 nm from DER). a single left turn that takes it overhead Cheadl West Didsbury before completing the left turn he in a south-westerly direction to the south of Sale it combines with the option for 05R. It continues swest to route just north of Altrincham and term at 7,000ft south of Warrington. O5R: After departure this route turns left at a point is perpendicular with the turn point for the 05L on This is a single left turn that takes it overhead Cheadl West Didsbury before completing the left heading in a south-westerly direction to the sous Sale where it combines with the option for C continues south-west to route just north of Altrin and terminates at 7,000ft south of Warrington. A speed restriction of 190 KIAS is used for the fir which allows the smallest radius. Although PANS compliant it should be assessed for flyability as p the procedure validation process within Stage CAP1616. 	etwork 2A in pliant route arliest This is e and ading where south- inates nt that ption. eadle t turn uth of /5L. It cham st turn south- or for the south- inates	ROS South-West O	
Design Drinsials Safet:	05L		MET
Design Principle Safety	05R		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.

D. S. D. S. L. Dalian	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 2B L is estimated to limit the total population affected by noise. Option 2B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 2B R is estimated to limit the total population affected by noise. Option 2B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. C. D Canacity	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

Design Bringints Noise N1	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 91,300.

Up to 7,000ft, option 2B L 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 an approximate total population of 95,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 101,400.

Up to 7,000ft, option 2B R 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 an approximate total population of 109,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	PARTIAL
Summary of Qualitative Accessment	-	

Up to 4,000ft, this option 2B L is estimated to overfly 160 noise sensitive areas.

Up to 7,000ft, this option 2B L is estimated to overfly 175 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2B R is estimated to overfly 195 noise sensitive areas.

Up to 7,000ft, this option 2B R is estimated to overfly 215 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

11.4 Runways 05L/05R South-west Option 3A

Design Principle Evaluation			Option No: 3A
Option Name: SID RW 05L SOUTH-WEST Option 3A		REJECT	
Option Name: SID RW 05R SOUTH-WEST Opt	ion 3A		ACCEPT
Option Description:			1
 Option Description: This is an RNP1 that uses RF coding to provide a initial turn starting at the position of the current create a fuel-efficient route to the south-wess similar to option 2A but is designed with a design speed of 210kts. The greater speed results in a wider track, which aid vertical separation from MAN arriving traffit the north. The design speed may also permit aircraft to be in a clean configuration (without the of flaps) which has potential benefits in terms of 05L: After departure this route makes a single legist after Cheadle which takes it overhead Bia and Fallowfield where it combines with the opt 05R. The left turn is completed heading in a westerly direction between Chorlton and Stretfor it continues in this direction to terminate at 7 south of the Lymm interchange between the M5 the M6. O5R: After departure this route makes a single legist after Cheadle which takes it overhead Bia and Fallowfield where it combines with the opt 05L. The left turn is completed heading in a westerly direction between Chorlton and Stretfor it continues in this direction to terminate at 7 south of the Lymm interchange between the M5 the M6. O5R: After departure this route makes a single legist after Cheadle which takes it overhead Bia and Fallowfield where it combines with the opt 05L. The left turn is completed heading in a westerly direction between Chorlton and Stretfor it continues in this direction to terminate at 7 south of the Lymm interchange between the M5. A speed restriction of 210 KIAS is applied to t turn which is the CAP778 recommended speed 	turn to t. It is higher the use noise. eff turn urnage ion for south- rd and 7,000ft 56 and eff turn urnage ion for south- rd and 7,000ft 56 and 2,000ft 56 and	ield As 79 Anitem	Me1 Dearse Dearse Dearse Dearse </th
	05L		MET
Design Principle Satety	05R		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.

D. S. D. S. L. Dalian	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 3A L is estimated to limit the total population affected by noise. Option 3A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 3A R is estimated to limit the total population affected by noise. Option 3A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. C. D Canacity	05L	MET
Design Principle Capacity	05R	PARTIAL

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	PARTIAL
	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

Design Principle Noise N1	05L	PARTIAL
	05R	PARTIAL

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 an approximate total population of 126,300.

Up to 7,000ft, option 3A L 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 an approximate total population of 152,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 135,500.

Up to 7,000ft, option 3A R 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 an approximate total population of 172,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 3A L is estimated to overfly 225 noise sensitive areas.

Up to 7,000ft, this option 3A L is estimated to overfly 270 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3A R is estimated to overfly 235 noise sensitive areas.

Up to 7,000ft, this option 3A R is estimated to overfly 300 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

11.5 Runways 05L/05R South-west Option 3B

Design Principle Evaluation Option No: 3B Option Name: SID RW 05L SOUTH-WEST Option 3B REJECT Option Name: SID RW 05R SOUTH-WEST Option 3B ACCEPT **Option Description:** This is an **RNP1** option that uses RF coding to provide R05 South-West Option 3B Let 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 R05 South-West Option 3B Right 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. 05L MET Design Principle Safety 05R 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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 3B L is estimated to limit the total population affected by noise. Option 3B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 3B R is estimated to limit the total population affected by noise. Option 3B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 103,000.

Up to 7,000ft, option 3B L 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 an approximate total population of 112,000.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 112,500.

Up to 7,000ft, option 3B R 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 an approximate total population of 128,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	PARTIAL
Summary of Qualitative Assessment:	•	

Up to 4,000ft, this option 3B L is estimated to overfly 170 noise sensitive areas.

Up to 7,000ft, this option 3B L is estimated to overfly 185 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3B R is estimated to overfly 215 noise sensitive areas.

Up to 7,000ft, this option 3B R is estimated to overfly 240 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

11.6 Runways 05L/05R South-west Option 4A

Design Principle Evaluation Option No: 4A Option Name: SID RW 05L SOUTH-WEST Option 4A REJECT Option Name: SID RW 05R SOUTH-WEST Option 4A REJECT **Option Description:** This is an **RNP1** option that uses RF coding to provide R05 South-West Option 4A Left 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 southwesterly 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 R05 South-West Option 4A Rig 05L. The left turn is completed heading in a southwesterly 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 MET Design Principle Safety

05R

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.

D. S. D. S. L. Dalian	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4A L is estimated to limit the total population affected by noise. Option 4A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 4A R is estimated to limit the total population affected by noise. Option 4A R is similar in length and it is anticipated that emissions would be increased. At this stage of the process, option 4A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. C. D Canacity	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	NOT MET
		·

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 therefore 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 therefore greater emissions would be anticipated.

Design Bringinta Noice N1	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 132,400.

Up to 7,000ft, option 4A L 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 an approximate total population of 161,300.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 145,100.

Up to 7,000ft, option 4A R 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 an approximate total population of 182,800.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 4A L is estimated to overfly 235 noise sensitive areas.

Up to 7,000ft, this option 4A L is estimated to overfly 290 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4A R is estimated to overfly 275 noise sensitive areas.

Up to 7,000ft, this option 4A R is estimated to overfly 340 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

11.7 Runways 05L/05R South-west Option 4B

Design Principle Evaluation		Option No: 4B
Option Name: SID RW 05L SOUTH-WEST Option 4B		ACCEPT
Option Name: SID RW 05R SOUTH-WEST Op	tion 4B	ACCEPT
Option Description: This is an RNP1 option that uses RF coding to pasition to create a route to the south-west. It from option 4A in that the turn is at the earliest OPS compliant position from Runway 05L to option shorter route for this design speed. It is similar to options 2B and 3B but is design a higher speed of 220kts. The design speed rea a wider track, which may aid vertical separatic MAN arriving traffic from the north. It will also a larger number of aircraft to fly this route in a configuration (without the use of flaps) whi potential benefits in terms of noise. O5L: After departure this route turns left at the PANS-OPS compliant position (1nm from DER) a single left turn that takes it overhead CI Burnage and Fallowfield before completing turn heading in a south-westerly direction at S where it combines with the option for 05R. It co in this direction to terminate at 7,000ft west Lymm interchange between the M56 and the N O5R: After departure this route turns left at a point is perpendicular with the turn point for the 05L. This single left turn takes it overhead CI Burnage and Fallowfield before completing turn heading in a south-westerly direction at S where it combines with the option for 05R. It co in this direction to terminate at 7,000ft west Lymm interchange between the M56 and the N O5R: After departure this route turns left at a point is perpendicular with the turn point for the 05L. This single left turn takes it overhead CI Burnage and Fallowfield before completing turn heading in a south-westerly direction at S where it combines with the option for 05L. It co in this direction to terminate at 7,000ft west Lymm interchange between the M56 and the N A speed restriction of 220 KIAS is used for the f which allows most aircraft to fly in a configuration.	provide mpliant differs PANS- reate a ed with soults in on from permit a clean ch has earliest . This is neadle, the left tretford ntinues of the 16. int that option. neadle, the left tretford ntinues of the 16. int that option. neadle, the left tretford ntinues of the 16. int stat	<figure></figure>
Design Principle Safety	05L 05R	MET 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.

D. S. D. S. L. Dalian	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4B L is estimated to limit the total population affected by noise. Option 4B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 4B R is estimated to limit the total population affected by noise. Option 4B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. C. D Canacity	05L	MET
Design Principle Capacity	05R	PARTIAL

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	05L	PARTIAL
Design Principle Noise N1	05R	PARTIAL

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 an approximate total population of 114,400.

Up to 7,000ft, option 4B L 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 an approximate total population of 129,700.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 126,700.

Up to 7,000ft, option 4B R 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 an approximate total population of 149,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	PARTIAL
Design Principle Noise N3	05R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 4B L is estimated to overfly 195 noise sensitive areas.

Up to 7,000ft, this option 4B L is estimated to overfly 225 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4B R is estimated to overfly 225 noise sensitive areas.

Up to 7,000ft, this option 4B R is estimated to overfly 270 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. L. Tachnalami	05L	MET
Design Principle Technology	05R	MET

Summary of Qualitative Assessment:

11.8 Runways 05L/05R South-west Option 5

Design Principle Evaluation			Option No: 5
Option Name: SID RW 05L SOUTH-WEST Opt	ACCEPT		
Option Name: SID RW 05R SOUTH-WEST Opt		ACCEPT	
Option Description: This is an RNAV1 option that provides two turns left to route south-west similar option 1 but u initial 15° track adjustment to the left from the D Runway 05L, and a 5° adjustment for Runwa This is to provide noise relief for the Cheadle which lies underneath the approach path for Ru 23R/23L arrivals.	a to the ses an DER for y 05R. a area, unways AP778 t to fly use of oise. ^o track then a ombine and it oarsely south- ^o track then a poise. ^o track then a ombine and it oarsely south-	Theo Solution	
	05L		More Laber Collect Collect Collections of the te Collect Collection of the te Collection of te Collection of the te Collection of te
Design Principle Safety	05R		MET

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.

D. C. D. C. Balian	05L	MET
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 5 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 5 L is estimated to limit the total population affected by noise. Option 5 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5 L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 5 R is estimated to limit the total population affected by noise. Option 5 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Canadita	05L	MET
Design Principle Capacity	05R	PARTIAL

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 05R PARTIAL		05L	PARTIAL
	Design Principle Emissions	05R	PARTIAL

The estimated track length of option 5 L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 5 R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 5 L 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 an approximate total population of 74,100.

Up to 7,000ft, option 5 L 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 an approximate total population of 80,000.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 5 R 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 an approximate total population of 86,900.

Up to 7,000ft, option 5 R 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 an approximate total population of 93,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 5 L is estimated to overfly 150 noise sensitive areas.

Up to 7,000ft, this option 5 L is estimated to overfly 165 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 5 R is estimated to overfly 180 noise sensitive areas.

Up to 7,000ft, this option 5 R is estimated to overfly 195 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. L. Tashnalami	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

11.9 Runways 05L/05R South-west Summary

	Option 1L	Option 2AL	Option 2BL	Option 3AL	Option 3BL	Option 4AL	Option 4BL	Option 5L
S	MET	MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET
С	MET	MET	MET	MET	MET	MET	MET	MET
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET
N2	MET	MET	MET	MET	MET	MET	MET	MET
N3	MET	PARTIAL	MET	PARTIAL	MET	PARTIAL	PARTIAL	MET
Α	MET	MET	MET	MET	MET	MET	MET	MET
Т	MET	MET	MET	MET	MET	MET	MET	MET
	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Add. Qual.	Best

	Option 1R	Option 2AR	Option 2BR	Option 3AR	Option 3BR	Option 4AR	Option 4BR	Option 5R
S	MET	MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	NOT MET	PARTIAL	PARTIAL
N1	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N2	MET	MET	MET	MET	MET	MET	MET	MET
N3	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Α	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET
	Best	Best	Best	Best	Best	Rejected	Best	Best

11.10 Runways 05L/05R South-west Viable but Poor Fit Options

Option	Safety	Policy	Capacity		
A6 Extended climb out then left turn	S	Р	С		
After departure from Runwo before making a 180-degre					
Policy: This option fails to c	lign with the ends of the	AMS with respect to:			
mileage than is n	rformance – Emissions ecessary by taking traffic g to increased fuel burn	a significant distance			
The trade-off analysis betw below 4,000ft.	veen emissions and nois	se, did not identify a n	naterial noise benefit		
Similarly, the trade-off ana sufficient to offset a red cat		ends did not identify o	ther material benefits		
<u>Capacity</u> : This option would initially take the same track as departure options within the 05 East envelope and would also interact with departures in the 05 North and South-west envelopes. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.					
B7 Extended climb out, then right turn C					
After departure from Runways 05L/05R, aircraft would continue straight ahead beyond Stockport before making a 180-degree right-hand turn to the west and then south-west.					
Policy: This option fails to c	llign with the ends of the	AMS with respect to:			
 Environmental performance – Emissions: This option would involve 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. 					
The trade-off analysis between emissions and noise, did not identify a potential noise benefit below 4,000ft.					
	Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.				
		ends did not identify o			
	egorisation. d take the same track a velope. This would limit	s departures to the eas	ther material benefits t and to interact with		

After departure from Runways 05L/05R, aircraft would make a right-hand turn, fly around the airport to head north initially and then begin heading south-west towards the SID aiming point.

<u>Safety</u>: This option is expected to conflict with the Runways 05L/05R MAP.

<u>Capacity</u>: This option would interact with departures in the 05 South Design Envelope and 05 arrivals from the both the south and north. This would limit the ability to achieve one minute departure splits and not 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 23L NORTH Option 1A		ACCEPT
Option Name: SID RW 23R NORTH Option 1A		ACCEPT
 Option Description: Option 1A is an RNAV1 replication of the curred departure to POL and uses fly-over waypoints of path terminator coding to create an approximal replication of the existing conventional POL 5R An element of dispersion would be apparent in turns due to the fly-over waypoint and CF codir The fly-over waypoints are positioned at the eximarkers. For Runway 23R this first turn is at MCC For Runway 23L, this is at D3.2 which than 1 nm from DER but replicates the aprocedure. As a replicated route it follows a similar track or ground as the current published route. This take routes to the north of Knutsford at which point that tracks of the SIDs converge. The route heads north-east direction and terminates at 7,000ft jof Farnworth. A speed restriction of 200 KIAS is used for the flame of the flame of the flame of 200 KIAS is used for the flame. 	vith CF te 1Y SID. the ng. sting T D3. is less current ver the es both the orth until in a ust east	<figure></figure>
Design Principle Safety	23L 23R	MET

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	PARTIAL
	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 1A L is estimated to limit the total population affected by noise. Option 1A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 1A R is estimated to limit the total population affected by noise. Option 1A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity	23L	MET
	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

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 therefore 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 therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 12,400.

Up to 7,000ft, option 1A L 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 an approximate total population of 91,900.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 12,500.

Up to 7,000ft, option 1A R is estimated to overfly approximately 39,200 households with an approximate population of 90,100. Taking account of planned property developments, this option is estimated to impact an approximate total population of 92,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Design Principle Noise N2	23L	MET
	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment		

Up to 4,000ft, this option 1A L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 1A L is estimated to overfly 155 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1A R is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 1A R is estimated to overfly 155 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Design Principle Airspace	23L	MET
	23R	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	MET
	23R	MET

Summary of Qualitative Assessment:

12.2 Runways 23R/23L North Option 1B

Design Principle Evaluation			Option No: 1B
Option Name: SID RW 23L NORTH Option 1E	3		REJECT
Option Name: SID RW 23R NORTH Option 11	3		ACCEPT
 Option Description: Option 1B is an RNAV1 option, similar to optiss of the second rige of	minator pht turn efficient existing T D3. T D3	R23 North Option M62 A57 M6 Lymn A50 M6 Lymn A57 Altherto Tyli Leich A5 A57 M62 M62 A57	Image: Control of the second of the secon
Design Principle Safety	23L 23R		MET MET

Summary of	Qualitative A	Assessment:
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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.

During Diamity Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 1B L is estimated to limit the total population affected by noise. Option 1B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 1B R is estimated to limit the total population affected by noise. Option 1B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Directory Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

Design Dringing Noice N1	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 14,400.

Up to 7,000ft, option 1B L 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 an approximate total population of 119,900.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 14,300.

Up to 7,000ft, option 1B R 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 an approximate total population of 120,800.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Design Brigginda Noise N2	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 1B L is estimated to overfly 25 noise sensitive areas.

Up to 7,000ft, this option 1B L is estimated to overfly 235 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1B R is estimated to overfly 25 noise sensitive areas.

Up to 7,000ft, this option 1B R is estimated to overfly 240 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Dutin Divide Airpage	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

12.3 Runways 23R/23L North Option 2B

Design Principle Evaluation			Option No: 2B
Option Name: SID RW 23L NORTH Option 21	3		ACCEPT
Option Name: SID RW 23R NORTH Option 2	В		ACCEPT
 Option Description: This is an RNP1 option with RF coding that is si option 1B but the use of RF coding results in slightly further west initially before heading no initially following the course of the M62 to promore direct and fuel-efficient route. The option has been created to use the more technology and maximise fuel efficiency by m second right turn earlier to head on a notrajectory where it terminates south of the existis SID. The design speed aligns to the C recommendation and may permit some aircrothis route in a clean configuration (without the flaps) which has potential benefits in terms of recommendation. This turn continues via Over Tab routes north to the east of Lymm until or Partington at which point the route heads nor It initially follows the route of the M62 and ter at 7,000ft north of Prestwich. 23R: This route commences the RF turn to the Knutsford. This turn continues via Over Tab routes north to the east of Lymm until or Partington at which point the route heads nor It initially follows the route of the M62 and ter at 7,000ft north of Prestwich. A speed restriction of 210 KIAS is applied to the turn which is the CAP778 recommended speed 	a track rth-east ovide a modern aking a rth-east ng POL CAP778 aft to fly e use of noise. north of ley and west of th-east. minates north of ley and west of th-east. minates e first	AS7 AS9 ATPEND	Asso Asso Asso Asso Asso Asso Asso Asso
Design Principle Safety	23L 23R		MET 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.

During Driving Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 2B L is estimated to limit the total population affected by noise. Option 2B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 2B R is estimated to limit the total population affected by noise. Option 2B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Division Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 12,100.

Up to 7,000ft, option 2B L 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 an approximate total population of 93,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 10,200.

Up to 7,000ft, option 2B R 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 an approximate total population of 92,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment		

Up to 4,000ft, this option 2B L is estimated to overfly 25 noise sensitive areas.

Up to 7,000ft, this option 2B L is estimated to overfly 175 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2B R is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 2B R is estimated to overfly 170 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

12.4 Runways 23R/23L North Option 3

Design Principle Evaluation			Option No: 3
Option Name: SID RW 23L NORTH Option 3		ACCEPT	
Option Name: SID RW 23R NORTH Option 3			ACCEPT
Option Description: This provides an RNP1 option with RF coding us by waypoints. It has been created using fly-by waypoints with a radius first turn than option 2B to reduce noise for Knutsford. It also aims to improve fuel efficie making a second right turn earlier than the POL SID. The design speed aligns to the C recommendation and may permit some aircra this route in a clean configuration (without the flaps) which has potential benefits in terms of n 23L : This route commences the RF turn to the r Knutsford. The radius of this turn takes it further of Knutsford than option 2B to route betwee Legh and Bucklow Hill. The route heads nor combine near Broomedge and continue until ju of Partington. At this point the route turns r follow the course of the M62 in a north- direction and terminates at 7,000ft west of Pres 23R : This route commences the RF turn earlie 23L, to route further to the north of Knutsfor routes it between High Legh and Bucklow Hill converges with the option for 23L in the vic Broomedge. The route heads north until just Partington. At this point the route turns right to the course of the M62 in a north-easterly directit terminates at 7,000ft west of Prestwich. A speed restriction of 210 KIAS is applied to fit turn which is the CAP778 recommended speed	tighter impact ency by current AP778 ft to fly use of oise. north of er north n High th and ust west ight to easterly stwich. er than d. This and it inity of west of o follow on and the first	A57 M62 Lym	Image: Clarin worth Whileheld Image: Clarin worth Works Image: Clarin worth Works Image: Clarin worth See of Sallord Image: Clarin worth
Design Principle Safety	23L 23R		MET MET

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 3 L is estimated to limit the total population affected by noise. Option 3 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 3 R is estimated to limit the total population affected by noise. Option 3 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Conseits	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	PARTIAL
Design Principle Emissions 23R	PARTIAL

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

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

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3 L 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 an approximate total population of 12,200.

Up to 7,000ft, option 3 L 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 an approximate total population of 100,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 3 R 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 an approximate total population of 11,700.

Up to 7,000ft, option 3 R 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 an approximate total population of 99,700.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 3 L is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 3 L is estimated to overfly 200 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3 R is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 3 R is estimated to overfly 200 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

12.5	Runways 23R/23L North Option 4A	
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Design Principle Evaluation		Option No: 4A	
Option Name: SID RW 23L NORTH Option 4A		ACCEPT	
Option Name: SID RW 23R NORTH Option 4A		ACCEPT	
 Option Description: This is an RNP1 option with RF coding inclusive plicate the existing conventional POL SID but an RF turn. This results in a slightly wider initiation that the conventional route and the RNAV1 reploptions. It has been created with the slightly tighter radiaturn similar to option 3 to reduce noise important for the point of that option because it replications. The design aims to have aircraft make the first turn no closer than 1nm from DER after which routes head in a northerly direction and convert north of Cadishead. 23L: This route commences the RF turn to the north of Cadishead. 23L: This route commences the RF turn to the north of Cadishead. 23R: This route commences the RF turn earlier of Knutsford than option 2B to route between Legh and Bucklow Hill. The route heads north turning right via a fly-by turn at XUMAT (nor Cadishead) to head in a north-east direction terminates just east of Farnworth. 23R: This route commences the RF turn earlier 23L, to route further to the north of Knutsford routes it between High Legh and Bucklow Hill converges with the option for 23L in the vici Cadishead. At this point the route turns right to in a north-east direction and terminates just east of Farnworth. A speed restriction of 190 KIAS is used for the first which allows the smallest radius. Although PAN3 compliant it may need to be assessed for flyabill part of the procedure validation process within S of CAP1616. 	t using al turn ication us first act for at the tes the st right h both ge just orth of r north h until orth of n and er than d. This and it nity of b head east of st turn S-OPS ity as	<figure></figure>	
Design Principle Safety	23L 23R	MET MET	

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4A L is estimated to limit the total population affected by noise. Option 4A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 4A R is estimated to limit the total population affected by noise. Option 4A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

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 therefore 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 therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 9,400.

Up to 7,000ft, option 4A L 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 an approximate total population of 88,700.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 4A R is estimated to overfly approximately 4,200 households with an approximate population of 10,100. Taking account of planned property developments, this option is estimated to impact an approximate total population of 10,800.

Up to 7,000ft, option 4A R 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 an approximate total population of 90,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 4A L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 4A L is estimated to overfly 150 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4A R is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 4A R is estimated to overfly 155 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

12.6	Runways 23R/23L North Option 4I	В
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12.6 Runways 23R/23L North Option 4B			
Design Principle Evaluation	Option No: 4B		
Option Name: SID RW 23L NORTH Option 4B	ACCEPT		
Option Name: SID RW 23R NORTH Option 4B	ACCEPT		
 Option Description: This is an RNP1 option with RF coding included t replicate the existing conventional POL SID but usin an RF turn. It has the same slightly tighter turn radiu as option 4A to reduce noise impact for Knutsford bu 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 1 nm from DER. 23L: This route commences the RF turn to the north of Knutsford. The radius of this turn takes it further nort of Knutsford than option 2B to route between Hig Legh and Bucklow Hill. The route turns right to follow th course of the M62 in a north-easterly direction an terminates at 7,000ft west of Prestwich. 23R: This route commences the RF turn earlier tha 23L, prior to Parkgate Industrial Area to route furthe to the north of Knutsford. This routes between Hig Legh and Bucklow Hill and it converges with the optio for 23L in the vicinity of Partington. At this point the route turns right to follow the course of the M62 in north-easterly direction and terminates at 7,000ft west of Prestwich. A speed restriction of 190 KIAS is used for the first tur which allows the smallest radius. Although PANS-OP compliant it should be assessed for flyability as part of the procedure validation process within Stage 4 or CAP1616. 	Rest define the state of the		
23	MET		

D. C. D. C. Cafat.	23L	MET		
Design Principle Safety	23R	MET		
Commence of Orientiation According to				

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	PARTIAL
	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4B L is estimated to limit the total population affected by noise. Option 4B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 4B R is estimated to limit the total population affected by noise. Option 4B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

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 therefore 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 therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 12,900.

Up to 7,000ft, option 4B L is estimated to overfly approximately 42,450 households with an approximate population of 97,900. Taking account of planned property developments, this option is estimated to impact an approximate total population of 99,700.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 12,700.

Up to 7,000ft, option 4B R 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 an approximate total population of 100,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Design Principle Noise N2	23L	MET
	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 4B L is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 4B L is estimated to overfly 175 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4B R is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 4B R is estimated to overfly 185 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Design Principle Airspace	23L	MET
	23R	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	MET
	23R	MET

Summary of Qualitative Assessment:

12.7 Kullways 23K/23L North Option 6A			
Design Principle Evaluation			Option No: 6A
Option Name: SID RW 23L NORTH Option 64	A		ACCEPT
Option Name: SID RW 23R NORTH Option 6/	4		ACCEPT
 Option Description: This is an RNP1 option with RF coding that may fuel efficiency by removing the northbour between the first and second turns and replacing a single turn to the north-east. This provides the direct route to POL. The design aims to have aircraft make the first urn no closer than 1nm from DER, and the applied to this option results in this option form westerly edge of the envelope in the initial turn with option 6B. This speed will also permit on number of aircraft to fly this route in a configuration (without the use of flaps) whi potential benefits in terms of noise. 23L: This route commences the single RF turn north of Knutsford. The turn continues north vi Tabley before heading in a north easterly direct the vicinity of Broomedge. The route then conti the west of the Sale and Urmston before term at 7,000ft in the vicinity of Eccles. 23R: This route commences the single RF turn than 23L, prior to route further to the methan 23L and the sale and Urmston before terminor 7,000ft in the vicinity of Eccles. 	nd leg g it with he most ast right speed ing the halong larger clean ch has to the a Over ction in nues to inating earlier of Over L in the s to the ating at	R23 North Option A57 Athertor DTyle Leich A51 M62 A57 M6 Lymn	Prestwith Wakden Worsley Stab M602 DE odes Saitord Trafford Park Umston Stretord Asis Asis Asis Asis Asis Asis Asis Asi
Design Principle Safety	23L 23R		MET MET

12.7 Runways 23R/23L North Option 6A

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to limit the total population affected by noise. Up to 7,000ft, option 6A L is estimated to increase the total population affected by noise. Option 6A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 6A R is estimated to limit the total population affected by noise. Option 6A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Dutte Diately Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

Design Drinsinte Nicise N1	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 6,200.

Up to 7,000ft, option 6A L 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 an approximate total population of 141,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 5,200.

Up to 7,000ft, option 6A R 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 an approximate total population of 140,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Dutu Diata Naina N2	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 6A L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 6A L is estimated to overfly 290 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6A R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 6A R is estimated to overfly 285 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

12.8	Runways 23R/23L	North Option 6B
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Design Principle Evaluation			Option No: 6B
Option Name: SID RW 23L NORTH Option 6B			ACCEPT
Option Name: SID RW 23R NORTH Option 6B			ACCEPT
 Option Description: This is an RNP1 option with RF coding that is sim option 2B but the use of a higher speed result track slightly further west before making the sturn to the north. The design aims to have aircraft make the first turn no closer than 1nm from DER, and the applied to this option results in this option formin westerly edge of the envelope in the initial turn with option 6A. This speed will also permit a number of aircraft to fly this route in a configuration (without the use of flaps) whice potential benefits in terms of noise. 23L: This route commences the RF turn to the not Knutsford. The radius of this turn takes it on the track as option 6a via Over Tabley and east of 1 until west of Partington. At this point it combines the option for 23R and heads north-east. They it follow the route of the M62 and terminate at 7 north of Prestwich. 23R: This route commences the RF turn earlie 23L, to route further to the north of Knutsford radius of this turn takes it on the same track as a 6a via Over Tabley and east of Lymm, until w Partington. At this point it combines with the opti 23L and heads north-east. They initially follor route of the M62 and terminate at 7,000ft no Prestwich. A speed restriction of 220 KIAS is used for the fir which allows most aircraft to fly in a configuration; however, this results in a wide radius than the replicated route. 	s in a econd t right speed ng the along larger clean h has orth of same -ymm, s with nitially ,000ft r than d. The option rest of on for w the orth of st turn clean	Kar	es Left M61 Kearsley Prestwich ton Walkden Workshy Swirton Asso Partington Asso Aso
Design Principle Safety	23L		MET

D. C. D. C. Cafate	23L	MET
Design Principle Satety	23R	MET

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6B L is estimated to limit the total population affected by noise. Option 6B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 6B R is estimated to limit the total population affected by noise. Option 6B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

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 therefore 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 therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 10,400.

Up to 7,000ft, option 6B L 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 an approximate total population of 95,100.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 8,600.

Up to 7,000ft, option 6B R 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 an approximate total population of 94,300.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 6B L is estimated to overfly 25 noise sensitive areas.

Up to 7,000ft, this option 6B L is estimated to overfly 180 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6B R is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 6B R is estimated to overfly 180 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Dut a Diat la Airongeo	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

12.9	Runways 23R/23L	North Option 7
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12.9 KUNWAYS ZSK/ZSL North Option 7			
Design Principle Evaluation		Option No: 7	
Option Name: SID RW 23L NORTH Option 7			ACCEPT
Option Name: SID RW 23R NORTH Option 7			ACCEPT
 Option Description: This is an RNP1 option that uses RF coding initial 15° track adjustment to the right from the for Runway 23L and a 5° adjustment for Runway This track adjustment is aimed to reduce noise on Knutsford. Thereafter this option has a similate to that of option 4B. An RNP+RF turn follows the initial track adjuand this commences at 1nm from DER for 23L. The design speed aligns to the C recommendation and may permit some aircrothis route in a clean configuration (without the flaps) which has potential benefits in terms of recommendation. An RNP+RF turn is then commence north of Knutsford. This is continued until h north in the vicinity of High Legh at which per route heads north until just west of Partington. 23R: After passing DER this route has a 5° adjustment to the north. An RNP+RF turn commenced to the north of Knutsford. Continued until the route heads north until just west of Car where it turns right to follow the course of the M62 in a continued until the vicinity of High Legh which per oute heads north until just west of Car where it turns right to follow the course of the Af2 in a continued until the vicinity of High Legh which desterly direction and terminates at 7,000ft methods. After passing DER this route has a 5° adjustment to the north. An RNP+RF turn commenced to the north of Knutsford. Continued until the vicinity of High Legh which desterly direction and terminates at north of Prestwich. A speed restriction of 210 KIAS is applied to the turn which is the CAP778 recommended speed 	he DER ay 23R. impact ar route estment, Runway CAP778 aft to fly e use of hoise. 5° track til 1 nm d to the heading bint the a north- horth of 5° track is then This is ere the his point dishead M62 in 7,000ft e first	AS7 M6 Lum AS0 AS7 M6 Lum AS7 AS7 AS7 Athento Athento	
Design Principle Safety	23L 23R		MET MET
	2011		····=·

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 7 L is estimated to limit the total population affected by noise. Option 7 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 7 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 7 R is estimated to limit the total population affected by noise. Option 7 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 7 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Conseits	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

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

The estimated track length of option 7 R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7 L 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 an approximate total population of 11,200.

Up to 7,000ft, option 7 L 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 an approximate total population of 110,800.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 7 R 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 an approximate total population of 11,800.

Up to 7,000ft, option 7 R 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 an approximate total population of 112,700.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 7 L is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 7 L is estimated to overfly 225 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 7 R is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 7 R is estimated to overfly 225 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
	23R	MET

Summary of Qualitative Assessment:

12.10 Runways 23R/23L North Summary

	Option 1AL	Option 1BL	Option 2BL	Option 3L	Option 4AL	Option 4BL	Option 6AL	Option 6BL	Option 7L
S	MET	MET	MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET	MET	MET	MET
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N2	MET	MET	MET	MET	MET	MET	MET	MET	MET
N3	PARTIAL	NOT MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	NOT MET	PARTIAL	PARTIAL
Α	MET	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Rejected	Best	Best	Best	Best	4,000ft beneficial	Best	Best

	Option 1AL	Option 1BL	Option 2BL	Option 3L	Option 4AL	Option 4BL	Option 6AL	Option 6BL	Option 7L
S	MET	MET	MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N2	MET	MET	MET	MET	MET	MET	MET	MET	MET
N3	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Α	MET	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Best	Best	Best	Best	Best	Best	Best	Best

12.11 Runways 23R/23L North Viable but Poor Fit Options

Option	Safety	Policy	Capacity			
A5 Tight right-hand turn 190kts	S	Р	С			
Originally Option 5, this was initially included as an RNAV1 option to provide a more direct route to POL following an initial tight turn at 190kts. <u>Safety</u> : This option is expected to conflict with the Runway 23R MAP and would result in both procedures routing to the north of the airfield in a similar location. Alternative options were created to mitigate this interaction.						
B8 Tight right-hand turn 210kts	S	Р	С			
Originally Option 2A this was initially included to provide a more direct route to POL following the initial turn using RNP1 + RF coding at 210kts. It is similar in track to 'viable but poor fit' option A5. <u>Safety</u> : This option is expected to conflict with the Runway 23R MAP and would result in both procedures routing to the north of the airfield in a similar location. Alternative options were created to mitigate this interaction.						
C9 Left-hand Wraparound	S	Р	С			
After departure from Runways 23L/23R, aircraft would make a left-hand turn, fly around the airport, and then begin heading north towards the SID aiming point. Policy: This option fails to align with the ends of the AMS with respect to: Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic a significant distance south before turning it north leading to increased fuel burn and emissions. The trade-off analysis between emissions and noise, identified a potential noise benefit below 4,000ft which resulted in an amber categorisation.						
The trade-off analysis against other AMS ends did not identify any other material benefits. <u>Capacity</u> : This option would interact with the 23 South and 23 East Left Turn Departure design envelopes and 23 arrivals from the north and south. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.						

D10 Tight right-hand turn, route east then north	S	Р	С			
After departure from Runways airport then begin heading nor			turn, fly parallel to the			
<u>Safety</u> : This option is expected routing to the north of the airfi interaction.		,	the second se			
<u>Capacity</u> : This option would int the north. This would limit the runway capacity.	the second se	0 1				
E11 Extended straight ahead then right turn to north	S	Р	С			
After departure from Runways 2 before gradually turning right to		-	he vicinity of Knutsford			
Policy: This option fails to align	with the ends of the AMS	with respect to:				
necessary by taking tra	 Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic a significant distance south before turning it north leading to increased fuel burn and emissions. 					
		ound and outbound rout TC intervention to resolve.				
The trade-off analysis between emissions and noise, did not identify a potential noise benefit below 4,000ft.						
Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.						
F12 Sharp right-hand turn before heading north	S	Р	С			
Similar to 'viable but poor fit' option A5 and B8, after departure from Runways 23L/23R, aircraft would make a sharp right-hand turn before heading north, towards the SID aiming point.						
<u>Safety</u> : This was classed as a poor fit against the Design Principle Safety, as it conflicts with the MAP for Runway 23R. This option would result in both procedures routing to the north of the airfield in a similar location.						
Alternative options that avoided	this conflict were created	to mitigate this interactio	n.			

13 Runways 23R/23L East

13.1 Runways 23R/23L East Option 1A

Design Principle Evaluation		Option No: 1A
Option Name: SID RW 23L EAST Right Turn Op	ption 1A	ACCEPT
Option Name: SID RW 23R EAST Right Turn O	ption 1A	ACCEPT
Option Description:		
Option 1A is an RNAV1 replication of the SONEX 1R/1Y SID and uses a fly-over waypoin CF path terminator coding.		stion 1A Left
The fly-over waypoints are positioned at the e markers.	existing	
23R this first turn is at MCT D3.		A Stamin
23L this is at MCT D3.2 which less than 1 nm fro but as this replicates the turn of the current pro it therefore aligns to the Design Principle Safety	ocedure	
As a replicated route it follows a similar track or ground as the current published route. The fit commences to the north and east of Knutsford takes both routes north of Knutsford at which po- tracks of the SIDs converge close to Mere. The head north until turning right to the north of Irla then heads in an easterly direction south of Eccl terminates at 7,000ft just east of Salford.	rst turn I which pint the routes m, and	Participante de la Companya
An element of dispersion would be apparent in turns due to the fly-over waypoint and CF codin speed restriction of 200 KIAS is used for the firs create replication of the current route.	ng. A	Non 1A Right
Design Principle Safety	23L 23R	MET MET

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.

D. C. D. C. Ballow	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 1A L is estimated to increase the total population affected by noise. Option 1A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 1A R is estimated to limit the total population affected by noise. Option 1A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 12,800.

Up to 7,000ft, option 1A L 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 an approximate total population of 168,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 12,900.

Up to 7,000ft, option 1A R 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 an approximate total population of 169,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Design Brigginghe Nicisco NI2	23L	MET
Design Principle Noise N2	23R	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
	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 1A L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 1A L is estimated to overfly 385 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1A R is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 1A R is estimated to overfly 390 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

13.2 Runways 23R/23L East Option 1B

Design Principle Evaluation		Option No: 1B
Option Name: SID RW 23L EAST Right Turn Opt	ion 1B	REJECT
Option Name: SID RW 23R EAST Right Turn Opt	tion 1B	REJECT
 Option Description: This is an RNAV1 option similar to the exconventional SID. However, aircraft will make second right turn to head east at an earlier pocreate a more direct and fuel-efficient route. The fly-over waypoints are positioned at the exmarkers: For Runway 23R this first turn is at MCT I For Runway 23L, this is at D3.2 which is than 1nm from DER, but this replicates the of the current procedure and therefore at the the Design Principle Safety. 23L: This follows an initial track over the ground seeks to replicate the current route in the first right This turn routes to the north of Knutsford and the converges with the option for 23R close to Mere routes continue north until turning east to the sou Partington routing over Stretford and Urmston terminating at 7,000ft overhead Levenshulme. 23R: This follows an initial track over the ground seeks to replicate the current route in the first right This turn routes to the north of Knutsford and the converges with the option for 23L close to Mere routes continue north until turning east to the sou Partington routing over Stretford and Urmston terminating at 7,000ft overhead Levenshulme. An element of dispersion would be apparent in the due to the fly-over waypoint. A speed restriction or KIAS is used for the first turn to create replication the current route. 	e the int to issting D3. s less e turn aligns d that turn. route s. The uth of a and e turn f 200 on of F200 o	Asis Head
Design Principle Safety	23L 23R	MET MET

Summary of	Qualitative A	Assessment:
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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.

D. J. D. J. Delin.	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 1B L is estimated to increase the total population affected by noise. Option 1B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 1B R is estimated to increase the total population affected by noise. Option 1B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Directed Capacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	MET

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 therefore 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 therefore fewer emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT 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 an approximate total population of 15,100.

Up to 7,000ft, option 1B L 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 an approximate total population of 275,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 13,900.

Up to 7,000ft, option 1B R 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 an approximate total population of 276,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

During Director Maine N/2	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Naisa N2	23L	NOT MET
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 1B L is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 1B L is estimated to overfly 470 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1B R is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 1B R is estimated to overfly 470 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

13.3	Runways	23R/23L	East Option	1C
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Design Principle Evaluation	Option No: 1C
Option Name: SID RW 23L EAST Right Turn Option 1C	ACCEPT
Option Name: SID RW 23R EAST Right Turn Option 1C	ACCEPT
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.	R23 East Option.1C Left Lyidesley Asio M602 Eccle Sal ford Asio Urinste Streford Asio Paragoron Asio
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:	nm Bowdon Heald VHume Bowdon Asss Green Bram
 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 	A53 A538 Withis low A537 A537 M6 biour used State.come bit any alt-out changer wateranding 7 200
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.	ASBO M602 E coles Sailord A Umited Ciriam M602 Ciriam M602 Ciriam M602 Ciriam Ciriam M602 Ciriam
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.	Participion A50 Participion A50 A34 Store A50 A34 Store A34 Cheadle Head O Hutine A55 Gran Bran + A50 A50 Knutstord A537 Ministore associated associ
A speed restriction of 200 KIAS is used for the first turn to create track replication of the current route.	

D. C. D. C. Cafat.	23L	MET
Design Principle Satety	23R	MET

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 Dringinka Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1C L is estimated to increase the total population affected by noise. Up to 7,000ft, option 1C L is estimated to increase the total population affected by noise. Option 1C L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 1C L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1C R is estimated to limit the total population affected by noise. Up to 7,000ft, option 1C R is estimated to increase the total population affected by noise. Option 1C R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 1C R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Conseits	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	MET
Design Principle Emissions	23R	MET

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 therefore fewer 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 therefore fewer emissions would be anticipated.

Dute District Noise N1	23L	NOT MET
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 4,700.

Up to 7,000ft, option 1C L 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 an approximate total population of 287,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 3,000.

Up to 7,000ft, option 1C R 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 an approximate total population of 289,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

During Director Maine N/2	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 1C L is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 1C L is estimated to overfly 550 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1C R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 1C R is estimated to overfly 555 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

13.4 Runways 23R/23L East Option 2

Design Principle Evaluation Option No: 2 Option Name: SID RW 23L EAST Right Turn Option 2 REJECT Option Name: SID RW 23R EAST Right Turn Option 2 REJECT **Option Description:** This option provides an RNP1+RF coded option that R23 East Option 2 Left 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. R23 East Option 2 Right 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. 23L MET Design Principle Safety 23R 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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 2 L is estimated to increase the total population affected by noise. Option 2 L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 2 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 2 R is estimated to increase the total population affected by noise. Option 2 R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 2 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	MET
Design Principle Emissions	23R	MET

The estimated track length of option 2 L is 39km (21nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

The estimated track length of option 2 R is 39km (21nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2 L 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 an approximate total population of 24,300.

Up to 7,000ft, option 2 L 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 an approximate total population of 243,200.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 2 R 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 an approximate total population of 19,700.

Up to 7,000ft, option 2 R 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 an approximate total population of 241,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. S. D. S. J. Nation N2	23L	NOT MET
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Assessment		

Up to 4,000ft, this option 2 L is estimated to overfly 25 noise sensitive areas.

Up to 7,000ft, this option 2 L is estimated to overfly 395 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2 R is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 2 R is estimated to overfly 395 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

13.5 Runways 23R/23L East Option 4A

Design Principle Evaluation Option No: 4 Option Name: SID RW 23L EAST Right Turn Option 4 REJECT Option Name: SID RW 23R EAST Right Turn Option 4 ACCEPT **Option Description:** This is an **RNP1** option using RF coding that provides a R23 East Option 4 Left 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 R23 East Option 4 Right and Altrincham. It converges with the option for 23L south of Sale where it heads east before terminating at Salford 7,000ft near Heaton Chapel. A speed restriction of 210 KIAS is applied to the first turn which is the CAP778 recommended speed. Parting 23L MET Design Principle Safety

23R

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4 L is estimated to increase the total population affected by noise. Option 4 L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 4 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4 R is estimated to limit the total population affected by noise. Up to 7,000ft, option 4 R is estimated to increase the total population affected by noise. Option 4 R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 4 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	MET
Design Principle Emissions	23R	MET

The estimated track length of option 4 L is 41km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

The estimated track length of option 4 R is 41km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4 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 an approximate total population of 6,200.

Up to 7,000ft, option 4 L 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 an approximate total population of 236,600.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 4 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 an approximate total population of 2,800.

Up to 7,000ft, option 4 R 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 an approximate total population of 234,800.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	MET
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 4 L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 4 L is estimated to overfly 390 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4 R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 4 R is estimated to overfly 390 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

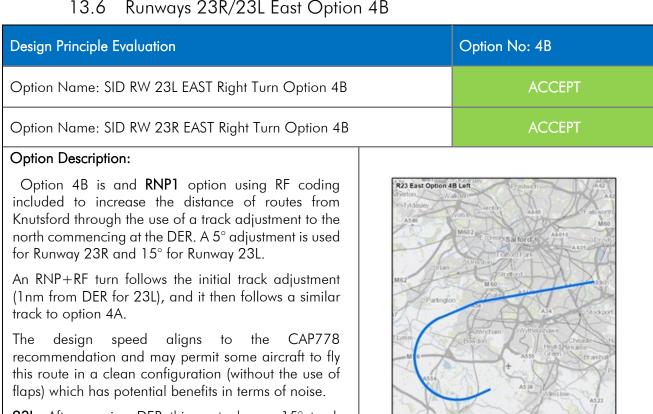
	23L	MET
Design Principle Airspace	23R	MET

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.

During Division Technology	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

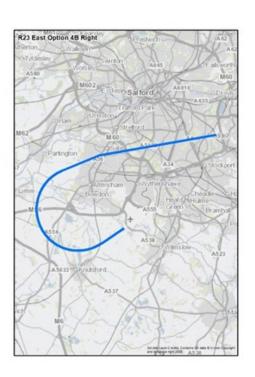


23L

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.



MET

Design Principle Evaluation (DPE) – V2

Design Principle Safety	23R	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	PARTIAL	
Summary of Qualitative Assessment:	23R	PARTIAL	
performance 'End' and Design Principle Policy. Up to 4,000ft, option 4B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 4B R is estimated to increase the total population affected by noise. Option 4B R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.			
Option 4B R is shorter in length and it is anticip At this stage of the process, option 4B R is eval	pated that	emissions would be limited.	
Option 4B R is shorter in length and it is anticip At this stage of the process, option 4B R is eval	pated that luated to b	emissions would be limited. e partially consistent with the environmental	
Option 4B R is shorter in length and it is anticip At this stage of the process, option 4B R is eval	pated that luated to b	emissions would be limited.	
Option 4B R is shorter in length and it is anticip At this stage of the process, option 4B R is eval performance 'End' and Design Principle Policy.	pated that luated to b	emissions would be limited. e partially consistent with the environmental MET	
Option 4B R is shorter in length and it is anticip At this stage of the process, option 4B R is eval performance 'End' and Design Principle Policy. Design Principle Capacity <i>Summary of Qualitative Assessment:</i> When assessed in isolation for Runway 23L, thi of the capacity of our existing runways and cou runway, or as a single runway operation to ach When assessed in isolation for Runway 23R the be fully attained due to ground movement limit backtrack the runway for a Runway 23R depart	23L 23R is option is uld be used nieve this. ere is a gre tations and ture.	emissions would be limited. e partially consistent with the environmental MET PARTIAL deemed to be capable of enabling the best use l operationally in conjunction with another ater likelihood that best use of capacity may not	
Option 4B R is shorter in length and it is anticip At this stage of the process, option 4B R is eval performance 'End' and Design Principle Policy. Design Principle Capacity <i>Summary of Qualitative Assessment:</i> When assessed in isolation for Runway 23L, thi of the capacity of our existing runways and cou runway, or as a single runway operation to ach When assessed in isolation for Runway 23R the be fully attained due to ground movement limit backtrack the runway for a Runway 23R depart Based on current information, these options sh	23L 23R 23R is option is uld be used nieve this. ere is a gre tations and ture. ould not a age 3 of th	emissions would be limited. e partially consistent with the environmental MET PARTIAL deemed to be capable of enabling the best use l operationally in conjunction with another ater likelihood that best use of capacity may not I the time taken for aircraft to enter and dversely affect operations within airspace that is e ACP process, and will consider whether, as	
Option 4B R is shorter in length and it is anticip At this stage of the process, option 4B R is eval performance 'End' and Design Principle Policy. Design Principle Capacity <i>Summary of Qualitative Assessment:</i> When assessed in isolation for Runway 23L, thi of the capacity of our existing runways and cou runway, or as a single runway operation to ach When assessed in isolation for Runway 23R the be fully attained due to ground movement limit backtrack the runway for a Runway 23R depart Based on current information, these options sh shared with adjacent airports. Further assessments would be conducted at Sto part of a combination of routes, these design of	23L 23R 23R 23R 23R 23R 23R 23R 23R 23R 23R	emissions would be limited. e partially consistent with the environmental MET PARTIAL deemed to be capable of enabling the best use l operationally in conjunction with another ater likelihood that best use of capacity may not the time taken for aircraft to enter and dversely affect operations within airspace that is e ACP process, and will consider whether, as tinue to satisfy the Design Principle Capacity. MET	
Option 4B R is shorter in length and it is anticip At this stage of the process, option 4B R is eval performance 'End' and Design Principle Policy. Design Principle Capacity <i>Summary of Qualitative Assessment:</i> When assessed in isolation for Runway 23L, thi of the capacity of our existing runways and cour runway, or as a single runway operation to ach When assessed in isolation for Runway 23R the be fully attained due to ground movement limit backtrack the runway for a Runway 23R depart Based on current information, these options sh shared with adjacent airports.	23L 23R is option is uld be used nieve this. ere is a gre tations and ture. ould not a age 3 of th options cor	emissions would be limited. e partially consistent with the environmental MET PARTIAL deemed to be capable of enabling the best use l operationally in conjunction with another ater likelihood that best use of capacity may not I the time taken for aircraft to enter and dversely affect operations within airspace that is e ACP process, and will consider whether, as tinue to satisfy the Design Principle Capacity.	

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 therefore fewer 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT 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 an approximate total population of 16,800.

Up to 7,000ft, option 4B L 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 an approximate total population of 235,800.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 10,800.

Up to 7,000ft, option 4B R 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 an approximate total population of 238,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 4B L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 4B L is estimated to overfly 390 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4B R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 4B R is estimated to overfly 395 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

D · D· · · Technology	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

13.7 Runways 23R/23L East Option 5

Design Principle Evaluation			Option No: 5
Option Name: SID RW 23L EAST Right Turn O		REJECT	
Option Name: SID RW 23R EAST Right Turn C		ACCEPT	
 Option Name: SID RW 23L EAST Right Turn Option 5 Option Name: SID RW 23R EAST Right Turn Option 5 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 or aircraft to fly this route in a clean configuratior (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 1 nm 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 ther 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. 		A57 HIVE! A580 M62 A57 C Limp M56 A5	Note of the property of the pro
Design Principle Safety	23L 23R		MET MET

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.

	23L	PARTIAL
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 5 L is estimated to increase the total population affected by noise. Option 5 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5 R is estimated to limit the total population affected by noise. Up to 7,000ft, option 5 R is estimated to limit the total population affected by noise. Option 5 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5 R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

D. C. D Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

The estimated track length of option 5 L is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 5 R is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

Design Principle Noise N1	23L	NOT MET
	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5 L 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 an approximate total population of 6,200.

Up to 7,000ft, option 5 L 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 an approximate total population of 215,800.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 5 R 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 an approximate total population of 6,100.

Up to 7,000ft, option 5 R 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 an approximate total population of 217,400.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	MET
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 5 L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 5 L is estimated to overfly 360 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 5 R is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 5 R is estimated to overfly 355 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

13.8 Runways 23R/23L East Right Turn Summary

	Option 1A L	Option 1B L	Option 1C L	Option 2 L	Option 4A L	Option 4B L	Option 5 L
S	MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET	MET
E	PARTIAL	PARTIAL	MET	MET	MET	MET	PARTIAL
N1	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET
N2	MET	MET	MET	MET	MET	MET	MET
N3	NOT MET	NOT MET	PARTIAL	NOT MET	NOT MET	NOT MET	NOT MET
Α	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Rejected	Best	Rejected	Rejected	Add. Qual.	Rejected

	Option 1AR	Option 1BR	Option 1C R	Option 2R	Option 4AR	Option 4BR	Option 5R
S	MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	PARTIAL	MET	MET	MET	MET	PARTIAL	PARTIAL
N1	PARTIAL	NOT MET	PARTIAL	NOT MET	PARTIAL	NOT MET	MET
N2	MET	MET	MET	MET	MET	MET	MET
N3	PARTIAL	NOT MET	PARTIAL	NOT MET	MET	PARTIAL	MET
Α	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Rejected	4,000ft beneficial	Rejected	4,000ft beneficial	Add. Qual.	Best

13.9 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	Р	С

Originally Option 3, after departure from Runways 23L/23R, aircraft would continue straight ahead until beyond Knutsford before turning left towards the north-east towards the SID aiming point.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

• Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic west before turning it left to head east leading to increased fuel burn and emissions.

The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: This option would interact with the 23 South Departure design envelopes and 23 arrivals from the south. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

B7 Extended straight ahead then right turn to	S	Р	С
north-east			

After departure from Runways 23L/23R, aircraft would continue straight ahead until beyond Knutsford before turning right towards the north-east, towards the SID aiming point.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

• Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic west before turning it right to head east leading to increased fuel burn and emissions.

The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: This option would interact with traffic on the 23 West and 23 North departure envelopes and 23 arrivals from the north. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

C9 Further extended straight ahead then left turn to north-east	S	Ρ	С
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After departure from Runways 23L/23R, aircraft would continue straight ahead for 5-6nm until just before Northwich before turning left towards the north-east, towards the SID aiming point.

Policy: This option fails to align with the ends of the AMS with respect to:

- Environmental performance Emissions: This option would involve greater track mileage than is necessary by taking traffic a significant distance west before turning left to head north-east leading to increased fuel burn and emissions.
- Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles, or ATC intervention to resolve.

The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: In addition to the LPL interaction, this option would interact with the 23 South Departure design envelopes and 23 arrivals from the south. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

D10 Further extended straight ahead then right turn to north-east	S	Ρ	С
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After departure from Runways 23L/23R, aircraft would continue straight ahead for 5-6nm until just before Northwich before turning right towards the north-east, towards the SID aiming point.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

- Environmental performance Emissions: This option would involve greater track mileage than is necessary by taking traffic a significant distance west before turning right to head north-east leading to increased fuel burn and emissions.
- Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles, or ATC intervention to resolve.

The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: In addition to the LPL interaction, this option would interact with the 23 West and North Departure design envelopes and 23 arrivals from the north. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

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 23L EAST Left Turn Op	tion 6A		ACCEPT
Option Name: SID RW 23R EAST Left Turn Op	tion 6A		ACCEPT
 Option Description: This is an RNP1 left turn option using RF codi included to provide a direct route to the east for an initial left turn and is intended to provalternative to the existing right turn departures. This route is already used tactically by ATC in a weather conditions and therefore formaliser routes. The speed of the initial left turn ha applied to create the smallest radius and red noise impact on Knutsford. These routes do not converge until reaching 7. 23L: This route commences the single RF left turn to Mobberley and routes aircraft to the set Knutsford. The turn continues before heading easterly direction to the south of Alderley Ed continues south of Poynton on an easterly head terminate at 7,000ft to the west of New Mills. 23R: This route commences the single RF turn earlier than 23L, which results in a track slightly south of Knutsford. The turn continues before h in an easterly direction to the south of Alderley and continues south of Poynton on an easterly to terminate and converge with the option for 7,000ft to the west of New Mills. A speed restriction of 190 KIAS is used for the which allows the smallest radius. Although PAN compliant it should be assessed for flyability as the procedure validation process within Stage 4 CAP1616. 	ng. It is Illowing ride an adverse s these s been uce the 000ft. In close buth of g in an ge and ding to slightly further neading y Edge neading 23L at first turn IS-OPS part of	R22 East Option 6 M0 M0 M0 M0 M0 M0 M0 M0 M0 M0	A Left A ANN ANN ANN ANN ANN ANN ANN ANN ANN
Design Principle Safety	23L 23R		MET 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.

D. J. D. J. Daltan	23L	PARTIAL
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6A L is estimated to limit the total population affected by noise. Option 6A L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 6A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6A R is estimated to limit the total population affected by noise. Up to 7,000ft, option 6A R is estimated to limit the total population affected by noise. Option 6A R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 6A R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Canadita	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	MET
Design Principle Emissions	23R	MET

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 therefore fewer 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 therefore fewer emissions would be anticipated.

Design Dringin la Nicion N1	23L	PARTIAL
Design Principle Noise N1	23R	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 an approximate total population of 4,200.

Up to 7,000ft, option 6A L 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 an approximate total population of 24,100.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 4,100.

Up to 7,000ft, option 6A R 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 an approximate total population of 25,700.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

During Director Nation N/2	23L	MET
Design Principle Noise N2	23R	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.

Dutu Diutu Noizo N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 6A L is estimated to overfly 95 noise sensitive areas.

Up to 7,000ft, this option 6A L is estimated to overfly 140 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6A R is estimated to overfly 90 noise sensitive areas.

Up to 7,000ft, this option 6A R is estimated to overfly 140 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

14.2 Konways 23K/23E East Option ob Len Tonn			
Design Principle Evaluation			Option No: 6B
Option Name: SID RW 23L EAST Left Turn Option 6B			ACCEPT
Option Name: SID RW 23R EAST Left Turn Op	tion 6B		ACCEPT
 Option Description: This is an RNP1 left turn option using RF coding identical to option 6A in the initial turn but terr at 7,000ft further to the north. As with option included to provide a direct route to the east for the initial left turn and to provide an alternative existing right turn departures. The speed of the left turn has been applied to create the smalles and reduce the noise impact on Knutsford. 23L: This route commences the single RF left turn to Mobberley and routes aircraft to the sock funtsford. The turn continues before heading easterly direction over Chelford to the south of AE dge and continues via Woodford and Poynterminate at 7,000ft south of Marple. 23R: This route commences the single RF turn earlier than 23L, which results in a track slightly south of Knutsford. The turn continues before heading easterly direction over Chelford to the solution of Poynton to terminate at 7,000ft south of Marple. A speed restriction of 190 KIAS is used for the which allows the smallest radius. Although PAN compliant it should be assessed for flyability as the procedure validation process within Stage 4 CAP1616. 	g that is minates 6A it is llowing e to the e initial t radius outh of g in an Alderley nton to slightly further neading outh of rd and e. first turn IS-OPS part of	R23 East Option A A A A A A A A A A A A A	Tamori Pisi Pinnor Pisi An Redson Asso
Design Principle Safety	23L		MET
	23R		MET

14.2 Runways 23R/23L East Option 6B Left Turn

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.

D. J. D. J. Daltan	23L	PARTIAL
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6B L is estimated to limit the total population affected by noise. Option 6B L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 6B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6B R is estimated to limit the total population affected by noise. Up to 7,000ft, option 6B R is estimated to limit the total population affected by noise. Option 6B R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 6B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	MET
Design Principle Emissions	23R	MET
		·

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 therefore fewer 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 therefore fewer emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	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 an approximate total population of 4,300.

Up to 7,000ft, option 6B L 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 an approximate total population of 46,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 4,100.

Up to 7,000ft, option 6B R 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 an approximate total population of 47,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Desire Brigginto Noice N2	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 6B L is estimated to overfly 95 noise sensitive areas.

Up to 7,000ft, this option 6B L is estimated to overfly 180 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6B R is estimated to overfly 90 noise sensitive areas.

Up to 7,000ft, this option 6B R is estimated to overfly 175 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

Dutu Dividu Tachnalamı	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation			Option No: 6C
Option Name: SID RW 23L EAST Left Turn Option 6C			ACCEPT
Option Name: SID RW 23R EAST Left Turn Opti	on 6C		ACCEPT
 Option Description: This is an RNP1 left turn option using RF codin has been created with an earlier turn point compared to option 6A and 6B to increas distance of routes from Knutsford. This turn point is less than 1nm from the DER but is identical tused by existing Runway 23 departures. After the initial turn it routes in a similar direct option 6B and is included to provide a direct route east following the initial turn and provid alternative to the existing right turn departures speed of the initial left turn has been applied to the smallest radius and reduce the noise important for the first radius and reduce the noise important for the current procedure and therefore to the Design Principle Safety. 23L: This route commences the single RF left turn to Mobberley and routes aircraft further to the so the Soft when compared to option 6B. The continues before heading over Chelford in an edirection to the south of Alderley Edge and corvia Woodford and Poynton to terminate at 7,00 Marple. 23R: This route commences the single RF turn searlier than 23L, which results in a track slightly south of Knutsford when compared to option 6B. The continues before heading over Chelford in an edirection to the south of Alderley Edge and corvia Woodford and Poynton to terminate at 7,00 Marple. A speed restriction of 190 KIAS is used for the fir which allows the smallest radius. Although PANS compliant it should be assessed for flyability as the procedure validation process within Stage CAP1616.	g that when be the t used to that ion to bute to de an s. The create act on at the D3. is less to that D3. is less to turn aligns a close buth of e turn asterly tinues D0ft at slightly further B. The ection e and ate at st turn S-OPS part of	Raser Option 6C Mega Extension Mega Aas Aas Aas Aas Aas Aas Aas Aas Aas Aa	Loft Me0 Athon-Bridder, Lyne 10 Fark Athon Drown 3m Drawn 4m 04 Fark Athon Bradbar Athon 05 Fark Athon Bradbar Athon 04 Fark Athon Bradbar Athon 05 Gar Bradbar Athon Athon 05 Gar Bradbar Athon Athon 05 Gar Bradbar Athon Athon 05 Gar Athon Athon <td< th=""></td<>
Design Principle Safety	23L		MET
J	23R		MET

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.

	23L	PARTIAL
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6C L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6C L is estimated to limit the total population affected by noise. Option 6C L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 6C L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6C R is estimated to limit the total population affected by noise. Up to 7,000ft, option 6C R is estimated to limit the total population affected by noise. Option 6C R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 6C R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

Dutu Diut L Emissione	23L	MET
Design Principle Emissions	23R	MET

The estimated track length of option 6C L is 38km (21nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

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

During Directory Nician N1	23L	PARTIAL
Design Principle Noise N1	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6C L 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 an approximate total population of 3,100.

Up to 7,000ft, option 6C L 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 an approximate total population of 48,900.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 6C R 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 an approximate total population of 4,800.

Up to 7,000ft, option 6C R 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 an approximate total population of 51,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	MET
Summary of Qualitative Assessment		

Summary of Quamanve Assessment

Up to 4,000ft, this option 6C L is estimated to overfly 85 noise sensitive areas.

Up to 7,000ft, this option 6C L is estimated to overfly 170 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6C R is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 6C R is estimated to overfly 105 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation		Option No: 8A
Option Name: SID RW 23L EAST Left Turn Option 8A		ACCEPT
Option Name: SID RW 23R EAST Left Turn Opti	on 8A	ACCEPT
 Option Description: This is an RNP1 left turn option using RF codin uses a higher speed in the initial turn but termina a similar area to option 6A. As with option 6 included to provide a direct route to the east foll the initial left turn and to provide an alternative existing right turn departures. The speed of the initial left turn is the C/ recommended but this results in a track clo Knutsford. The design speed may also permit aircraft to fly this route in a clean configu (without the use of flaps) which has potential but in terms of noise. 23L: This route commences the single RF left turn to Mobberley and routes aircraft close to the cert Knutsford. The turn continues before heading easterly direction to the south of Chelford and Al Edge and continues to the north of Prestbut terminate at 7,000ft close to Disley. 23R: This route commences the single RF turn s earlier than 23L, which results in a track the southern edge of Knutsford. The turn continues I heading in an easterly direction to the sout Chelford and Alderley Edge and continues to the of Prestbury to terminate and converge with the for 23L at 7,000ft close to Disley. A speed restriction of 210 KIAS is applied to the turn which is the CAP778 recommended speed. 	Area in A it is owing to the AP778 ser to some tration enefits a close of in an derley ury to slightly to the before of in orth of a north of a north of a north a route the first	<figure></figure>
Design Principle Safety	23L 23R	MET 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.

	23L	PARTIAL
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 8A L is estimated to limit the total population affected by noise. Option 8A L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 8A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8A R is estimated to limit the total population affected by noise. Up to 7,000ft, option 8A R is estimated to limit the total population affected by noise. Option 8A R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 8A R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	MET
Design Principle Emissions	23R	MET
		·

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 therefore fewer 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 therefore fewer emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	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 an approximate total population of 4,000.

Up to 7,000ft, option 8A L 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 an approximate total population of 15,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 4,800.

Up to 7,000ft, option 8A R 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 an approximate total population of 16,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Design Principle Noise N2	23L	MET
	23R	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	PARTIAL
	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 8A L is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 8A L is estimated to overfly 40 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 8A R is estimated to overfly 95 noise sensitive areas.

Up to 7,000ft, this option 8A R is estimated to overfly 115 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

Dute Divide Technology	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation Option No: 8B Option Name: SID RW 23L EAST Left Turn Option 8B ACCEPT Option Name: SID RW 23R EAST Left Turn Option 8B ACCEPT **Option Description:** This is an RNP1 left turn option using RF coding that R23 East Option 8B Left 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 R23 East Option 8B 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. 23L MET

23R

MET

14.5 Runways 23R/23L East Option 8B Left Turn

Design Principle Safety

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.

	23L	PARTIAL
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 8B L is estimated to limit the total population affected by noise. Option 8B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 8B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8B R is estimated to limit the total population affected by noise. Up to 7,000ft, option 8B R is estimated to limit the total population affected by noise. Option 8B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 8B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

D. Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	MET

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 therefore 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 therefore fewer emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	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 an approximate total population of 4,100.

Up to 7,000ft, option 8B L 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 an approximate total population of 30,000.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 4,800.

Up to 7,000ft, option 8B R 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 an approximate total population of 31,300.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 8B L is estimated to overfly 95 noise sensitive areas.

Up to 7,000ft, this option 8B L is estimated to overfly 140 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 8B R is estimated to overfly 90 noise sensitive areas.

Up to 7,000ft, this option 8B R is estimated to overfly 140 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

D. C. D. C. L. Tashnalami	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

14.6 Runways 23R/23L East Option 8C Left Turn

Design Principle Evaluation		Option No: 8C
Option Name: SID RW 23L EAST Left Turn Op	tion 8C	ACCEPT
Option Name: SID RW 23R EAST Left Turn Op	tion 8C	ACCEPT
 Option Description: This is an RNP1 left turn option using RF codit has the higher CAP778 turn speed as options 8B but with an earlier turn point that aims to the impact of noise on Knutsford. This turn point is less than 1 nm from the DER but is identical used by existing Runway 23 departures. After the initial turn it routes in a similar direct of the east following the initial turn and provalternative to the existing right turn departures. The design speed may permit some aircraft to route in a clean configuration (without the used which has potential benefits in terms of noise. The waypoints for the first turn are positioned existing markers: For Runway 23R this first turn is at MCC For Runway 23L, this is at D3.2 which than 1 nm from DER, but this replicates of the current procedure and therefore with the Design Principle Safety. 23L: This route commences the single RF left turn to Mobberley and routes aircraft just to the south of Chelford and Acdge and continues via Woodford and Poynterminate south of Marple. 23R: This route commences the single RF turn earlier than 23L, which results in a track slightly south of Knutsford than 23L. The turn continues heading in an easterly direction to the south of Chelford and Alderley Edge and continue Woodford and Poynton to terminate south of N A speed restriction of 210 KIAS is applied to turn which is the CAP778 recommended speed	ng that 8A and reduce nt used to that ction to oute to ride an fly this of flaps) d at the T D3. n is less the turn e aligns rn close outh of g in an Alderley nton to slightly further s before outh of res via Aarple. the first	<figure></figure>
Design Principle Safety	23L 23R	MET MET
Summany of Qualitative Assessment:	201	IVILI

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.

	23L	PARTIAL
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8C L is estimated to increase the total population affected by noise. Up to 7,000ft, option 8C L is estimated to limit the total population affected by noise. Option 8C L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 8C L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8C R is estimated to limit the total population affected by noise. Up to 7,000ft, option 8C R is estimated to limit the total population affected by noise. Option 8C R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 8C R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	MET
Design Principle Emissions	23R	MET
		·

The estimated track length of option 8C L is 40km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

The estimated track length of option 8C R is 42km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8C L 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 an approximate total population of 3,600.

Up to 7,000ft, option 8C L 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 an approximate total population of 42,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 8C R 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 an approximate total population of 4,200.

Up to 7,000ft, option 8C R 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 an approximate total population of 43,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment		

Up to 4,000ft, this option 8C L is estimated to overfly 95 noise sensitive areas.

Up to 7,000ft, this option 8C L is estimated to overfly 180 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 8C R is estimated to overfly 90 noise sensitive areas.

Up to 7,000ft, this option 8C R is estimated to overfly 175 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Design Principle Airspace	23L	MET
	23R	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	MET
	23R	MET

Summary of Qualitative Assessment:

	Option 6AL	Option 6BL	Option 6CL	Option 8AL	Option 8BL	Option 8CL
S	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET
E	MET	MET	MET	MET	PARTIAL	MET
N1	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N2	MET	MET	MET	MET	MET	MET
N3	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Α	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET
	Best	Best	Best	Best	4,000ft beneficial	Best

14.7 Runways 23R/23L East Left Turn Summary

	Option 6AR	Option 6BR	Option 6CR	Option 8AR	Option 8BR	Option 8CR
S	MET	MET	MET	MET	MET	MET
Р	MET	MET	MET	MET	MET	MET
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	MET	MET	MET	MET	MET	MET
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	PARTIAL	PARTIAL	MET	PARTIAL	PARTIAL	PARTIAL
Α	MET	MET	MET	MET	MET	MET
Т	MET	MET	MET	MET	MET	MET
	4,000ft beneficial	4,000ft beneficial	Best	4,000ft beneficial	4,000ft beneficial	4,000ft beneficial

14.8 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	Р	С		
Originally Option 3, after d until beyond Knutsford befor			-		
Policy: This option fails to al	ign with the ends of the A	AMS with respect to:			
	y taking traffic west befor	This option would involve re turning it left to head e			
The trade-off analysis betwee 4,000ft.	een emissions and noise,	, did not identify a mate	rial noise benefit below		
Similarly, the trade-off analys to offset a red categorisation	•	ls did not identify other m	aterial benefits sufficient		
<u>Capacity</u> : This option would from the south. This would li use of runway capacity.					
B7 Extended straight ahead then right turn to north-east	S	Р	С		
After departure from Runway before turning right towards		-	d until beyond Knutsford		
Policy: This option fails to al	ign with the ends of the A	AMS with respect to:			
than is necessary b	• Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic west before turning it right to head east leading to increased fuel burn and emissions.				
The trade-off analysis betwee 4,000ft.	The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.				
Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.					
<u>Capacity</u> : This option would and 23 arrivals from the nor not enable best use of runwo	th. This would limit the a				

C9 Further extended straight ahead then left turn to north-east	S	Р	С	
After departure from Runways 23L/23R, aircraft would continue straight ahead for 5-6nm until just before Northwich before turning left towards the north-east, towards the SID aiming point.				

Policy: This option fails to align with the ends of the AMS with respect to:

- Environmental performance Emissions: This option would involve greater track mileage than is necessary by taking traffic a significant distance west before turning left to head northeast leading to increased fuel burn and emissions.
- Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles, or ATC intervention to resolve.

The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: In addition to the LPL interaction, this option would interact with the 23 South Departure design envelopes and 23 arrivals from the south. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

D10 Further extended straight ahead then right turn to north-east

After departure from Runways 23L/23R, aircraft would continue straight ahead for 5-6nm until just before Northwich before turning right towards the north-east, towards the SID aiming point.

Ρ

С

Policy: This option fails to align with the ends of the AMS with respect to:

- Environmental performance Emissions: This option would involve greater track mileage than is necessary by taking traffic a significant distance west before turning right to head north-east leading to increased fuel burn and emissions.
- Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles, or ATC intervention to resolve.

The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: In addition to the LPL interaction, this option would interact with the 23 West and North Departure design envelopes and 23 arrivals from the north. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

15 Runways 23R/23L South

15.1 Runways 23R/23L South Option 1

Design Principle Evaluation			Option No: 1
Option Name: SID RW 23L SOUTH Option 1			ACCEPT
Option Name: SID RW 23R SOUTH Option 1			ACCEPT
 Option Description: Option 1 is an RNAV1 replication of the SANBA 1R/1Y SID and uses a fly-by to waypoint sequence with CF path terminator corrected an approximate replication. As a replication of the SANBA, this option route west side of the envelope. The fly-by waypoints are positioned to replication at the existing markers: 23R this first turn is at MCT D3. 23L this is at MCT D3.2 which less the from DER but as this replicates the turn current procedure it therefore aligns Design Principle Safety. This earlier to avoid Knutsford. As a replicated route it follows a similar track of ground as the current published route. The f commences in the vicinity of Parkgate Industriand the route kinks to the north of Knutsford turning left to head south. The routes converg vicinity of Lostock Gralam and it then routes in easterly direction to pass west of Holmes Cha east of Sandbach and terminates at 7,000ft ju of Kidsgrove. An element of dispersion would be apparent in turns due to the fly-over waypoint and CF codil speed restriction of 200 KIAS, then 210 KIAS is the first and second turn to create replication of current route. 	fly-over ading to as to the ate the ate the an 1nm of the to the rn is to over the first turn al Area before e in the a south oel and ust west the ng. A s used for	R23,South Option	A556 A556 A533 Kinutstord A54 A54 A54 A54 A54 A54 A54 A54 A54 A54
Design Principle Safety	23L 23R		MET 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.

D. J. D. J. Baltan	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L is estimated to limit the total population affected by noise. Up to 7,000ft, option 1 L is estimated to increase the total population affected by noise. Option 1 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1 R is estimated to limit the total population affected by noise. Up to 7,000ft, option 1 R is estimated to increase the total population affected by noise. Option 1 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

The estimated track length of option 1 L is 47km (25nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 1 R is 50km (27nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1 L 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 an approximate total population of 2,000.

Up to 7,000ft, option 1 L 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 an approximate total population of 29,800.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 1 R 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 an approximate total population of 2,700.

Up to 7,000ft, option 1 R 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 an approximate total population of 31,100.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 1 L is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 1 L is estimated to overfly 65 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1 R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 1 R is estimated to overfly 65 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

15.2	Runways	23R/23L	South	Option	2A
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Design Principle Evaluation			Option No: 2A
Option Name: SID RW 23L SOUTH Option 2/	4		ACCEPT
Option Name: SID RW 23R SOUTH Option 2	Ą		ACCEPT
 Option Description: This is an RNAV1 replication of the curren 2R/2Y SID which turns south before Knutsford a fly-over waypoint with CF path terminator correate an approximate replication. As a replication of the LISTO, this option route east side of the envelope. The fly-by waypoints are positioned to replication at the existing markers: 23R this first turn is at MCT D3. 23L this is at MCT D3.2 which less the from DER but as this replicates the turn current procedure it therefore aligns Design Principle Safety. This earlier the avoid Knutsford. The first turn results in both routes avoiding K to the south-east and they converge in the vi Chelford. It routes in a south-easterly direction over Congleton and terminate just east of St Trent. An element of dispersion would be apparent in due to the fly-over waypoint and CF coding. A restriction of 185kts is required for the initial aircraft to avoid Knutsford.	t LISTO . It uses oding to es to the cate the an 1 nm n of the to the urn is to nutsford cinity of to pass oke-on- the turn A speed	R23 South Option A556 A5037 TO KILLES OF M6 A527 A527 A527 A527 A527 A527 A527 A527	AS AS AS AS AS AS AS AS AS AS
Design Principle Safety	23L 23R		MET 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.

D. C. D. C. Dalian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 2A L is estimated to increase the total population affected by noise. Option 2A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2A R is estimated to limit the total population affected by noise. Up to 7,000ft, option 2A R is estimated to increase the total population affected by noise. Option 2A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	TIAL
Design Principle Emissions 23R PAR	TIAL

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 therefore 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 3,100.

Up to 7,000ft, option 2A L 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 an approximate total population of 66,400.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 3,100.

Up to 7,000ft, option 2A R 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 an approximate total population of 66,800.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

Determine Noine N2	23L	MET
Design Principle Noise N2	23R	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.

During Direct In Niciaa NI2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 2A L is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 2A L is estimated to overfly 135 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2A R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 2A R is estimated to overfly 135 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

15.3 Runways 23R/23L South Option 2	В
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Design Principle Evaluation			Option No: 2B
Option Name: SID RW 23L SOUTH Option 2E	3		ACCEPT
Option Name: SID RW 23R SOUTH Option 21	3		ACCEPT
Option Description:			
This is an RNAV1 option is included that provisame initial turn inside of Knutsford but ther track to create the maximum divergence from southbound routes and to avoid the overful Congleton. The aim is to provide a 45° track divergence	n has a n other light of	R23 South Option	28-Left A538 Witms low A523 Bollington
other southbound SIDs when created as a which would enable a one-minute de separation to align with the Design Principle Co	network parture	T	A34 6538
Pt1), the minimum departure separation or reduced to one minute provided that the aircra	line with CAP493 (Manual of Air Traffic Services 1), the minimum departure separation can be duced to one minute provided that the aircraft fly on acks diverging by 45° or more immediately after		A523
The option uses a fly-over waypoint with C terminator coding to create an appro replication of the initial turn and a similar tra the ground as the current route. The waypoin positioned to replicate the turn at the existing m	reate an approximate and a similar track over route. The waypoints are		Al Soor Al 4 Al 5 Al 5 Al 5 Al 6 Al 6 Al 6 Al 6 Al 6 Al 6 Al 6 Al 6
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.		R23 South Option	2B Right A535 + Poynton A528 Withmstow A523 Bollington Macclesfield A53
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.		h A54 A534 Sandbach M6	A34 28 A523 Condition Biddulph
A speed restriction of 185kts is required for the initial turn for aircraft to avoid Knutsford.		4	A50
During Director Confat.	23L		MET
Design Principle Safety	23R		MET

Summary of	Qualitative A	Assessment:
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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.

D. C. D. C. Balian	23L	MET
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to limit the total population affected by noise. Up to 7,000ft, option 2B L is estimated to limit the total population affected by noise. Option 2B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2B R is estimated to limit the total population affected by noise. Up to 7,000ft, option 2B R is estimated to limit the total population affected by noise. Option 2B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore similar emissions would be anticipated.

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

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 1,100.

Up to 7,000ft, option 2B L 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 an approximate total population of 4,900.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 900.

Up to 7,000ft, option 2B R 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 an approximate total population of 4,700.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Dutu Divid Naiza N2	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET
Summary of Qualitative Assessment		

Up to 4,000ft, this option 2B L is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 2B L is estimated to overfly 25 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2B R is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 2B R is estimated to overfly 30 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	MET

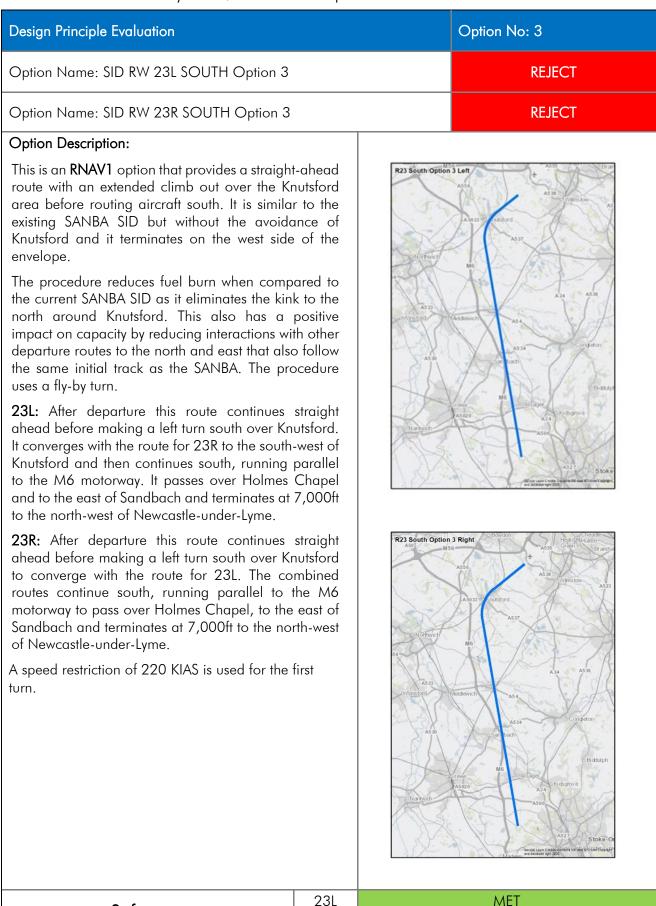
Summary of Qualitative Assessment:

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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

15.4	Runways	23R/23L	South	Option 3
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	Design Principle Safety	ZJL	
		23R	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.

Derive Directole Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 3 L is estimated to increase the total population affected by noise. Option 3 L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 3 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 3 R is estimated to increase the total population affected by noise. Option 3 R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 3 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During District Connacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	23L	MET
Design Principle Emissions	23R	MET

The estimated track length of option 3 L is 41km (22nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

The estimated track length of option 3 R is 43km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 3 L 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 an approximate total population of 13,400.

Up to 7,000ft, option 3 L 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 an approximate total population of 38,800.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 3 R 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 an approximate total population of 13,600.

Up to 7,000ft, option 3 R 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 an approximate total population of 39,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

During District Nation N2	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 3 L is estimated to overfly 35 noise sensitive areas.

Up to 7,000ft, this option 3 L is estimated to overfly 80 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3 R is estimated to overfly 45 noise sensitive areas.

Up to 7,000ft, this option 3 R is estimated to overfly 90 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation		Option No: 4A
Option Name: SID RW 23L SOUTH Option 4A		ACCEPT
Option Name: SID RW 23R 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-tofix. 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.





D. C. D. C. Cafat.	23L	MET
Design Principle Satety	23R	MET

Summary of	Qualitative A	Assessment:
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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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4A L is estimated to increase the total population affected by noise. Option 4A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 4A R is estimated to increase the total population affected by noise. Option 4A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT 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 an approximate total population of 6,400.

Up to 7,000ft, option 4A L 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 an approximate total population of 49,800.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 4,000.

Up to 7,000ft, option 4A R 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 an approximate total population of 48,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 4A L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 4A L is estimated to overfly 75 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 7,000ft, this option 4A R is estimated to overfly 65 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

15.6 Runways 23R/23L South Option 4B

Design Principle Evaluation	Design Principle Evaluation		Option No: 4B
Option Name: SID RW 23L SOUTH Option 4B		REJECT	
Option Name: SID RW 23R SOUTH Option 4	В		REJECT
 Option Description: This RNAV1 option provides a route that heads south-south-west of the envelope, but with an environment of the option terminates at the same point as 4A initial turn intended to avoid Knutsford. The option terminates at the same point as 4A initial turn is now at: For Runway 23L it is at MCT D3.2, whe 0.7nm from DER. For Runway 23R it is at 1nm from DER. For Runway 23R it is at 1nm from DER. This combination allows the subsequent tracks further east than that of option 4A, creating measeparation from Knutsford. The procedure uses a fly-over waypoint and concoded as either course-to-fix, track-to-fix, or difix. The climb gradient has been set at 6%. 23L: After departure this route makes a left turn west at MCT D3.2 which less than 1nm from DER this replicates the turn of the current procedure to the Design Principle Safety. This first turn route the south of Knutsford and the route continues south-westerly heading to the west of Holmes C and Sandbach. It passes over the eastern edge Crewe and converges with the option for 23R 7,000ft termination point just south of Crewe. 23R: After departure this route makes a left turn south-west to route south of Knutsford and correthis direction, passing just to the west of Holmes C and Sandbach. It then routes over the eastern edge Crewe and both routes converge at the 7,000ft termination point just south of Crewe. 	s to the earlier , but the ich is to be ore an be rect-to- n south- DER. As e it aligns utes to on a Chapel e of at the n to the nto the nto the performation chapel e of at the nto the nto the nto the nto the nto the nto the nto the nto the nto the nto the nto t	R23 South Option	<figure></figure>
turn.		() and	All God All Godd All Godd A
Design Principle Safety	23L 23R		MET
	ZJK		MET

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.

D. C. D. C. Balian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4B L is estimated to increase the total population affected by noise. Option 4B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4B R is estimated to limit the total population affected by noise. Up to 7,000ft, option 4B R is estimated to increase the total population affected by noise. Option 4B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Conseits	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

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 therefore 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 4,500.

Up to 7,000ft, option 4B L 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 an approximate total population of 46,300.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 3,300.

Up to 7,000ft, option 4B R 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 an approximate total population of 48,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Assessment:		

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

Up to 7,000ft, this option 4B L is estimated to overfly 65 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 7,000ft, this option 4B R is estimated to overfly 65 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

15.7 Runways 23R/23L South Option 4	4C
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	Design Principle Evaluation			Option No: 4C
 Cybion 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 48, and a left turn further down route to avoid Sandbach and Crewe. In common with option 4B the turn point for Runway 23R is at 1 nm 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 dimb gradient has been set at 6%. An element of dispersion would be apparent in the turn due to the part terminator coding. 23L: After departure this route makes a left turn south-west of MCI D3.2 which less than 1 nm from DER. At his replicates the turn of the current procedure it aligns to the Design Principle Safety. This first turn routes to the south of Knutsford and ther oute 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 7,0001 in the vicinity of Betley. As peed restriction of 190 KIAS is applied to the first furn. 	Option Name: SID RW 23L SOUTH Option 40	2		ACCEPT
 This RNAVI option provides a route that heads to the south-south-west of the envelope with the some earlier initial turn intended to avoid Knutsford as option 48, and a left turn further down route to avoid Sandbach and Crewe. In common with option 48 the turn point for Runway 231 is at MCT D3.2, which is 0.7nm 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 faith reminator coding. 23L: After departure this route makes a left turn southwest at MCT D3.2, which less than 1nm from DER. As this replicates the turn of the current procedure it digns 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 7,000fi in the vicinity of Betley. 23R: After departure this route makes a left turn to the south-westerly heading and the make a slight right turn to avoid Crewe and terminate at 7,000fi in the vicinity of Betley. As peed restriction of 190 KIAS is applied to the first turn. 	Option Name: SID RW 23R SOUTH Option 40	C		ACCEPT
23L MET	 Option Description: This RNAV1 option provides a route that head south-south-west of the envelope with the same initial turn intended to avoid Knutsford as option and a left turn further down route to avoid Same and Crewe. In common with option 4B the turn point for Ru 23L is at MCT D3.2, which is 0.7nm from DER turn point for Runway 23R is at 1nm from DER. combination creates separation from Knutsford The procedure uses a fly-over waypoint and can coded as either course-to-fix, track-to-fix, or dir fix. The climb gradient has been set at 6%. An experimentation creates apparent in the turn due path terminator coding. 23L: After departure this route makes a left turn west at MCT D3.2 which less than 1nm from D this replicates the turn of the current procedure to the Design Principle Safety. This first turn rout he south of Knutsford and the route continues south-westerly heading and combines with the 2 option midway between Lower Peover and Over Peover. The combined routes pass to the west of Holmes Chapel and Sandbach and then make right turn to avoid Crewe and terminate at 7,00 the vicinity of Betley. A speed restriction of 190 KIAS is applied to the 	ds to the e earlier n 4B, dbach nway . The This n be rect-to- element e to the n south- ER. As it aligns tes to on a 23R er of a slight Doft in n to the bines over and west of a slight Doft in	A 559 A 559 D'ATTRICT A 50 A 50 A 50 A 50 A 50 A 50 A 50 A 50	<figure></figure>
		23L		MET

Option 4C R is shorter in length and it is anticipated that emissions would be At this stage of the process, option 4C R is evaluated to be partially consister performance 'End' and Design Principle Policy. Design Principle Capacity 23L Summary of Qualitative Assessment: 23L When assessed in isolation for Runway 23L, this option is deemed to be capa of the capacity of our existing runways and could be used operationally in corrunway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R there is a greater likelihood that be fully attained due to ground movement limitations and the time taken for backtrack the runway for a Runway 23R departure. Based on current information, these options should not adversely affect operational context of the capacity of the capacity for a Runway 23R departure.	onsidered to be safe, we do not believe that though an assessment				
criteria as RNAV1 routes. When assessed in isolation, both these routes are of designable and meets with industry standards and regulations. At this stage, additional protocols or mitigations are required to confirm safe operation, al against the other FASI-N airports and other MAN routes may be required to Design Principle Policy 23L 23R Summary of Qualitative Assessment: Up to 4,000ft, option 4C L is estimated to limit the total population affected Up to 7,000ft, option 4C L is estimated to increase the total population affect Option 4C L is shorter in length and it is anticipated that emissions would be At this stage of the process, option 4C L is evaluated to be partially consister performance 'End' and Design Principle Policy. Up to 4,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to be partially consister performance 'End' and Design Principle Policy. Design Principle Capacity Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be capp of the capacity of our existing runways and could be used operationally in co runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R there is a greater likelihood that be fully attain	onsidered to be safe, we do not believe that though an assessment confirm this at a later stage. PARTIAL				
Design Principle Policy 23R Summary of Qualitative Assessment: Up to 4,000ft, option 4C L is estimated to limit the total population affected Up to 7,000ft, option 4C L is estimated to increase the total population affected Option 4C L is shorter in length and it is anticipated that emissions would be At this stage of the process, option 4C L is evaluated to be partially consister performance 'End' and Design Principle Policy. Up to 4,000ft, option 4C R is estimated to limit the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to be partially consister performance 'End' and Design Principle Policy. Design Principle Capacity 23L 23R Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be capa When assessed in isolation for Runway 23R there is a greater likelihood that be fully attained due to ground movement limitations and the time taken for backtrack the runway for a Runway 23R departure. Based on current information, these optio					
Summary of Qualitative Assessment: Up to 4,000ff, option 4C L is estimated to limit the total population affected Up to 7,000ff, option 4C L is estimated to increase the total population affect Option 4C L is shorter in length and it is anticipated that emissions would be At this stage of the process, option 4C L is evaluated to be partially consister performance 'End' and Design Principle Policy. Up to 4,000ff, option 4C R is estimated to limit the total population affected Up to 7,000ff, option 4C R is estimated to increase the total population affected Up to 7,000ff, option 4C R is estimated to increase the total population affected Up to 7,000ff, option 4C R is estimated to increase the total population affected Up to 7,000ff, option 4C R is estimated to increase the total population affected Up to 7,000ff, option 4C R is estimated to increase the total population affected Up to 7,000ff, option 4C R is estimated to be partially consister performance 'End' and Design Principle Policy. Design Principle Capacity 23L 23R Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be capacity of our existing runways and could be used operationally in corrunway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R there is a greater likelihood that be fully attained due to ground movement					
Up to 4,000ft, option 4C L is estimated to limit the total population affected Up to 7,000ft, option 4C L is estimated to increase the total population affect Option 4C L is shorter in length and it is anticipated that emissions would be At this stage of the process, option 4C L is evaluated to be partially consister performance 'End' and Design Principle Policy. Up to 4,000ft, option 4C R is estimated to limit the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Up to 7,000ft, option 4C R is estimated to increase the total population affected Option 4C R is shorter in length and it is anticipated that emissions would be At this stage of the process, option 4C R is evaluated to be partially consister performance 'End' and Design Principle Policy. Design Principle Capacity <i>23L</i> <i>23R</i> <i>Summary of Qualitative Assessment:</i> When assessed in isolation for Runway 23L, this option is deemed to be capa of the capacity of our existing runways and could be used operationally in co runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R there is a greater likelihood that be fully attained due to ground movement limitations and the time taken for backtrack the runway for a Runway 23R departure. Based on current information, these options should not adversely affect oper-					
Design Principle Capacity 23R Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be cape of the capacity of our existing runways and could be used operationally in corrunway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R there is a greater likelihood that be fully attained due to ground movement limitations and the time taken for backtrack the runway for a Runway 23R departure. Based on current information, these options should not adversely affect operational content information.	Up to 7,000ft, option 4C R is estimated to increase the total population affected by noise. Option 4C R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 4C R is evaluated to be partially consistent with the environmental				
Design Principle Capacity 23R Summary of Qualitative Assessment: When assessed in isolation for Runway 23L, this option is deemed to be cape of the capacity of our existing runways and could be used operationally in corrunway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R there is a greater likelihood that be fully attained due to ground movement limitations and the time taken for backtrack the runway for a Runway 23R departure. Based on current information, these options should not adversely affect operational content information.	MET				
When assessed in isolation for Runway 23L, this option is deemed to be cape of the capacity of our existing runways and could be used operationally in co runway, or as a single runway operation to achieve this. When assessed in isolation for Runway 23R there is a greater likelihood that be fully attained due to ground movement limitations and the time taken for backtrack the runway for a Runway 23R departure. Based on current information, these options should not adversely affect operation	PARTIAL				
be fully attained due to ground movement limitations and the time taken for backtrack the runway for a Runway 23R departure. Based on current information, these options should not adversely affect oper	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				
	When assessed in isolation for Runway 23R 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 23R 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	will consider whether, as				
Summary of Qualitative Assessment:	will consider whether, as				

The estimated track length of option 4C L is 43km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

The estimated track length of option 4C R is 44km (24nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4C L 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 an approximate total population of 3,300.

Up to 7,000ft, option 4C L 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 an approximate total population of 26,300.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 4C R 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 an approximate total population of 2,100.

Up to 7,000ft, option 4C R 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 an approximate total population of 27,200.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. S. D. S. J. Naina N2	23L	PARTIAL
Design Principle Noise N3	23R	MET
Summary of Qualitative Assessment		

Summary of Quamanve Assessment

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

Up to 7,000ft, this option 4C L is estimated to overfly 35 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 7,000ft, this option 4C R is estimated to overfly 35 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

15.8 Runways 23R/23L South Option 5A

Option Name: SID RW 23L SOUTH Option 5A ACCEPT Option Name: SID RW 23R SOUTH Option 5A ACCEPT Option Name: SID RW 23R SOUTH Option 5A ACCEPT Option Description: This is an RNP1 option that uses RF coding and follows a similar initial trank to the existing LISTO SID which turns south before Knutsford. However, the track following the initial turn routes further south-east that existing LISTO SID once south of Chelford. Image: Comparison optimation o	Design Principle Evaluation			Option No: 5A
<text><text><text><text><text></text></text></text></text></text>	Option Name: SID RW 23L SOUTH Option 5/	Ą		ACCEPT
<text><text><text><text></text></text></text></text>	Option Name: SID RW 23R SOUTH Option 5.	4		ACCEPT
Design Principle Satety	This is an RNP1 option that uses RF coding and a similar initial track to the existing LISTO SID turns south before Knutsford. However, the trace following the initial turn routes further south-ear the existing LISTO SID once south of Chelford. The aim is to provide a 45° track divergence for southbound SIDs when created as a network we would enable a one-minute departure separation align with the Design Principle Capacity. 23L: After departure, this route makes a left turn MCT D3.2 which less than 1 nm from DER. As replicates the turn of the current procedure it a the Design Principle Safety. This first turn routes south of Knutsford and the route continues on easterly heading to route west of Chelford whe combines with the 23R option. The combined to avoid Congleton and Stoke-on-Trent and term 7,000ft west of Leek. 23R: After departure this route makes a left tur route south of Knutsford and combines with the option to the west of Chelford. The combined to avoid Congleton and Stoke-on-Trent and term 7,000ft west of Leek. A speed restriction of 190 KIAS is used for the which allows the smallest radius to avoid Knuts Although PANS-OPS compliant it should be as for flyability as part of the procedure validation	which ck st than om other hich on to in at this ligns to s to the a south- re it and routes inate at a south- re it and routes inate at first turn ford. sessed	33 D Knustord. A537 Ch A54 Sandbach M5 33 D Knustor M5 33 D Knustor M5 33 D Knustor M5 33 D Knustor	
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.

	23L	MET
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5A L is estimated to limit the total population affected by noise. Up to 7,000ft, option 5A L is estimated to limit the total population affected by noise. Option 5A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5A R is estimated to limit the total population affected by noise. Up to 7,000ft, option 5A R is estimated to limit the total population affected by noise. Option 5A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5A R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 1,700.

Up to 7,000ft, option 5A L 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 an approximate total population of 26,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 1,500.

Up to 7,000ft, option 5A R is estimated to overfly approximately 9,800 households with an approximate population of 22,400. Taking account of planned property developments, this option is estimated to impact an approximate total population of 26,400.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

During Direct In Nation N/2	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET
Summary of Qualitative Assessment		

Summary of Quamanve Assessment

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

Up to 7,000ft, this option 5A L is estimated to overfly 40 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 5A R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 5A R is estimated to overfly 45 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

Deter District Technology	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

15.9	Runways 23R/23L South Option 5B
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Design Principle Evaluation		Option No: 5B
Option Name: SID RW 23L SOUTH Option 5E	3	ACCEPT
Option Name: SID RW 23R SOUTH Option 5E	В	ACCEPT
 Option Description: This is an RNP1 option with RF coding that fol similar initial track to option 5A and turns south Knutsford. However, this left turn is continued to provide a route more to the east to avoid Cong and Leek to aid capacity and departure separa. In a similar way to options 2B and 5A, the aim provide a 45° track divergence from other sout SIDs when created as a network which would e one-minute departure separation to align with the Design Principle Capacity. 23L: After departure this route makes a left turn D3.2 which less than 1 nm from DER. As this re the turn of the current procedure it aligns to the Principle Safety. This first turn routes to the sout Knutsford and the route continues on a south-eheading south-west of Chelford and then mid-w between Macclesfield and Congleton to avoid towns. It combines with the 23R option south of Macclesfield and the combined routes turn souterminate at 7,000ft between Stoke-on-Trent at 23R: After departure this route makes a left turn route south of Knutsford and congleton to avoid towns. It combines with the 23L option south of Macclesfield and the combined routes turn souterminate at 7,000ft between Stoke-on-Trent at 23R: After departure this route makes a left turn route south of Knutsford and congleton to avoid towns. It combines with the 23L option south of Macclesfield and the combined routes turn souterminate at 7,000ft between Stoke-on-Trent at A speed restriction of 190 KIAS is used for the which allows the smallest radius to avoid Knuts Although PANS-OPS compliant it should be ass for flyability as part of the procedure validation within Stage 4 of CAP1616. 	Ilows a h before o gleton tion. is to thound enable a the at MCT plicates e Design th of easterly way both of easterly way both of th and nd Leek. In to puth-vay both f th and nd Leek.	
Design Principle Safety	23L 23R	MET 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.

	23L	MET
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5B L is estimated to limit the total population affected by noise. Up to 7,000ft, option 5B L is estimated to limit the total population affected by noise. Option 5B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5B R is estimated to limit the total population affected by noise. Up to 7,000ft, option 5B R is estimated to limit the total population affected by noise. Option 5B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 1,400.

Up to 7,000ft, option 5B L 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 an approximate total population of 5,100.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 2,500.

Up to 7,000ft, option 5B R 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 an approximate total population of 6,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

During Director Nation N2	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET
Summary of Qualitative Assessment		

Summary of Quamanve Assessment

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

Up to 7,000ft, this option 5B L is estimated to overfly 20 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 7,000ft, this option 5B R is estimated to overfly 20 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

15.10	Runways 23R/23L South Option 5C
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Design Principle Evaluation		Option No: 5C
Option Name: SID RW 23L SOUTH Option 5C		ACCEPT
Option Name: SID RW 23R SOUTH Option 50		ACCEPT
 Option Description: This is an RNP1 option with RF coding that follod similar initial track to the existing LISTO 2R/2Y S However, the turn is stopped earlier to provide to the south which passes west of Congleton to terminate in the vicinity of that for the current S/ SID. 231: After departure this route makes a left turn D3.2 which less than 1 nm from DER. As this rept the turn of the current procedure it aligns to the Principle Safety. This first turn routes to the south Knutsford and the route continues on a souther heading to the south of Chelford where it comb with the 23R option. The combined routes then south-west to avoid Congleton and Sandbach of terminate at 7,000ft west of Stoke-on-Trent. 23R: After departure this route makes a left turn route south of Knutsford and continues on a souther combines with the 23L option. The combined routes and terminate at 7,000ft west of Stoke-on-Trent. 23R: After departure this route makes a left turn route south of Knutsford and continues on a southard terminate at 7,000ft west of Stoke-on-Trent. 23R: After departure this route makes a left turn route south of Knutsford and continues on a souther then turn south-west to avoid Congleton and Sc and terminate at 7,000ft west of Stoke-on-Trent. A speed restriction of 190 KIAS is used for the fit to avoid Knutsford. Although PANS-OPS complishould be assessed for flyability as part of the procedure validation process within Stage 4 of CAP1616. 	ws a SID. a route NBA at MCT blicates Design n of asterly ines turn ind to uth- it butes andbach rst turn	<figure></figure>
Design Principle Safety	23L	MET

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.

D. C. D. C. Balian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 5C L is estimated to limit the total population affected by noise. Up to 7,000ft, option 5C L is estimated to increase the total population affected by noise. Option 5C L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 5C L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5C R is estimated to limit the total population affected by noise. Up to 7,000ft, option 5C R is estimated to increase the total population affected by noise. Option 5C R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 5C R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Conseits	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	MET
Design Principle Emissions	23R	MET

The estimated track length of option 5C L is 42km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

The estimated track length of option 5C R is 43km (23nm). When compared to the 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 5C L 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 an approximate total population of 1,700.

Up to 7,000ft, option 5C L 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 an approximate total population of 24,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 5C 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 an approximate total population of 1,400.

Up to 7,000ft, option 5C R 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 an approximate total population of 23,800.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Assessment:		

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

Up to 7,000ft, this option 5C L is estimated to overfly 50 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 7,000ft, this option 5C R is estimated to overfly 50 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation			Option No: 6
Option Name: SID RW 23L SOUTH Option 6			ACCEPT
Option Name: SID RW 23R SOUTH Option 6			ACCEPT
 Option Description: This option is included to provide a RNAV1 resof the existing conventional SANBA 1R/1Y SID 7,000ft. However, unlike the 'do minimum' op which uses fly-over waypoints, this option has be designed as an RNAV1 route using fly-by wayp. The benefit of fly over waypoints is more accurate keeping. However, option 1 is more likely to be representation of existing operations with dispebeing apparent in the turn to the south. The route has been designed as an RNAV1 routuses fly-by waypoints. The climb gradient has a to%. 23L: After departure, this route makes a right the MCT D3.2 which less than 1 nm from DER. As replicates the turn of the current procedure it a the Design Principle Safety. This first turn routes north of Knutsford and following a short straigh segment, then turns left to route south between Knutsford and Northwich where it combines wit 23R option. The combined routes pass just to t of Holmes Chapel and to the eastern edge of Sandbach and terminate at 7,000ft south-east Sandbach. 23R: After departure, this route makes a right troute north of Knutsford and following a short segment, then turns left to route south between Knutsford and Northwich where it combines wite 33 andbach. 23R: After departure, this route makes a right troute north of Knutsford and following a short segment, then turns left to route south between Knutsford and Northwich where it combines wite 33L option. The combined routes pass just to the fully option. The combined routes pass just to the fully and Northwich where it combines wite 33L option. The combined routes pass just to the fully scheme and terminate at 7,000ft south-east Sandbach. A speed restriction of 200 KIAS then 210 KIAS for the first turn and second turn. 	to tion 1 been oints. ate track a better rsion ute and been set urn at this ligns to s to the at th the he west of urn to straight th the ne west of	R23 South Option A533 Wirsford A530 A530 CNortwich G A532 OWirsford A533	
Design Principle Safety	23L 23R		MET MET

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6 L is estimated to increase the total population affected by noise. Option 6 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 6 R is estimated to increase the total population affected by noise. Option 6 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

The estimated track length of option 6 L is 48km (26nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 6 R is 51km (28nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

Dutu Diviti Noine N1	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6 L 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 an approximate total population of 4,400.

Up to 7,000ft, option 6 L 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 an approximate total population of 29,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 6 R 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 an approximate total population of 4,600.

Up to 7,000ft, option 6 R is estimated to overfly approximately 12,300 households with an approximate population of 27,600. Taking account of planned property developments, this option is estimated to impact an approximate total population of 30,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Naisa N2	23L	PARTIAL
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Assessment		

Up to 4,000ft, this option 6 L is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 6 L is estimated to overfly 65 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6 R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 6 R is estimated to overfly 65 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Dutin Divide Airpage	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

15.12 Runways 23R/23L South Option 7A

Design Principle Evaluation		Option No: 7A
Option Name: SID RW 23L SOUTH Option 7A		REJECT
Option Name: SID RW 23R SOUTH Option 7A	Λ	REJECT
 Option Description: This is an RNP1 option with RF coding that provalternative version of the existing LISTO 2R/2Y sturns south before Knutsford but heads south slifutther west than option 2A (the LISTO replication terminate near Stoke-on-Trent. It uses an RF turn at 1nm DER in accordance with PANS-OPS/CAP778 which has the effect of row option closer to the centre of Knutsford. 23L: After departure this route makes a left turn at 1nm from DER and routes to the south of Kn It then routes to the west of Chelford and over the western edge of Congleton and terminates at 7 the north-east corner of Stoke-on-Trent. 23R: After departure this route makes a left turn at 1nm from DER which routes it over the south edge of Knutsford. It then routes over the wester of Congleton and terminates at 7,000ft to the reast corner of Stoke-on-Trent. A speed restriction of 190 KIAS is used for the f which allows the smallest radius. Although PAN compliant it should be assessed for flyability as the procedure validation process within Stage 4 CAP1616. 	SID. It ghtly on) to ith ting this south utsford. he ,000ft to n south -east rn edge north- irst turn S-OPS part of of	<figure></figure>
Design Principle Safety	23L	MET

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.

D. C. D. C. Balian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 7A L is estimated to increase the total population affected by noise. Option 7A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 7A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7A R is estimated to limit the total population affected by noise. Up to 7,000ft, option 7A R is estimated to increase the total population affected by noise. Option 7A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 7A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During District Capacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

Destru Disertale Nicion NI	23L	NOT MET
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 4,300.

Up to 7,000ft, option 7A L 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 an approximate total population of 73,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 3,400.

Up to 7,000ft, option 7A R 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 an approximate total population of 76,600.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

During Directory Nician NI2	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 7A L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 7A L is estimated to overfly 135 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 7A R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 7A R is estimated to overfly 140 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

15.13 Runways 23R/23L South Option 7B

Option Name: SID RW 23R SOUTH Option 7B A 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. 231: 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 town. 238: 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.	lo: 7B
 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 1 nm 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 1 nm 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 1 nm 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. 	ACCEPT
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.	ACCEPT
Nation A34	ASS ASS ASS ASS ASS ASS ASS ASS ASS ASS
De la De la la Calanda de la Cala	Т
Design Principle Safety 23R MET Summary of Qualitative Assessment: 23R MET	Т

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.

D. C. D. C. Balian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to limit the total population affected by noise. Up to 7,000ft, option 7B L is estimated to increase the total population affected by noise. Option 7B L is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 7B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7B R is estimated to limit the total population affected by noise. Up to 7,000ft, option 7B R is estimated to increase the total population affected by noise. Option 7B R is shorter in length and it is anticipated that emissions would be limited. At this stage of the process, option 7B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During District Capacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	MET
Design Principle Emissions	23R	MET

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 therefore fewer 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 therefore fewer emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 2,300.

Up to 7,000ft, option 7B L 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 an approximate total population of 24,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 1,900.

Up to 7,000ft, option 7B R 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 an approximate total population of 24,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Naisa N2	23L	NOT MET
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 7B L is estimated to overfly 10 noise sensitive areas.

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

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 7B R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 7B R is estimated to overfly 55 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

15.14 Runways 23R/23L South SANBA Summary

	Option 1L	Option 3L	Option 4AL	Option 4BL	Option 4CL	Option 5CL	Option 6L	Option 7BL
S	MET	MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET	MET	MET
Ε	PARTIAL	MET	PARTIAL	PARTIAL	MET	MET	PARTIAL	MET
N1	PARTIAL	NOT MET	NOT MET	NOT MET	PARTIAL	PARTIAL	NOT MET	PARTIAL
N2	MET	MET	MET	MET	MET	MET	MET	MET
N3	PARTIAL	NOT MET	NOT MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	NOT MET
Α	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Rejected	Add. Qual.	Rejected	Best	Best	Add. Qual.	4,000ft beneficial

	Option 1R	Option 3R	Option 4AR	Option 4BR	Option 4CR	Option 5CR	Option 6R	Option 7BR
S	MET	MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	PARTIAL	MET	PARTIAL	PARTIAL	MET	MET	PARTIAL	MET
N1	PARTIAL	NOT MET	NOT MET	PARTIAL	PARTIAL	PARTIAL	NOT MET	PARTIAL
N2	MET	MET	MET	MET	MET	MET	MET	MET
N3	NOT MET	NOT MET	NOT MET	NOT MET	MET	NOT MET	NOT MET	NOT MET
Α	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Rejected	Add. Qual.	Rejected	Best	4,000ft beneficial	Add. Qual.	4,000ft beneficial

	Option O2AL	Option O2BL	Option O5AL	Option O5BL	Option O7AL
S	MET	MET	MET	MET	MET
Р	PARTIAL	MET	MET	MET	PARTIAL
С	MET	MET	MET	MET	MET
Ε	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	NOT MET	MET	MET	MET	NOT MET
N2	MET	MET	MET	MET	MET
N3	PARTIAL	MET	MET	MET	NOT MET
Α	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Best	Best	Best	Rejected

15.15 Runways 23R/23L South LISTO Summary

	Option O2AR	Option O2BR	Option O5AR	Option O5BR	Option O7AR
S	MET	MET	MET	MET	MET
Р	PARTIAL	MET	MET	MET	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Ε	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	PARTIAL	MET	MET	MET	PARTIAL
N2	MET	MET	MET	MET	MET
N3	PARTIAL	MET	MET	MET	PARTIAL
Α	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET
	Do Minimum (Replication)	Best	Best	Best	Rejected

15.16 Runways 23R/23L South Viable but Poor Fit Options

Option	Safety	Policy	Capacity						
A8 Left-hand wraparound	S	Р	с						
After departure from Runways through the overhead and the			· · · · · · · · · · · · · · · · · · ·						
Policy: This option fails to alig	gn with the ends of the A	MS with respect to:							
the second s	taking traffic east and no	is option would involve orth before turning it south							
• Environmental perforarriving aircraft.	ormance – Noise: This op	ption may hinder the ach	ievement of CDAs for						
The trade-off analysis agains offset a red categorisation.	t other AMS ends did n	ot identify other materia	l benefits sufficient to						
<u>Capacity</u> : This option would i from the south. This would lir best use of runway capacity.	the second se	0	the second se						
B9 Right-hand wraparound	S	Р	С						
· · · · · · · · · · · · · · · · · · ·		0	After departure from Runways 23L/23R, aircraft would make a right-hand turn, fly around the airport						
through the overhead then begin heading south towards the SID aiming point. <u>Safety</u> : This option is expected to conflict with the Runway 23R MAP.									
salory. This ophon is expected	d to conflict with the Run	01							
Policy: This option fails to alig		iway 23R MAP.							
Policy: This option fails to alig • Environmental perfo	gn with the ends of the A prmance – Emissions: Th taking traffic north and e	iway 23R MAP.	greater track mileage						
Policy: This option fails to alig Environmental perfortion is necessary by fuel burn and emiss	gn with the ends of the A prmance – Emissions: Th taking traffic north and e ions.	way 23R MAP. MS with respect to: is option would involve	greater track mileage n leading to increased						
 <u>Policy</u>: This option fails to alig Environmental performance than is necessary by fuel burn and emiss Environmental performance 	gn with the ends of the A prmance – Emissions: Th taking traffic north and e ions. prmance – Noise: This op	way 23R MAP. MS with respect to: is option would involve ast before turning it south otion may hinder the ach	greater track mileage n leading to increased ievement of CDAs for						
 <u>Policy</u>: This option fails to alig Environmental performance than is necessary by fuel burn and emiss Environmental performant arriving aircraft. The trade-off analysis against 	gn with the ends of the A prmance – Emissions: Th taking traffic north and e ions. prmance – Noise: This op at other AMS ends did n nteract with 23 East and	way 23R MAP. MS with respect to: is option would involve to ast before turning it south otion may hinder the ach ot identify other materia North departure design e	greater track mileage n leading to increased ievement of CDAs for I benefits sufficient to envelopes and arrivals						
 <u>Policy</u>: This option fails to alig Environmental performants than is necessary by fuel burn and emiss Environmental performants arriving aircraft. The trade-off analysis agains offset a red categorisation. <u>Capacity</u>: This option would in from the north. This would li 	gn with the ends of the A prmance – Emissions: Th taking traffic north and e ions. prmance – Noise: This op at other AMS ends did n nteract with 23 East and	way 23R MAP. MS with respect to: is option would involve to ast before turning it south otion may hinder the ach ot identify other materia North departure design e	greater track mileage n leading to increased ievement of CDAs for I benefits sufficient to envelopes and arrivals						
 <u>Policy</u>: This option fails to alig Environmental performants than is necessary by fuel burn and emiss Environmental performants arriving aircraft. The trade-off analysis agains offset a red categorisation. <u>Capacity</u>: This option would in from the north. This would limit from the north. 	gn with the ends of the A prmance – Emissions: Th taking traffic north and e ions. prmance – Noise: This op at other AMS ends did n nteract with 23 East and	way 23R MAP. MS with respect to: is option would involve to ast before turning it south otion may hinder the ach ot identify other materia North departure design e	greater track mileage n leading to increased ievement of CDAs for I benefits sufficient to envelopes and arrivals						

C10 Extended straight and then turn south	S	Р	С			
After departure from Runways 23L/23R, aircraft would continue straight ahead towards Northwich before turning south towards the SID aiming point.						
Policy: This option fails to alig	In with the ends of the A	MS with respect to:				
the second se	taking traffic a significa	is option would involve int distance west before	o o			
		ound and outbound rout or ATC intervention to res				
The trade-off analysis between 4,000ft.	n emissions and noise, o	did not identify a materia	al noise benefit below			
Similarly, the trade-off analys sufficient to offset a red categ	-	ends did not identify ot	her material benefits			
<u>Capacity</u> In addition to the L South-west departure design e splits and not enable best use	envelope. This would lin					
D11 Slight right after departure then 90-degree left turn to the south	S	Р	С			
After departure from Runways making a 90-degree turn tow		0 0	d turn due west before			
Policy: This option fails to alig	In with the ends of the A	MS with respect to:				
		is option would involve before turning south lead				
· · · · · · · · · · · · · · · · · · ·		ound and outbound rout or ATC intervention to res				
The trade-off analysis between 4,000ft.	n emissions and noise, a	did not identify a materic	al noise benefit below			
Similarly, the trade-off analysis sufficient to offset a red categ	-	ends did not identify ot	her material benefits			
<u>Capacity</u> : In addition to the L West and South-west departur	re design envelopes. Thi	s would limit the ability t				
departure splits and not enab	le best use of runway ca	pacity.				

16 Runways 23R/23L South-west

16.1 Runways 23R/23L South-west Option 1A

Design Principle Evaluation			Option No: 1A
Option Name: SID RW 23L SOUTH-WEST Op	ACCEPT		
Option Name: SID RW 23R SOUTH-WEST Op	otion 1A		ACCEPT
 Option Description: This option is included to provide a RNAV1 report the MONTY 1R/1Y SIDs. The procedure uses fly-by waypoints, positioned replicate the turn at the existing markers: 23R this first turn is at MCT D3. 23L this is at MCT D3.2 which less that from DER but as this replicates the turn current procedure it therefore aligns to Design Principle Safety. This earlier turn avoid Knutsford. As a replicated route it follows a similar track of ground as the current SID. This routes aircraft the south of Knutsford, before making a left turn to to route north of Northwich and then making at the south of Frodsham to route south-west. A speed restriction of 200 KIAS is used for the thereafter 250 KIAS would apply. 	olication d to d to n 1 nm n of the o the n is to over the o the o the o the o the o the the west i left to	Resort Withes Runcom Frodsham M56 Road	Option 1 A Right Suitbord Lingh Saltord On-Le-Willows Irlian Warrington Lymm Northwich M6 Northwich Willows Northwich M6 Warrington Lymm M6 Mirincham M6 Mirincham M6
Design Principle Safety	23L 23R		PARTIAL PARTIAL

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.

	23L	MET
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1A L is estimated to limit the total population affected by noise. Up to 7,000ft, option 1A L is estimated to limit the total population affected by noise. Option 1A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1A R is estimated to limit the total population affected by noise. Up to 7,000ft, option 1A R is estimated to limit the total population affected by noise. Option 1A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1A R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

D. C. D. C. Emissions	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

Summary of Qualitative Assessment:

The estimated track length of option 1A L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

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

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 1,500.

Up to 7,000ft, option 1A L 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 an approximate total population of 6,000.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 1,000.

Up to 7,000ft, option 1A R 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 an approximate total population of 5,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, this option 1A L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 1A L is estimated to overfly 25 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1A R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 1A R is estimated to overfly 25 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation		(Option No: 1B
Option Name: SID RW 23L SOUTH-WEST Opt	ion 1B		REJECT
Option Name: SID RW 23R SOUTH-WEST Option 1B			ACCEPT
 Option Description: Option 1b is an RNAV1 option that avoids Knu a similar way to the current KUXEM departure b second turn to the south-west to join the networe arlier. The procedure uses fly-by waypoints. 23L: After departure the route makes turn to the route to the north of Knutsford. This turn is at D which less than Design Principle Safety. Follow short straight segment, it then makes a left turn Over Tabley where it combines with the option The combined routes continue in a south-weste direction to avoid Northwich and then make a left to the south-west to terminate at 7,000ft south Kelsall. 23R: After departure the route makes turn to the route to the north of Knutsford. Following a short straight segment it then makes a left turn close Tabley where it combines with the option for 23 combined routes continue in a south-westerly d to avoid Northwich and then make a left turn to south-west to terminate at 7,000ft south of Kels A speed restriction of 200 KIAS is used for the f thereafter 250 KIAS would apply. 	but the ik is e right to 3.2 ing a close to for 23R. rly eft turn of e right to of e right to of E. The irection o the call.	R23 South West Option Mag A57 A57 A57 A57 A57 A57 A57 A57 A57 A57	A Carbon Control Contr
Design Principle Safety	23L 23R		PARTIAL PARTIAL

16.2 Runways 23R/23L South-west Option 1B

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 1B L is estimated to limit the total population affected by noise. Option 1B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 1B R is estimated to limit the total population affected by noise. Option 1B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

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 therefore 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 therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 1,700.

Up to 7,000ft, option 1B L 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 an approximate total population of 8,500.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 1,000.

Up to 7,000ft, option 1B R 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 an approximate total population of 8,100.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. I. Naisa N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Association		

Up to 4,000ft, this option 1B L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 1B L is estimated to overfly 25 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1B R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 1B R is estimated to overfly 25 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and as maller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation		Option No: 1C
Option Name: SID RW 23L SOUTH-WEST Opt	ion 1C	ACCEPT
Option Name: SID RW 23R SOUTH-WEST Op	tion 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 replicate the turn at the existing markers: 23R this first turn is at MCT D3. 23L this is at MCT D3.2 which less that from DER but as this replicates the turn current procedure it therefore aligns to Design Principle Safety. This earlier turn avoid Knutsford. As a replicated route it follows a similar track or ground as the current route. This routes aircraft north of Knutsford, before making a left turn to to route north of Northwich. It then then makes second left turn to the north-west of Northwich south-west and terminates at 7,000ft to the east Chester. A speed restriction of 200 KIAS is used for the fthereafter 250 KIAS would apply. 	to n 1 nm of the the n is to ver the to the the west a to route t of	

16.3 Runways 23R/23L South-west Option 1C

Summary of	Qualitative A	Assessment:
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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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1C L is estimated to increase the total population affected by noise. Up to 7,000ft, option 1C L is estimated to limit the total population affected by noise. Option 1C L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1C L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1C R is estimated to increase the total population affected by noise. Up to 7,000ft, option 1C R is estimated to limit the total population impacted. Option 1C R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1C R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 1,400.

Up to 7,000ft, option 1C L 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 an approximate total population of 9,000.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 900.

Up to 7,000ft, option 1C R 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 an approximate total population of 8,600.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

During Directory Nation N/2	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Noise N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Ouglitative Accomments		

Up to 4,000ft, this option 1C L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 1C L is estimated to overfly 30 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1C R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 1C R is estimated to overfly 25 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

16.4 Runways 23R/23L South-west Option 1[D
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Design Principle Evaluation		Option No: 1D
Option Name: SID RW 23L SOUTH-WEST Opt	tion 1D	ACCEPT
Option Name: SID RW 23R SOUTH-WEST Op	tion 1D	ACCEPT
 Option Description: This option is included to provide a RNAV1 rep of the EKLAD 1R/1Y SIDs. The procedure uses fly-by waypoints, positioned replicate the turn at the existing markers: 23R this first turn is at MCT D3. 23L this is at MCT D3.2 which less tha from DER but as this replicates the turn current procedure it therefore aligns to Design Principle Safety. This earlier turn avoid Knutsford. As a replicated route it follows a similar track o ground as the current route. This routes aircraft north of Knutsford, before making a left turn to to route north of Northwich. The route continued direction until reaching 7,000ft to the north-east Chester. A speed restriction of 200 KIAS is used for the f thereafter 250 KIAS would apply. 	lication d to n 1 nm of the the n is to ver the to the the west es in this st of first turn,	
Design Principle Safety	23L 23R	PARTIAL PARTIAL

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.

D. C. D. C. Balian	23L	PARTIAL
Design Principle Policy	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1D L is estimated to limit the total population affected by noise. Up to 7,000ft, option 1D L is estimated to increase the total population affected by noise. Option 1D L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1D L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1D R is estimated to limit the total population affected by noise. Up to 7,000ft, option 1D R is estimated to limit the total population affected by noise. Option 1D R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 1D R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

The estimated track length of option 1D L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

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

	23L	PARTIAL
Design Principle Noise N 1	23R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1D 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 an approximate total population of 1,400.

Up to 7,000ft, option 1D L 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 an approximate total population of 12,400.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 1D 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 an approximate total population of 900.

Up to 7,000ft, option 1D R 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 an approximate total population of 12,100.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

During Director Nicina NI2	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	MET
Summary of Qualitative Assessment		

Summary of Quamanve Assessment

Up to 4,000ft, this option 1D L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 1D L is estimated to overfly 30 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 1D R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 1D R is estimated to overfly 30 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

Option Name: SID RW 23L SOUTH-WEST Option 2A Option Name: SID RW 23R SOUTH-WEST Option 2A **Option Description:** This is an **RNAV1** option that is includes a 15° offset to R23 South-West Option 2A Left the north (right) at the DER. The aim of this is to avoid overflight of built-up areas in a more fuel-efficient M6 manner than the current KUXEM SID. The higher design speed (when compared to the M56 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.

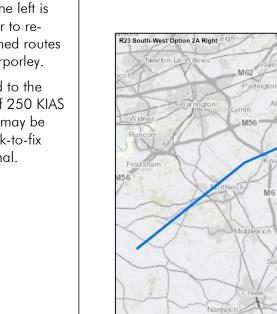
23L: Upon reaching the DER this route has a 15° offset to the right that routes it to the north of Knutsford. It continues in this direction until north of Northwich where it combines with the 23R option and makes a left turn onto a slightly more south westerly track. The

routes terminate at 7,000ft between Kelsall and Tarporley.

Design Principle Evaluation

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 recombine 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.



D. C. D. C. Cafate	23L	PARTIAL
Design Principle Safety	23R	PARTIAL

Summary of Qualitative Assessment:

16.5 Runways 23R/23L South-west Option 2A

REJECT

Option No: 2A

REJECT

MG

Salfor

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.

During Director Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 2A L is estimated to increase the total population affected by noise. Option 2A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 2A R is estimated to increase the total population affected by noise. Option 2A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT 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 an approximate total population of 16,500.

Up to 7,000ft, option 2A L 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 an approximate total population of 25,400.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 2A R is 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 an approximate total population of 14,300.

Up to 7,000ft, option 2A R is estimated to overfly approximately 8,550 households with an approximate population of 20,100. Taking account of planned property developments, this option is estimated to impact an approximate total population of 23,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Decise Directede Niciae NI2	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Noise N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Accessment:		

Up to 4,000ft, this option 2A L is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 2A L is estimated to overfly 40 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2A R is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 2A R is estimated to overfly 40 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

16.6	Runways	23R/23L	South-west	Option	2B
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Option Name: SID RW 23L SOUTH-WEST Option 28 REPCT Option Name: SID RW 23R SOUTH-WEST Option 28 REPCT Option Description: The same south-west track as shown in option 2A. The same south-west track as shown in option 2A. The same south-west track as shown in option 2A. The same south-west track as shown in option 2A. The same south-west track as shown in option 2A. The same south-west track as shown in option 2A. The same south-west track as shown in option 2A. The same south-west track as shown in option 2A. The same south-west track as shown in option 2A. The same south-west track as shown in option 2A. The same south-west track as an RF turn to the same south-west of Northwich where it combines with the 23A option and makes as left turn onto a slightly more south-west ford track. The routes terminate at 7,000ft between Kelsall and Tarporly. Assert departure the route makes an RF turn to the first turn to the north of Knutsford. The routes terminate at 7,000ft between Kelsall and Tarporly. Assert departure the route makes and RF turn to the same south-west eff track. The routes terminate at 7,000ft between Kelsall and Tarporly. Assert departure the route makes and RF turn to the same south-west eff track. The routes terminate at 7,000ft between Kelsall and Tarporly. Image: Comparison of 20 Monthwich where it combines with the 23A option and makes at left turn onto a slightly more south-west eff track. The routes terminate at 7,000ft between Kelsall and Tarporly. Image: Comparison of 20 Monthwich where it combines with the 23A option and makes at left turn onto a slightly more south-west eff turn	Design Principle Evaluation			Option No: 2B
<text><text><text><text><text><text></text></text></text></text></text></text>	Option Name: SID RW 23L SOUTH-WEST Option 2B		REJECT	
<text><text><text></text></text></text>	Option Name: SID RW 23R SOUTH-WEST Op	tion 2B		REJECT
Design Principle Satety	Option 2B uses an RNP1 with RF coding, conn the same south-west track as shown in option 2 aim of this is to avoid overflight of built-up area more fuel-efficient manner than the current KU by removing the legs using the MCT and POL The procedure uses radius-to-fix coding. 23L: After departure the route makes an RF tur right to route to the north of Knutsford. It contin this direction until north-east of Northwich whe combines with the 23R option and makes a left onto a slightly more south-westerly track. The re- terminate at 7,000ft between Kelsall and Tarpo 23R: After departure the route makes an RF tur right to route to the north of Knutsford. It contin this direction until north-east of Northwich whe combines with the 23L option and makes a left onto a slightly more south-westerly track. The re- terminate at 7,000ft between Kelsall and Tarpo 23R: After departure the route makes an RF tur right to route to the north of Knutsford. It contin this direction until north-east of Northwich whe combines with the 23L option and makes a left onto a slightly more south-westerly track. The re- terminate at 7,000ft between Kelsall and Tarpo	2A. The as in a XEM SID /OR. n to the nues in re it t turn outes orley. n to the nues in re it turn outes orley. ied to	Runcom Frodisham	
	Design Principle Safety	23L 23R		PARTIAL PARTIAL

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 2B L is estimated to increase the total population affected by noise. Option 2B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 2B R is estimated to increase the total population affected by noise. Option 2B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT 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 an approximate total population of 15,600.

Up to 7,000ft, option 2B L is estimated to overfly approximately 8,550 households with an approximate population of 20,200. Taking account of planned property developments, this option is estimated to impact an approximate total population of 24,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 15,000.

Up to 7,000ft, option 2B R is estimated to overfly approximately 8,700 households with an approximate population of 20,500. Taking account of planned property developments, this option is estimated to impact an approximate total population of 24,800.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Decise Directole Niciae N/2	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Noise N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Accessment:		

Up to 4,000ft, this option 2B L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 2B L is estimated to overfly 35 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2B R is estimated to overfly 20 noise sensitive areas.

Up to 7,000ft, this option 2B R is estimated to overfly 40 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

16.7	Runways	23R/23L	South-west	Option	3A
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Design Principle Evaluation			Option No: 3A
Option Name: SID RW 23L SOUTH-WEST Op	tion 3A		REJECT
Option Name: SID RW 23R SOUTH-WEST Op	otion 3A		REJECT
 Option Description: This is an RNAV1 option that that replicates the track of the current KUXEM SID but then turns a west earlier to make this a more fuel-efficient of the design envelope. The procedure uses a fly-over to fly-by sequence element of dispersion would be apparent in the due to the fly-over waypoint and DF coding. 23L: After departure, the route makes turn to the route to the north of Knutsford. Following a straight segment, it then makes a left turn close Tabley where it combines with the option for 2: combined routes continue in a south-westerly of to avoid Northwich and terminate at 7,000ft b Kelsall and Tarporley. 23R: After departure, the route makes turn to the route to the north of Knutsford. Following a straight segment, it then makes a left turn close Tabley where it combines with the option for 2: combined routes continue in a south-westerly of to avoid Northwich and terminate at 7,000ft b Kelsall and Tarporley. A speed restriction of 200 KIAS then 220 KIAS for the first turn and second turn. 	south- oute than e centre ce. An e turn ne right short to Over 3R. The direction etween he right short to Over 3L. The direction etween	R23 South-West C	1
Design Principle Safety	23L 23R		PARTIAL PARTIAL
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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 3A L is estimated to increase the total population affected by noise. Option 3A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 3A R is estimated to increase the total population affected by noise. Option 3A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

Dutu Diut L Emissions	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT 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 an approximate total population of 16,300.

Up to 7,000ft, option 3A L 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 an approximate total population of 25,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 13,500.

Up to 7,000ft, option 3A R 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 an approximate total population of 25,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

During Directole Nician NI2	23L	MET
Design Principle Noise N2	23R	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 Reinsight Nicise N3	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Ouglitative Assocration		

Up to 4,000ft, this option 3A L is estimated to overfly 35 noise sensitive areas.

Up to 7,000ft, this option 3A L is estimated to overfly 55 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3A R is estimated to overfly 25 noise sensitive areas.

Up to 7,000ft, this option 3A R is estimated to overfly 55 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

16.8 Runways 23R/23L South-west Option 3B

Design Principle Evaluation Option No: 3B Option Name: SID RW 23L SOUTH-WEST Option 3B REJECT Option Name: SID RW 23R SOUTH-WEST Option 3B ACCEPT **Option Description:** This option uses an RNP1 with RF coding right turn R23 South-West Option 3B Left Salfo initially (1nm DER for Runway 23L) to avoid Knutsford. It is similar to option 3A initially, but the track after the MG first turn is further north to provide greater avoidance from Northwich. ymm This route increases fuel efficiency when compared to M56 the replicated route by removing the legs using the MCT and POL VOR and routes towards the centre of the design envelope. Nort M6 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. ndbach 23L: After departure, the route makes an RF turn to the right to route to the north of Knutsford at 1nm from Alsage 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. R23 South-West Option 3B Right 23R: After departure the route makes an RF turn to the right to route to the north of Knutsford at 1nm from MG 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 M56 this direction until north of Delamere and then turns left onto a more south-westerly track and terminates at 7,000ft close to Kelsall. Nort A speed restriction of 210 KIAS is applied to the first MG turn which is the PANS-OPS/CAP778 recommended speed. 23L PARTIAL Design Principle Safety 23R PARTIAL

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 Dringinta Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 3B L is estimated to limit the total population affected by noise. Option 3B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 3B R is estimated to limit the total population affected by noise. Option 3B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 3,000.

Up to 7,000ft, option 3B L 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 an approximate total population of 13,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 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 an approximate total population of 2,000.

Up to 7,000ft, option 3B R 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 an approximate total population of 12,300.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Design Dringinka Nicion N2	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Noise N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Accessment:		

Up to 4,000ft, this option 3B L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 3B L is estimated to overfly 35 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3B R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 3B R is estimated to overfly 35 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

16.9 Runways 23R/23L South-west Option 3C

Design Principle Evaluation			Option No: 3C
Option Name: SID RW 23L SOUTH-WEST Option 3C			REJECT
Option Name: SID RW 23R SOUTH-WEST Op	tion 3C		ACCEPT
 Option Description: This option uses an RNP1 with RF coding right the same way as option 3B, except that the turn for Runway 23L is earlier and replicates the curposition of MCT D3.2 position (0.7nm DER). T provides greater avoidance of Knutsford. This route is intended as an alternative to the E SID and routes towards the centre of the design envelope. The design speed aligns to the CAP778 recommendation and may permit some aircraft this route in a clean configuration (without the flaps) which has potential benefits in terms of n 23L: After departure the route makes an RF turright at 0.7nm from DER which replicates the tu current procedure and therefore aligns to the D Principle Safety. It routes to the north of Knutsfor following a short straight segment it combines option for 23R and turns left on a track that take to the north of Northwich and Kelsall and termit 7,000ft east of Chester. 23R: After departure the route makes an RF turright to route to the north of Knutsford. Followins short straight segment it combines with the opti 23L and turns left on a track that takes it well to north of Northwich. It continues in this direction north of Delamere and then turns left onto a m south-westerly track and terminates at 7,000ft Kelsall. A speed restriction of 210 KIAS is applied to the turn which is the CAP778 recommended speed 	turn in n point rent turn his KLAD to fly use of oise. In to the urn of the Design ord and with the tes it well nates at n to the nates at n to the on for o the n until ore close to e first	Prescot Widness Runcom Frod Shan M56 Ranford	Partington 3C Left Leigh Din-Lei-Willows Warrington Uymm Horthwich Northwich Northwich Northwich Sandbach Crawe Alfrager Northwich North
Design Principle Safety	23L 23R		PARTIAL PARTIAL

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 Dringinta Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3C L is estimated to increase the total population affected by noise. Up to 7,000ft, option 3C L is estimated to limit the total population affected by noise. Option 3C L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3C L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3C R is estimated to increase the total population affected by noise. Up to 7,000ft, option 3C R is estimated to limit the total population affected by noise. Option 3C R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3C R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

The estimated track length of option 3C L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 3C R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3C L 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 an approximate total population of 2,800.

Up to 7,000ft, option 3C L 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 an approximate total population of 8,200.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 3C 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 an approximate total population of 2,000.

Up to 7,000ft, option 3C R 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 an approximate total population of 7,700.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

During District Nation N2	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. I. Naisa N2	23L	PARTIAL	
Design Principle Noise N3	23R	PARTIAL	
Summary of Qualitative Association			

Up to 4,000ft, this option 3C L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 3C L is estimated to overfly 30 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3C R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 3C R is estimated to overfly 30 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

16.10	Runways	23R/23L South-west	Option 4B
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Design Principle Evaluation		Option No: 4B
Option Name: SID RW 23L SOUTH-WEST Opt	tion 4B	REJECT
Option Name: SID RW 23R SOUTH-WEST Op	tion 4B	REJECT
 Option Description: This option routes fully around Knutsford and is with RF coding initially (1 nm DER for Runway 2 followed by a left turn and right turn, routing or Northwich. This route is similar to option 3A but routes slig further south and is intended as an alternative to EKLAD SID. The design speed aligns to the CAP778 recommendation and may permit some aircraft this route in a clean configuration (without the offaps) which has potential benefits in terms of nu 23L: After departure the route makes an RF turn right 1 nm from DER to the north of Knutsford a following a short straight segment it then turns left and combines with the option for 23R. After a further segment it then turns right to route over the nore edge of Northwich. It terminates at 7,000ft west Tarporley. 23R: After departure the route makes an RF turn right to the north of Knutsford and following a straight segment it then turns left and combines option for 23L. After a further short segment it 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 right to route over the northern edge of Northwich. It terminates at 7,000ft west of Tarporley. 	3L), ver htly to fly use of oise. In to the nd left and er short thern t of n to the short with the hen porley. e first	A2 Plantington A2 Plantington A3 A3 A3 A3 A3 A3 A3 A3 A3 A3
Design Principle Safety	23L 23R	PARTIAL PARTIAL

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 Dringin la Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4B L is estimated to increase the total population affected by noise. Option 4B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 4B R is estimated to increase the total population affected by noise. Option 4B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT 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 an approximate total population of 19,500.

Up to 7,000ft, option 4B L 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 an approximate total population of 27,200.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 15,700.

Up to 7,000ft, option 4B R 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 an approximate total population of 27,100.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

During District Nation N2	23L	MET
Design Principle Noise N2	23R	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
	23R	NOT MET
Summary of Qualitative Accoremonts	•	

Up to 4,000ft, this option 4B L is estimated to overfly 60 noise sensitive areas.

Up to 7,000ft, this option 4B L is estimated to overfly 65 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 4B R is estimated to overfly 55 noise sensitive areas.

Up to 7,000ft, this option 4B R is estimated to overfly 70 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

Dute Divide Technology	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

16.11	Runways	23R/23L South-west	Option 5
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Option Name: SID RW 23L SOUTH-WEST Option 5 REJECT Option Name: SID RW 23R SOUTH-WEST Option 5 REJECT Option Description: This is an RNAMO This is an RNAMO phin which is a straight dimb from the DER out to 7,000ft. There is no turn in this option witch results in the option overflying Knutsford. Image: Comparison overflying Knutsford. The option maximises fuel efficiency by removing the turnor out fuel in clean configuration (without the use of flaps) which has potential benefits in terms of noise. Image: Comparison overflying the turnor out for the turnor out for the turnor out for the south of Nontrokich and just north of Winsford. It terminates at 7,000ft the continues to the south of Nontrokich and just north of Winsford. It terminates at 7,000ft just east of Tattenhall. Image: Comparison out the 23 control of Winsford. It terminates at 7,000 fjust east of Tattenhall. There would be no speed restrictions applied to the procedure; therefore, the maximum speed of 250 KKS law FLIO would apply. No dispersion would be apparent as the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law process at the track is straight alhead and track law proc	Design Principle Evaluation		Option No: 5	
<text><text><text><text><text></text></text></text></text></text>	Option Name: SID RW 23L SOUTH-WEST Option 5		REJECT	
<text><text><text><text></text></text></text></text>	Option Name: SID RW 23R SOUTH-WEST Op	tion 5		REJECT
Design Principle Satety	 This is an RNAV1 option which is a straight clint the DER out to 7,000ft. There is no turn in this which results in the option overflying Knutsford. The higher design speed (when compared to the replicated route) will permit aircraft to fly this reclean configuration (without the use of flaps) we potential benefits in terms of noise. The option maximises fuel efficiency by removint turnaround Knutsford which use the MCT and IVOR. 23L: After departure, the route continues straig on runway heading to 7,000ft. This routes it ow Knutsford and it then continues to the south of Northwich and just north of Winsford. It termine 7,000ft just east of Tattenhall. 23R: After departure, the route makes a slight the adjustment to combine with the 23L option. The it overhead Knutsford and it then continues to the south of Northwich and just north of Winsford. It termine 7,000ft just east of Tattenhall. There would be no speed restrictions applied to procedure; therefore, the maximum speed of 2 below FL100 would apply. No dispersion would apparent as the track is straight ahead and trace 	option e pute in a hich has ng the POL ht ahead rerhead ates at track is routes he south ninates at o the 50 KIAS d be	M62 A57 Underst A537 A222 J M66 Trobham A69 A69 A52 A41 A60	A3 A3 A3 A3 A3 A3 A3 A3 A3 A3
	Design Principle Safety			

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.

D. C. D. C. Balian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 5 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 5 L is estimated to increase the total population affected by noise. Option 5 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 5 R is estimated to increase the total population affected by noise. Option 5 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Division Connacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

The estimated track length of option 5 L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

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

	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 5 L 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 an approximate total population of 16,300.

Up to 7,000ft, option 5 L 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 an approximate total population of 27,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 5 R 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 an approximate total population of 18,500.

Up to 7,000ft, option 5 R 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 an approximate total population of 29,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

During Directory Nation N/2	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Association		

Up to 4,000ft, this option 5 L is estimated to overfly 40 noise sensitive areas.

Up to 7,000ft, this option 5 L is estimated to overfly 60 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

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

Up to 7,000ft, this option 5 R is estimated to overfly 75 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

Dutu Divide Technology	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

16.12 Runways 23R/23L South-west Option 6

Design Principle Evaluation		Option No: 6
Option Name: SID RW 23L SOUTH-WEST Option 6		ACCEPT
Option Name: SID RW 23R SOUTH-WEST Opt	ion 6	ACCEPT
 Option Description: This is an RNP1 with RF coding initially (1nm DE Runway 23L) to make a kink around Knutsford k tracking back on the extended runway centreling similar to option 4B except that the radius of the shorter resulting in a track that is more to the so Northwich. This route is intended as an alternative to the KU SID and routes towards the south of the design envelope. 23L: After departure, the route makes an RF turn right 1nm from DER which takes it just to the no Knutsford. It then turns left and then right to retur route onto the extended runway centreline where combines with the option for 23R. It continues to south of Northwich and just north of Winsford a terminates at 7,000ft just east of Tattenhall. 23R: After departure, the route makes an RF turn right which takes it just to the north of Knutsford turns left and then right to return the route onto extended runway centreline where it combines with the option for 23R. It continues to south of Northwich and just north of Northard turns left and then right to return the route onto extended runway centreline where it combines with the option for 23L. It continues to the south of Northard turns left and then right to return the route onto extended runway centreline where it combines with and just north of Winsford and terminates at 7,00 just east of Tattenhall. A speed restriction of 190 KIAS is applied to the turn, 210 KIAS to the second turn and 250 KIAS thereafter. 	before e. It is e turn is uth of JXEM In to the rth of urn the e it o the nd It then the vith the pwich D00ft e first	<figure></figure>
Design Principle Safety	23L 23R	PARTIAL PARTIAL
	201	

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.

D. C. D. C. Dollar	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6 L is estimated to increase the total population affected by noise. Option 6 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 6 R is estimated to increase the total population affected by noise. Option 6 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Conseits	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

The estimated track length of option 6 L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 6 R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6 L 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 an approximate total population of 15,800.

Up to 7,000ft, option 6 L 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 an approximate total population of 27,100.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 6 R 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 an approximate total population of 15,300.

Up to 7,000ft, option 6 R 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 an approximate total population of 27,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

During Director Nation N2	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. I. Naisa N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Association		

Up to 4,000ft, this option 6 L is estimated to overfly 30 noise sensitive areas.

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

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6 R is estimated to overfly 30 noise sensitive areas.

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

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

D. C. D. C. L. Tashnalamu	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

16.13 Runways 23R/23L South-west Option 7A
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Option Name: SID RW 23L SOUTH-WEST Opt Option Name: SID RW 23R SOUTH-WEST Op Option Description: This is an RNAV1 option included to provide a route to that of option 1A (the MONTY 1R /1Y nowever, it uses an initial 15° track adjustment right (north) from the DER to reduce the impact on Knutsford. It then follows the same route as replicated route once beyond Mere.		ACCEPT
Option Description: This is an RNAV1 option included to provide a route to that of option 1A (the MONTY 1R /1Y nowever, it uses an initial 15° track adjustment right (north) from the DER to reduce the impact on Knutsford. It then follows the same route as	tion 7A	
This is an RNAV1 option included to provide a route to that of option 1A (the MONTY 1R /1Y nowever, it uses an initial 15° track adjustment right (north) from the DER to reduce the impact on Knutsford. It then follows the same route as		ACCEPT
The procedure uses fly-by waypoints. 23L: Aircraft make a 15° track adjustment at DI right to route to the north of Knutsford and to the of Mere. It then follows the same track as 1A arrows west to combine with the option for 23R just we Over Tabley. The routes continue in a south-we direction to avoid Northwich and then makes a to the south of Frodsham to terminate at 7,000 of Tarvin. 23R: Aircraft make a 15° track adjustment at D ight to route to the north of Knutsford. It then for the same track as 1A just north of Knutsford and west to combine with the option for 23L around theath. The combined routes continue in a south westerly direction to avoid Northwich and then eff turn to the south of Frodsham to terminate of 7,000ft north-west of Kelsall. A speed restriction of 200/210 KIAS is used for and second turn, thereafter 250 KIAS would ap	SID) to the of noise the ER to the ne south nd routes est of esterly left turn off north ER to the off north ER to the off north ER to the at ER to the off noise recorrection Frod Sham M56 Frod Sham Frod Sham M56 Frod Sham M56 Frod Sham M56 Frod Sham M56 Frod Sham M56 Frod Sham M56 Frod Sham M56 Frod Sham M56 Frod Sham Frod	Lingh Salford Dn-Le-Willows Infam Stettord Warrington Mg Altricham Warrington Mg Mg Northwich Mg Mg Northwich<
Design Principle Safety	23L 23R	PARTIAL PARTIAL

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.

D. C. D. C. Balian	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to limit the total population affected by noise. Up to 7,000ft, option 7A L is estimated to limit the total population affected by noise. Option 7A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 7A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 7A R is estimated to limit the total population affected by noise. Option 7A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 7A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

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 therefore 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 therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 1,200.

Up to 7,000ft, option 7A L 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 an approximate total population of 5,800.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 1,000.

Up to 7,000ft, option 7A R 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 an approximate total population of 5,800.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. I. Naisa N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Association		

Up to 4,000ft, this option 7A L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 7A L is estimated to overfly 25 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 7A R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 7A R is estimated to overfly 30 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation Option Name: SID RW 23L SOUTH-WEST O Option Name: SID RW 23R SOUTH-WEST O			Option No: 7B ACCEPT
Option Name: SID RW 23R SOUTH-WEST O			ACCEPT
•	ption 7B		
			ACCEPT
 Option Description: This is an RNAV1 option included to provide a route to that of option 1A (the MONTY 1R /1¹ however, it uses an initial 15° track adjustmen right (north) from the DER to reduce the impade on Knutsford. It then follows the same route a replicated route once beyond Mere. The procedure uses fly-by waypoints. 23L: Aircraft make a 15° track adjustment at 1 right to route to the north of Knutsford and to of Mere. It then follows the same track as 1A a west to combine with the option for 23R just w Over Tabley. The routes continue in a south-direction to avoid Northwich and then makes to the south of Frodsham to terminate at 7,00 of Tarvin. 23R: Aircraft make a 15° track adjustment at right to route to the north of Knutsford. It then the same track as 1A just north of Knutsford a west to combine with the option for 23L arour Heath. The combined routes continue in a southed west of combine with the option for 23L arour Heath. The combined routes continue in a south a speed restriction of 200/210 KIAS is used for and second turn, thereafter 250 KIAS would an example. 	Y SID) at to the ct of noise s the DER to the the south and routes vest of westerly a left turn DOft north DER to the follows and routes a left at north DER to the follows and routes a left turn off north	R23 South-West Option Mag A37 B6 toobham A48 A48 A48 A48 A48 A48 A48 A48 A48 A48	In the second se
Design Principle Safety	23L 23R		PARTIAL PARTIAL

16 14	Runways	23R/23I	South-west	Ontion	7B
10.14	Runways		<u>J</u> UUIII-WCJI	Opnon	10

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.

D. C. D. C. Balian	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to limit the total population affected by noise. Up to 7,000ft, option 7B L is estimated to limit the total population affected by noise. Option 7B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 7B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 7B R is estimated to limit the total population affected by noise. Option 7B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 7B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

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 therefore 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 therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 1,200.

Up to 7,000ft, option 7B L 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 an approximate total population of 8,100.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 1,000.

Up to 7,000ft, option 7B R 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 an approximate total population of 8,100.

This is a smaller population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. I. Naisa N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Association		

Up to 4,000ft, this option 7B L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 7B L is estimated to overfly 25 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 7B R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 7B R is estimated to overfly 25 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

Detter District Technology	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

16.15 Runways 23R/23L S	South-west Option 8
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Design Principle Evaluation	Option No: 8
Option Name: SID RW 23L SOUTH-WEST Option 8	ACCEPT
Option Name: SID RW 23R 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.	R23 South-West Option 8 Left Stiffers Transford Strikes Color Mag A57 A57 A57 A57 A57 A57 A57 A57 A57 A57
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.	ASS ASS ASS ASS ASS ASS ASS ASS ASS ASS
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.	A34 A34 A34 A34 A34 A34 A34 A34 A34 A34
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.	R23 South-West Option's Right Leigh New bn-Le-Willows
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.	Partington Warrington Lymm Runcom Frod Sham
23L: After departure, the route makes an RF turn to the right 1 nm 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.	56 Northwich M6 Middlewich Sandbach Crewe Alsager
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	Nantwich Sever Lever Collar Collare & Erver College and Stateson right 200

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.		
D. C. D. C. Safat	23L	PARTIAL
Design Principle Safety	23R	PARTIAL

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.

D. C. D. C. Deller	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 8 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 8 L is estimated to increase the total population affected by noise. Option 8 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 8 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 8 R is estimated to increase the total population affected by noise. Option 8 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 8 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

Dutu Diut L Emissione	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

Summary of Qualitative Assessment:

The estimated track length of option 8 L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 8 R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8 L 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 an approximate total population of 20,800.

Up to 7,000ft, option 8 L 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 an approximate total population of 24,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 8 R 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 an approximate total population of 19,700.

Up to 7,000ft, option 8 R 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 an approximate total population of 24,300.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

	ZJL	PARTIAL
Design Principle Noise N3	23R	PARTIAL

Up to 4,000ft, this option 8 L is estimated to overfly 35 noise sensitive areas.

Up to 7,000ft, this option 8 L is estimated to overfly 40 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 8 R is estimated to overfly 35 noise sensitive areas.

Up to 7,000ft, this option 8 R is estimated to overfly 45 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation		Option No: 9
Option Name: SID RW 23L SOUTH-WEST Option 9		REJECT
Option Name: SID RW 23R 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 rack 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. 	R23 South-Wes	Store in the second sec
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 1 nm from DER which takes it just to the north of Knutsford. It then turns left onto a direct track to the	T	st Option 9 Right Leigh Salford on-Le-Willows Irlam Stretford Partington Sale Warrington Lymm Gra H M56 G Wilr Knutsbird
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.	156	Northarch M6 Middlewich
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.		Crewe Alsager Nantwich Bennicum Crestit Creater on see Crew Course

16.16 Runways 23R/23L South-west Option 9

A speed restriction of 190 KIAS is applied to the first turn, 210 KIAS to the second turn and 250 KIAS thereafter.		
D. D. D. J. Safat	23L	PARTIAL
Design Principle Safety	23R	PARTIAL

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.

D. C. D. C. Delin y	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 9 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 9 L is estimated to increase the total population affected by noise. Option 9 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 9 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 9 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 9 R is estimated to increase the total population affected by noise. Option 9 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 9 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Canadita	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

D. C. D. C. Frissiana	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

Summary of Qualitative Assessment:

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

The estimated track length of option 9 R is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 9 L is estimated to overfly approximately 11,200 households with an approximate population of 25,600. Taking account of planned property developments, this option is estimated to impact an approximate total population of 29,500.

Up to 7,000ft, option 9 L 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 an approximate total population of 33,200.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 9 R 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 an approximate total population of 30,300.

Up to 7,000ft, option 9 R 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 an approximate total population of 34,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. I. Natas N2	23L	NOT MET
Design Principle Noise N3	23R	NOT MET

Up to 4,000ft, this option 9 L is estimated to overfly 70 noise sensitive areas.

Up to 7,000ft, this option 9 L is estimated to overfly 75 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 9 R is estimated to overfly 75 noise sensitive areas.

Up to 7,000ft, this option 9 R is estimated to overfly 80 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Dute Divide Airpage	23L	MET
Design Principle Airspace	23R	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.

Desire Driverials Technology	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation			Option No: 10
Option Name: SID RW 23L SOUTH-WEST Op	tion 10		REJECT
Option Name: SID RW 23R SOUTH-WEST Op	tion 10		ACCEPT
 Option Description: This is as an RNP1 option with RF coding as ar alternative to the current KUXEM SID. It aims to minimise the interactions with the proposed LPL 27 VEGUN arrival route from the south followi stakeholder feedback It is similar to option 8 be further south after Knutsford to reduce noise im Northwich. This option has been assessed against a 4.2nm from this arrival route in line with minimum rad separation criteria of 3nm plus a buffer of 1.2r line with CAP1385) and seeks to resolve the in using vertical separation. This option uses an RNP1 RF turn initially (1nm Runway 23L) to make a kink around Knutsford tracking back north of the extended runway cere This is like other options, but the radius of the t shorter and the subsequent track to the south is to create an option that fully avoids Northwich. The assessment of the route identifies that a PD less than 6% is required for both Runways 23R, achieve 3,500ft at the 4.2nm buffer zone. The procedure uses radius-to-fix coding, and th gradient has been set at 6%. 23L: After departure, the route makes an RF turight 1nm from DER which takes it just to the net Knutsford. It then turns left and routes south of Northwich where it combines with the option for 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 turinates at 7,000ft south of Kelsall. 	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 ine 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 ess 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 1 nm 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		<image/>
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.			ADD Writed 7/63daach ADA ADD ADA ADA
A speed restriction of 190 KIAS is applied to the first turn, 210 KIAS to the second turn and 250 KIAS thereafter.		A53	A) 4 (1) starting (1) beine Laytin Capital Shrania Os, Jan & Oran Capital and Beatering (2), Spin
Design Principle Safety	23L		PARTIAL
Summary of Qualitative Assessment:	23R		PARTIAL
Design Principle Evaluation (DPE) – V2			

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 Deinsiele Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 10 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 10 L is estimated to limit the total population affected by noise. Option 10 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 10 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 10 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 10 R is estimated to limit the total population affected by noise. Option 10 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 10 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

The estimated track length of option 10 L is 41km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 10 R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 10 L 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 an approximate total population of 9,300.

Up to 7,000ft, option 10 L 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 an approximate total population of 17,300.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 10 R 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 an approximate total population of 7,600.

Up to 7,000ft, option 10 R 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 an approximate total population of 16,700.

This is a similar population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Desire Briesinte Noice N2	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Naisa N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL
Summary of Ouglitative Assocration		

Up to 4,000ft, this option 10 L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 10 L is estimated to overfly 25 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 10 R is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 10 R is estimated to overfly 25 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Dute Divide Airpage	23L	MET
Design Principle Airspace	23R	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.

Desire Driveriale Technology	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

	Option 1AL
S	PARTIAL
Р	MET
С	MET
E	PARTIAL
N1	MET
N2	MET
N3	PARTIAL
Α	MET
т	MET
	Do Minimum (Replication)

	Option 1AR
S	PARTIAL
Ρ	MET
С	PARTIAL
Ε	PARTIAL
N1	MET
N2	MET
N3	MET
Α	MET
Т	MET
	Do Minimum (Replication)

16.19 Runways 23R/23L South-west EKLAD Summary

	Option 1DL
s	PARTIAL
Р	PARTIAL
С	MET
E	PARTIAL
N1	PARTIAL
N2	MET
N3	NOT MET
Α	MET
т	MET
	Do Minimum (Replication)

	Option 1DR				
S	PARTIAL				
Р	MET				
С	PARTIAL				
E	PARTIAL				
N1	MET				
N2	MET				
N3	MET				
Α	MET				
т	MET				
	Do Minimum (Replication)				

Design Principle Evaluation (DPE) – V2

16.20 Runways 23R/23L South-west KUXEM Summary

	Option 1BL	Option 1CL	Option 2AL	Option 2BL	Option 3AL	Option 3BL	Option 3CL	Option 4BL	Option 5L	Option 6L	Option 7AL	Option 7BL	Option 8L	Option 9L	Option 10L
S	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Ρ	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	MET	MET	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N 1	PARTIAL	PARTIAL	NOT MET	NOT MET	NOT MET	PARTIAL	PARTIAL	NOT MET	NOT MET	NOT MET	MET	MET	NOT MET	NOT MET	PARTIAL
N 2	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
N 3	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	NOT MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	NOT MET	PARTIAL
Α	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
	Rejected	Do Minimu m (Replicat ion)	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Add. Qual.	Best	Best	Add. Qual.	Rejected	Rejected

	Option 1BR	Option 1CR	Option 2AR	Option 2BR	Option 3AR	Option 3BR	Option 3CR	Option 4BR	Option 5R	Option 6R	Option 7AR	Option 7BR	Option 8R	Option 9R	Option 10R
S	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Ρ	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Е	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N 1	PARTIAL	PARTIAL	NOT MET	NOT MET	NOT MET	PARTIAL	PARTIAL	NOT MET	NOT MET	NOT MET	PARTIAL	PARTIAL	NOT MET	NOT MET	PARTIAL
N 2	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
N 3	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	NOT MET	NOT MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	NOT MET	PARTIAL
Α	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
	Best	Do Minimu m (Replicat ion)	Rejected	Rejected	Rejected	Best	Best	Rejected	Rejected	Add. Qual.	Best	Best	Add. Qual.	Rejected	Best

16.21 Runways 23R/23L South-west Viable but Poor Fit Options

Option	Safety	Policy	Capacity				
A11 Replicate the current KUXEM SID but with a termination point further south.	S	Ρ	С				
Originally designed as Option more directly to the south-wes							
<u>Safety</u> : The design of this option particular for slower climbing outside of CAS which is not a	aircraft. Design of this o	ption would result in the					
Additional options that are ful option offering no benefits if t	· · · · · · · · · · · · · · · · · · ·	-	vhich resulted in this				
<u>Capacity</u> : This option is likely This would limit the ability to a capacity.			Ŭ,				
B12: Route south-west earlier after departure.	S	Р	С				
Routes could turn left off dep route) shortly after departure			provide a more direct				
<u>Safety</u> : This would involve the opposite direction to other trunacceptable safety risk.		-					
Policy: This option fails to alig	-						
• Efficiency: This op The trade-off analysis betwee	-	t the traffic flows within th					
4,000ft.		and not identify a potentic	di noise benein below				
Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.							

C13 Left-hand wraparound	S	Р	С					
After departure from Runways 23L/23R, 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.								
Policy: This option fails to alig	gn with the ends of the A	MS with respect to:						
	ormance – Emissions: Th taking traffic east before							
Environmental perfor arriving aircraft from	ormance – Noise: This op n the south.	otion may hinder the ach	ievement of CDAs for					
The trade-off analysis agains offset a red categorisation.	t other AMS ends did n	ot identify other materia	l benefits sufficient to					
23 arrivals from the south. Th	<u>Capacity</u> : This option is likely to interact with options on the 23 East departure design envelope and 23 arrivals from the south. This would limit the ability to achieve one minute departure splits and not enabling best use of runway capacity.							
D14 Right-hand wraparound.	S	Р	С					
After departure from Runways and through the overhead ar <u>Safety</u> : This option would cor	nd then begin heading so	outh-west towards the SI						
Policy: This option fails to alig	an with the ends of the A	MS with respect to:						
Environmental perfe	prmance – Emissions: Th y taking traffic north and	is option would involve						
Environmental perfor arriving aircraft from	ormance – Noise: This op n the north.	otion may hinder the ach	ievement of CDAs for					
The trade-off analysis agains offset a red categorisation.	The trade-off analysis against other AMS ends did not identify other material benefits sufficient to							
<u>Capacity</u> : This option is likel envelopes and 23 arrivals from splits and not enabling best u	m the north. This would li							

E15: Slight right turn after departure, then south- west.	S	Р	С
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After departure from Runways 23L/23R, aircraft would make a slight right-hand turn in a northwesterly direction, towards LPL before heading south-west, towards the SID aiming point.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

• Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles, or ATC intervention to resolve.

The trade-off analysis against noise, did not identify a material noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: In addition to the Liverpool interaction, this option would interact with 23 East and North departure design envelopes, both of which would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

F16 Left turn after departure, head direct south then turn west	S	Р	С
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After departure from Runways 23L/23R, 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.

Policy: This option fails to align with the ends of the AMS with respect to:

• Environmental performance – Emissions: This option would involve greater track mileage than is necessary by taking traffic south before turning west and south-west leading to increased fuel burn and emissions.

The trade-off analysis between emissions and noise, did not identify a material noise benefit below 4,000ft.

Similarly, the trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

<u>Capacity</u>: This option would interact with the 23 south departure design envelope. This would limit the ability to achieve one minute departure splits and not enable best use of runway capacity.

17 Runways 23R/23L West

17.1 Runways 23R/23L West Option 2

Design Principle Evaluation			Option No: 2
Option Name: SID RW 23L WEST Option 2		REJECT	
Option Name: SID RW 23R WEST Option 2	Option Name: SID RW 23R WEST Option 2		REJECT
 Option Description: Option 2 is an RNAV1 option which provides climb out to a fly-over waypoint and then a rig route north of Knutsford and direct towards Wa has been created to provide the most direct (fue 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 this route in a clean configuration (without the flaps) which has potential benefits in terms of route climb gradient has been set at 6% to design envelope. 23L: After departure, the route makes a turn to 1 nm from DER which takes it just to the north of Knutsford through Mere. It then heads in a nor westerly direction routing to the south of Warring passing south of Widnes and north of Runcorn terminates at 7,000ft to the north of Knutsford Mare. It then heads in a north-westerly direction to the south of Warring to the south of Warring passes south of Wirnorth of Runcorn and terminates at 7,000ft to the south of Wirnorth of Runcorn and terminates at 7,000ft to south-east of Liverpool. An element of dispersion would be apparent in due to the fly-over waypoint and either CF or D coding. A speed restriction of 210 KIAS is applied to the turn. 	ht turn to allasey. It rel- it to fly use of noise. gn the othe right of th- ngton, and pool. es a right d through n routing dnes and the of the pool.	Frequencies Burboo From Barboo Barboo Barboo State Sta	Standah Bolton Farrworth Farrworth Bolton Saftord Altrocharn Werngton Umm Northwoh M6 Northwoh M6 Nort
			Nantrui: brun furri canni thine a con cannol Nantrui: brun furri canni thine a con cannol
Design Principle Safety	23L 23R		NOT MET NOT MET
Summary of Qualitative Assessment:	201		

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 the routes are designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised. This will not comply with industry standards and regulations.

D. C. D. C. Dalian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 2 L is estimated to increase the total population affected by noise. Option 2 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 2 R is estimated to increase the total population affected by noise. Option 2 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 2 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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	
23R PARTIAL	

The estimated track length of option 2 L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

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

During Directory Noine N1	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2 L 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 an approximate total population of 2,500.

Up to 7,000ft, option 2 L 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 an approximate total population of 65,400.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 2 R 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 an approximate total population of 3,300.

Up to 7,000ft, option 2 R 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 an approximate total population of 63,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative Accoremont		

Up to 4,000ft, this option 2 L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 2 L is estimated to overfly 120 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 2 R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 2 R is estimated to overfly 115 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

17.2 Runways 23R/23L West Option 3B

Design Principle Evaluation		Option No: 3B
Option Name: SID RW 23L WEST Option 3B		REJECT
Option Name: SID RW 23R WEST Option 3B		REJECT
 Option Description: This is an RNAV1 option that aims to mimic the taken by aircraft once they have been vectored EKLAD SID by ATC. This is done on the existing SIDs once they have reached 3,000ft and so the formalises the vectored routes flown today. The procedure uses a fly-over to fly-by sequence the climb gradient has been set at 6%. The fly-waypoints are positioned to replicate the turn a existing MCT D3 and D3.2 markers. 23L: After departure, the route makes a turn to at 0.7nm from DER which replicates the turn of current EKLAD procedure and therefore aligns: Design Principle Safety. It continues to replicate EKLAD SID through Mere to the north of Knutsf Northwich at which point it turns right onto a w heading which takes it overhead Widnes where terminates at 7,000ft. 23R: After departure, the route makes a turn to at 1 nm from DER and replicates the track of the EKLAD SID through Mere to the north of Knutsf where it combines with the route for 23L. It there north of Northwich at which point it turns right westerly heading which takes it overhead Widn it terminates at 7,000ft. An element of dispersion would be apparent in due to the fly-over waypoint and either CF or Ecoding. A speed restriction of 200 KIAS then 250 KIAS for the first turn and second turn. 	off the westerly is option e and over t the the right the right e current ord n routes onto a es where the turn PF is used	West Option 3B Left Forwich Bolton Interest als Login Farmworth Andred Login Santhord West Option 3B Left Login Santhord Andred Login Santhord West Option 3B Left Masker field Santhord West Option 3B Left Login Santhord West Option 3B Left West Option 3B Left Alter ham West Option 3B Left New Yor Login Santhord West Option 3B Left New Yor Login Alter ham West Option 3B Left New Yor Login Santhord Santhord New Yor Login Santhord Santhord Santhord Login Alter ham Santhord Santhord Login Santhord Santhord Santho
Design Principle Safety Summary of Qualitative Assessment:	23L 23R	NOT MET NOT MET

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 designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised. This will not comply with industry standards and regulations.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3B L is estimated to limit the total population affected by noise. Up to 7,000ft, option 3B L is estimated to increase the total population affected by noise. Option 3B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3B R is estimated to limit the total population affected by noise. Up to 7,000ft, option 3B R is estimated to increase the total population affected by noise. Option 3B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 3B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 1,500.

Up to 7,000ft, option 3B L 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 an approximate total population of 67,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 1,000.

Up to 7,000ft, option 3B R 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 an approximate total population of 67,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a similar population compared to the 'do nothing' scenario up to 4,000ft.

Design Bringin la Naigo N2	23L	MET
Design Principle Noise N2	23R	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.

D. S. D. S. J. Maine N/2	23L	NOT MET
Design Principle Noise N3	23R	PARTIAL
Summary of Qualitative Assessment:		

Up to 4,000ft, this option 3B L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 3B L is estimated to overfly 110 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 3B R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 3B R is estimated to overfly 105 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

Dutu Divid Technology	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

17.3 Runways 23R/23L West Option 4

Design Principle Evaluation			Option No: 4
Option Name: SID RW 23L WEST Option 4			REJECT
Option Name: SID RW 23R WEST Option 4			REJECT
 Option Description: This is option is an RNP1 option with an RF tur routes north of Knutsford and then direct towar Wallasey. It has been created to provide a dire efficient) route to the network joining point for westbound traffic at Wallasey. It has an almost identical track across the grou option 2 but to a higher navigation standard to more accurate track keeping. The climb gradient is set at 6%. 23L: After departure, the route makes a turn to 1nm from DER which takes it just to the north of Knutsford. It then heads in a north-westerly dire routing to the south of Warrington, passes sout Widnes and north of Runcorn and terminates of to the south-east of Liverpool. 23R: Similar to option for 23L, this route make to the right which takes it just to the north of Kr It then heads in a north-westerly direction routi south of Warrington, passes south of Warrington, passes south of Warrington, passes south of Kr It then heads in a north-westerly direction routi south of Warrington, passes south of Widnes and funcorn and terminates at 7,000ft to the so of Liverpool. A speed restriction of 190 KIAS is used for the thereafter 250 KIAS would apply. Although PAI compliant it should be assessed for flyability as the procedure validation process within Stage 4 CAP1616. 	ds ct (fuel- nd as provide the right of ection th of th of th of th of th 7,000ft s a turn nutsford. ng to the nd north uth-east first turn, NS-OPS part of	Resources of the second	Standish Bolton Farmorth Uncefin Materifield Werington Dumin Mot Merington Mitcliewich Mit
Design Principle Safety	23L 23R		NOT MET NOT MET

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 designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised. This will not comply with industry standards and regulations.

During District Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 4 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 4 L is estimated to increase the total population affected by noise. Option 4 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 4 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 4 R is estimated to increase the total population affected by noise. Option 4 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 4 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Conseits	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

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

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

	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 4 L 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 an approximate total population of 2,900.

Up to 7,000ft, option 4 L 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 an approximate total population of 64,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 4 R 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 an approximate total population of 4,300.

Up to 7,000ft, option 4 R 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 an approximate total population of 63,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Design Bringin la Naigo N2	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative According		

Up to 4,000ft, this option4 L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option4 L is estimated to overfly 120 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option4 R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option4 R is estimated to overfly 115 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Dutin Divide Airongco	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

17.4 Runways 23R/23L West Option 5A

Design Principle Evaluation		Option No: 5A
Option Name: SID RW 23L WEST Option 5A		REJECT
Option Name: SID RW 23R WEST Option 5A		REJECT
 Option Description: This is an RNP1 option with an RF turn that rout of Knutsford and then direct towards Wallasey. I slightly further north than option 4 to route north and below the current MIRSI hold for Mancheste been created to provide a direct (fuel-efficient) of the network joining point for westbound traffic a Wallasey. The design speed will permit a larger number of to fly this route in a clean configuration (without of flaps) which has potential benefits in terms of The climb gradient is set at 6%. 23L: After departure, the route makes a turn to at 1 nm from DER which takes it just to the north Knutsford. It then heads in a north-westerly direct routing to the south of Warrington and terminat 7,000ft just west of Widnes. 23R: After departure, the route makes a turn to which takes it over the northern edge of Knutsfor then heads in a north-westerly direction routing south of Warrington and terminates at 7,000ft j of Widnes. A speed restriction of 220 KIAS is used for the fithereafter 250 KIAS would apply. 	t is n of LPL er. It has oute to t aircraft the use noise. the right of ction es at the right rd. It to the ust west	
Design Principle Safety	23L 23R	NOT MET NOT MET
	201	

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 designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised. This will not comply with industry standards and regulations.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 5A L is estimated to increase the total population affected by noise. Up to 7,000ft, option 5A L is estimated to increase the total population affected by noise. Option 5A L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5A R is estimated to increase the total population affected by noise. Up to 7,000ft, option 5A R is estimated to increase the total population affected by noise. Option 5A R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. Caracity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL
		·

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 therefore 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT 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 an approximate total population of 8,000.

Up to 7,000ft, option 5A L 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 an approximate total population of 69,700.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 9,000.

Up to 7,000ft, option 5A R 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 an approximate total population of 69,200.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative According		

Up to 4,000ft, this option 5A L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 5A L is estimated to overfly 110 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 5A R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 5A R is estimated to overfly 95 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

17.5 Runways 23R/23L West Option 5B

Option Name: SID RW 23L WEST Option 5E Option Name: SID RW 23R WEST Option 5I Option Description: This is an RNP1 option with an RF turn like o except that the turn point for Runway 23L is a the DER to increase the separation from Knur has been created to provide a direct (fuel-eff route to the network joining point for westbo	B ption 5A, closer to tsford. It icient)	REJECT REJECT REJECT
Option Description: This is an RNP1 option with an RF turn like o except that the turn point for Runway 23L is o the DER to increase the separation from Knur has been created to provide a direct (fuel-eff	ption 5A, closer to tsford. It icient)	R23 West Option 5B Left Standish Bolton Skelmersdale Famworth
This is an RNP1 option with an RF turn like o except that the turn point for Runway 23L is o the DER to increase the separation from Knu has been created to provide a direct (fuel-eff	closer to tsford. It icient)	rk Skeimersdale Famworth
at Wallasey but with greater emphasis on lim This earlier turn results in a track for 23L that further north than option 5A. The design speed will permit a larger numbe to fly this route in a clean configuration (with of flaps) which has potential benefits in terms 23L: After departure, the route makes a turn at 1nm from DER which takes it to the north Knutsford. It then heads in a north-westerly d routing to the south of Warrington and termi 7,000ft just west of Widnes. 23R: After departure, the route makes a turn which takes it just to the north of Knutsford. It heads in a north-westerly direction routing to of Warrington and terminates at 7,000ft just Widnes. A speed restriction of 220 KIAS is used for th thereafter 250 KIAS would apply.	niting noise. t is slightly r of aircraft out the use s of noise. to the right of irection nates at to the right t then the south west of he first turn,	Rand Ligh Suite 1 New to n-los Willows If fam so to not Widness Baltord Attrict ham Widness Med Med Foot attam Not to not Sandbach 1 Foot attam Not to not 1 Hindon Sandbach 1 Foot attam Not to not 1 Hindon Sandbach 1 Hindon Hindon 1 Hindon Hindon 1 Hindon Hindon 1 Hindon Hindon 1 Hindon Hindo
Design Principle Safety	23L 23R	NOT MET NOT MET

Summary o	f Qualitative Assessment.
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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 designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised. This will not comply with industry standards and regulations.

D. C. D. C. Balian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 5B L is estimated to increase the total population affected by noise. Up to 7,000ft, option 5B L is estimated to increase the total population affected by noise. Option 5B L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 5B R is estimated to increase the total population affected by noise. Up to 7,000ft, option 5B R is estimated to increase the total population affected by noise. Option 5B R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 5B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Directed Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

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 therefore 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 therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT 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 an approximate total population of 8,600.

Up to 7,000ft, option 5B L 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 an approximate total population of 71,200.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

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 an approximate total population of 9,000.

Up to 7,000ft, option 5B R 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 an approximate total population of 71,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Dutu Diut I Naiza N2	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	NOT MET
Summary of Qualitative According		

Up to 4,000ft, this option 5B L is estimated to overfly 15 noise sensitive areas.

Up to 7,000ft, this option 5B L is estimated to overfly 105 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 5B R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 5B R is estimated to overfly 90 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

D. D. J. Tashaalaaw	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

17.6 Runways 23R/23L West Option 6

Option Name: SID RW 23L WEST Option 6	REJECT
Option Name: SID RW 23R 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 se deconflict MAN westbound departures from traffic and LPL. This is achieved through an initial north before turning left towards the network joining point at Wallasey. The design speed aligns to the CAP778 recommendation and may permit some aircraft to this route in a clean configuration (without the use flaps) which has potential benefits in terms of nois. The procedure uses RF coding, and the climb gradhas been set at 6%. 23L: After departure, the route makes a turn to the at 1 nm from DER which takes it to the north of Knutsford through Mere. It then heads north on a straight segment before making a left turn to the wijust to the north of Lymm where it combines with the option from 23R. The combined routes continue in westerly direction routing overhead Warrington and terminate at 7,000ft just north of Widnes. 23R: After departure, the route makes a turn to the which takes it to the north of Knutsford through Mere. It combines durington and terminate at 7,000ft just north of Widnes. 23R: After departure, the route makes a turn to the which takes it to the north of Knutsford through M then heads north on a short straight segment befor making a left turn to the west, just to the north of I where it combines with the option from 23L. The combined routes continue in a westerly direction routes continue in a westerly direction routes continue in a westerly direction route of 210 KIAS is applied to the fiturn which is the CAP778 recommended speed. 	exist to to ound he figure in the second of
Design Principle Safety <i>Summary of Qualitative Assessment:</i>	23L NOT MET 23R NOT MET

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 designable; however, by maintaining a 6% climb gradient they are likely to infringe controlled airspace delegated to LPL and safety could be compromised. This will not comply with industry standards and regulations.

D. C. D. C. Balian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 6 L is estimated to increase the total population affected by noise. Option 6 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 6 R is estimated to increase the total population affected by noise. Option 6 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 6 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D. J. D. J. Conseits	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

The estimated track length of option 6 L is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 6 R is 44km (24nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

Dute Diate Noine NI	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6 L 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 an approximate total population of 15,800.

Up to 7,000ft, option 6 L 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 an approximate total population of 134,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 6 R is estimated to overfly approximately 5,450 households with an approximate population of 12,400. Taking account of planned property developments, this option is estimated to impact an approximate total population of 12,700.

Up to 7,000ft, option 6 R 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 an approximate total population of 133,400.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	NOT MET
Summany of Qualitative Accessment:		

Up to 4,000ft, this option 6 L is estimated to overfly 40 noise sensitive areas.

Up to 7,000ft, this option 6 L is estimated to overfly 285 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 6 R is estimated to overfly 30 noise sensitive areas.

Up to 7,000ft, this option 6 R is estimated to overfly 275 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

17.7	Runways 23R/23L	West O	ption 7
	, ,		1

Design Principle Evaluation	Option No: 7
Option Name: SID RW 23L WEST Option 7	ACCEPT
Option Name: SID RW 23R WEST Option 7	ACCEPT
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 simples is grantflows.	Lince-In-Makerfield d Loigh Swinbn New bn-Le-Wildows Ifriam Stretford Partington Sale Warmgton Lymm Altrinch am Warmgton Warmgton Without W Vidnes Warmgton Lymm Without W Vidnes Warmgton Lymm Materia
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.	Middlewich Sandbach Crowe Nantwerfeaseringer Nantwerfeaseringer Bury Life Standish Standish Bolion Famworth Incelint Makeriteld
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	New bn-Le-Wildows New bn-Le-Wildows Warrington Udmss Warrington Lymm Knutsb rd Northwich Northwich M6
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.	Middlewich Sandbach Creve Aliager
23L: After departure, the route makes a turn to the right 1 nm 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.	Namptor: been faire out to control to the a control out

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.			
coaing. A speed restriction of 210 KIAS is applied to the first turn.			
Design Principle Safety	23L	MET	
	23R	MET	
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	PARTIAL	
23R PARTIAL Summary of Qualitative Assessment: 23R Up to 4,000ft, option 7 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 7 L is estimated to increase the total population affected by noise. Option 7 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 7 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.			
Option 7 L is similar in length and it is anticipa At this stage of the process, option 7 L is evaluated	ted that er	nissions would be limited.	

performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

Summary of Qualitative Assessment:

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

The estimated track length of option 7 R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7 L 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 an approximate total population of 2,900.

Up to 7,000ft, option 7 L 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 an approximate total population of 73,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 7 R 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 an approximate total population of 700.

Up to 7,000ft, option 7 R 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 an approximate total population of 69,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	MET

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.

During Directory Noine N2	23L	NOT MET
Design Principle Noise N3	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, this option 7 L is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 7 L is estimated to overfly 135 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 7 R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 7 R is estimated to overfly 125 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

D. C. D. C. L. Tashnalami	23L	MET
Design Principle Technology	23R	MET

Summary of Qualitative Assessment:

17.8 Runways 23R/23L West Option 8

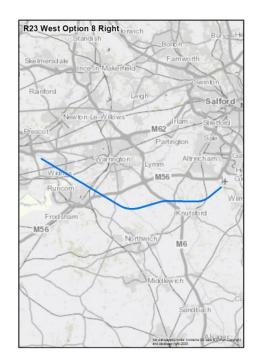
Design Principle Evaluation		Option No: 8
Option Name: SID RW 23L WEST Option 8		ACCEPT
Option Name: SID RW 23R WEST Option 8		ACCEPT
Option Description: This is an RNAV1 option that modifies option 3B to minimise the interactions with LPL airspace following stakeholder feedback.	R23 West Op	Bolion Famworth
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.	Frescot Wolfree	Ince-In-Makerrield Swinbn Laigh Won-Le-Willows Iffam Strotford Partington Sale Warrington Lymm Altrincham M56
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	FredShar M56	m Knutsbrid Northwich M6 Middlewich

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.

airlines to confirm viability should it be taken forward.

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



which point it turns right onto a westerly heading	ne route for 23L. It then routes north of Northwich at which point it turns right onto a westerly heading which akes it overhead Widnes where it terminates at 7,000ft		
n element of dispersion would be apparent in the turn ue to the fly-over waypoint and either CF or DF oding.			
A speed restriction of 200 KIAS then 250 KIAS for the first turn and second turn.	is used		
Design Principle Safety	23L	MET	
Summary of Qualitative Assessment:	23R	MET	
, ,			
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.			
be safe, designable and meets with industry sto that additional protocols or mitigations are req	indards an uired to cc	d regulations. At this stage, we do not believe onfirm safe operation, although an assessment	
be safe, designable and meets with industry sto that additional protocols or mitigations are req against the other FASI-N airports and other MA	indards an uired to cc AN routes r 23L	d regulations. At this stage, we do not believe onfirm safe operation, although an assessment may be required to confirm this at a later stage. PARTIAL	
be safe, designable and meets with industry sto that additional protocols or mitigations are req against the other FASI-N airports and other MA Design Principle Policy	indards an uired to cc AN routes i	d regulations. At this stage, we do not believe onfirm safe operation, although an assessment may be required to confirm this at a later stage.	
be safe, designable and meets with industry sto that additional protocols or mitigations are req against the other FASI-N airports and other MA	ndards an uired to co N routes r 23L 23R he total po ted that er ated to be he total po ase the tota ted that er ated to be	d regulations. At this stage, we do not believe onfirm safe operation, although an assessment may be required to confirm this at a later stage. PARTIAL PARTIAL population affected by noise. nissions would be limited. partially consistent with the environmental opulation affected by noise. al population affected by noise. al population affected by noise. missions would be limited. partially consistent with the environmental	
be safe, designable and meets with industry stat that additional protocols or mitigations are req against the other FASI-N airports and other MA Design Principle Policy <i>Summary of Qualitative Assessment:</i> Up to 4,000ft, option 8 L is estimated to limit t Up to 7,000ft, option 8 L is estimated to increa Option 8 L is similar in length and it is anticipa At this stage of the process, option 8 L is evalue performance 'End' and Design Principle Policy. Up to 4,000ft, option 8 R is estimated to limit t Up to 7,000ft, option 8 R is estimated to limit t Up to 7,000ft, option 8 R is estimated to limit t Up to 7,000ft, option 8 R is estimated to limit t Up to 7,000ft, option 8 R is estimated to limit t Up to 7,000ft, option 8 R is estimated to limit t Up to 7,000ft, option 8 R is estimated to limit t	ndards an uired to co N routes r 23L 23R he total po ted that er ated to be he total po ase the tota	d regulations. At this stage, we do not believe onfirm safe operation, although an assessment may be required to confirm this at a later stage. PARTIAL PARTIAL population affected by noise. nissions would be limited. partially consistent with the environmental population affected by noise. al population affected by noise. missions would be limited.	

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

Summary of Qualitative Assessment:

The estimated track length of option 8 L is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 8 R is 42km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

During Directly Nicion NI	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 8 L 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 an approximate total population of 1,000.

Up to 7,000ft, option 8 L 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 an approximate total population of 73,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 8 R 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 an approximate total population of 500.

Up to 7,000ft, option 8 R 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 an approximate total population of 72,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, this option 8 L is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 8 L is estimated to overfly 120 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 8 R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 8 R is estimated to overfly 120 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

Dut - Divit - Technology	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

17.9 Runways 23R/23L West Option 9

Design Principle Evaluation		Option No: 9
Option Name: SID RW 23L WEST Option 9		ACCEPT
Option Name: SID RW 23R 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.	R23 West Optic skirk Stelmersd ale M58 Ramford DV 157 Firescot Widnes	Standish bowich Bury: - Standish Bolton Bury: - Bolton Farmworth Swinibin Leigh Salford wrbn-Le-Willows Irlam Stretford Partington Salo Wartington Lymm Altrinchiam C
It has an almost identical track across the ground as option 2 but to a higher navigation standard to provide more accurate track keeping.	+ Runcor Frodisha	m Knutsbrd Northwich M6
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.	ter	Middlewich Nilddlewich Sandbach Crewe Alsager Manto ##featurington for an e com Cayrol
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.	R23 West Optic skirk. Ske Imersdiale M58 Rainford by Rianford by Rightson Firescot	Standish Bury_He Bolton Farrworth Incelln Makerifield SwinDin Lorgh Saltord B Won-Le-Willows Alfrington Sale Warnington Lymm Alfrincham Gatt
23L: After departure, the route makes a turn to the right 1 nm 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.	Proclamar Reflection M56	M56 H Gr Wilm M Knutsbrd Northwich M6
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.	fer	Middlewich Sandbach Crewe Alsager Nantwic Burnistic optics
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 the procedure validation process within Stage 4 CAP1616.		
	23L	MET
Design Principle Safety	23R	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.

Dute Distal Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 9 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 9 L is estimated to increase the total population affected by noise. Option 9 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 9 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 9 R is estimated to limit the total population affected by noise. Up to 7,000ft, option 9 R is estimated to increase the total population affected by noise. Option 9 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 9 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Direct la Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

Summary of Qualitative Assessment:

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

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

	23L	NOT MET
Design Principle Noise N1	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 9 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 an approximate total population of 2,200.

Up to 7,000ft, option 9 L 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 an approximate total population of 72,100.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 9 R 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 an approximate total population of 800.

Up to 7,000ft, option 9 R 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 an approximate total population of 75,000.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a smaller population compared to the 'do nothing' scenario up to 4,000ft.

Destruction Noise N2	23L	MET
Design Principle Noise N2	23R	MET

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.

Deterrish Noize N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, this option 9 L is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 9 L is estimated to overfly 130 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 9 R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 9 R is estimated to overfly 110 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Design Brigging Airpage	23L	MET
Design Principle Airspace	23R	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 Bringin La Tachpalagy	23L	MET
Design Principle Technology	23R	MET

Summary of Qualitative Assessment:

17.10 Runways 23R/23L West Option 10

Design Principle Evaluation	Option No: 10
Option Name: SID RW 23L WEST Option 10	ACCEPT
Option Name: SID RW 23R 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.	Standish Bury Bolton Bury Bolton

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.

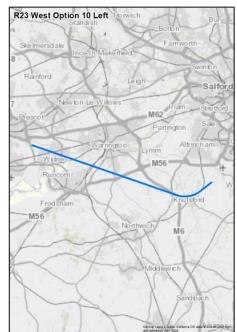
The initial climb gradient in this option is greater than the 6% to 7,000ft that has been adopted for other routes and which was identified as flyable by all aircraft within the fleet equipage survey as described in the DOR. This survey identified that some aircraft could exceed this 6% gradient, and 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.

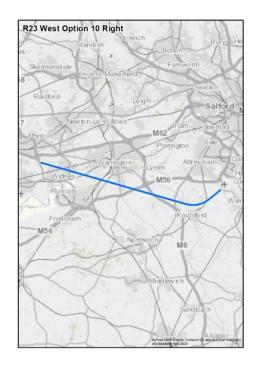
The initial climb gradient has been set at 11.3% for 23L / 9.7% for 23R for the portion of the SID prior to where the route meets the 3nm buffer of the LPL delegated airspace. Thereafter a maximum climb gradient of 4.2% is applied to terminate at 7,000ft at the same end position as option 5A to give 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 at 1nm from DER which takes it just to the north Knutsford through Mere. It then heads in a norwesterly direction routing to the south of Warring and terminates at 7,000ft just west of Widnes. 23R: After departure, the route makes a turn to which takes it over the northern edge of Knutsforthrough Mere. It then heads in a north-westerly direction routing to the south of Warrington an terminates at 7,000ft just west of Widnes. A speed restriction of 220 KIAS is used for the thereafter 250 KIAS would apply. 	h of th- ngton o the right ord , d		
D D Cafat.	23L	MET	
Design Principle Safety	23R	MET	
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 Bringinla Policy	23L	PARTIAL	
Design Principle Policy	23R	PARTIAL	
Summary of Qualitative Assessment: Up to 4,000ft, option 10 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 10 L is estimated to increase the total population affected by noise. Option 10 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 10 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy. Up to 4,000ft, option 10 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 10 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 10 R is estimated to increase the total population affected by noise. Option 10 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 10 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.			
	23L	MET	
Design Principle Capacity	23R	PARTIAL	

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 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 23R 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.

Dute Divid Emissions	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

Summary of Qualitative Assessment:

The estimated track length of option 10 L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 10 R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

Design Principle Noise N1	23L	NOT MET
Design Principle INDISE IN I	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 10 L 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 an approximate total population of 6,000.

Up to 7,000ft, option 10 L 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 an approximate total population of 76,200.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 10 R 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 an approximate total population of 1,200.

Up to 7,000ft, option 10 R 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 an approximate total population of 73,500.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	MET

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
Design Principle Noise N3	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, this option 10 L is estimated to overfly 25 noise sensitive areas.

Up to 7,000ft, this option 10 L is estimated to overfly 125 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 10 R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 10 R is estimated to overfly 110 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Technology	23R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation		Option No: 11
Option Name: SID RW 23L WEST Option 11		ACCEPT
Option Name: SID RW 23R WEST Option 11		ACCEPT
 Option Name: SID RW 23R WEST Option 11 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 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,	Irk Skelmersdiale 58 Rainford 7 New Frescot 8 Runcom Frod Bham M56 8 Riskelmersdiale 1 Skelmersdiale	n. 11, Left tandi sh Bolion Farrworth Leigh Don-Le-Willows M62 Partington Salt Partington Salt Warrington Uymm M56 Warrington Knutsbrd Middlewich Sandbizh
 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 	L	Santibă:h
Mere. It then heads in a north-westerly direction routing Design Principle Evaluation (DPE) – V2		

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.		
D. S. D. S. J. Cafat.	23L	MET
Design Principle Safety	23R	MET

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 11 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 11 L is estimated to increase the total population affected by noise. Option 11 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 11 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 11 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 11 R is estimated to increase the total population affected by noise. Option 11 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 11 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	MET
Design Principle Capacity	23R	PARTIAL

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

The estimated track length of option 11 L is 39km (21nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 11 R is 40km (22nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 11 L 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 an approximate total population of 3,400.

Up to 7,000ft, option 11 L 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 an approximate total population of 76,900.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 11 R 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 an approximate total population of 1,200.

Up to 7,000ft, option 11 R 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 an approximate total population of 70,200.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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
Design Principle Noise N3	23R	PARTIAL

Up to 4,000ft, this option 11 L is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 11 L is estimated to overfly 115 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 11 R is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 11 R is estimated to overfly 125 noise sensitive areas.

This is a smaller number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

17.12 Runways 23R/23L West Option 12

Design Principle Evaluation		Option No: 12
Option Name: SID RW 23L WEST Option 12		ACCEPT
Option Name: SID RW 23R 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.	R23 West Opt	tion 12 Left Al 77 Scraim As

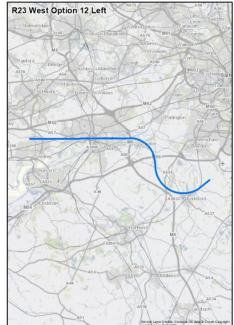
It follows the same lateral track as option 6 with an RF right turn that routes north before turning towards Wallasey. However, to eliminate interactions with LPL inbound traffic to Runway 27, it has an increased climb gradient up to the point the LPL delegated airspace is overflown. Thereafter the gradient 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.

D. C. D. C. Cafat.	23L	MET
Design Principle Safety	23R	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.

D. C. D. C. Balian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 12 L is estimated to increase the total population affected by noise. Up to 7,000ft, option 12 L is estimated to increase the total population affected by noise. Option 12 L is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 12 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 12 R is estimated to increase the total population affected by noise. Up to 7,000ft, option 12 R is estimated to increase the total population affected by noise. Option 12 R is similar in length and it is anticipated that emissions would be limited. At this stage of the process, option 12 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

D D Canacity	23L	MET
Design Principle Capacity	23R	PARTIAL
Summary of Qualitative Assessment:		

Design Principle Evaluation (DPE) – V2

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 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 23R 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.

	23L	PARTIAL
Design Principle Emissions	23R	PARTIAL

Summary of Qualitative Assessment:

The estimated track length of option 12 L is 43km (23nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 12 R is 44km (24nm). When compared to the 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	NOT MET
Design Principle Noise N1	23R	NOT MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 12 L 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 an approximate total population of 3,600.

Up to 7,000ft, option 12 L 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 an approximate total population of 155,400.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, option 12 R 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 an approximate total population of 2,900.

Up to 7,000ft, option 12 R 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 an approximate total population of 148,300.

This is a greater population compared to the 'do nothing' scenario up to 7,000ft, and a greater population compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Noise N2	23R	MET

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
Design Principle Noise N3	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, this option 12 L is estimated to overfly 5 noise sensitive areas.

Up to 7,000ft, this option 12 L is estimated to overfly 330 noise sensitive areas.

This is a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

Up to 4,000ft, this option 12 R is estimated to overfly 10 noise sensitive areas.

Up to 7,000ft, this option 12 R is estimated to overfly 320 noise sensitive areas.

This is a similar number of noise sensitive areas compared to the 'do nothing' scenario up to 7,000ft, and a greater number of noise sensitive areas compared to the 'do nothing' scenario up to 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

	23L	MET
Design Principle Technology	23R	MET

Summary of Qualitative Assessment:

17.13 Runways 23R/23L West Summary

	Option 2L	Option 3BL	Option 4L	Option 5AL	Option 5BL	Option 6L	Option 7L	Option 8L	Option 9L	Option 10L	Option 11L	option 12L
S	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	NOT MET	PARTIAL	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET	PARTIAL	NOT MET	NOT MET	NOT MET	NOT MET
N2	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
N3	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET	PARTIAL	PARTIAL	NOT MET	NOT MET	NOT MET
Α	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Add. Qual.	Best	Add. Qual.	Add. Qual.	Add. Qual.	Add. Qual.

	Option 2R	Option 3BR	Option 4R	Option 5AR	Option 5BR	Option 6R	Option 7R	Option 8R	Option 9R	Option 10R	Option 11R	Option 12R
S	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET	NOT MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	NOT MET	PARTIAL	NOT MET	NOT MET	NOT MET	NOT MET	PARTIAL	PARTIAL	PARTIAL	NOT MET	NOT MET	NOT MET
N2	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
N3	NOT MET	PARTIAL	NOT MET	NOT MET	NOT MET	NOT MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Α	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET
	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Best	Best	Best	Add. Qual.	Add. Qual.	Add. Qual.

17.14 Runways 23R/23L West Viable but Poor Fit Options

Option	Safety	Policy	Capacity					
A1 Extended straight ahead then route to WAL	S	Р	С					
tactical basis by ATC. In cur	Originally created as Option 1, this seeks to align with current operations that are managed on a tactical basis by ATC. In current operations, aircraft route initially south-west (on the EKLAD SID) before being vectored off the SID by ATC towards Wallasey (WAL).							
Policy: This option fails to ali	gn with the ends of the A	MS with respect to:						
	on would interact with i e stop climb or descent p							
The trade-off analysis agains	t noise, did not identify c	n material noise benefit b	pelow 4,000ft.					
Similarly, the trade-off analy sufficient to offset a red cated		ends did not identify ot	her material benefits					
Additional options were creat	ed to mitigate this by ave	oiding this interaction.						
<u>Capacity</u> : This option would interact with the 23 South-west departure design envelope. This would limit the ability to achieve one minute departure splits and not enabling best use of runway capacity.								
B13 Combined replication of EKLAD and KUXEM	S	Ρ	С					
Originally created as Option 3A, this was a combined EKLAD and KUXEM SID which separated close to the termination point.								
<u>Safety</u> : Feedback from NATS NERL suggested that this option would create issues with both flight planning and ATC procedures which may result in safety incidents. Additional options were created that avoid this risk occurring.								
<u>Capacity</u> : This option would limit the ability to achieve one								

18 Standard Instrument Departures Evaluation Summary

The acceptance / rejection process set out at section 4.2 accepted 133 SID design options that were carried forward to the IOA for further consideration. This process also rejected 75 SID design options.

At this relatively early stage in the process the ability to carry out a detailed assessment of the design principles Capacity, Emissions, Noise N2 and Airspace in particular was limited, due to routes not being developed as a system or combined with the designs of the enroute network and adjacent airports. 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 Safety, Policy and Capacity.

- Safety: Safety is the no.1 priority for all airspace changes, and our routes must be safe and comply with industry standards and regulations. The application of this design principle focussed on the alignment to PANS-OPS and CAP778 and the avoidance of a hazardous conflict between the design option and other aircraft either at MAN at adjacent airports or in adjacent airspace.
- Policy: The Design Principle Policy requires us to take account of the CAA AMS (CAP1711) which sets out the 'Ends' that airspace modernisation must deliver, including the need to create a more efficient, environmentally focussed and integrated airspace network. To address this, the design process takes account of the constraints and considerations in the local airspace to create options to meet the 'Ends' within the AMS. This includes options that seek to reduce the number of people affected by noise in line with the Air Navigation Guidance 2017 or provide a more direct routing to the joining point with the network airspace to reduce emissions. Although listed as one of the 'Ends' in the AMS, Safety was not considered within the Design Principle Policy assessment, but as part of the Design Principle Safety assessment. This is outlined in the Policy evaluation summary in section 4.5
- 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, 23 design options, as detailed in the summary tables for each design envelope, 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 4.2.1 of this DPE and the potential for these options to align with the requirements of the design principles Safety, 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 section 3 details 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 133 SID design options were carried forward to the IOA for further consideration.

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 3000	Off FAF ACCEPT	
Option Name: Transition RW 05R North Option 1A 3000	Off FAF ACCEPT	
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 of equal CDA profile to all runways. From this location the route splits and turns south-west, w 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 Runwar 05L and 3.28%/1.88° for Runway 05R. These gradients of within the optimum range for low noise approaches and within the acceptable range for CDAs defined within ICAC guidance.	an vest of a yoy are	
05L	L MET	

Design Principle Safety

05R

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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 1A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 1A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 1A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 1A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 1A L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 1A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 1A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 1A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 1A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 1A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 1A R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 1A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

Design Principle Noise N1	05L	MET
Design Principle Noise NI	05R	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 an approximate total population of 17,300.

From 7,000ft, option 1A L 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 an approximate total population of 96,900.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 13,700.

From 7,000ft, option 1A R 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 an approximate total population of 106,700.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. C. D. C. I. Noise N2	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 1A L is estimated to overfly 45 noise sensitive areas.

From 7,000ft, this option 1A L is estimated to overfly 210 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 1A R is estimated to overfly 35 noise sensitive areas.

From 7,000ft, this option 1A R is estimated to overfly 220 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

Deter District Airpage	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

20.2 Transition Runways 05L/05R North Option 2A – 3,000ft FAF

Option Name: Transition RW 05L North Option 2A 3000ft FAF Option Name: Transition RW 05R North Option 2A 3000ft FAF	ACCEPT
Option Name: Transition RW 05R North Option 2A 3000ft FAF	
	ACCEPT
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 05K. 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.	<figure></figure>
Design Principle Safety 05L 05R	MET MET

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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 2A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 2A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 2A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 2A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 2A L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 2A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 2A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 2A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 2A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 2A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 2A R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 2A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Districts Canadity	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 17,400.

From 7,000ft, option 2A L 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 an approximate total population of 63,500.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 13,800.

From 7,000ft, option 2A R 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 an approximate total population of 61,800.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

D. C. D. C. Maine N/2	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 2A L is estimated to overfly 50 noise sensitive areas.

From 7,000ft, this option 2A L is estimated to overfly 120 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 2A R is estimated to overfly 40 noise sensitive areas.

From 7,000ft, this option 2A R is estimated to overfly 115 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

Deter District Airpage	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. Taskaslami	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

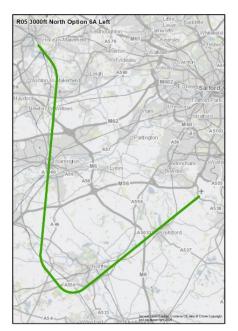
20.3 Transition Runways 05L/05R North Option 6A – 3,000ft FAF

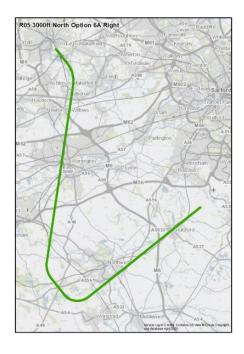
Design Principle Evaluation	Option No: 6A
Option Name: Transition RW 05L North Option 6A 3000ft FAF	REJECT
Option Name: Transition RW 05R North Option 6A 3000ft FAF	REJECT
Option Description:	

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.





D. C. D. C. Calat.	05L	MET
Design Principle Satety	05R	MET

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.

During Directly Policy	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 6A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 6A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 6A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 6A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 6A L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 6A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 6A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 6A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 6A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 6A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 6A R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 6A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
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Design Principle **Emissions**

05R

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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 17,100.

From 7,000ft, option 6A L 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 an approximate total population of 144,200.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 13,600.

From 7,000ft, option 6A R 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 an approximate total population of 127,800.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET
Summary of Qualitative Assessment:		

From 4,000ft, this option 6A L is estimated to overfly 45 noise sensitive areas.

From 7,000ft, this option 6A L is estimated to overfly 340 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 6A R is estimated to overfly 35 noise sensitive areas.

From 7,000ft, this option 6A R is estimated to overfly 315 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

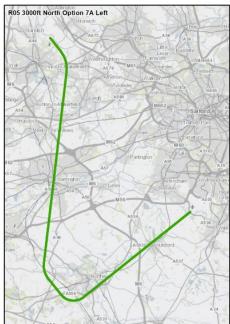
20.4 Transition Runways 05L/05R North Option 7A – 3,000ft FAF

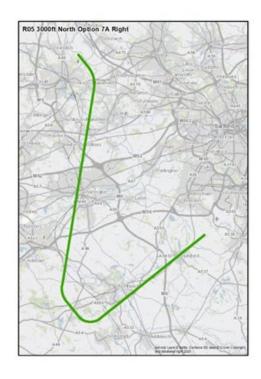
Design Principle Evaluation		Option No: 7A
Option Name: Transition RW 05L North Option 7A 3000ft FAF		REJECT
Option Name: Transition RW 05R North Option 7A 3000ft FAF		REJECT
Option Description: Option 7A has an IAF at 7,000ft to the north-west of the airport in the vicinity of Aspull to the east of Wigan and has been designed to reduce potential interactions with	R05 3000ft Nor	All Television th Option 7A Left Planned A877 Epi(on Asia Television Tele

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.





D. C. D. C. Cafat	05L	MET
Design Principle Satety	05R	MET

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.

D. J. D. J. Daltar	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 7A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 7A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 7A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 7A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 7A L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 7A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 7A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 7A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 7A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 7A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 7A R is longer in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 7A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 16,200.

From 7,000ft, option 7A L 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 an approximate total population of 147,600.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 12,700.

From 7,000ft, option 7A R 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 an approximate total population of 133,400.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

MET

Design Principle Noise N3	O5R	MET
Summary of Qualitative Assessment:		

From 4,000ft, this option 7A L is estimated to overfly 45 noise sensitive areas.

From 7,000ft, this option 7A L is estimated to overfly 330 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 7A R is estimated to overfly 35 noise sensitive areas.

From 7,000ft, this option 7A R is estimated to overfly 310 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

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
Diption Description: Deption 8A has an IAF at 7,000ft to the north-west of tairport in the vicinity of the Middlebrook Retail Park. It been designed to reduce potential interactions with departures and to facilitate a CDA profile to all runway also provides a broadly equal CDA for both runway directions. From this location the route splits, and heads south-we he vicinity of Atherton and routes just to the east of cervarington. Both routes then turn left to establish aircuinal approach to the west of Northwich at 3,000ft for Runway 05L or 05R. The descent gradient to the FAF is 3.06%/1.75° for RuD5L and 2.9%/1.66° for Runway 05R. These gradients at the lower end of the optimum for low noise approastill within the acceptable range for CDAs defined with CAO guidance.	he has ys. It est in ontral raft on either ynway s are ch but in	
Design Principle Satety	05L	MET
	05R	MET

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.

D. C. D. C. L. Balian	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 8A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 8A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 8A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 8A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 8A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 8A L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 8A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 8A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 8A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 8A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 8A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 8A R is longer in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 8A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
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Design Principle Emissions	05R	PARTIAL
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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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 19,400.

From 7,000ft, option 8A L 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 an approximate total population of 182,500.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 12,900.

From 7,000ft, option 8A R 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 an approximate total population of 189,800.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

D. C. D. C. Natas NO	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 8A L is estimated to overfly 55 noise sensitive areas.

From 7,000ft, this option 8A L is estimated to overfly 390 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 8A R is estimated to overfly 35 noise sensitive areas.

From 7,000ft, this option 8A R is estimated to overfly 375 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

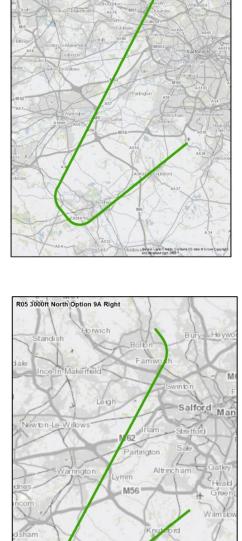
20.6 Transition Runways 05L/05R North Option 9A – 3,000ft FAF

Design Principle Evaluation		Option No: 9A
Option Name: Transition RW 05L North Option 9A 3000ft FAF		ACCEPT
Option Name: Transition RW 05R North Option 9A 3000ft F.	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.	R05 3000ft No	rth Option 9A Left Left Left Left Left Left Left Left
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	Bilinge All Hardoot Hardoot	In Alexandre - Control - C

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.

aircraft on final approach at 3,000ft for either Runway 05L



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Derice Directed Safate	05L	MET
Design Principle Safety	05R	MET
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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.

D. C. D. C. Dollar	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 9A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 9A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 9A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 9A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 9A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 9A L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 9A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 9A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 9A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 9A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 9A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 9A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 9A R is longer in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 9A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
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Design Principle Emissions	05R	PARTIAL

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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore 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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 17,700.

From 7,000ft, option 9A L 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 an approximate total population of 153,300.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 17,200.

From 7,000ft, option 9A R 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 an approximate total population of 160,500.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 9A L is estimated to overfly 45 noise sensitive areas.

From 7,000ft, this option 9A L is estimated to overfly 275 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 9A R is estimated to overfly 50 noise sensitive areas.

From 7,000ft, this option 9A R is estimated to overfly 290 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

	IAF STEAK	IAF STEAK	IAF 1	IAF 2	IAF 3	IAF 4
	Option 1AL	Option 2AL	Option 6AL	Option 7AL	Option 8AL	Option 9AL
S	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Ε	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET
	Best	Best	Best but incomplete IAF	Best but incomplete IAF	Best	Best

20.7 Transition Runways 05L/05R North 3,000ft FAF Summary

	IAF STEAK	IAF STEAK	IAF 1	IAF 2	IAF 3	IAF 4
	Option 1AR	Option 2AR	Option 6AR	Option 7AR	Option 8AR	Option 9AR
S	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET
	4,000ft beneficial	4,000ft beneficial	Best but incomplete IAF	Best but incomplete IAF	4,000ft beneficial	4,000ft beneficial

Option	Safety	Policy	Capacity		
Transition north option A3	S	Р	С		
This was initially designed as Option 3 and is a route based on the "North1" IAF located at the position of the current MIRSI hold.					
<u>Safety</u> : This option raised sigr between MAN arrivals and de		0	and lateral separation		
Policy: This option fails to alig	n with the ends of the AM	S with respect to:			
		ound and outbound rout ATC intervention to resolve			
design envelope and sub-optimal descent	unable to provide a CD/	ons created from this IAF w A to both runway direction dditional noise. No other	ns. This would create a		
The trade-off analysis against red categorisation.	other AMS ends did not ic	lentify other material bene	fits sufficient to offset a		
Transition north option B4	S	Р	С		
Transition north option B4 This was initially designed as a Merge" IAF located close to th	Option 4 and is a route k				
This was initially designed as (Option 4 and is a route b ne current MIRSI hold. nificant safety concerns wi	pased on the position of c ith regards to the vertical	NATS proposed" NW		
This was initially designed as a Merge" IAF located close to th <u>Safety</u> : This option raised sign	Option 4 and is a route k ne current MIRSI hold. nificant safety concerns wi partures and arrivals to LF	pased on the position of c ith regards to the vertical PL.	NATS proposed" NW		
This was initially designed as a Merge" IAF located close to the <u>Safety</u> : This option raised sign between MAN arrivals and de <u>Policy</u> : This option fails to alig • Efficiency: This option	Option 4 and is a route k ne current MIRSI hold. nificant safety concerns wi partures and arrivals to LF n with the ends of the AM n would interact with inb	pased on the position of c ith regards to the vertical PL.	a NATS proposed" NW and lateral separation res to LPL which would		
This was initially designed as a Merge" IAF located close to the <u>Safety</u> : This option raised sign between MAN arrivals and de <u>Policy</u> : This option fails to alig • Efficiency: This option require a stop to clim • Environmental perfor design envelope and	Option 4 and is a route k ne current MIRSI hold. nificant safety concerns wi partures and arrivals to LF n with the ends of the AM n would interact with inb nb or descent profiles, or 7 mance – Noise: The optic	pased on the position of c ith regards to the vertical PL. S with respect to: ound and outbound rout ATC intervention to resolve ons created from this IAF w A to both runway direction	a NATS proposed" NW and lateral separation es to LPL which would e. vere outside the arrivals		
This was initially designed as a Merge" IAF located close to the <u>Safety</u> : This option raised sign between MAN arrivals and de <u>Policy</u> : This option fails to alig • Efficiency: This option require a stop to clim • Environmental perfor design envelope and	Option 4 and is a route k ne current MIRSI hold. nificant safety concerns wi partures and arrivals to LF n with the ends of the AM n would interact with inb nb or descent profiles, or / mance – Noise: The optic unable to provide a CD/ profile likely to result in ad	pased on the position of c ith regards to the vertical PL. S with respect to: ound and outbound rout ATC intervention to resolve ons created from this IAF w A to both runway direction dditional noise.	a NATS proposed" NW and lateral separation res to LPL which would e. vere outside the arrivals ns. This would create a		
This was initially designed as a Merge" IAF located close to the <u>Safety</u> : This option raised sign between MAN arrivals and de <u>Policy</u> : This option fails to alig • Efficiency: This option require a stop to clim • Environmental perfor design envelope and sub-optimal descent	Option 4 and is a route k ne current MIRSI hold. nificant safety concerns wi partures and arrivals to LF n with the ends of the AM n would interact with inb nb or descent profiles, or / mance – Noise: The optic unable to provide a CD/ profile likely to result in ad	pased on the position of c ith regards to the vertical PL. S with respect to: ound and outbound rout ATC intervention to resolve ons created from this IAF w A to both runway direction dditional noise.	a NATS proposed" NW and lateral separation res to LPL which would e. vere outside the arrivals ns. This would create a		
This was initially designed as a Merge" IAF located close to the <u>Safety</u> : This option raised sign between MAN arrivals and de <u>Policy</u> : This option fails to alig • Efficiency: This option require a stop to clim • Environmental perfor design envelope and sub-optimal descent	Option 4 and is a route k ne current MIRSI hold. nificant safety concerns wi partures and arrivals to LF n with the ends of the AM n would interact with inb nb or descent profiles, or / mance – Noise: The optic unable to provide a CD/ profile likely to result in ad	pased on the position of c ith regards to the vertical PL. S with respect to: ound and outbound rout ATC intervention to resolve ons created from this IAF w A to both runway direction dditional noise.	a NATS proposed" NW and lateral separation res to LPL which would e. vere outside the arrivals ns. This would create a		

Transition north option C5	S	Р	С
This was initially designed as Op Hold" IAF located north of the c		ased on the position of a	NATS proposed" West
<u>Safety</u> : This option raised signifi between MAN arrivals and depo			and lateral separation
Policy: This option fails to align	with the ends of the AMS	with respect to:	
· · · · · · · · · · · · · · · · · · ·		ound and outbound rout TC intervention to resolve	
design envelope and u		ns created from this IAF w to both runway direction Iditional noise.	
The trade-off analysis against oth red categorisation.	ner AMS ends did not id	entify other material bene	fits sufficient to offset a
Transition north option D10	S	Р	С
This was initially designed as O the current ROSUN hold. It w demonstrated that the profile for	vas considered as an c	ption for both runways;	however, the analysis
Policy: This option fails to align	with the ends of the AMS	with respect to:	
design envelope and u		ns created from this IAF w to both runway direction Iditional noise.	
The trade-off analysis against of red categorisation.	ner AMS ends did not id	entify other material bene	fits sufficient to offset c
Transition north option E11	S	Р	С
This was initially designed as Op the current ROSUN hold. It we demonstrated that the profile for	as considered as an o	ption for both runways;	however, the analysis
Policy: This option fails to align	with the ends of the AMS	with respect to:	
Environmental perform design envelope and u	ance – Noise: The optio	ns created from this IAF w to both runway direction	
			fits sufficient to offset o

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

Transition north option F12	S	Р	С
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An arrival procedure could be created to provide a straight-in transition from the west for Runway 05 at MAN.

<u>Safety</u>: This option raised significant safety concerns with regards to the vertical and lateral separation between MAN arrivals and departures and arrivals to LPL.

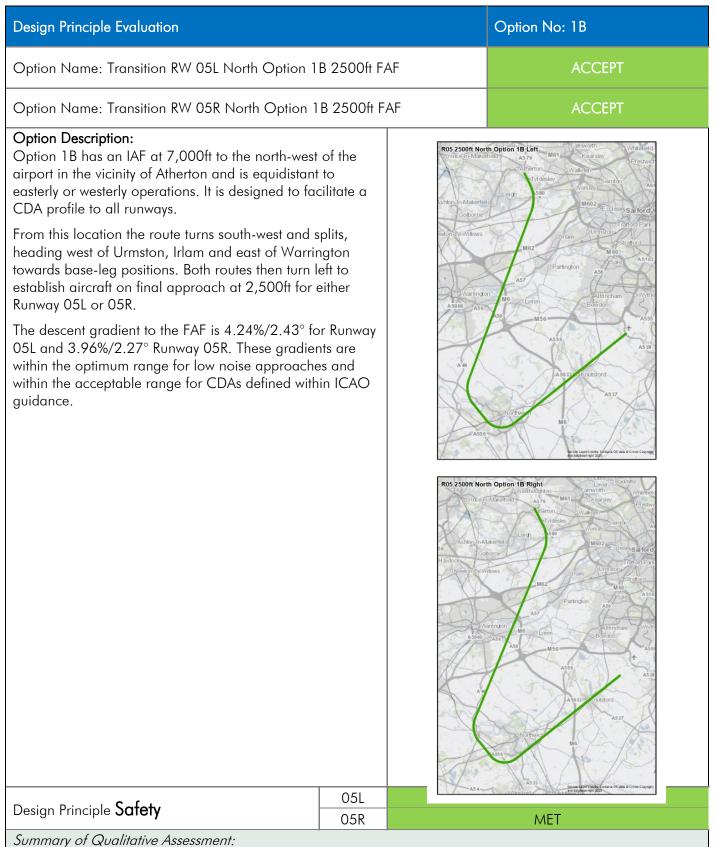
<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

• Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles, or ATC intervention to resolve. Whilst there may be opportunities to provide this route on a tactical basis, it would not be viable to create this route for use during peak time operations.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

21 Transitions Runways 05L/05R North – 2,500ft FAF

21.1 Transition Runways 05L/05R North Option 1B – 2,500ft FAF



Design Principle Evaluation (DPE) – V2

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.

D. C. D. C. L. Balian	05L	PARTIAL
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 1B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 1B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 1B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 1B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 1B L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 1B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 1B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 1B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 1B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 1B R is similar in length and it is anticipated that emissions would be limited when compared against the MIRSI 'do nothing' comparator. Option 1B R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 1B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

|--|

Design Principle Emissions 05R 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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 26,600.

From 7,000ft, option 1B L 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 an approximate total population of 89,900.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 12,500.

From 7,000ft, option 1B R 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 an approximate total population of 91,300.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 1B L is estimated to overfly 75 noise sensitive areas.

From 7,000ft, this option 1B L is estimated to overfly 190 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 1B R is estimated to overfly 35 noise sensitive areas.

From 7,000ft, this option 1B R is estimated to overfly 190 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

21.2 Transition Runways 05L/05R North Option 2B – 2,500ft FAF

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	ACCEPT ACCEPT
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	R05 2500ft North Option 2B Loff - Leich A580 - N-Makerfield Colborne Col
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	Lei di ASB Soborne Col
Design Principle Safety 05L 05R	MET MET

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.

D. C. D. C. L. Dollard	05L	PARTIAL
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 2B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 2B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 2B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 2B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 2B L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 2B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 2B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 2B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 2B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 2B R is similar in length and it is anticipated that emissions would be limited when compared against the MIRSI 'do nothing' comparator. Option 2B R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 2B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
Design Principle Emissions	05R	MET

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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 26,600.

From 7,000ft, option 2B L 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 an approximate total population of 72,100.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 13,600.

From 7,000ft, option 2B R 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 an approximate total population of 60,700.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. C. D. C. Maine N2	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 2B L is estimated to overfly 75 noise sensitive areas.

From 7,000ft, this option 2B L is estimated to overfly 145 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 2B R is estimated to overfly 45 noise sensitive areas.

From 7,000ft, this option 2B R is estimated to overfly 120 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

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 2500ft FAF	REJECT
Option Name: Transition RW 05R North Option 6B 2500ft 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.	<figure></figure>
Design Principle Safety 05L 05P	MET

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

	05L	PARTIAL
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 6B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 6B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 6B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 6B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 6B L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 6B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 6B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 6B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 6B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 6B R is similar in length and it is anticipated that emissions would be limited when compared against the MIRSI 'do nothing' comparator. Option 6B R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 6B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Decise District Canacity	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
Design Principle Emissions	05R	MET

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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 26,300.

From 7,000ft, option 6B L 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 an approximate total population of 163,200.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 12,600.

From 7,000ft, option 6B R 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 an approximate total population of 139,400.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

Destru Directal Noise N2	05L	MET
Design Principle Noise N2	05R	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.

Deterrish Noine N2	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 6B L is estimated to overfly 80 noise sensitive areas.

From 7,000ft, this option 6B L is estimated to overfly 385 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 6B R is estimated to overfly 35 noise sensitive areas.

From 7,000ft, this option 6B R is estimated to overfly 335 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

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 2500ft FAF	REJECT
Option Name: Transition RW 05R North Option 7B 2500ft 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.	<figure></figure>
Design Principle Safety	MET

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.

Determine Policy	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 7B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 7B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 7B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 7B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 7B L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 7B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 7B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 7B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 7B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 7B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 7B R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 7B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
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Design Principle Emissions	05R	PARTIAL

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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

Design Principle Noise N1	05L	MET
Design Principle Noise NI	05R	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 an approximate total population of 32,900.

From 7,000ft, option 7B L 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 an approximate total population of 167,500.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 12,100.

From 7,000ft, option 7B R 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 an approximate total population of 145,900.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 7B L is estimated to overfly 85 noise sensitive areas.

From 7,000ft, this option 7B L is estimated to overfly 325 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 7B R is estimated to overfly 35 noise sensitive areas.

From 7,000ft, this option 7B R is estimated to overfly 315 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

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 2500ft FAF	ACCEPT
Option Name: Transition RW 05R North Option 8B 2500ft FAF	ACCEPT
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.	<figure></figure>
Design Principle Safety	MET
05R	MET

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.

D. C. D. C. Delin y	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 8B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 8B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 8B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 8B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 8B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 8B L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 8B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 8B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 8B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 8B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 8B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 8B R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 8B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Districts Canacity	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
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Design Principle Emissions	05R	PARTIAL
Summary of Qualitative Assessment:		
this option is longer in length and therefore great ROSUN 'do nothing' scenario this option is shorte	er emissions er in length o	and therefore fewer emissions would be anticipated.
this option is longer in length and therefore great	er emissions	When compared to the MIRSI 'do nothing' scenario would be anticipated. When compared to the and therefore fewer emissions would be anticipated.
Design Principle Noise N1	05L	MET
	05R	MET
approximate total population of 170,500. Compared to the MIRSI 'do nothing' scenario this smaller population from 4,000ft. When compare smaller population from 7,000ft, and a smaller p From 4,000ft, option 8B R is estimated to overfly population of 17,000. Taking account of planned approximate total population of 18,600. From 7,000ft, option 8B R is estimated to overfly population of 161,900. Taking account of plann	option over ed to the RC opulation fr approximat d property d	OSUN 'do nothing' scenario this option overflies a om 4,000ft. ely 7,300 households with an approximate evelopments, this option is estimated to impact an
approximate total population of 172,100.		flies a smaller population from 7.000ft, and a
Compared to the MIRSI 'do nothing' scenario this smaller population from 4,000ft. When compare smaller population from 7,000ft, and a smaller p	ed to the RC opulation fr	OSUN 'do nothing' scenario this option overflies a om 4,000ft.
Compared to the MIRSI 'do nothing' scenario this smaller population from 4,000ft. When compare	ed to the RC	SUN 'do nothing' scenario this option overflies a

	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 8B L is estimated to overfly 75 noise sensitive areas.

From 7,000ft, this option 8B L is estimated to overfly 360 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 8B R is estimated to overfly 45 noise sensitive areas.

From 7,000ft, this option 8B R is estimated to overfly 365 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

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 2500ft FAF		ACCEPT
Option Name: Transition RW 05R North Option 9B 2500ft FAF		ACCEPT
Defion Description: Defion 9B has an IAF at 7,000ft to the north of the ai in the vicinity of Bolton and is designed to facilitate a C profile to all runways. From this location the route splits, heads south-west and racks to the east of Warrington. Both routes then turn establish aircraft on final approach at 2,500ft for eithe Runway 05L or 05R. The descent gradient to the FAF is 3.24%/1.86° for Ru 05L and 3.07%/1.76° for Runway 05R. These gradien he lower end of the optimum range for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.	CDA Ind left to er unway its at	<figure></figure>
Design Principle Satety	05L 05R	MET
		MET

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.

D. C. D. C. L. Balian	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 9B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 9B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 9B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 9B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 9B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 9B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 9B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 9B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 9B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 9B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 9B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 9B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 9B R is longer in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 9B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Division Canadity	05L	PARTIAL
Design Principle Capacity	05R	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.

05L NOT MET

Design Principle Emissions	05R	PARTIAL
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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.		
	05L	MET
Design Principle Noise N1	05L 05R	MET
approximate total population of 22,900.	property d	evelopments, this option is estimated to impact an
approximate total population of 22,900. From 7,000ft, option 9B L is estimated to overfly a population of 150,000. Taking account of planned approximate total population of 152,900. Compared to the MIRSI 'do nothing' scenario this of smaller population from 4,000ft. When compared	pproximate d property option over l to the RC	ely 65,500 households with an approximate developments, this option is estimated to impact an flies a smaller population from 7,000ft, and a DSUN 'do nothing' scenario this option overflies a
approximate total population of 22,900. From 7,000ft, option 9B L is estimated to overfly a population of 150,000. Taking account of planned approximate total population of 152,900. Compared to the MIRSI 'do nothing' scenario this c	pproximate d property option over d to the RC pulation fr	ely 65,500 households with an approximate developments, this option is estimated to impact an flies a smaller population from 7,000ft, and a DSUN 'do nothing' scenario this option overflies a om 4,000ft. ely 5,300 households with an approximate
approximate total population of 22,900. From 7,000ft, option 9B L is estimated to overfly a population of 150,000. Taking account of planned approximate total population of 152,900. Compared to the MIRSI 'do nothing' scenario this of smaller population from 4,000ft. When compared smaller population from 7,000ft, and a smaller po From 4,000ft, option 9B R is estimated to overfly a population of 12,400. Taking account of planned approximate total population of 12,800. From 7,000ft, option 9B R is estimated to overfly a	pproximate d property ption over t to the RC pulation fr pproximat property d	ely 65,500 households with an approximate developments, this option is estimated to impact an flies a smaller population from 7,000ft, and a DSUN 'do nothing' scenario this option overflies a om 4,000ft. ely 5,300 households with an approximate levelopments, this option is estimated to impact an ely 61,750 households with an approximate
 approximate total population of 22,900. From 7,000ft, option 9B L is estimated to overfly a population of 150,000. Taking account of planned approximate total population of 152,900. Compared to the MIRSI 'do nothing' scenario this of smaller population from 4,000ft. When compared smaller population from 7,000ft, and a smaller population of 12,400. Taking account of planned approximate total population of 12,800. From 7,000ft, option 9B R is estimated to overfly a population of 141,300. Taking account of planned 	pproximate d property pption over to the RC pulation fr property d pproximat d property d property	ely 65,500 households with an approximate developments, this option is estimated to impact an flies a smaller population from 7,000ft, and a DSUN 'do nothing' scenario this option overflies a om 4,000ft. ely 5,300 households with an approximate levelopments, this option is estimated to impact an ely 61,750 households with an approximate developments, this option is estimated to impact an flies a smaller population from 7,000ft, and a DSUN 'do nothing' scenario this option overflies a
 approximate total population of 22,900. From 7,000ft, option 9B L is estimated to overfly a population of 150,000. Taking account of planned approximate total population of 152,900. Compared to the MIRSI 'do nothing' scenario this a smaller population from 4,000ft. When compared smaller population from 7,000ft, and a smaller population of 12,400. Taking account of planned approximate total population of 12,800. From 7,000ft, option 9B R is estimated to overfly a population of 141,300. Taking account of planned approximate total population of 143,200. Compared to the MIRSI 'do nothing' scenario this a smaller population of 143,200. 	pproximate d property pption over to the RC pulation fr property d pproximat d property d property	ely 65,500 households with an approximate developments, this option is estimated to impact an flies a smaller population from 7,000ft, and a DSUN 'do nothing' scenario this option overflies a om 4,000ft. ely 5,300 households with an approximate levelopments, this option is estimated to impact an ely 61,750 households with an approximate developments, this option is estimated to impact an flies a smaller population from 7,000ft, and a DSUN 'do nothing' scenario this option overflies a

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.

	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 9B L is estimated to overfly 65 noise sensitive areas.

From 7,000ft, this option 9B L is estimated to overfly 280 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 9B R is estimated to overfly 35 noise sensitive areas.

From 7,000ft, this option 9B R is estimated to overfly 255 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

21.7 Transition Runways 05L/05R North Option 10B – 2,500ft FAF

Design Principle Evaluation	Option No: 10B
Option Name: Transition RW 05L North Option 10B 2500ft F	F ACCEPT
Option Name: Transition RW 05R North Option 10B 2500ft F	F ACCEPT
Option Description: Option 10B has an IAF at 7,000ft to the north of the airport in the vicinity of Hawkshaw. The IAF is located approximately 2nm south of the ROSUN hold and is co- located with the IAF for the 23L/23R option 3B. 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 2.79%/1.60° for Runway 05L and 2.66%/1.53° for Runway 05R. These gradients are at the lower end of the optimum range for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.	<figure></figure>

D. C. D. C. Cafate	05L	MET
Design Principle Satety	05R	MET

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

D. C. D. C. Dallar	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 10B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 10B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 10B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 10B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 10B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 10B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 10B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 10B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 10B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 10B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 10B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 10B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 10B R is longer in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 10B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity	05L	PARTIAL
	05R	MET

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.

	05L	PARTIAL
Design Principle Emissions	05R	PARTIAL

Summary of Qualitative Assessment:

The estimated track length of option 10B L is 71km (38nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

The estimated track length of option 10B R is 73km (39nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

Design Principle Noise N1	05L	MET
	05R	MET

From 4,000ft, option 10B L is estimated to overfly approximately 10,100 households with an approximate population of 23,700. Taking account of planned property developments, this option is estimated to impact an approximate total population of 24,700.

From 7,000ft, option 10B L is estimated to overfly approximately 66,000 households with an approximate population of 155,300. Taking account of planned property developments, this option is estimated to impact an approximate total population of 159,000.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

From 4,000ft, option 10B R is estimated to overfly approximately 9,900 households with an approximate population of 23,500. Taking account of planned property developments, this option is estimated to impact an approximate total population of 25,200.

From 7,000ft, option 10B R is estimated to overfly approximately 68,100 households with an approximate population of 160,100. Taking account of planned property developments, this option is estimated to impact an approximate total population of 164,300.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 10B L is estimated to overfly 65 noise sensitive areas.

From 7,000ft, this option 10B L is estimated to overfly 290 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 10B R is estimated to overfly 60 noise sensitive areas.

From 7,000ft, this option 10B R is estimated to overfly 305 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. J. Taskaslami	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

21.8 Transition Runways 05L/05R North 2,500ft Summary

	IAF STEAK	IAF STEAK	IAF 1	IAF 2	IAF 3	IAF 4	IAF 5
	Option 1BL	Option 2BL	Option 6BL	Option 7BL	Option 8BL	Option 9BL	Option O10BL
S	MET	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	MET	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET
	Best	Best	Best but incomplete IAF	Best but incomplete IAF	Best	Best	Best

	IAF STEAK	IAF STEAK	IAF 1	IAF 2	IAF 3	IAF 4	IAF 5
	Option 1BR	Option 2BR	Option 6BR	Option 7BR	Option 8BR	Option 9BR	Option 10BR
S	MET	MET	MET	MET	MET	MET	MET
Ρ	MET	MET	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET	MET
Е	MET	MET	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL
N1	MET	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET
	Best	Best	Best but incomplete IAF	4,000ft beneficial but incomplete IAF	4,000ft beneficial	4,000ft beneficial	4,000ft beneficial

21.9 Transition Runways 05L/05R North 2,500ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity		
Transition north option A3	S	Р	С		
This was initially designed as position of the current MIRSI <u>Safety</u> : This option raised s separation between MAN arr	hold. significant safety concer	rns with regards to the			
 Policy: This option fails to align with the ends of the AMS with respect to: Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles, or ATC intervention to resolve. Environmental performance – Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise. The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation. 					
Transition north option B4	S	Р	С		
 This was initially designed as Option 4 and is a route based on the position of a NATS proposed" NW Merge" IAF located close to the current MIRSI hold. <u>Safety</u>: This option raised significant safety concerns with regards to the vertical and lateral separation between MAN arrivals and departures and arrivals to LPL. <u>Policy</u>: This option fails to align with the ends of the AMS with respect to: Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles or, ATC intervention to resolve. Environmental performance – Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise. The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation. 					
Transition north option C5	S	Р	С		
This was initially designed as Option 5 and is a route based on the position of a NATS proposed" West Hold" IAF located north of the current MIRSI hold. <u>Safety</u> : This option raised significant safety concerns with regards to the vertical and lateral separation between MAN arrivals and departures and arrivals to LPL.					

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

- Efficiency: This option would interact with inbound and outbound routes to LPL airport which would require stop climb or descent profiles or ATC intervention to resolve.
- Environmental performance Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

Transition north option D11	S	Р	С
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This was initially designed as Option 11 and is based on IAF6, which is the approximate position of the current ROSUN hold. It was considered as an option for both runways; however, the analysis demonstrated that profile for Runways 05L/05R would be below the minimum CDA criteria.

<u>Policy:</u> This option fails to align with the ends of the AMS with respect to:

• Environmental performance – Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

Transition north option E12	S	Р	С
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An arrival procedure could be created to provide a straight-in transition from the west for Runway 05 at MAN.

<u>Safety:</u> This option raised significant safety concerns with regards to the vertical and lateral separation between MAN arrivals and departures and arrivals to LPL.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

• Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles, or ATC intervention to resolve. Whilst there may be opportunities to provide this route on a tactical basis, it would not be viable to create this route for use during peak time operations.

The trade-off analysis against other AMS ends, including did not identify any further benefits.

22 Transitions Runways 05L/05R North – 2,000ft FAF

22.1 Transition Runways 05L/05R North Option 7C - 2,000ft FAF

Design Principle Evaluation			Option No: 7C
Option Name: Transition RW 05L North Option 7C 2000ft FAF			REJECT
Option Name: Transition RW 05R North Option 7	'C 2000ft F	FAF	REJECT
Option Description: Option 7C has an IAF at 7,000ft to the north-wes airport in the vicinity of Aspull and has been desig reduce potential interactions and increase the late separation from LPL Runway 27 arrivals. From the Aspull area, east of Wigan, the route spl heads south overflying Warrington. Both routes th left to establish aircraft on final approach at 2,000 either Runway 05L or 05R. The descent gradient to the FAF is 4.33%/2.48° fc 05L and 4.12%/2.36° for Runway 05R. These gra within the optimum range for low noise approached within the acceptable range for CDAs defined with guidance.	ned to ral its, and en turn Oft for or Runway dients are es and	r Starter Au Participa Handret Thatorie	<figure></figure>
Design Principle Safety	05L 05R		MET 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.

	05L	PARTIAL
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7C L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 7C L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 7C L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 7C L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 7C L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 7C L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 7C L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7C R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 7C R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 7C R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 7C R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 7C R is similar in length and it is anticipated that emissions would be limited when compared against the MIRSI 'do nothing' comparator. Option 7C R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 7C R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
Design Principle Emissions	05R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation (DPE) – V2

The estimated track length of option 7C L is 54km (29nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

The estimated track length of option 7C R is 56km (30nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, option 7C L 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 an approximate total population of 25,900.

From 7,000ft, option 7C L 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 an approximate total population of 126,800.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

From 4,000ft, option 7C R 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 an approximate total population of 44,600.

From 7,000ft, option 7C R 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 an approximate total population of 167,300.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. C. D. C. L. Natas N2	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 7C L is estimated to overfly 70 noise sensitive areas.

From 7,000ft, this option 7C L is estimated to overfly 255 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 7C R is estimated to overfly 105 noise sensitive areas.

From 7,000ft, this option 7C R is estimated to overfly 300 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

D. C. D. C. J. Taskaslami	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

22.2 Transition Runways 05L/05R North Option 12 - 2,000ft FAF

Option Name: Transition RW 05L North Option 12 2000ft FAF Option Name: Transition RW 05R North Option 12 2000ft FAF 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. t is similar to 7C, except the right turn direct to the base leg o 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.	
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.t is similar to 7C, except the right turn direct to the base leg o 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	R05 200001 North Option 12 Left
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 o 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	Addinator - Chrone (n Chroe
Design Principle Safety 05L 05R	MET MET

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.

	05L	PARTIAL
Design Principle Policy	05R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 12 L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 12 L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 12 L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 12 L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 12 L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 12 L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 12 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 12 R is estimated to increase the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 12 R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 12 R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 12 R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 12 R is similar in length and it is anticipated that emissions would be limited when compared against the MIRSI 'do nothing' comparator. Option 12 R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 12 R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
Design Principle Emissions	05R	MET

Summary of Qualitative Assessment:

The estimated track length of option 12 L is 56km (30nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

The estimated track length of option 12 R is 58km (31nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	PARTIAL

Summary of Qualitative Assessment:

From 4,000ft, option 12 L 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 an approximate total population of 34,800.

From 7,000ft, option 12 L 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 an approximate total population of 152,000.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

From 4,000ft, option 12 R 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 an approximate total population of 52,500.

From 7,000ft, option 12 R 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 an approximate total population of 172,400.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a greater population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	MET

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.

D. C. D. C. Maine N2	05L	MET
Design Principle Noise N3	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 12 L is estimated to overfly 85 noise sensitive areas.

From 7,000ft, this option 12 L is estimated to overfly 285 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 12 R is estimated to overfly 130 noise sensitive areas.

From 7,000ft, this option 12 R is estimated to overfly 400 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a greater number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

22.3 Transition Runways 05L/05R North Option 13 - 2,000ft FAF

Design Principle Evaluation		Option No: 13
Option Name: Transition RW 05L North Option 13 2000ft FAF		ACCEPT
Option Name: Transition RW 05R North Option 13 2	2000ft FAF	ACCEPT
Option Description: Option 13 has an IAF at 7,000ft to the north-north-w the airport in the vicinity of Worsley, co-located with t for option 23R/23L North 11A and has been designe reduce potential interactions and increase the lateral separation from LPL Runway 27 arrivals. From the Worsley area, west of Prestwich, the route sp and heads south-west just to the west of Irlam and overflying Cadishead and Lymm. Both routes then tu to establish aircraft on final approach at 2,000ft for e Runway 05L or 05R. The descent gradient to the FAF is 4.37%/2.50° for R 05L and 4.09%/2.34° for Runway 05R. These gradies optimum for low noise approaches and within the acceptable range for CDAs defined within ICAO guid	he IAF d to blits, rn left ither unway nts are ance.	
Design Principle Safety	05L 05R	MET MET

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.

D. C. D. C. Dollard	05L	PARTIAL
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 13 L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 13 L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 13 L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 13 L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 13 L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 13 L is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 13 L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 13 R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 13 R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 13 R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 13 R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 13 R is similar in length and it is anticipated that emissions would be limited when compared against the MIRSI 'do nothing' comparator. Option 13 R is similar in length and it is anticipated that emissions would be limited when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 13 R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	PARTIAL
Design Principle Emissions	05R	MET

Summary of Qualitative Assessment:

The estimated track length of option 13 L is 52km (28nm). When compared to the MIRSI 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

The estimated track length of option 13 R is 55km (30nm). When compared to the MIRSI 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise NI	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, option 13 L 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 an approximate total population of 9,900.

From 7,000ft, option 13 L 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 an approximate total population of 122,400.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

From 4,000ft, option 13 R 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 an approximate total population of 29,000.

From 7,000ft, option 13 R 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 an approximate total population of 136,100.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

From 4,000ft, this option 13 L is estimated to overfly 45 noise sensitive areas.

From 7,000ft, this option 13 L is estimated to overfly 235 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 13 R is estimated to overfly 70 noise sensitive areas.

From 7,000ft, this option 13 R is estimated to overfly 260 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

	IAF 2	IAF 11	IAF 12
	Option 7CL	Option 12L	Option 13L
S	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL
Ε	PARTIAL	PARTIAL	PARTIAL
N1	MET	MET	MET
N2	MET	MET	MET
N3	MET	MET	MET
Α	MET	MET	MET
т	MET	MET	MET
	Best but complete IAF	Best but complete IAF	Best

22.4 Transition Runways 05L/05R North 2,000ft FAF Summary

	IAF 2	IAF 11	IAF 12
	Option 7CR	Option 12R	Option 13R
S	MET	MET	MET
Р	MET	PARTIAL	MET
С	MET	MET	MET
E	MET	MET	MET
N1	MET	PARTIAL	MET
N2	MET	MET	MET
N3	MET	MET	MET
Α	MET	MET	MET
т	MET	MET	MET
	Best but complete IAF	Rejected	Best

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 1	A 3000ft FA	٨F	ACCEPT
Option Name: Transition RW 05R South Option 1	A 3000ft FA	٨F	ACCEPT
Option Description: Option 1A has an IAF at 7,000ft to the south-east airport in the vicinity of Meerbrook and is equidist easterly or westerly operation. It is designed to fac CDA profile to all runways. From this location the route splits and heads west, south of Macclesfield, north of Congleton. Both ro turn right to establish aircraft on final approach at for either Runway 05L or 05R. The descent gradient to the FAF is 3.45%/1.98° fc 05L and 3.28%/1.88° for Runway 05R. These gra within the optimum range for low noise approache within the acceptable range for CDAs defined with guidance.	ant to ilitate a to the outes then 3,000ft or Runway dients are es and	Logh lows Manglon Lyn Northwels Martwech	M56 Head Grow Paynon With Low Cha Reported M6 Maccie stre B Maccie stre
		Ros 3000ft So Us on Withows Durington	Bit option 1A Right Bit option 1A Right Salitorial Falistionin Salitorial Falistionin Manchester Manchester Marchaster Roddith Partington Salitorial Marchaster Roddith Minchester Marple Minchester High Marchaster High Minchester High High High </th
Design Principle Safety	05L 05R		MET MET
Summary of Qualitative Assessment:	, <u> </u>		

Design Principle Evaluation (DPE) – V2

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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 1A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 1A L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 1A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 1A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 1A R is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 1A R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	MET
Design Principle Emissions	05R	MET

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 therefore 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 therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 34,900.

From 7,000ft, option 1A L 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 an approximate total population of 39,500.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 31,200.

From 7,000ft, option 1A R 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 an approximate total population of 34,100.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

D. C. D. C. I. Naisa N2	05L	MET
Design Principle Noise N2	05R	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.

D. C. D. C. Noise N2	05L	MET
Design Principle Noise N3	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 1A L is estimated to overfly 60 noise sensitive areas.

From 7,000ft, this option 1A L is estimated to overfly 75 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 1A R is estimated to overfly 50 noise sensitive areas.

From 7,000ft, this option 1A R is estimated to overfly 65 noise sensitive areas.

Design Principle Evaluation (DPE) – V2

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

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	3000ft FAF	ACCEPT
Option Name: Transition RW 05R South Option 6A 3	3000ft FAF	ACCEPT
Option Description: Option 6A has an IAF at 7,000ft to the south-east of airport, just to the north of Leek. It is co-located with for the 23R/23L option 9A and is designed to facilita CDA profile to all runways. From this location the route splits and heads west, so Holmes Chapel, north of Sandbach and over Middle Both routes then turn right to establish aircraft on find approach at 3,000ft for either Runway 05L or 05R. This is the southernmost option and has been designe maintain 3nm separation from the boundary of CAS accordance with the CAA containment policy. The descent gradient to the FAF is 3.55% 2.03° for R 05L and 3.38%/1.94° Runway 05R. These gradients within the optimum range for low noise approaches of within the acceptable range for CDAs defined within guidance.	the the IAF te a uth of wich. al ed to in unway are and ICAO	
	0.51	Mode by Same Lynn Gotts, Crans 33 time Drow Company
Design Principle Safety	05L 05R	MET MET

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.

D. C. D. C. Dollard	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 6A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 6A L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 6A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 6A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 6A R is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 6A R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	MET
Design Principle Emissions	05R	MET

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 therefore 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 therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 33,100.

From 7,000ft, option 6A L 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 an approximate total population of 54,700.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 29,400.

From 7,000ft, option 6A R 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 an approximate total population of 58,900.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

D. C. D. C. Naisa NO	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 6A L is estimated to overfly 60 noise sensitive areas.

From 7,000ft, this option 6A L is estimated to overfly 75 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 6A R is estimated to overfly 50 noise sensitive areas.

From 7,000ft, this option 6A R is estimated to overfly 65 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

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 3000ft FAF		ACCEPT
Option Name: Transition RW 05R South Option 7A 3	000ft FAF	ACCEPT
Option Description: Option 7A has an IAF at 7,000ft co-located at the exi DAYNE hold. It is designed to facilitate a CDA profile runways. From this location the route splits and heads west, sou Macclesfield, north of Congleton and Sandbach and - over Middlewich. Both routes then turn right to establi aircraft on final approach at 3,000ft for either Runwar or 05R. The descent gradient to the FAF is 3.17%/1.82° for Ri 05L and 3.01%/1.73° Runway 05R. These gradients of just below the optimum for low noise approaches but the acceptable range for CDAs defined within ICAO guidance.	to all uth of then sh y O5L unway are within North	
Design Principle Safety	05L 05R	MET MET
	001	

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.

D. C. D. C. Doling	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 7A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 7A L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 7A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 7A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 7A R is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 7A R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	MET
Design Principle Emissions	05R	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 therefore 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 therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 35,900.

From 7,000ft, option 7A L 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 an approximate total population of 44,800.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 31,000.

From 7,000ft, option 7A R 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 an approximate total population of 37,000.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

D. C. D. C. Maine N2	05L	MET
Design Principle Noise N3	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 7A L is estimated to overfly 60 noise sensitive areas.

From 7,000ft, this option 7A L is estimated to overfly 85 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 7A R is estimated to overfly 50 noise sensitive areas.

From 7,000ft, this option 7A R is estimated to overfly 65 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	MET

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.

Dute Divide Technology	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

Design Principle Evaluation	Option No: 8A
Option Name: Transition RW 05L South Option 8A 3000ft FAF	ACCEPT
Option Name: Transition RW 05R South Option 8A 3000ft FAF	ACCEPT
Diption Description: Deption 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 he south of Macclesfield, just north of Congleton, then west ust north of Sandbach and over Middlewich to establish aircraft on the final approach at 3,000ft for either Runway DSL or OSR. The route has been designed to replicate the existing rectoring 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 DSL and 2.63%/1.51° Runway 05R. These gradients are below the optimum for low noise approaches but just within he acceptable range for CDAs defined within ICAO guidance.	

D. S. D. S. J. Safati	05L	MET
Design Principle Satety	O5R	MET

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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 8A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 8A L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 8A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 8A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 8A R is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 8A R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	MET
Design Principle Emissions	O5R	MET

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 therefore 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 therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise NI	05R	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 an approximate total population of 27,400.

From 7,000ft, option 8A L 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 an approximate total population of 60,700.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 34,600.

From 7,000ft, option 8A R 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 an approximate total population of 68,600.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

D. C. D. C. Maine N2	05L	MET
Design Principle Noise N2	05R	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	MET
	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 8A L is estimated to overfly 55 noise sensitive areas.

From 7,000ft, this option 8A L is estimated to overfly 85 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 8A R is estimated to overfly 60 noise sensitive areas.

From 7,000ft, this option 8A R is estimated to overfly 65 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

Design Principle Airspace	05L	MET
	05R	MET

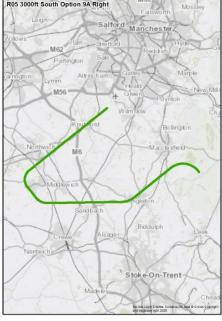
Summary of Qualitative Assessment:

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 Technology	05L	MET
	05R	MET

Summary of Qualitative Assessment:

esign Principle Evaluation	Option No: 9A
Option Name: Transition RW 05L South Option 9A 3000ft FAF	ACCEPT
Option Name: Transition RW 05R South Option 9A 3000ft FAF	ACCEPT
Option Description: Option 9A has an IAF at 7,000ft to the south-east of the irport in the vicinity of The Roaches. It is co-located with ne IAF for the 23R/23L option 8A and is designed to accilitate a CDA profile to all runways.	R05 3000ft South Option 9A Left. Leigh Salford Manchester Iows M62 Parington Sale Parington
rom this location the route splits and turns downwind, outh-west to Congleton, then west just north of Sandbach nd over Middlewich before turning on to the final pproach at 3,000ft for either Runway 05L or 05R.	Ington Lymm Altrincham Gatey Marple Hoadd Green Poynton Wilm Sow Knowbord Bollington
he route has been designed to replicate the existing ectoring patterns used by ATC and is anticipated to reduce iteractions with Runway 05 southbound departures.	Northwich Maccie stie B
he descent gradient to the FAF is 3.21%/1.84° for Runway 5L and 3.08%/1.77° Runway 05R. These gradients are ithin the optimum range for low noise approaches and ithin the acceptable range for CDAs defined within ICAO uidance.	Sandbäch Sandbäch Crowe Alsager Bidulph L Nantwich Made is v Stoke On-Trent



Design Principle Safety	05L	MET
	05R	MET
Summary of Qualitative Assessment		

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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 9A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 9A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 9A L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 9A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 9A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 9A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 9A R is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 9A R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	MET	
Design Principle Emissions	05R	MET	

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 therefore 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 therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 31,100.

From 7,000ft, option 9A L 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 an approximate total population of 60,000.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 30,900.

From 7,000ft, option 9A R 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 an approximate total population of 62,900.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

D. C. D. C. Maine NO	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 9A L is estimated to overfly 55 noise sensitive areas.

From 7,000ft, this option 9A L is estimated to overfly 120 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 9A R is estimated to overfly 55 noise sensitive areas.

From 7,000ft, this option 9A R is estimated to overfly 125 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed in accordance with PANS-OPS requirements.

	IAF TURKY	IAF 7	IAF 8	IAF 9	IAF 10
	Option 01AL	Option 06AL	Option 07AL	Option 08AL	Option 09AL
S	MET	MET	MET	MET	MET
Р	MET	MET	MET	MET	MET
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	MET	MET	MET	MET	MET
N1	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET
	Best	Best	Best	Best	Best

23.6 Transition Runways 05L/05R South 3,000ft FAF Summary

	IAF TURKY	IAF 7	IAF 8	IAF 9	IAF 10
	Option 1AR	Option 6AR	Option 7AR	Option 8AR	Option 9AR
S	MET	MET	MET	MET	MET
Р	MET	MET	MET	MET	MET
С	MET	MET	MET	MET	MET
E	MET	MET	MET	MET	MET
N1	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET
	Best	Best	Best	Best	Best

23.7 Transition Runways 05L/05R South 3,000ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity		
Transition south option A2	S	Р	С		
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 directly towards the airport where aircraft would make a 90 degrees left turn onto a downwind leg. <u>Safety</u> : This option is expected to interact with the Runways 05L/05R Missed Approach Procedure (MAP). This option also raised safety concerns with regards to the systemised separation between MAN arrivals and MAN Runway 05 southbound departures. <u>Capacity</u> : This option would interact with departures within the 05 South Departure Envelope. This would limit the ability to achieve one minute departure splits and not enabling best use of runway capacity.					
Transition south option B3	S	Р	С		
This was initially designed as Option 3 this procedure could be created to provide a straight-in transition from the west for Runway 05 at MAN.					
<u>Safety:</u> This option raised s separation between MAN arr	o ,	0	vertical and lateral		
Policy: This option fails to alig	gn with the ends of the A	MS with respect to:			
• Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles, or ATC intervention to resolve. Whilst there may be opportunities to provide this route on a tactical basis, it would not be viable to create this route for use during peak time operations.					
The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.					
Transition south option C4	S	Р	С		
This was initially designed as 'South Merge' IAF located so	the second se	the second se	of a NATS proposed		
<u>Safety:</u> The design of this may result in aircraft not being compliant with airspace containment requirements. This introduces the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy.					
Alternative options were designed to mitigate this risk.					
Policy: This option fails to align with the ends of the AMS with respect to:					

• Environmental performance – Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.



This was initially designed as Option 5 and is a route based on the position of a NATS proposed South 2 IAF located south-west of the existing DAYNE hold.

<u>Safety:</u> The design of this may result in aircraft not being compliant with airspace containment requirements. This introduces the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy.

Additional options that are fully contained were designed to mitigate this risk which resulted in this option offering no benefits if the containment restriction were not present.

<u>Policy:</u> This option fails to align with the ends of the AMS with respect to:

• Environmental performance – Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This creates a sub-optimal descent profile likely to result in additional noise.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

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 2500ft FAF		ACCEPT
Option Name: Transition RW 05R South Option 1B 2	2500ft FAF	ACCEPT
Option Description: Option 1B has an IAF at 7,000ft to the south-east of airport in the vicinity of Meerbrook and is equidistant easterly or westerly operation. It is designed to facilita CDA profile to all runways. From this location the route splits and heads west, to south of Macclesfield, north of Congleton and over Middlewich. Both routes then turn right to establish ai on final approach at 2,500ft for either Runway 05L o 05R. The descent gradient to the FAF is 4.17%/2.39° for R 05L and 3.95%/2.26° for Runway 05R. These gradie within the optimum range for low noise approaches of within the acceptable range for CDAs defined within I guidance.	to te a the rcraft r unway nts are ind	
		StokesOncilient
Design Principle Safety	05L	MEI
	05R	MET

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.

During District Policy	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 1B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 1B L is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 1B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 1B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 1B R is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 1B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

D. C. D. C. Friedone	05L	MET
Design Principle Emissions	05R	MET

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 therefore fewer 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 therefore fewer emissions would be anticipated.

	05L	MET
Design Principle Noise N1	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, option 1B L is estimated to overfly approximately 11,100 households with an approximate population of 25,300. Taking account of planned property developments, this option is estimated to impact an approximate total population of 28,600.

From 7,000ft, option 1B L is estimated to overfly approximately 12,050 households with an approximate population of 27,700. Taking account of planned property developments, this option is estimated to impact an approximate total population of 31,100.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

From 4,000ft, option 1B R is estimated to overfly approximately 11,300 households with an approximate population of 26,500. Taking account of planned property developments, this option is estimated to impact an approximate total population of 30,700.

From 7,000ft, option 1B R is estimated to overfly approximately 12,450 households with an approximate population of 29,300. Taking account of planned property developments, this option is estimated to impact an approximate total population of 34,500.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

D. C. D. C. Maine N2	05L	MET
Design Principle Noise N2	05R	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.

D. S. D. S. Maine N2	05L	MET
Design Principle Noise N3	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 1B L is estimated to overfly 75 noise sensitive areas.

From 7,000ft, this option 1B L is estimated to overfly 120 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 1B R is estimated to overfly 50 noise sensitive areas.

From 7,000ft, this option 1B R is estimated to overfly 125 noise sensitive areas.

Design Principle Evaluation (DPE) – V2

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed 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 2500ft FAF		ACCEPT	
Option Name: Transition RW 05R South Option 6	B 2500ft FAF		ACCEPT
Option Description: Option 6B has an IAF at 7,000ft to the south-east airport, just to the north of Leek. It is designed to fe CDA profile to all runways. From this location the route splits and heads west, Holmes Chapel, north of Sandbach and over Midd Both routes then turn right to establish aircraft on f approach at 2,500ft for either Runway 05L or 05R This is the southernmost option and has been desi maintain 3nm separation from the boundary of C/ accordance with the CAA containment policy. The descent gradient to the FAF is 4.26%/2.44° fc 05L and 4.06%/2.33° Runway 05R. These gradier within the optimum range for low noise approache within the acceptable range for CDAs defined with guidance.	acilitate a south of dlewich. final	Ros 2500R South	Notion 6E Right Magoon Bidulph Notion 6E Right Magoon Bidulph Notion 6E Right Magoon Bidulph Notion 6E Right Magoon Bidulph Notion 6E Right Magoon Reddish Marchester Hydro Marchester Hydro Marchester Hydro
Design Principle Safety	05L 05R		MET MET
Summary of Qualitative Assessment:			

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.

During Director Policy	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 6B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 6B L is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 6B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 6B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 6B R is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 6B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

D. Canacity	05L	PARTIAL
Design Principle Capacity	05R	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.

D. C. D. C. Emissions	05L	MET
Design Principle Emissions	05R	MET
		·

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 therefore fewer 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 therefore fewer emissions would be anticipated.

Design Principle Noise N1	05L	MET
	05R	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 an approximate total population of 23,300.

From 7,000ft, option 6B L 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 an approximate total population of 37,400.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 29,800.

From 7,000ft, option 6B R 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 an approximate total population of 51,100.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

Design Principle Noise N2	05L	MET
	05R	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	MET
	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 6B L is estimated to overfly 60 noise sensitive areas.

From 7,000ft, this option 6B L is estimated to overfly 80 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 6B R is estimated to overfly 50 noise sensitive areas.

From 7,000ft, this option 6B R is estimated to overfly 85 noise sensitive areas.

Design Principle Evaluation (DPE) – V2

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

Design Principle Airspace	05L	MET
	05R	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 Technology	05L	MET
	05R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed 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 25	500ft FAF	ACCEPT
Option Name: Transition RW 05R South Option 7B 2	ACCEPT	
Option Description: Option 7B has an IAF at 7,000ft co-located at the exis DAYNE hold. It is designed to facilitate a CDA profile unways. From this location the route splits and heads west, sou 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 Ru D5L and 3.62%/2.08° Runway 05R. These gradients a within the optimum range for low noise approaches an within the acceptable range for CDAs defined within 10 guidance.	to all th of n. unway ire nd CAO	Surprise Poynton Chapel Marcine stele 30 Builing in Marcine stele 30 Buildgin Sandblich Buildgin Stok e On Trent Buildgin Sandblich Buildgin
S. J. S. J. C. Let	05L	MET
Design Principle Safety	05R	MET

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	MET
	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 7B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 7B L is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 7B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 7B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 7B R is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 7B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity	05L	PARTIAL
	05R	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	MET
	05R	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 therefore fewer 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 therefore fewer emissions would be anticipated.

Design Principle Noise N1	Design	Principle	Noise	N1
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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 an approximate total population of 27,300.

From 7,000ft, option 7B L 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 an approximate total population of 33,000.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 35,100.

From 7,000ft, option 7B R 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 an approximate total population of 40,200.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

Design Principle Noise N2	05L	MET
	05R	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.

D. C. D. C. Maine N2	05L	MET
Design Principle Noise N3	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 7B L is estimated to overfly 70 noise sensitive areas.

From 7,000ft, this option 7B L is estimated to overfly 80 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 7B R is estimated to overfly 55 noise sensitive areas.

From 7,000ft, this option 7B R is estimated to overfly 85 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	MET

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.

	05L	MET
Design Principle lechnology	05R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed in accordance with PANS-OPS requirements.

Design Principle Evaluation	Opt	ion No: 8B
Option Name: Transition RW 05L South Option 8B 2500ft FAF		ACCEPT
Option Name: Transition RW 05R South Option 8B 2500ft FAF		ACCEPT
 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 ust 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 nteractions 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. 	M62 Irlan Sh Partington Sk on Lymm Attinche M56 Northwist M6 Moneyrch Sandbach	Ealsworth Mossley alford Manchester enfond Reddlinh de Uton
	ows M62 Partington S option Lymm Alteric ha M56 Northwy56 M6 M64Lewich Sandbach	n Falswonth Mosky Alford Manchester Unford Reddlah Marchester Galey Marke Hoad H Hoad H H

D. S. D. S. J. Safat.	05L	MET
Design Principle Satety	05R	MET

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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 8B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 8B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 8B L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 8B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 8B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 8B R is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 8B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

	05L	PARTIAL
Design Principle Capacity	05R	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.

	05L	MET
Design Principle Emissions	05R	MET
		·

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 therefore 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 therefore similar emissions would be anticipated.

	05L	MET
Design Principle Noise NI	05R	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 an approximate total population of 20,300.

From 7,000ft, option 8B L 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 an approximate total population of 52,700.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 26,100.

From 7,000ft, option 8B R 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 an approximate total population of 58,600.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	05L	MET
Design Principle Noise N2	05R	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.

	05L	MET
Design Principle Noise N3	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 8B L is estimated to overfly 55 noise sensitive areas.

From 7,000ft, this option 8B L is estimated to overfly 125 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 8B R is estimated to overfly 45 noise sensitive areas.

From 7,000ft, this option 8B R is estimated to overfly 115 noise sensitive areas.

Design Principle Evaluation (DPE) – V2

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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.

	05L	MET
Design Principle Iechnology	05R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed 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	Option Name: Transition RW 05L South Option 9B 2500ft FAF		
Option Name: Transition RW 05R South Option 9B	2500ft FAF	ACCEPT	
Option Description: Option 9B has an IAF at 7,000ft to the south-east o airport in the vicinity of The Roaches. From this location the route splits and turns downwir south-west to Congleton, then west just north of San over Middlewich before turning on to the final appro 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 interactions with Runway 05 southbound departures. The descent gradient to the FAF is 3.82%/2.19° for 05L and 3.67%/2.1° for Runway 05R. These gradien within the optimum range for low noise approaches within the acceptable range for CDAs defined within guidance.	nd, dbach bach at reduce Runway nts are and ICAO	Attrict nam Gatey Marpe Attrict nam Gatey Poynton Attrict nam Green Poynton Kristord Bollington Addition Bollington	
Design Principle Safety	05L 05R	MET MET	
Summary of Qualitative Assessment:			

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.

	05L	MET
Design Principle Policy	05R	MET

Summary of Qualitative Assessment:

Up to 4,000ft, option 9B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 9B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 9B L is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 9B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 9B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 9B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 9B R is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 9B R is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity	05L	PARTIAL
	05R	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.

	05L	MET
Design Principle Emissions	05R	MET

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 therefore fewer 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 therefore fewer emissions would be anticipated.

Deterrist Noise N1	05L	MET
Design Principle Noise N1	05R	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 an approximate total population of 21,900.

From 7,000ft, option 9B L 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 an approximate total population of 50,100.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 28,100.

From 7,000ft, option 9B R 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 an approximate total population of 56,700.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

D. C. D. C. I. Naisa N2	05L	MET
Design Principle Noise N2	05R	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	MET
	05R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 9B L is estimated to overfly 60 noise sensitive areas.

From 7,000ft, this option 9B L is estimated to overfly 125 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 9B R is estimated to overfly 45 noise sensitive areas.

From 7,000ft, this option 9B R is estimated to overfly 115 noise sensitive areas.

Design Principle Evaluation (DPE) – V2

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	05L	MET
Design Principle Airspace	05R	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 Technology	05L	MET
	05R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed in accordance with PANS-OPS requirements.

	IAF TURKY	IAF 7	IAF 8	IAF 9	IAF 10
	Option 1BL	Option 6BL	Option 7BL	Option 8BL	Option 9BL
S	MET	MET	MET	MET	MET
Р	MET	MET	MET	MET	MET
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	MET	MET	MET	MET	MET
N1	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET
	Best	Best	Best	Best	Best

24.6 Transition Runways 05L/05R South 2,500ft FAF Summary

	IAF TURKY	IAF 7	IAF 8	IAF 9	IAF 10
	Option 1BR	Option 6BR	Option 7BR	Option 8BR	Option 9BR
S	MET	MET	MET	MET	MET
Р	MET	MET	MET	MET	MET
С	MET	MET	MET	MET	MET
Ε	MET	MET	MET	MET	MET
N1	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET
Т	MET	MET	MET	MET	MET
	Best	Best	Best	Best	Best

24.7 Transition Runways 05L/05R South 2,500ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity		
Transition south option A2	S	Р	с		
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> : This option is expecte (MAP). This option also raise MAN arrivals and MAN Runw	d safety concerns with r	egards to the systemise			
<u>Capacity</u> : This option would i would limit the ability to achi capacity.		the second s			
Transition south option B3	S	Р	С		
Initially designed as Option 3, this procedure could be created to provide a straight-in transition from the west for Runway 05 at MAN. Safety: This option raised significant safety concerns with regards to the vertical and lateral					
separation between MAN arrivals and departures and arrivals to LPL.					
 Policy: This option fails to align with the ends of the AMS with respect to: Efficiency: This option would interact with inbound and outbound routes to LPL which would require a stop to climb or descent profiles, or ATC intervention to resolve. Whilst there may be opportunities to provide this route on a tactical basis, it would not be viable to create this route for use during peak time operations. 					
The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.					
Transition south option C4	S	Р	С		
This was initially designed as Option 4 and is a route based on the position of a NATS proposed 'South Merge' IAF located south-east of the existing DAYNE hold.					
<u>Safety</u> : The design of this may result in aircraft not being compliant with airspace containment requirements. This introduces the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy.					
Additional options that are fully contained were designed to mitigate this risk which resulted in this option offering no benefits if the containment restriction were not present.					
Policy: This option fails to align with the ends of the AMS with respect to:					

• Environmental performance – Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.



This was initially designed as Option 5 and is a route based on the position of a NATS proposed South 2 IAF located south-west of the existing DAYNE hold.

<u>Safety</u>: The design of this may result in aircraft not being compliant with airspace containment requirements. This introduces the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy.

Additional options that are fully contained were designed to mitigate this risk which resulted in this option offering no benefits if the containment restriction were not present.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

• Environmental performance – Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

25 Transitions Runways 23R/23L North – 3,500ft FAF

25.1 Transition Runways 23R/23L North Option 1A – 3,500ft FAF

Design Principle Evaluation		Option No: 1A	
Option Name: Transition RW 23L North Option 1A 3500ft FAF		ACCEPT	
Option Name: Transition RW 23R North Option 1A	3500ft FAF	ACCEPT	
Option Description: Option 1A has an IAF at 7,000ft to the north-west of airport in the vicinity of Aspull. It is designed to facili CDA profile to all runways. From this location the route splits and heads east, of 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 eit Runway 23L or 23R. The descent gradient to the FAF is 2.99%/1.71° for 23L and 2.89%/1.65° for Runway 23R. These gradii just below the optimum for low noise approaches but the acceptable range for CDAs defined within ICAO guidance.	of the tate a ver her Runway ents are ut within	R33,355000 North Option 18/Lett Bacup Outportert Soverhy NG6 Whitworth Marcue Marcue In Baru Baru Baru Baru In Baru Baru Baru Baru In Baru Baru Baru Baru Baru In Baru Bar	
Design Principle Safety	23L	MET	
Summary of Qualitative Assessment:	23R	MET	

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	PARTIAL
	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 1A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 1A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 1A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 1A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 1A L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 1A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 1A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 1A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 1A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 1A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 1A R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 1A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

23L	MET	
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Design Principle Emissions	23R	MET
Summary of Qualitative Assessments		

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

Design Principle Noise N1	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 77,100.

From 7,000ft, option 1A L 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 an approximate total population of 320,300.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 59,000.

From 7,000ft, option 1A R 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 an approximate total population of 300,700.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 1A L is estimated to overfly 150 noise sensitive areas.

From 7,000ft, this option 1A L is estimated to overfly 630 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 1A R is estimated to overfly 125 noise sensitive areas.

From 7,000ft, this option 1A R is estimated to overfly 565 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

Design Principle Airspace	23L	MET
	23R	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.

Dut a Diatala Tachnalagy	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed 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 3500ft FAF		ACCEPT	
Option Name: Transition RW 23R North Option 3A 3500ft FAF		٩F	ACCEPT
Option Description: Option 3A has an IAF at 7,000ft to the north of the in the vicinity of Hawkshaw approximately 2nm sout ROSUN hold. From this location the route splits and heads south-e between Bury and Rochdale. Both routes then turn ri establish aircraft on final approach at 3,500ft for eit Runway 23L or 23R. The descent gradient to the FAF is 3.35%/1.92° for 23L and 3.3%/1.89° for Runway 23R. These gradien within the optimum range for low noise approaches within the acceptable range for CDAs defined within guidance.	n of the east ght to her Runway nts are and	n A3 Line of E Carner of E Car	<figure></figure>
Design Principle Safety	23L 23R		MET MET
Summary of Qualitative Assessment:	201		

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 3A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 3A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 3A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 3A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 3A L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 3A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 3A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 3A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 3A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 3A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 3A R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 3A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

	23L	MET
Design Principle Emissions	23R	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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 54,900.

From 7,000ft, option 3A L 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 an approximate total population of 178,800.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

From 4,000ft, option 3A R 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 an approximate total population of 45,700.

From 7,000ft, option 3A R 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 an approximate total population of 153,000.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 3A L is estimated to overfly 100 noise sensitive areas.

From 7,000ft, this option 3A L is estimated to overfly 320 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 3A R is estimated to overfly 110 noise sensitive areas.

From 7,000ft, this option 3A R is estimated to overfly 280 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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 3500ft FAF		REJECT
Option Name: Transition RW 23R North Option 6A	3500ft FAF	REJECT
Option Description:		
Option 6A has an IAF at 7,000ft to the north-west of airport co-located with the ROSUN hold. From this location the route splits and heads south-eat the east of Bury but overhead Rochdale. Both routes turn right to establish aircraft on final approach at 3, for either Runway 23L or 23R. The descent gradient to the FAF is 3.26%/1.87 Runway 23L and 3.24%/1.86° for Runway 23R. gradients are within the optimum range for low approaches and within the acceptable range for defined within ICAO guidance.	ast, to then 500ft ° for These noise CDAs	<figure></figure>
Design Principle Safety	23L	MET
	23R	MET

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.

Dut - Distal Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 6A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 6A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 6A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 6A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 6A L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 6A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 6A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 6A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 6A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 6A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 6A R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 6A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Division Canacity	23L	PARTIAL
Design Principle Capacity	23R	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.

Design Principle Emissions	23R	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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

Design Principle Noise N1	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 64,600.

From 7,000ft, option 6A L 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 an approximate total population of 145,200.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 45,400.

From 7,000ft, option 6A R 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 an approximate total population of 140,200.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

Design Principle Noise N2	23L	MET
Design Principle Noise NZ	23R	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	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 6A L is estimated to overfly 110 noise sensitive areas.

From 7,000ft, this option 6A L is estimated to overfly 260 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 6A R is estimated to overfly 105 noise sensitive areas.

From 7,000ft, this option 6A R is estimated to overfly 300 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

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 3500ft FAF		ACCEPT
Option Name: Transition RW 23R North Option 7	A 3500ft FAF	ACCEPT
Option Description: Option 7A has an IAF at 7,000ft to the north-west airport in the vicinity of Harwood. It is designed to a CDA profile to all runways. From this location the route splits and heads south between Bolton and Bury but overhead Oldham. E routes then turn right to establish aircraft on final of at 3,500ft for either Runway 23L or 23R. The descent gradient to the FAF is 3.64%/2.09° fo 23L and 3.53%/2.02° for Runway 23R. These grad within the optimum range for low noise approache within the acceptable range for CDAs defined with guidance.	facilitate -east Both approach or Runway dients are os and in ICAO	<figure></figure>
Design Principle Safety	23L 23R	MET MET
Summary of Qualitative Assessment:		

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.

Detter Ditation Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 7A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 7A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 7A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 7A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 7A L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 7A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 7A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 7A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 7A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 7A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 7A R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 7A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

23L	MET

Design Principle Emissions	23R	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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 56,200.

From 7,000ft, option 7A L 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 an approximate total population of 257,000.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 44,200.

From 7,000ft, option 7A R 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 an approximate total population of 215,100.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 7A L is estimated to overfly 100 noise sensitive areas.

From 7,000ft, this option 7A L is estimated to overfly 425 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 7A R is estimated to overfly 105 noise sensitive areas.

From 7,000ft, this option 7A R is estimated to overfly 380 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

D. C. D. C. J. Taskaslami	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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 3500ft FAF		ACCEPT	
Option Name: Transition RW 23R North Option 8A 3	3500ft FAI	=	ACCEPT
Option Description: Option 8A has an IAF at 7,000ft to the north-west of airport in the vicinity of the Middlebrook Retail Park, a located with the IAF for option 05L/05R North 8A. It designed to facilitate a CDA profile to all runways. From this location the route splits and heads east, to south of Bury and Rochdale. Both routes then turn rig establish aircraft on final approach at 3,500ft for eith Runway 23L or 23R. The descent gradient to the FAF is 2.84%/1.63° for R 23L and 2.76%/1.58° for Runway 23R. These gradie below the optimum for low noise approaches but witt acceptable range for CDAs defined within ICAO guid	co- is the ht to her Cunway nts are hin the	R23 3500Ft Nor M65 Darrier M65 Darrier Honorch Barrier Honorch Barrier Honorch Barrier Honorch Barrier Honorch Barrier Honorch	And to be a read of the second
Design Principle Safety	23L		MET
Summary of Qualitative Assessment:	23R		MET

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.

D. C. D. C. Dollard	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 8A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 8A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 8A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 8A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 8A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 8A L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 8A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 8A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 8A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 8A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 8A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 8A R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 8A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

|--|

Design Principle Emissions	23R	MET
Commence of Origitation According		

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated.

Design Principle Noise N1	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 85,000.

From 7,000ft, option 8A L 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 an approximate total population of 304,200.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 65,800.

From 7,000ft, option 8A R 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 an approximate total population of 273,600.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 8A L is estimated to overfly 155 noise sensitive areas.

From 7,000ft, this option 8A L is estimated to overfly 535 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 8A R is estimated to overfly 145 noise sensitive areas.

From 7,000ft, this option 8A R is estimated to overfly 495 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

During Divide Aironago	23L	MET
Design Principle Airspace	23R	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.

Durin Divisio Technology	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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 3500ft FAF		F	ACCEPT
Option Name: Transition RW 23R North Option 11A 3500ft FAF		\F	ACCEPT
Option Description: Option 11A has an IAF at 7,000ft to the north-wess airport in the vicinity of Worsley, co-located with th option 05L/05R North 13. It is designed to facilitat profile to all runways. From this location the route splits and heads south- overhead Farnworth, then heads east, just to the nor Prestwich overhead Oldham. Both routes then turn establish aircraft on final approach at 3,500ft for e Runway 23L or 23R. This option is included to provide a design option f IAF created specifically for Runways 05L/05R (05L/ 2,000ft FAF option 13), where design options were required that minimise the impact on LPL Runway 2 arrivals. The descent gradient to the FAF is 3.59%/2.05° for 23L and 3.44%/1.97° for Runway 23R. These grads within the optimum range for low noise approache within the acceptable range for CDAs defined withit guidance.	e IAF for e a CDA east orth of right to ither rom an 05R e 7 r Runway lients are s and	an 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	<figure></figure>
Design Principle Safety	23L 23R		MET MET
Summary of Qualitative Assessment:	201		

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.

Determined Policy	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 11A L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 11A L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 11A L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 11A L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 11A L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 11A L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 11A L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 11A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 11A R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 11A R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 11A R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 11A R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 11A R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

PARTIAL

MET

At this stage of the process, option 11A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity 23L 23R

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.

23L	MET

Design Principle Emissions	23R	MET
Summary of Qualitative Assessments		

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 56,900.

From 7,000ft, option 11A L 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 an approximate total population of 287,700.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 44,500.

From 7,000ft, option 11A R 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 an approximate total population of 263,900.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 11A L is estimated to overfly 105 noise sensitive areas.

From 7,000ft, this option 11A L is estimated to overfly 515 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 11A R is estimated to overfly 105 noise sensitive areas.

From 7,000ft, this option 11A R is estimated to overfly 500 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

	IAF STEAK	IAF 5	IAF 6	IAF 4	IAF 3	IAF 12
	Option 1AL	Option 3AL	Option 6AL	Option 7AL	Option 8AL	Option 11AL
S	MET	MET	MET	MET	MET	MET
Р	MET	MET	MET	MET	MET	MET
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	MET	MET	MET	MET	MET	MET
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET
	Best	Best	Best but incomplete IAF	Best	Best	Best

25.7 Transition Runways 23R/23L North 3,500ft FAF Summary

	IAF STEAK	IAF 5	IAF 6	IAF 4	IAF 3	IAF 12
	Option 1AR	Option 3AR	Option 6AR	Option 7AR	Option 8AR	Option 11AR
S	MET	MET	MET	MET	MET	MET
Ρ	MET	MET	MET	MET	PARTIAL	MET
С	MET	MET	MET	MET	MET	MET
E	MET	MET	MET	MET	PARTIAL	MET
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET
	Best	Best	Best but incomplete IAF	Best	4,000ft beneficial	Best

25.8 Transition Runways 23R/23L North 3,500ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity		
Transition north option A2	S	Ρ	с		
This was initially designed as Option 2 and is a route based on the STEAK IAF 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.					
<u>Safety</u> : This option is expecte This option also raised safet arrivals and MAN Runway 23	y concerns with regards	s to the systemised sepa			
<u>Capacity</u> : This option would interact with departures within the Runway 23L/23R North and East departure envelopes which would limit the ability to achieve one minute departure splits and not enabling best use of runway capacity.					
Transition north option B4	S	Р	с		
 This was initially designed as Option 4 and is a route based on the North Merge IAF located near Blackburn. It was considered as an option for both runways; however, the analysis demonstrated that the profile for Runways 23L/23R would be below the minimum CDA criteria. Policy: This option fails to align with the ends of the AMS with respect to: Environmental performance – Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise. The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation. 					
Transition north option C5	S	Ρ	с		
This was initially designed as Option 5A and is a route based on the North 2 IAF located near Blackburn and north-west of the current ROSUN hold. It was considered as an option for both runways; however, the analysis demonstrated that the profile for Runways 23L/23R would be below the minimum CDA criteria.					
Policy: This option fails to align with the ends of the AMS with respect to:					
• Environmental performance – Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.					
The trade-off analysis agains offset a red categorisation.	t other AMS ends did n	ot identify other materia	benefits sufficient to		
Transition north option D9	S	Р	С		

This was initially designed as Option 9A and is a route based on IAF2. It was considered as an option for both runways; however, the analysis demonstrated that the profile for Runways 23L/23R for this 3,500ft FAF would be below the minimum CDA criteria. <u>Policy</u>: This option fails to align with the ends of the AMS with respect to: Environmental performance - Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise. The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation. Transition north option Ρ E10 This was initially designed as Option 10A and is a route based on IAF1. It was considered as an option for both runways; however, the analysis demonstrated that the profile for Runways 23L/23R for this 3,500ft FAF would be below the minimum CDA criteria. Policy: This option fails to align with the ends of the AMS with respect to: Environmental performance - Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise. The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation. Transition north option Ρ С F12 This was initially designed as Option 12A and is a route based on IAF11. It was considered as an option for both runways; however, the analysis demonstrated that the profile for Runways 23L/23R for this 3,500ft FAF would be below the minimum CDA criteria. Policy: This option fails to align with the ends of the AMS with respect to: Environmental performance - Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise. The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

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:	1B
Option Name: Transition RW 23L North Option 1	3 3000ft FAF		REJECT
Option Name: Transition RW 23R North Option 11	B 3000ft FAF		REJECT
Option Description: Option 1B has an IAF at 7,000ft to the north-west airport in the vicinity of Aspull. It is designed to faci CDA profile to all runways. From this location the route splits and heads east, of Boothstown, Prestwich and Oldham but north of Manchester City Centre. Both routes then turn right establish aircraft on final approach at 3,000ft for e Runway 23L or 23R. The descent gradient to the FAF is 3.68%/2.11° for 23L and 3.54%/2.03° for Runway 23R. These grac within the optimum range for low noise approache within the acceptable range for CDAs defined withi guidance.	litate a over to ither r Runway lients are s and	ch Bolton Buryo Heyer Bolton Saverbard Ma Bolton Saverbard Ma M60 Hinn Strettord Ma M60	Poyton Failworth Reddain Poyton Poyton Poyton Bollington Marchester Poyton Cr Bollington Marchester Poyton Cr Bollington Marchester Poyton Cr Bollington Marchester Poyton Cr Bollington Marchester Poyton Cr Bollington Marchester Poyton Cr Bollington Marchester Poyton Cr Bollington Marchester Poyton Cr Bollington Marchester Poyton Cr Bollington Marchester Poyton Marchester Poyton Marchester Cr Bollington Marchester Poyton Marchester Poyton Moren Cr Bollington Marchester Poyton Moren Cr Bollington Moren Cr Bollington Marchester Poyton Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Moren Cr Bollington Bollington Moren Cr Bollington Boll
Design Principle Safety	23L 23R	MET MET	

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.

D. C. D. C. Dollard	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 1B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 1B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 1B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 1B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 1B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 1B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 1B R is estimated to increase it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 1B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 1B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 1B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 1B R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 1B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

Z3L PARTIAL		23L	PARTIAL
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Design Principle Emissions	23R	MET
Summary of Qualitative Accessment:		

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 115,400.

From 7,000ft, option 1B L 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 an approximate total population of 345,500.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft.

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 an approximate total population of 115,600.

From 7,000ft, option 1B R 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 an approximate total population of 335,400.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a greater population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL

From 4,000ft, this option 1B L is estimated to overfly 225 noise sensitive areas.

From 7,000ft, this option 1B L is estimated to overfly 700 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft.

From 4,000ft, this option 1B R is estimated to overfly 265 noise sensitive areas.

From 7,000ft, this option 1B R is estimated to overfly 675 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a greater number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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 3000ft FAF		ACCEPT
Option Name: Transition RW 23R North Option 3	3B 3000ft FAF	ACCEPT
Option Description: Option 3B has an IAF at 7,000ft to the north of th in the vicinity of Hawkshaw approximately 2nm so ROSUN hold. From this location the route splits and heads south between Bury and Rochdale. Both routes then turn establish aircraft on final approach at 3,000ft for a Runway 23L or 23R. The descent gradient to the FAF is 3.96%/2.27° fo 23L and 3.93%/2.25° for Runway 23R. These gra within the optimum range for low noise approaches within the acceptable range for CDAs defined with guidance.	uth of the n-east n right to either or Runway dients are es but nin ICAO	<figure></figure>
Design Principle Safety	23L 23R	MET MET
Summary of Qualitative Assessment:		

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 3B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 3B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 3B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 3B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 3B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 3B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 3B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 3B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 3B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 3B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 3B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 3B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 3B R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 3B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

During Directole Emissions	23L	MET
Design Principle Emissions	23R	MET

The estimated track length of option 3B L is 51 km (28nm). When compared to the MIRSI 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer emissions would be anticipated.

Design Principle Noise N1	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 76,100.

From 7,000ft, option 3B L 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 an approximate total population of 222,300.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 81,400.

From 7,000ft, option 3B R 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 an approximate total population of 199,700.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Maine N2	23L	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 3B L is estimated to overfly 130 noise sensitive areas.

From 7,000ft, this option 3B L is estimated to overfly 430 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 3B R is estimated to overfly 160 noise sensitive areas.

From 7,000ft, this option 3B R is estimated to overfly 375 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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 3000ft FAF		REJECT
Option Name: Transition RW 23R North Option 6B	3000ft FAF	REJECT
Option Description: Option 6B has an IAF at 7,000ft to the north-west of airport co-located with the ROSUN hold. From this location the route splits and heads south-of he east of Bury but overhead Rochdale. Both routes ourn right to establish aircraft on final approach at 3 for either Runway 23L or 23R. The descent gradient to the FAF is 3.81%/2.19° for 23L and 3.8%/2.18° for Runway 23R. These gradie within the optimum range for low noise approaches within the acceptable range for CDAs defined within guidance.	east, to then ,000ft Runway nts are and	<figure></figure>
	23L	

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.

D. C. D. C. L. Dalian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 6B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 6B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 6B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 6B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 6B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 6B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 6B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 6B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 6B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 6B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 6B R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 6B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity23LPARTIAL23RMET

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.

23L	MET

Design Principle Emissions	23R	MET

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 101,500.

From 7,000ft, option 6B L 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 an approximate total population of 158,100.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 96,400.

From 7,000ft, option 6B R 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 an approximate total population of 154,600.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	PARTIAL

From 4,000ft, this option 6B L is estimated to overfly 205 noise sensitive areas.

From 7,000ft, this option 6B L is estimated to overfly 320 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 6B R is estimated to overfly 180 noise sensitive areas.

From 7,000ft, this option 6B R is estimated to overfly 285 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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	3000ft FAF	ACCEPT
Option Name: Transition RW 23R North Option 7B	3000ft FAF	ACCEPT
Option Description: Option 7B has an IAF at 7,000ft to the north-west of airport in the vicinity of Harwood. It is designed to fe a CDA profile to all runways. From this location the route splits and heads south- between Bolton and Bury but overhead Oldham. Bo routes then turn right to establish aircraft on final ap at 3,000ft for either Runway 23L or 23R. The descent gradient to the FAF is 4.45%/2.55° for 23L and 4.32%/2.48° for Runway 23R. These gradi optimal for low noise approaches and within the acr range for CDAs defined within ICAO guidance.	acilitate east th proach Runway ents are ceptable	A32 Delingent Deling
Design Principle Safety	23L 23R	MET MET

Design Principle Evaluation (DPE) – V2

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.

D D D alian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 7B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 7B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 7B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 7B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 7B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 7B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 7B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 7B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 7B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 7B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 7B R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 7B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity	23L	PARTIAL
	23R	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.

Design Principle Emissions	23L	MET
	23R	MET

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

Design Principle Noise N1	23L	MET
	23R	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 an approximate total population of 84,400.

From 7,000ft, option 7B L 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 an approximate total population of 303,000.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 88,700.

From 7,000ft, option 7B R 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 an approximate total population of 280,000.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft.

Design Principle Noise N2	23L	MET
	23R	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	MET
	23R	MET

From 4,000ft, this option 7B L is estimated to overfly 135 noise sensitive areas.

From 7,000ft, this option 7B L is estimated to overfly 535 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 7B R is estimated to overfly 165 noise sensitive areas.

From 7,000ft, this option 7B R is estimated to overfly 485 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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 3000ft FAF		REJECT
Option Name: Transition RW 23R North Option 8B 30	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 Nor 8A. It is designed to facilitate a CDA profile to all runw From this location the route splits and heads east, to the south of Bury and Rochdale. Both routes then turn right astablish 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 Ru 23L and 3.36%/1.92° for Runway 23R. These gradient within the optimum range for low noise approaches an within the acceptable range for CDAs defined within IC guidance.	th ays. e to r hway s are d AO	
Design Principle Satety	23L	MET
	:3R	MET

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.

D. C. D. C. Dollar	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 8B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 8B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 8B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 8B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 8B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 8B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 8B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 8B R is estimated to increase it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 8B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 8B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 8B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 8B R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 8B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

	23L	MET
Design Principle Emissions	23R	MET

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 114,700.

From 7,000ft, option 8B L 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 an approximate total population of 302,000.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft.

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 an approximate total population of 120,100.

From 7,000ft, option 8B R 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 an approximate total population of 321,200.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a greater population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL

Summary of Qualitative Assessment:

Design Principle Evaluation (DPE) – V2

From 4,000ft, this option 8B L is estimated to overfly 235 noise sensitive areas.

From 7,000ft, this option 8B L is estimated to overfly 545 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft.

From 4,000ft, this option 8B R is estimated to overfly 235 noise sensitive areas.

From 7,000ft, this option 8B R is estimated to overfly 585 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a greater number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

26.6 Transition Runways 23R/23L North Option 9B – 3,000ft FAF

		Option No: 9B
Option Name: Transition RW 23L North Option 9B 3000ft FAF		REJECT
option Name: Transition RW 23R North Option 9	9B 3000ft FAF	REJECT
Pption Description: Pption 9B has an IAF at 7,000ft to the north-wess irport co-located with the IAF for option 05L/05f B. It is designed to facilitate a CDA profile to all rom this location the route splits and heads east, buth of Bolton and Bury but overhead Oldham. I butes then turn right to establish aircraft on final of t 3,000ft for either Runway 23L or 23R. The descent gradient to the FAF is 3.01%/1.72° for 3L and 2.93%/1.68° for Runway 23R. These gradelow the optimum for low noise approaches but cceptable range for CDAs defined within ICAO gradely and the optimum for low noise approaches but the descent gradient to the FAF is 3.01%/1.72° for and 2.93%/1.68° for Runway 23R. These gradelow the optimum for low noise approaches but the optimum for Low noise a	R North runways. , to the Both approach or Runway adients are within the guidance.	

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 9B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 9B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 9B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 9B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 9B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 9B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 9B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 9B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 9B R is estimated to increase it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 9B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 9B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 9B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 9B R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 9B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

23L	MET

Design Principle Emissions	23R	PARTIAL
Summary of Qualitative Accordingt		

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 123,600.

From 7,000ft, option 9B L 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 an approximate total population of 287,500.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft.

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 an approximate total population of 141,100.

From 7,000ft, option 9B R 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 an approximate total population of 316,000.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a greater population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	PARTIAL
Design Principle Noise N3	23R	PARTIAL

From 4,000ft, this option 9B L is estimated to overfly 250 noise sensitive areas.

From 7,000ft, this option 9B L is estimated to overfly 515 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft.

From 4,000ft, this option 9B R is estimated to overfly 270 noise sensitive areas.

From 7,000ft, this option 9B R is estimated to overfly 565 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a greater number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

Option Name: Transition RW 23R North Option 10B 3000ft FAF 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 Evaluation		Option No: 10B
Option Description: Option 10B has an IAF at 7,000ft to the north-west of the airport co-located with the IAF for option OSL/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. $\frac{1}{100} \frac{1}{100} \frac{1}{100$	Option Name: Transition RW 23L North Option 10B 3000ft FAF		REJECT
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.	Option Name: Transition RW 23R North Option 10B 3000ft FAF		REJECT
	airport co-located with the IAF for option 05L/R N is designed to facilitate a CDA profile to all runwo From this location the route splits and heads east, Prestwich, Chadderton and Oldham but north of Manchester City Centre. Both routes then turn right establish aircraft on final approach at 3,000ft for Runway 23L or 23R. The descent gradient to the FAF is 2.92%/1.67° for 23L and 2.84%/1.63° for Runway 23R. These grad below the optimum for low noise approaches but	North 6B. It ays. , overhead ht to either or Runway adients are within the guidance.	<figure></figure>
Design Principle Safety 23L MET 23R MET	Design Principle Safety		

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 10B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 10B L is estimated to increase the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 10B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 10B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 10B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 10B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 10B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 10B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 10B R is estimated to increase it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 10B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 10B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 10B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 10B R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 10B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity

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.

23L

23R

PARTIAL

MET

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.

23L	MET

Design Principle Emissions	23R	PARTIAL

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 128,100.

From 7,000ft, option 10B L 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 an approximate total population of 348,200.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a greater population from 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 an approximate total population of 140,900.

From 7,000ft, option 10B R 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 an approximate total population of 353,100.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a similar population from 7,000ft, and a greater population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Maine N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL

From 4,000ft, this option 10B L is estimated to overfly 260 noise sensitive areas.

From 7,000ft, this option 10B L is estimated to overfly 685 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a greater number from 4,000ft.

From 4,000ft, this option 10B R is estimated to overfly 285 noise sensitive areas.

From 7,000ft, this option 10B R is estimated to overfly 680 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a similar number of sensitive sites from 7,000ft, and a greater number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

D. C. D. C. J. Taskaslami	23L	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

26.8 Transition Runways 23R/23L North Option 11B – 3,000ft FAF

Option Name: Transition RW 23L North Option 11B 3000ft FAF Option Name: Transition RW 23R North Option 11B 3000ft FAF 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	ACCEPT 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	3 3000ft North Option 11B Left Nor Left
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	Mase Asso Mase Flored Same Flored Same Mase Flored Same Flored Same Flored Same Flored Same Mase Mase Watcher Flored Same Flored Same Worker Mase Mase Worker Mase Mase Worker Mase Mase Formar Same Mase M
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.	<figure></figure>
Design Principle Safety 23L 23R	MET MET

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.

	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 11B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 11B L is estimated to limit the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 11B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 11B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 11B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 11B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 11B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 11B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 11B R is estimated to limit it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 11B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 11B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 11B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 11B R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 11B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

23L	MET	

Design Principle Emissions	23R	MET
Summary of Qualitative Assessments		

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is similar in length and therefore similar emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 83,700.

From 7,000ft, option 11B L 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 an approximate total population of 309,800.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 90,900.

From 7,000ft, option 11B R 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 an approximate total population of 299,800.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 11B L is estimated to overfly 130 noise sensitive areas.

From 7,000ft, this option 11B L is estimated to overfly 545 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 11B R is estimated to overfly 165 noise sensitive areas.

From 7,000ft, this option 11B R is estimated to overfly 555 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Technology	23R	MET

Summary of Qualitative Assessment:

26.9 Transition P s 23R/23L North Option 12R - 3 000ft FAF

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 potion 05L/05R North 12. Trom 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 231 or 23R. This option 12), where 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 231 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 Evaluation		0	ption No: 12B
Option 128 has an IAF at 7,000ft to the north-west of the dription 128 has an IAF at 7,000ft to the north-west of the dription 128 has an IAF at 7,000ft to the north-west of the dription 050/058 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 23 or 238.This option is included to provide a design option from on K2 created specifically for Runway 230 routes were required that minimise the impact on LPL Runway 27 arrivals.The descent gradient to the FAF is 2.80%/1.61° for Runway 231 and 2.75%/1.57° for Runway 238. These gradients are below the optimum for low noise approaches but within the acceptable range for CDAs defined within ICAO guidance.The descent gradient to the FAF is 2.80%/1.61° for Runway 241The descent gradient to the FAF is 2.80%/1.61° for Runway 241The descent gradient to the FAF is 2.80%/1.61° for Runway 250The descent gradient to the FAF is 2.80%/1.61° for Runway 260The descent gradient to the FAF is 2.80%/1.61° for Runway 260The descent gradient to the FAF is 2.80%/1.61° for Runway 260The descent gradient to the FAF is 2.80%/1.61° for Runway 260The descent gradient to the FAF is 2.80%/1.61° for Runway 260The descent gradient to the FAF is 2.80%/1.61° for Runway 260The descent gradient to the FAF is 2.80%/1.61° for Runway 260The descent gradient to the FAF is 2.80%/1.61° for Runway 260The descent gradient to the FAF is 2.80%/1.61° for Runway 270The descent gradient to the FAF is 2.80%/1.61° for Runway 200The desc	Option Name: Transition RW 23L North Option	12B 3000ft FAF		REJECT
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 Runway 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.	Option Name: Transition RW 23R North Option	12B 3000ft FAF		REJECT
De la Diana Safata 23L MET	Option 12B has an IAF at 7,000ft to the north-we airport in the vicinity of Bolton, co-located with the option 05L/05R North 12. From this location the route splits and heads east Bolton and Oldham but north of Manchester City Both routes then turn right to establish aircraft on approach at 3,000ft for either Runway 23L or 23 This option is included to provide a design option AF created specifically for Runways 05L/05R (051 2,000ft FAF option 12), where design options we required that minimise the impact on LPL Runway arrivals. The descent gradient to the FAF is 2.80%/1.61° ft 23L and 2.75%/1.57° for Runway 23R. These gra- below the optimum for low noise approaches but	e IAF for overhead Centre. final R. from an L/05R re 27 or Runway adients are within the	s ton there find or M65 Land Dar M61 Hot much Langh ribin La Winbws War anglon Lym Northworth M6 R23 3000ft North Option s ton	Chuch Huben Bacu Codmotion No Wintworth Mag Horn Buryu Lifewarda Mag Buryu Lifewarda Mag Mag Attree nam Catalon Mag Mag Mag Mag Mag Mag Mag Mag
Design Principle Safety 23R MET	Design Principle Safety			

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.

D. C. D. C. Dalian	23L	PARTIAL
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 12B L is estimated to limit the total population affected by noise, when compared with the MIRSI 'do nothing' comparator. Up to 4,000ft, option 12B L is estimated to increase the total population affected by noise, when compared with the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 12B L is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 12B L is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 12B L is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 12B L is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 12B L is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 12B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 4,000ft, option 12B R is estimated to increase it when compared against the ROSUN 'do nothing' comparator.

Up to 7,000ft, option 12B R is estimated to limit the total population affected by noise, when compared against the MIRSI 'do nothing' comparator. Up to 7,000ft, option 12B R is estimated to limit the total population affected by noise, when compared against the ROSUN 'do nothing' comparator.

Option 12B R is longer in length and it is anticipated that emissions would be increased when compared against the MIRSI 'do nothing' comparator. Option 12B R is longer in length and it is anticipated that emissions would be increased when compared against the ROSUN 'do nothing' comparator.

At this stage of the process, option 12B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

During Directly Canacity	23L	PARTIAL
Design Principle Capacity	23R	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.

Desire Brinsials Emissions	23L	MET
Design Principle Emissions	23R	PARTIAL

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 therefore fewer emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is shorter in length and therefore fewer 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 therefore similar emissions would be anticipated. When compared to the ROSUN 'do nothing' scenario this option is longer in length and therefore greater emissions would be anticipated.

	23L	PARTIAL
Design Principle Noise N1	23R	PARTIAL

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 an approximate total population of 130,900.

From 7,000ft, option 12B L 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 an approximate total population of 309,000.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a greater population from 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 an approximate total population of 138,700.

From 7,000ft, option 12B R 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 an approximate total population of 321,600.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a greater population from 4,000ft.

Design Principle Noise N2	23L	MET
Design Principle INDISE INZ	23R	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.

Deterrise Naire N2	23L	PARTIAL
Design Principle Noise N3	23R	PARTIAL

From 4,000ft, this option 12B L is estimated to overfly 265 noise sensitive areas.

From 7,000ft, this option 12B L is estimated to overfly 605 noise sensitive areas.

Compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a greater number from 4,000ft.

From 4,000ft, this option 12B R is estimated to overfly 255 noise sensitive areas.

From 7,000ft, this option 12B R is estimated to overfly 625 noise sensitive areas.

When compared to the MIRSI 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft. When compared to the ROSUN 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a greater number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

	IAF STEAK	IAF 5	IAF 6	IAF 4	IAF 3	IAF 2	IAF 1	IAF 12	IAF 11
	Option 1BL	Option 3BL	Option 6BL	Option 7BL	Option 8BL	Option 9BL	Option 10BL	Option 11BL	Option 12BL
S	MET	MET	MET	MET	MET	MET	MET	MET	MET
Р	MET	MET	MET	MET	MET	MET	PARTIAL	MET	PARTIAL
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
E	MET	MET	MET	MET	MET	MET	MET	MET	MET
N1	MET	MET	MET	MET	MET	MET	PARTIAL	MET	PARTIAL
N2	MET	MET	MET	MET	MET	MET	MET	MET	MET
N3	PARTIAL	MET	MET	MET	PARTIAL	PARTIAL	PARTIAL	MET	PARTIAL
Α	MET	MET	MET	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET	MET	MET	MET
	Rejected	Best	Best but incomplete IAF	Best	Rejected	Rejected	Rejected	Best	Rejected

26.10 Transition Runways 23R/23L North 3,000ft FAF Summary

	IAF STEAK	IAF 5	IAF 6	IAF 4	IAF 3	IAF 2	IAF 1	IAF 12	IAF 11
	Option 1BR	Option 3BR	Option 6BR	Option 7BR	Option 8BR	Option 9BR	Option 10BR	Option 11BR	Option 12BR
S	MET	MET	MET						
Р	PARTIAL	MET	MET	MET	PARTIAL	PARTIAL	PARTIAL	MET	PARTIAL
С	MET	MET	MET						
Е	MET	MET	MET	MET	MET	PARTIAL	PARTIAL	MET	PARTIAL
N1	PARTIAL	MET	MET	MET	PARTIAL	PARTIAL	PARTIAL	MET	PARTIAL
N2	MET	MET	MET						
N3	PARTIAL	MET	PARTIAL	MET	PARTIAL	PARTIAL	PARTIAL	MET	PARTIAL
Α	MET	MET	MET						
т	MET	MET	MET						
	Rejected	Best	Rejected	Best	Rejected	Rejected	Rejected	Best	Rejected

26.11 Transition Runways 23R/23L North 3,000ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity				
Transition north option A2	S	Р	С				
west of the airport. The route	This was initially designed as Option 2 and is a route based on the STEAK IAF 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.						
<u>Safety</u> : This option is expecte This option also raised safet arrivals and MAN Runway 23	y concerns with regards	to the systemised sepa	and the second				
<u>Capacity</u> : This option would departure envelopes which v enabling best use of runway	vould limit the ability to						
Transition north option B4	S	Р	С				
This was initially designed as Blackburn. It was considered that the profile for Runways 2	as an option for both	runways; however, the c	inalysis demonstrated				
Policy: This option fails to alig	gn with the ends of the A	MS with respect to:					
Environmental perfo arrivals design enve	- prmance – Noise: The o elope and unable to pro	ptions created from this ovide a CDA to both ru ikely to result in addition	nway directions. This				
The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.							
Transition north option C5	S	Р	С				
This was initially designed as Option 5A and is a route based on the North 2 IAF located near Blackburn and north-west of the current ROSUN hold. It was considered as an option for both runways; however, the analysis demonstrated that the profile for Runways 23L/23R would be below the minimum CDA criteria.							
Policy: This option fails to alig	Policy: This option fails to align with the ends of the AMS with respect to:						
• Environmental performance – Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.							
The trade-off analysis agains offset a red categorisation.	t other AMS ends did n	ot identify other materia	l benefits sufficient to				

27 Transitions Runways 23R/23L South – 3,500ft FAF

27.1 Transition Runways 23R/23L South Option 1A – 3,500ft FAF

Design Principle Evaluation		0	ption No: 1A
Option Name: Transition RW 23L South Option 1	A 3500ft FAF		ACCEPT
Option Name: Transition RW 23R South Option 1A 3500ft FAF			ACCEPT
Option Description: Option 1A has an IAF at 7,000ft to the south-east airport in the vicinity of Sutton. It is designed to fac CDA profile to all runways. From this location the route splits and heads north- to the west of Whaley Bridge and then overhead G Both routes then turn left to establish aircraft on fin approach at 3,500ft for either Runway 23L or 23R The descent gradient to the FAF is 3.15%/1.80° fo 23L and 3.02%/1.73° for Runway 23R. These grad within the optimum range for low noise approache within the acceptable range for CDAs defined with guidance.	ilitate a -east, just Blossop. al r Runway dients are s and	R23 35001 South Option 1 Saling of Asia 1 Sali	on 10 Lott Shavalay if F allworth Mon Mon - 6.0 tool Bhilder, brea tool dom - 0.0 tool if Lott - 0.0
		R23 35001 South Option	nr, 14, Right 19, and 19, and
Design Principle Safety	23L 23R		MET MET

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.

	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 1A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 1A L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 1A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 1A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 1A R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 1A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore 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 therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 43,900.

From 7,000ft, option 1A L 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 an approximate total population of 57,200.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 39,600.

From 7,000ft, option 1A R 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 an approximate total population of 53,200.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Maine N2	23L	MET
Design Principle Noise N3	23R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 1A L is estimated to overfly 80 noise sensitive areas.

From 7,000ft, this option 1A L is estimated to overfly 105 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 1A R is estimated to overfly 80 noise sensitive areas.

From 7,000ft, this option 1A R is estimated to overfly 105 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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 2,	A 3500ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 2	A 3500ft FAF	ACCEPT
Option Description: Option 2A has an IAF at 7,000ft to the south-east airport in the vicinity of Sutton. It is designed to fac CDA profile to all runways. From this location the route overflies Macclesfield, and heads north-east, just to the west of Whaley B then overhead Glossop. Both routes then turn left to establish aircraft on final approach at 3,500ft for e Runway 23L or 23R. The descent gradient to the FAF is 2.83%/1.62° fo 23L and 2.73%/1.56° for Runway 23R. These grad below the optimum for low noise approaches but j the acceptable range for CDAs defined within ICAr guidance.	of the illitate a splits ridge and to either r Runway dients are ust within O	<figure></figure>
	and the second s	A 324 Inversion former: Compared as a Crimit Company.
		AS1

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.

D. C. D. C. L. Dollard	23L	MET
Design Principle POIICy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 2A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 2A L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 2A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 2A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 2A R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 2A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore 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 therefore greater emissions would be anticipated.

Design Principle Noise N1	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 47,900.

From 7,000ft, option 2A L 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 an approximate total population of 106,300.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 47,200.

From 7,000ft, option 2A R 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 an approximate total population of 105,200.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

Deter Directed Nicion NI2	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 2A L is estimated to overfly 90 noise sensitive areas.

From 7,000ft, this option 2A L is estimated to overfly 105 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 2A R is estimated to overfly 110 noise sensitive areas.

From 7,000ft, this option 2A R is estimated to overfly 105 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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.

D. C. D. C. Taskaslami	23L	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

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
Dytion Description: Dytion 6A has an IAF at 7,000ft to the south-east of irrport co-located with the DAYNE hold. It is designed acilitate a CDA profile to all runways. From this location the route splits and heads north-ead he west of Whaley Bridge and then overhead Glosso Both routes then turn left to establish aircraft on final upproach at 3,500ft for either Runway 23L or 23R. The descent gradient to the FAF is 3.41%/1.96° for R 23L and 3.27%/1.87° for Runway 23R. These gradier within the optimum range for low noise approaches a within the acceptable range for CDAs defined within I guidance.	to st, to b. unway uts are nd CAO	A33 A43 A43 A445 A45 A

Design Principle Safety	23R	MET

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.

D. C. D. C. Dollard	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 6A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 6A L is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 6A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 6A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 6A R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 6A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore fewer 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 therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 49,000.

From 7,000ft, option 6A L 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 an approximate total population of 62,200.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 41,500.

From 7,000ft, option 6A R 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 an approximate total population of 54,600.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Noise N2	23L	MET
Design Principle Noise N3	23R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 6A L is estimated to overfly 90 noise sensitive areas.

From 7,000ft, this option 6A L is estimated to overfly 115 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 6A R is estimated to overfly 90 noise sensitive areas.

From 7,000ft, this option 6A R is estimated to overfly 115 noise sensitive areas.

Design Principle Evaluation (DPE) – V2

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

Design Principle Airspace		23L	MET
23R MEI	Design Principle Airspace	1 732	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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	A 3500ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 74	A 3500ft FAF	ACCEPT
Option Description: Option 7A has an IAF at 7,000ft to the south-east airport in the vicinity of Goyt Valley. It is co-located IAF for the 05L/05R option 8A and is designed to f a CDA profile to all runways. From this location the route splits and heads north- to the west of Whaley Bridge and then overhead G Both routes then turn left to establish aircraft on find approach at 3,500ft for either Runway 23L or 23R. The descent gradient to the FAF is 4.48%/2.57° for 23L and 4.24%/2.43° for Runway 23R. These grad optimal for low noise approaches and within the ac range for CDAs defined within ICAO guidance.	I with the acilitate east, just lossop. al r Runway lients are cceptable	A ANDIA CAL
Design Principle Safety	23L 23R	MET MET

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.

Device Directed Policy	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 7A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 7A L is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 7A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 7A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 7A R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 7A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore fewer 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 therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 48,900.

From 7,000ft, option 7A L 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 an approximate total population of 67,700.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 39,600.

From 7,000ft, option 7A R 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 an approximate total population of 57,800.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

Dute Disting Noine N2	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. Noise N2	23L	MET
Design Principle Noise N3	23R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 7A L is estimated to overfly 100 noise sensitive areas.

From 7,000ft, this option 7A L is estimated to overfly 115 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 7A R is estimated to overfly 95 noise sensitive areas.

From 7,000ft, this option 7A R is estimated to overfly 115 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

Design Brigginde Airongco	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

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	3500ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 8A	3500ft FAF	ACCEPT
Option Description: Option 8A has an IAF at 7,000ft to the south-east a airport in the vicinity of the Roaches. It is co-located IAF for the 05L/05R option 9A and is designed to for a CDA profile to all runways. From this location the route splits and heads north- to the west of Whaley Bridge and then overhead GI Both routes then turn left to establish aircraft on find approach at 3,500ft for either Runway 23L or 23R. The descent gradient to the FAF is 3.42%/1.96° for 23L and 3.28%/1.88° for Runway 23R. These grad within the optimum range for low noise approaches within the acceptable range for CDAs defined within guidance.	I with the acilitate east, just ossop. al Runway ients are and a ICAO	Site A655 Cushings
Design Principle Safety	23L 23R	MET

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.

D. C. D. C. L. Dollard	23L	MET
Design Principle POIICy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 8A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 8A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 8A L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 8A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 8A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 8A R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 8A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

D. C. D. C. Emissions	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore 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 therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 45,800.

From 7,000ft, option 8A L 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 an approximate total population of 60,000.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 41,300.

From 7,000ft, option 8A R 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 an approximate total population of 55,800.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 8A L is estimated to overfly 85 noise sensitive areas.

From 7,000ft, this option 8A L is estimated to overfly 115 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 8A R is estimated to overfly 90 noise sensitive areas.

From 7,000ft, this option 8A R is estimated to overfly 120 noise sensitive areas.

Design Principle Evaluation (DPE) – V2

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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	3500ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 9A	3500ft FAF	ACCEPT
Option Description: Option 9A has an IAF at 7,000ft to the south-east of airport, just to the north of Leek. It is co-located with for the 05L/05R option 6A and is designed to facilit CDA profile to all runways. From this location the route splits and heads north-ebetween Macclesfield and Buxton, overhead Whale and Glossop. Both routes then turn left to establish on final approach at 3,500ft for either Runway 23L 23R. The descent gradient to the FAF is 2.78%/1.59° for 23L and 2.69%/1.54° for Runway 23R. These gradi below the optimum range for low noise approaches within the acceptable range for CDAs defined within guidance.	n the IAF rate a east y Bridge aircraft or Runway ients are s but just n ICAO	<figure></figure>
Design Principle Safety	23L 23R	MET MET

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.

D. C. D. C. Delin y	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 9A L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 9A L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 9A L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 9A L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 9A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 9A R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 9A R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 9A R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore 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 therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 39,900.

From 7,000ft, option 9A L 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 an approximate total population of 49,900.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 37,400.

From 7,000ft, option 9A R 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 an approximate total population of 48,000.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 9A L is estimated to overfly 75 noise sensitive areas.

From 7,000ft, this option 9A L is estimated to overfly 115 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 9A R is estimated to overfly 80 noise sensitive areas.

From 7,000ft, this option 9A R is estimated to overfly 120 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

	IAF TURKY	IAF TURKY	IAF 8	IAF 9	IAF 10	IAF 7
	Option 1AL	Option 2AL	Option 6AL	Option 7AL	Option 8AL	Option 9AL
S	MET	MET	MET	MET	MET	MET
Р	MET	MET	MET	MET	MET	MET
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Ε	MET	MET	MET	MET	MET	MET
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET
	Best	Best	Best	Best	Best	Best

27.7 Transition Runways 23R/23L South 3,500ft FAF Summary

	IAF TURKY	IAF TURKY	IAF 8	IAF 9	IAF 10	IAF 7
	Option 1AR	Option 2AR	Option 6AR	Option 7AR	Option 8AR	Option 9AR
S	MET	MET	MET	MET	MET	MET
Р	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET
Ε	NOT MET					
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET
	Best	Best	Best	Best	Best	Best

27.8 Transition Runways 23R/23L South 3,500ft FAF: Viable but Poor Fit Options

Option	Safety	Policy	Capacity
Transition south option A3	S	Р	С

This option was the result of early concept work with NERL as Option 3 and is based on the South 1 IAF but was not developed due to perceived Network connection issues to the south-east of the airport.

<u>Safety</u>: The design of this may result in aircraft not being compliant with airspace containment requirements. This option introduced the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy.

Additional options that are fully contained were designed to mitigate this risk which resulted in this option offering no benefits if the containment restriction were not present.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

- Efficiency: It was found that access to this IAF from the south would not align to the traffic flows within the NATS network.
- Integration: This option had the potential to reduce airspace access for GA users because of the need to reduce the base of CAS to allow its use.
- Environmental performance Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.

Ρ

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

Transition south option B4

This was initially designed as Option 4 and is a route based on the position of a NATS proposed South Merge IAF located south-east of the existing DAYNE hold.

S

<u>Safety</u>: The design of this may result in aircraft not being compliant with airspace containment requirements in the Daventry CTA10 area. This introduces the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy.

Additional options that are fully contained were designed to mitigate this risk which resulted in this option offering no benefits if the containment restriction were not present.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

- Environmental performance Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.
- Integration: This option had the potential to reduce airspace access for GA users because of the need to change the dimensions of CAS to allow its use.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

Transition south option C5	S	Р	С
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This was initially designed as Option 5 and is a route based on the position of a NATS proposed South 2 IAF located south-west of the existing DAYNE hold.

<u>Safety</u>: The design of this may result in aircraft not being compliant with airspace containment requirements in the Daventry CTA10 area. This introduces the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy. Alternative options were designed to mitigate this risk.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

- Environmental performance Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.
- Integration: This option had the potential to reduce airspace access for GA users because of the need to change the dimensions of CAS to allow its use.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

28 Transitions Runways 23R/23L South – 3,000ft FAF

28.1 Transition Runways 23R/23L South Option 1B – 3,000ft FAF

Option Name: Transition RW 23R South Option 1B 3000ft FAF ACCEPT Option Description: Description: Image: Control of Description is the vicinity of Danebridge. It is designed to acilitate a CDA profile to all runways. Image: Control of Description is control of Description is control of Description in the vicinity of Danebridge. It is designed to acilitate a CDA profile to all runways. Image: Control of Description is control of Description is control of Description in the route splits and heads north-east, just of the west of Whaley Bridge and then overhead Glossop. Image: Control of Description is control of Description is control of Description in the route splits and heads north-east, just of the west of Whaley Bridge and then overhead Glossop. Image: Control of Description is control of Description in the vicinity of Description is control of Descriptinge is control of Description is control of De	Design Principle Evaluation		Option No: 1B
Deption Description: Deption 1B has an IAF at 7,000ft to the south-east of the increase of the vicinity of Danebridge. It is designed to acilitate 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. Note the twest of Whaley Bridge and then overhead Glossop. The descent gradient to the FAF is 3.78%/2.17° for Runway 23L or 23R. The descent gradient to the FAF is 3.78%/2.17° for Runway 23L or 23R. These gradients are distributed in a 3.63%/2.08° for Runway 23L or 23R. These gradients are distributed in the optimum range for LOAs defined within ICAO puidance.	Option Name: Transition RW 23L South Option 1B 3000ft FAF		F ACCEPT
Depion 1B has an IAF at 7,000ft to the south-east of the irror in the vicinity of Danebridge. It is designed to bacilitate a CDA profile to all runways. Irrom this location the route splits and heads north-east, just to the west of Whaley Bridge and then overhead Glosson to the vest of Whaley Bridge and then overhead Glosson the outer sheat to the FAF is 3.78%/2.17° for Runway 23L or 23R. These gradients are and 3.63%/2.08° for Runway 23R. These gradients are distributed for the profile to all runway 23L or 23R. These gradients are distributed for the profile to all one approaches and vithin the optimum range for CDAs defined within ICAO uidance.	Option Name: Transition RW 23R South Option 1B	3000ft FAF	AF ACCEPT
Option 1B has an IAF at /,000H to the south-east of the south routes and the noverhead Glossop. Noth routes then turn left to establish aircraft on final piproach at 3,000H for either Runway 23L or 23R. These gradients are within the optimum range for low noise approaches and within 1CAO upidance. Visit and 3,63%/2.08° for Runway 23R. These gradients are within the optimum range for low noise approaches and within 1CAO upidance. Visit are approaches and within 1CAO Visit and 2,63%/2.08° for Runway 50 to the acceptable range for CDAs defined within 1CAO Visit are approaches and within 1CAO	Option Description:		
	Option 1B has an IAF at 7,000ft to the south-east of 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-ea to the west of Whaley Bridge and then overhead Glo 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 F 23L and 3.63%/2.08° for Runway 23R. These gradie within the optimum range for low noise approaches of	ast, just ssop. Runway ents are and	<figure></figure>
23L MET	I		

Design Principle Safety	23R	MET

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.

D D Dalia r	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 1B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 1B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 1B L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 1B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 1B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 1B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 1B R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 1B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore 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 therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 59,000.

From 7,000ft, option 1B L 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 an approximate total population of 71,600.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 55,100.

From 7,000ft, option 1B R 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 an approximate total population of 67,900.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 1B L is estimated to overfly 105 noise sensitive areas.

From 7,000ft, this option 1B L is estimated to overfly 130 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 1B R is estimated to overfly 130 noise sensitive areas.

From 7,000ft, this option 1B R is estimated to overfly 155 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

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 3000ft FAF			ACCEPT
Option Name: Transition RW 23R South Option 2	3 3000ft FAF		ACCEPT
Option Description: Option 2B has an IAF at 7,000ft to the south-east airport in the vicinity of Sutton. It is designed to fac CDA profile to all runways. From this location the route overflies Macclesfield, and heads north-east, just to the west of Whaley Br then overhead Glossop. Both routes then turn left t establish aircraft on final approach at 3,000ft for e Runway 23L or 23R. The descent gradient to the FAF is 3.38%/1.94° fo 23L and 3.26%/1.87° for Runway 23R. These grad within the optimum range for low noise approache within the acceptable range for CDAs defined withi guidance.	ilitate a splits, idge and o ither r Runway lients are s and	R23 3000ft South	
Design Principle Safety	23L 23R		MET MET

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.

D. C. D. C. Delin y	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 2B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 2B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 2B L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 2B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 2B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 2B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 2B R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 2B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

	23L	MET
Design Principle Emissions	23R	NOT MET

The estimated track length of option 2B L is 57km (31 nm). When compared to the DAYNE 'do nothing' scenario this option is similar in length and therefore 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 therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 58,900.

From 7,000ft, option 2B L 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 an approximate total population of 120,200.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 56,400.

From 7,000ft, option 2B R 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 an approximate total population of 114,600.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 2B L is estimated to overfly 105 noise sensitive areas.

From 7,000ft, this option 2B L is estimated to overfly 130 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 2B R is estimated to overfly 130 noise sensitive areas.

From 7,000ft, this option 2B R is estimated to overfly 155 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

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	3000ft FAF		ACCEPT
Option Name: Transition RW 23R South Option 6E	3000ft FAF		ACCEPT
Option Description: Option 6B has an IAF at 7,000ft to the south-east of airport co-located with the DAYNE hold. It is design facilitate a CDA profile to all runways. From this location the route splits and heads north- the west of Whaley Bridge and then overhead Gloss Both routes then turn left to establish aircraft on find approach at 3,000ft for either Runway 23L or 23R. The descent gradient to the FAF is 4.12%/2.36° for 23L and 3.94%/2.26° for Runway 23R. These grad within the optimum range for low noise approaches within the acceptable range for CDAs defined within guidance.	east, to sop. al Runway ients are s and	And Transport Salidor And And And And And And And And	the same and an accord and accord and accord and accord ac
Design Principle Safety	23L 23R		MET MET

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 Dringials Policy	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 6B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 6B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 6B L is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 6B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 6B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 6B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 6B R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 6B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

	23L	PARTIAL
Design Principle Capacity	23R	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.

D. C. D. C. Emissions	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore fewer 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 therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 67,300.

From 7,000ft, option 6B L 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 an approximate total population of 80,100.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 60,200.

From 7,000ft, option 6B R 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 an approximate total population of 72,600.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

Desire Brinsinta Noiso N2	23L	MET
Design Principle Noise N2	23R	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	MEI
Design Principle Noise N3	23R	MET

From 4,000ft, this option 6B L is estimated to overfly 125 noise sensitive areas.

From 7,000ft, this option 6B L is estimated to overfly 145 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 6B R is estimated to overfly 140 noise sensitive areas.

From 7,000ft, this option 6B R is estimated to overfly 165 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle Iechnology	23R	MET

Summary of Qualitative Assessment:

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	3000ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 7B	3000ft FAF	ACCEPT
Option Description: Option 7B has an IAF at 7,000ft to the south-east of airport in the vicinity of Goyt Valley. It is co-located IAF for the 05L/R option 8B and is designed to facil CDA profile to all runways. From this location the route splits and heads north-to to the west of Whaley Bridge and then overhead Gl- Both routes then turn left to establish aircraft on find approach at 3,000ft for either Runway 23L or 23R. The descent gradient to the FAF is 5.5%/3.15° for R 23L and 5.19%/2.97° for Runway 23R. These gradifiest just above the range for low noise approaches but of within the acceptable range for CDAs defined within guidance.	with the itate a east, just ossop. all analyze are are are still a ICAO	Park A635 PUNITIES
Design Principle Safety	23L 23R	MET MET

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.

	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 7B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 7B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 7B L is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 7B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 7B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 7B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 7B R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 7B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Bringiple Capacity	23L	PARTIAL
Design Principle Capacity	23R	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 Driverinte Emissions	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore fewer 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 therefore greater emissions would be anticipated.

Desire Bright Noise N1	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 70,500.

From 7,000ft, option 7B L 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 an approximate total population of 85,500.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a similar population from 4,000ft.

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 an approximate total population of 63,100.

From 7,000ft, option 7B R 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 an approximate total population of 77,100.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

During Directly Nieline N/2	23L	MET
Design Principle Noise N2	23R	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	MET
Design Principle Noise N3	23R	MET

From 4,000ft, this option 7B L is estimated to overfly 140 noise sensitive areas.

From 7,000ft, this option 7B L is estimated to overfly 145 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a similar number from 4,000ft.

From 4,000ft, this option 7B R is estimated to overfly 145 noise sensitive areas.

From 7,000ft, this option 7B R is estimated to overfly 165 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

Design Drinsials Airpage	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

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 3000ft FAF		ACCEPT	
Option Name: Transition RW 23R South Option 8E	3 3000ft FAF		ACCEPT
Option Description: Option 8B has an IAF at 7,000ft to the south-east a airport in the vicinity of the Roaches. It is co-located IAF for the 05L/05R option 9B and is designed to fa a CDA profile to all runways. From this location the route splits and heads north- to the west of Whaley Bridge and then overhead G Both routes then turn left to establish aircraft on fine approach at 3,000ft for either Runway 23L or 23R. The descent gradient to the FAF is 4.14%/2.37° for 23L and 3.95%/2.26° for Runway 23R. These grad within the optimum range for low noise approaches within the acceptable range for CDAs defined withi guidance.	d with the acilitate east, just lossop. al Runway ients are s and	R23 3000ft South (A14) Salford Falford Park Strefford A510 A54 A54	
Design Principle Safety	23L 23R		MET MET

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.

Dute Divide Policy	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 8B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 8B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 8B L is shorter in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 8B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 8B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 8B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 8B R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 8B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Desire Brissials Canacity	23L	PARTIAL
Design Principle Capacity	23R	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.

	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore fewer 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 therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise N1	23R	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 an approximate total population of 62,300.

From 7,000ft, option 8B L 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 an approximate total population of 75,300.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 57,100.

From 7,000ft, option 8B R 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 an approximate total population of 70,700.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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	MET
	23R	MET

From 4,000ft, this option 8B L is estimated to overfly 110 noise sensitive areas.

From 7,000ft, this option 8B L is estimated to overfly 130 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 8B R is estimated to overfly 130 noise sensitive areas.

From 7,000ft, this option 8B R is estimated to overfly 155 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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 Technology	23L	MET
	23R	MET

Summary of Qualitative Assessment:

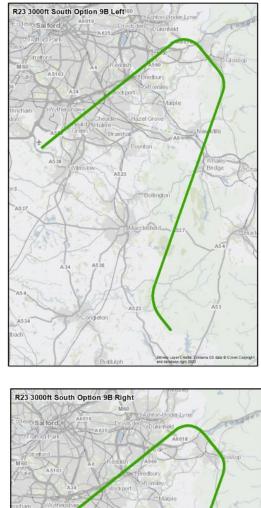
28.6 Transition Runways 23R/23L South Option 9B – 3,000ft FAF

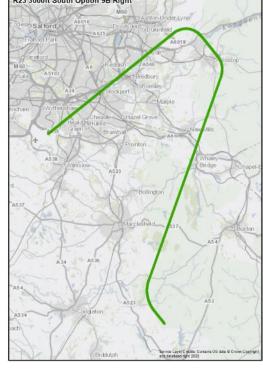
Design Principle Evaluation	Option No: 9B
Option Name: Transition RW 23L South Option 9B 3000ft FAF	ACCEPT
Option Name: Transition RW 23R South Option 9B 3000ft FAF	ACCEPT
Option Description:	

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	23R	MET

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.

	23L	MET
Design Principle Policy	23R	PARTIAL

Summary of Qualitative Assessment:

Up to 4,000ft, option 9B L is estimated to limit the total population affected by noise, when compared with the DAYNE 'do nothing' comparator. Up to 7,000ft, option 9B L is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Option 9B L is similar in length and it is anticipated that emissions would be limited when compared against the DAYNE 'do nothing' comparator. At this stage of the process, option 9B L is evaluated to be consistent with the environmental performance 'End' and Design Principle Policy.

Up to 4,000ft, option 9B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator. Up to 7,000ft, option 9B R is estimated to limit the total population affected by noise, when compared against the DAYNE 'do nothing' comparator.

Option 9B R is longer in length and it is anticipated that emissions would be increased when compared against the DAYNE 'do nothing' comparator.

At this stage of the process, option 9B R is evaluated to be partially consistent with the environmental performance 'End' and Design Principle Policy.

Design Principle Capacity	23L	PARTIAL
	23R	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.

D. J. D. J. Entiring	23L	MET
Design Principle Emissions	23R	NOT MET

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 therefore 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 therefore greater emissions would be anticipated.

	23L	MET
Design Principle Noise NI	23R	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 an approximate total population of 57,200.

From 7,000ft, option 9B L 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 an approximate total population of 65,600.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

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 an approximate total population of 54,000.

From 7,000ft, option 9B R 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 an approximate total population of 63,200.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller population from 7,000ft, and a smaller population from 4,000ft.

	23L	MET
Design Principle Noise N2	23R	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.

D. C. D. C. I. Noise N2	23L	MET
Design Principle Noise N3	23R	MET

Summary of Qualitative Assessment:

From 4,000ft, this option 9B L is estimated to overfly 90 noise sensitive areas.

From 7,000ft, this option 9B L is estimated to overfly 130 noise sensitive areas.

Compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

From 4,000ft, this option 9B R is estimated to overfly 125 noise sensitive areas.

From 7,000ft, this option 9B R is estimated to overfly 155 noise sensitive areas.

When compared to the DAYNE 'do nothing' scenario this option overflies a smaller number of sensitive sites from 7,000ft, and a smaller number from 4,000ft.

	23L	MET
Design Principle Airspace	23R	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	MET
Design Principle lechnology	23R	MET

Summary of Qualitative Assessment:

These options have been designed to utilise the latest aircraft technology through the use of PBN and have been designed in accordance with PANS-OPS requirements.

	IAF TURKY	IAF TURKY	IAF 8	IAF 9	IAF 10	IAF 7
	Option 1BL	Option 2BL	Option 6BL	Option 7BL	Option 8BL	Option 9BL
S	MET	MET	MET	MET	MET	MET
Р	MET	MET	MET	MET	MET	MET
С	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Ε	MET	MET	MET	MET	MET	MET
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET
т	MET	MET	MET	MET	MET	MET
	Best	Best	Best	Best	Best	Best

28.7 Transition Runways 23R/23L South 3,000ft FAF Summary

	IAF TURKY	IAF TURKY	IAF 8	IAF 9	IAF 10	IAF 7
	Option 1BR	Option 2BR	Option 6BR	Option 7BR	Option 8BR	Option 9BR
S	MET	MET	MET	MET	MET	MET
Ρ	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
С	MET	MET	MET	MET	MET	MET
Е	NOT MET					
N1	MET	MET	MET	MET	MET	MET
N2	MET	MET	MET	MET	MET	MET
N3	MET	MET	MET	MET	MET	MET
Α	MET	MET	MET	MET	MET	MET
Т	MET	MET	MET	MET	MET	MET
	Best	Best	Best	Best	Best	Best

28.8 Transition Runways 23R/23L South 3,000ft FAF: Viable but Poor Fit Options

Option	Safety Policy		Capacity
Transition south option A3	S	Р	С

This option was the result of early concept work with NERL as Option 3 and is based on the South 1 IAF but was not developed due to perceived network connection issues to the south-east of the airport.

<u>Safety</u>: The design of this may result in aircraft not being compliant with airspace containment requirements. This option introduced the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy.

Additional options that are fully contained were designed to mitigate this risk which resulted in this option offering no benefits if the containment restriction were not present.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

- Efficiency: It was found that access to this IAF from the south would not align to the traffic flows within the NATS network.
- Integration: This option had the potential to reduce airspace access for GA users because of the need to reduce the base of CAS to allow its use.
- Environmental performance Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.

Ρ

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

Transition south option B4

This was initially designed as Option 4 and is a route based on the position of a NATS proposed South Merge IAF located south-east of the existing DAYNE hold.

S

<u>Safety</u>: The design of this may result in aircraft not being compliant with airspace containment requirements in the Daventry CTA10 area. This introduces the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy.

Additional options that are fully contained were designed to mitigate this risk which resulted in this option offering no benefits if the containment restriction were not present.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

- Environmental performance Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.
- Integration: This option had the potential to reduce airspace access for GA users because of the need to change the dimensions of CAS to allow its use.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

Transition south option C5 S	Р	С	
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This was initially designed as Option 5 and is a route based on the position of a NATS proposed South 2 IAF located south-west of the existing DAYNE hold.

<u>Safety</u>: The design of this may result in aircraft not being compliant with airspace containment requirements in the Daventry CTA10 area. This introduces the risk of conflicts between aircraft operating in Class D and Class G (uncontrolled) airspace which is not aligned to CAA Airspace Containment Policy. Alternative options were designed to mitigate this risk.

<u>Policy</u>: This option fails to align with the ends of the AMS with respect to:

- Environmental performance Noise: The options created from this IAF were outside the arrivals design envelope and unable to provide a CDA to both runway directions. This would create a sub-optimal descent profile likely to result in additional noise.
- Integration: This option had the potential to reduce airspace access for GA users because of the need to change the dimensions of CAS to allow its use.

The trade-off analysis against other AMS ends did not identify other material benefits sufficient to offset a red categorisation.

29 Transitions Evaluation Summary

The acceptance / rejection process set out at section 4.3 accepted 80 transition design options that were carried forward to the IOA for further consideration. This process also rejected 26 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 limited due to routes not being developed as a system or combined with the designs of the enroute network and adjacent airports. 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 Safety, Policy and Capacity.

- Safety: Safety is the no.1 priority for all airspace changes, and our routes must be safe and comply with industry standards and regulations. The application of this design principle focussed on the alignment to PANS-OPS and CAP778 and the avoidance of a hazardous conflict between the design option and other aircraft either at MAN at adjacent airports or in adjacent airspace.
- Policy: The Design Principle Policy requires us to take account of the CAA AMS (CAP1711) which sets out the 'Ends' that airspace modernisation must deliver, including the need to create a more efficient, environmentally focussed and integrated airspace network. To address this, the design process takes account of the constraints and considerations in the local airspace to create options to meet the 'Ends' within the AMS. This includes options that seek to reduce the number of people affected by noise in line with the Air Navigation Guidance 2017 or provide a more direct routing to the joining point with the network airspace to reduce emissions. Although listed as one of the 'Ends' in the AMS, Safety was not considered within the Design Principle Policy assessment, but as part of the Design Principle Safety assessment. This is outlined in the Policy evaluation summary in section 4.5
- 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.

30.1

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 this DPE. Those that best align with the design principles are carried forward in the process to Step 2B.

30.2

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 has enabled us to identify a shortlist of design options.

30.3

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 enroute airspace provider. Therefore, we are confident that our proposals are flexible enough to provide compatibility with proposals emerging from other change sponsors, in so far as they are known at this time. However, it is still likely that some of our design options will be difficult to integrate with the proposals from other sponsors.

Therefore, we will continue to work with other sponsors, including NATS, to ensure that collectively we optimise operations with the MTMA. This will include providing information to NATS to inform their visualisation and development simulations, which will test the emerging concepts. It is likely that to optimise the MTMA trade-off decisions will need to be made between incompatible airport design options and where this is the case, we will undertake the necessary cumulative assessment of options in accordance with emerging guidance from ACOG. This process may mean that our consideration of some options shortlisted at Stage 2B is discontinued, or some options previously classified as rejected may be reconsidered or require modification in order to continue in the process. Where this is the case, we will set out our rationale and supporting evidence so that stakeholders have the opportunity to comment during the consultation exercise at Stage 3.

This work will allow us to combine our design options into operating networks. Defining networks of routes that support operations to and from MAN will allow us to undertake the more detailed assessment required at Stage 3 and it will also allow us to understand the extent to which we are able to provide noise respite and relief to those that are most impacted. The introduction of PBN which, consistent with the requirements of the AMS, is integral to our proposals, will increase the accuracy with which aircraft fly and is likely therefore to lead to greater concentration on any single flight path. In exploring different combinations of routes and their role in a network, we will be guided by the Government's objective to minimise the total adverse effects on people on routes below 4,000 feet.

30.4

The IOA that we have completed is the first of three appraisals required under the CAP1616 process. The operating networks that result from the steps we set out at 30.3 will allow us to undertake the more detailed Full Options Appraisal (FOA) required at Stage 3. This further assessment will make much greater use of quantitative data. As the FOA will consider fewer options, it will also allow us to explore local factors including tranquillity and biodiversity in greater detail than

has been possible to date, though this more detailed assessment will benefit from the data we have collated and reported at Stage 2.

Whilst the IOA considered the characteristics of each design option, the FOA will also consider operating networks. This assessment will require an estimate of the numbers and types of aircraft that will fly each route in a network. To facilitate this assessment, we will prepare detailed air traffic forecasts that estimate aircraft activity at the year of implementation and the ten years after implementation. To allow the networks that we are considering to be compared to today's operations, we will also prepare air traffic forecasts for a 'do nothing' scenario, that reflects the way we operate today and a 'do minimum' scenario, that reflects an informed view of the future and the minimum changes required to address the issues that mean "doing nothing" is not a feasible option in reality, as well as the issues identified in our statement of need.

The assessment of operating networks will also allow greater consideration of some important factors, reflected in our design principles and for which the assessment in the IOA was limited due to routes not being developed as a system, or combined with the designs of the enroute network and adjacent airports. These include noise, emissions, capacity and safety. In defining the full range of criteria that we will assess in the FOA we will be guided by CAP1616 and will take account of the information in Appendices B and E.

Our proposed approach to the FOA and the way we will consider and collect the key information is set out in greater detail in the IOA at section 8.3.

30.5

Our 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. This requirement is also reflected in our Design Principle Policy, which considers the ends of the AMS, including the Integration end, which calls for a transition towards greater integration of air traffic including GA and the military. However, due to the potential for routes to be refined or amended, as referred to in 30.3, 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.

30.6

The CAA published its refreshed Airspace Modernisation Strategy (AMS) in January 2023. The refreshed AMS pulls together the ICAO Global Air Navigation Plan, the 2018 AMS and new requirements that the CAA has identified through stakeholder engagement.

This MAN Stage 2 Gateway submissions, including the Viability Filter within the DOR, the Design Principles Evaluation (DPE) and the Initial Options Appraisal (IOA) that assessed alignment to Design Principle Policy (P), were based on assessments carried out against the requirements of the previous iteration of the AMS, which was in force at the time those assessments were carried out.

MAG have reviewed the refreshed 2023 AMS. This review concluded that no material change would result had the refreshed AMS been applied to this MAN Stage 2 submission. It has therefore been agreed with the CAA that it would not be practical or proportionate to revise the MAN Stage 2 submissions to refer to the 2023 AMS for the purpose of this resubmission. However, our assessment work within Stage 3A and beyond will align to the refreshed 2023 AMS.

30.7

The proposals being developed by MAG and other sponsors within the MTMA cluster are complex and will not be implemented for several years. Given the intention to rationalise the network of DVORs across the UK, it will be important that aircraft are able to continue to operate safely and efficiently in the intervening period between this rationalisation and the new arrangements being introduced. MAN intend to use the CAP1781 process provided by the CAA to provide a temporary solution using RNAV substitution, which will maintain the current network of routes with no change in aircraft behaviour, pending the full implementation of this airspace change. CAP1781 allows new technology - RNAV – to be used to maintain existing routeings (SIDs). To support this, we will work with airlines to ensure they implement the appropriate technical changes to their systems. The CAP1781 process has begun and will run in parallel to this airspace change. We expect to conclude this separate change process in 2024.

30.8

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 (<u>www.caa.co.uk/cap1711</u>). The original AMS was published in December 2018 and a refreshed version in January 2023. Unless otherwise stated, all references to the AMS are to the December 2018 version.
Amsl	Above mean sea level.
ANCON	The UK civil Aircraft Noise Contour Model. A computer model developed and maintained by the Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority which calculates contours of aircraft noise exposure levels around airports.
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.
ASMIM⁴	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.

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.

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).	
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).	
CAP1926	General Requirements and Guidance Material for the use of RNAV Substitution (www.caa.co.uk/cap1926).	
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 (<u>www.caa.co.uk/cap2303</u>).	
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 (<u>www.caa.co.uk/cap760</u>).	
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	The CAA Controlled Airspace Containment Policy Statement (January 2014 superseded in August 2022) sets out the minimum criteria applicable to containment of instrument flight	

Containment Policy Statement	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.
CATI & CATIIIB (approaches)	Categories of precision approach and landing (including Instrument Landing System (ILS) and Autoland) operations are defined according to the applicable Decision Altitude/Height and Runway Visual Range/visibility.
	A category I (CATI) approach requires a higher decision height and better visibility than a category IIIB (CATIIIB) approach. The technical apparatus for CATIIIB approaches allow an airport to maintain operations in very poor visibility.
ССО	Continuous Climb Operations - allows departing aircraft to climb continuously, which reduce 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 wor 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.
СР	Country Park - areas of land designated and protected by local authorities to provide acces 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.
EKLAD⁴	A navigation fix to the west of Manchester used by departing aircraft.
ERCD	The Environmental Research and Consultancy Department of the Civil Aviation Authority.
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.

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 17 th 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.
KUXEM⁴	A navigation fix to the south-west of Manchester used by departing aircraft.
LAeq	Equivalent continuous sound level, or Leq/LAeq, is the average sound level for a specific location, over a given period.
LISTO⁴	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 (<u>http://publicapps.caa.co.uk/docs/33/ORS4%20No.1545%20Correction.pdf</u>).
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.
ΜΑΡ	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.
Mean track	For noise modelling purposes, an average track over the ground, derived from radar data samples.
MIRSI	One of three existing hold stacks used at Manchester Airport.
Modal average path	The path over the ground most commonly flown, derived from radar data samples.

MONTY⁴	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, Wes 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.
SANBA⁴	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 (<u>www.sesarju.eu</u>).
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	A document that formed part of Manchester Airport's Stage 1 submission to the CAA
Principles Report	(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	The altitude at or below which the vertical position of an aircraft is controlled by reference to

Transport Act 2000The 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 AirspaceUncontrolled airspace is airspace where an ATC service is not deemed necessary or cannot be provided for practical reasons.UnviableOptions 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.VHFVery High Frequency.Viable and good fitOptions that are viable to design and which would not be expected to meet the three design principles with which all design options 'must' comply (design principles Safety, Policy, and Capacity).Viable but poor fitOptions that are viable to design, but which would not be expected to meet the requirements of the design principles Safety, Policy and Capacity.VNAVVertical Navigation - a term for vertical (up/down) navigation used within Performance Based Navigation.VRPVisual reference point.WALAbbreviation for the Wallasey DVOR navigation beacon that is to the west of Manchester and is used by departing aircraft as a navigation point.XUMAT4A navigation fix to the north-east of Manchester used by departing aircraft.		
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	ΧΙ ΙλλΔΤ ⁴	



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