Prepared by:

[redacted]

NATS Private

Edinburgh ACP - IFP Design Report

Version 4.0 – August 2018

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Prepared by:

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Revision History:

Version	Date	Changes
1.0	13 July 2016	Initial conceptual designs
2.0	23 December 2016	Detailed SID designs for flight validation
2.1	05 April 2017	Detailed Arrival and Approach designs for flight validation
3.0	31 August 2017	Final designs for CAA approval
4.0	03 August 2018	Re-submission following numerous design changes

Table of Contents

1. Introduction

Edinburgh Airport wishes to accommodate future growth in traffic within the ATC operation. Part of this desire is achieved by making approach and departure procedures as efficient as possible through redesign of SIDs, transitions and approaches (ILS and RNAV).

This report contains details of the procedure that have been revised or designed as part of this project. These detailed designs include draft charts, RNAV coding tables, and obstacle protection for all of the procedures.

2. Scope

The NATS Design brief for this stage of the project was to fully complete design work on the agreed procedures based on the outcome of the ACP consultation and the flight validation activities. This includes:

- Documenting final nominal tracks
- Obstacle protection assurance
- Draft chart and coding table
- Design rationale

The following procedures have been developed:

Package:	**RNAV1 SIDs and Omnidirectional SIDs**
Designer:	[redacted]
Checker:	[redacted]
AutoCAD File:	5248 - EGPH - UTM84-30N[redacted]dwg
Procedures:	› 10 RNAV1 SIDs › EVTOL 1C – RWY 24 towards TLA › ARLER 1C – RWY 24 towards TLA › MAVIX 1C – RWY 24 towards GOSAM › LIKLA 1C– RWY 24 towards GOW › GRICE 4C – RWY 24 towards GRICE › VOSNE 1C – RWY 24 towards HAVEN › EMJEE 1D – RWY 06 towards GOSAM / GOW › GRICE 5D – RWY 06 towards GRICE › VOSNE 1D – RWY 06 towards HAVEN › KRAGY 1D – RWY 06 towards TLA › 2 Omnidirectional SIDs – RWY 06 and RWY 24

Package:	**RNAV5 STARs and Holds**
Designer:	[redacted]
Checker:	[redacted] and [redacted]
AutoCAD File:	5248 - EGPH - UTM84-30N[redacted]dwg
Procedures:	› 5 RNAV5 STARs › BLACA 1E – BLACA to EDIBO via TUNSO › BLACA 1F – BLACA to EDIBO via GIRVA › ESKDO 1E – ESKDO to EDIBO › HAVEN 1E – HAVEN to EDIBO › PTH 1E – PTH to STIRA › 2 RNAV1 Holds › RNAV1 EDIBO › RNAV1 STIRA › 2 RNP-APCH Holds › RNP-APCH EDN › RNP-APCH UW

Package:	RNAV1 Approach Transitions and RNAV(GNSS) Approaches
Designer:	[redacted]
Checker:	[redacted]
AutoCAD File:	5248 - EGPH - UTM84-30N[redacted]dwg
Procedures:	› 2 RNAV1 Approach Transitions › EDIBO 1C – EDIBO to FIRTH for RWY 24 › EDIBO 1D – EDIBO to FAULD for RWY 06 › 2 Instrument Approach Procedures › RNAV(GNSS) with LNAV and LNAV/VNAV to RWY 06 › RNAV(GNSS) with LNAV and LNAV/VNAV to RWY 24 › 3 Minimum Sector Altitudes › MSA ARP › MSA NDB(L) EDN › MSA NDB(L) UW › 2 Visual Manoeuvring (Circling) › VMC – Total Area › VMC – North of RWY 06/24

Package:	Conventional Approaches and Holds
Designer:	[redacted]
Checker:	[redacted]
AutoCAD File:	5248 - EGPH - UTM84-30N[redacted]dwg
Procedures:	› 4 Instrument Approach Procedures › ILS/DME CAT I & II to RWY 06 › LOC/DME to RWY 06 › ILS/DME CAT I & II to RWY 24 › LOC/DME to RWY 24 › 2 Conventional Holds › NDB(L) EDN › NDB(L) UW

3. General Design Methodology

The following criteria have been adhered to as closely as possible:

1 ICAO Doc 8168 PANS-OPS - Volume II - 6th Edition, amendment 7

2 UK CAA policy where it supersedes ICAO (including but not limited to CAP 778)

3.1. Assumptions

The following assumptions have been made:

1 All runways, runway data, published navigation aids, and runway lighting will be 'fit for purpose'.

2 Survey information received is correct.

3 The airspace requirements for the procedures have been met and an assessment of the interaction of the revised procedures with the current airspace will be carried out by NATS.

4 All procedures and waypoints have been submitted with their final titles / names ready for publication.

3.2. Obstacle Data

The following obstacle data sources were used for obstacle clearance calculations:

› Edinburgh CAP232 Survey from February 2017

› UKMOD Digital Vertical Obstruction File (DVOF) data as of February 2018

› SRTM digital elevation data (DEM)

› OSVM terrain spot height data from November 2015

For analysis purposes an obstacle tolerance of 20m has been used for all CAP232 survey data. An obstacle tolerance of 50m has been used for all DVOF data and OSVM data. Obstacle tolerance for the DEM data varies between 67m and 707m based on the range from the EGPH ARP.

3.3. Other Data

3.3.1. Magnetic Variation

Magnetic variation for Edinburgh was provided for December 2019 by the NATS Cartography department.

3.3.2. Radio Navigation Aids and Waypoints

Coordinates for existing radio navigation aids and waypoints were obtained from an AIXM snapshot of the UK AIP. This contains high-resolution coordinates for most points in the UK. The AIXM snapshot is saved in the “Other” folder along with the AIP snapshot.

En route waypoints are currently published in section ENR 4.4 of the UK AIP to 0 decimal places of accuracy. Where these waypoints have been used on the IFPs in this project the high-resolution (2 decimal place) coordinates have been used. This will result in the same waypoints being published to different levels of precision in different parts of the AIP. However this situation already exists at various airports with RNAV SIDs and STARs and is not known to have caused any problems.

3.3.3. Aerodrome Details

Information specific to the aerodrome was obtained from the UK AIP AD 2.EGPH.

3.4. Obstacle Assessment

The tallest obstacle in the dataset is Ordnance Survey Vector Map spot height OSVM13451 at the peak of Ben Lawers with an elevation of 1214m. Adding the standard Minimum Obstacle Clearance (MOC) of 300m results in an obstacle safe altitude of 1514m or 4967ft. If mountainous terrain were considered and the MOC was increased to 600m the obstacle safe altitude would increase to 1814m or 5951ft. Specific obstacle analysis has therefore not been conducted for any procedures that remain entirely above 6000ft.

3.5. Maximum True Airspeed

TAS is a factor in determining the size of obstacle protection areas and MSD requirements. In making calculations for these parameters, it is assumed that aircraft on SIDs will be continuously climbing along the SID track and that aircraft on STARs will be continuously descending along the STAR track. Given the length of some SIDs and STARs and the gradients employed, the PANS-OPS formula for TAS resulted in large TAS figures which proved problematic for the designs.

For all designs, the TAS has been limited to a maximum of 480kts. This is approximately equivalent to Mach 0.83 at 31,000ft. This is the highest value given in Table II-4-1-App-A-2 of PANS-OPS. Modern airliners are now capable of cruising at Mach 0.85 which could result in a TAS closer to 500kts. However 480kts was considered to be adequate for this project.

3.6. DME/DME RNAV

The RNAV1 navigation specification can be supported by GNSS, DME/DME, and DME/DME/IRU navigation sensors. This project includes RNAV1 SIDs, RNAV1 Holds, and RNAV1 Approach Transitions. These procedures must therefore support aircraft using any of these navigation sensors.

The RNAV5 navigation specification can be supported by GNSS and DME/DME navigation sensors. This project includes RNAV5 STARs. These procedures must therefore support aircraft using either of these navigation sensors.

Aircraft flying the SIDs using DME/DME RNAV will be required to have INS/IRU with an automatic runway update. There are no PANS-OPS criteria for the calculation of fix tolerances using INS/IRU – it is assumed that the fix tolerance area will be less than or equal to the GNSS fix tolerance area.

The “PLAS Navigation Infrastructure Assessment Report” provides a detailed analysis of the ground based navigation infrastructure coverage within the PLAS project area. Appendix C of the PLAS report – covering the Glasgow, Edinburgh, and Prestwick airports – is included as Appendix A to this document.

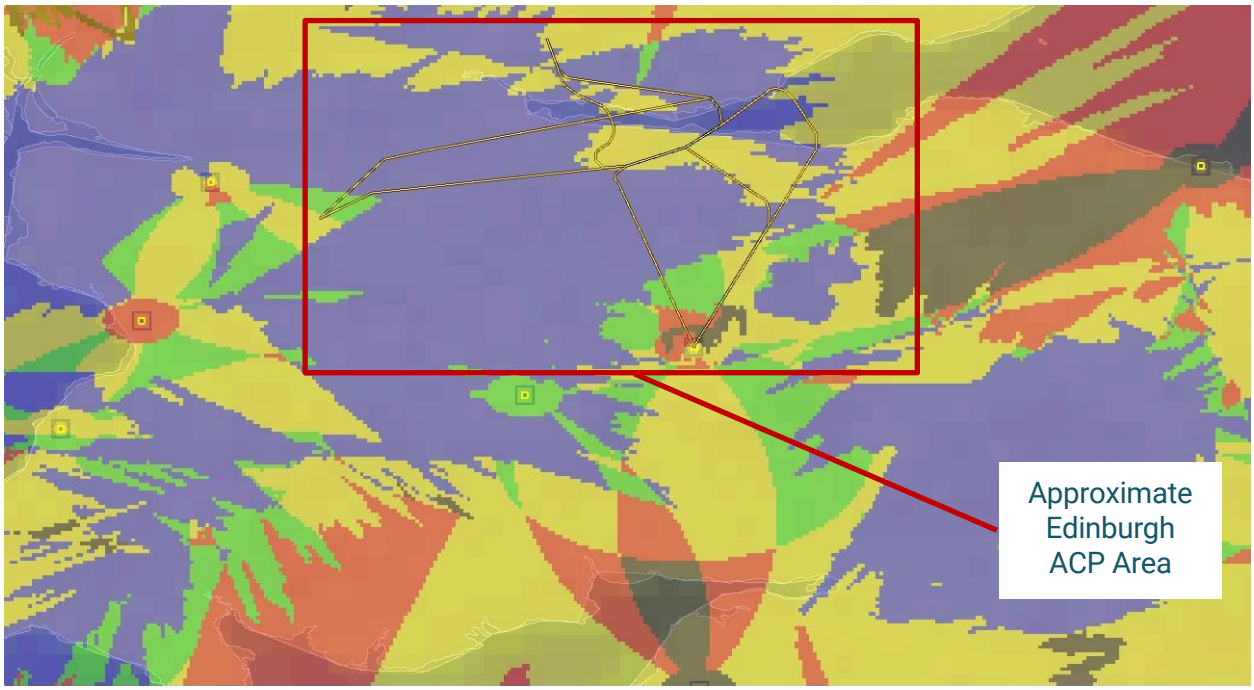


Figure 1 - DME/DME Assessment at 3000ft

DME/DME navigation is required above 3000ft. The image above shows that there is adequate DME/DME coverage throughout the area covered by the Edinburgh ACP. There are some areas shown in yellow which have limited DME/DME redundancy. This means that there is more than one DME/DME pair available but all of the available pairs share a common DME. In the case of the yellow area surrounding Edinburgh airport, the critical DME is GOW. All SIDs and Arrival Transitions therefore have a note that the procedure is not available if the GOW DME is unserviceable.

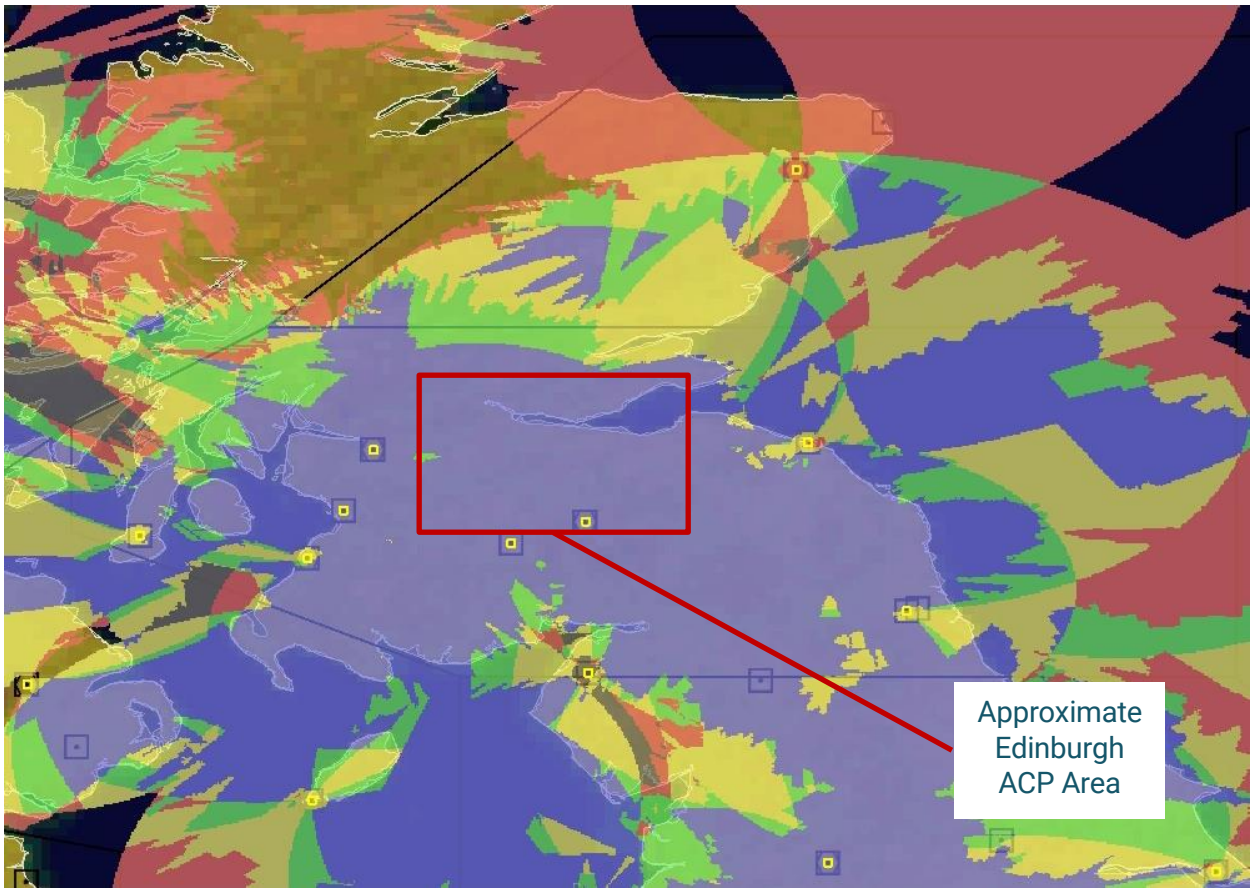


Figure 2 - DME/DME Assessment at 5000ft

At or below 6000ft the RNAV1 fix tolerance area for DME/DME RNAV with two DME update stations is smaller than the fix tolerance area for GNSS RNAV. The RNAV1 fix tolerance area for DME/DME RNAV with more than two DME update stations is smaller than the fix tolerance area for GNSS RNAV at all altitudes.

The figure above shows that there is fully redundant DME/DME coverage at 5000ft throughout the area covered by the Edinburgh ACP. Fully redundant DME/DME coverage implies that there are at least four DMEs so even if any single DME was unserviceable there would still be more than two DME stations available.

RNAV1 fix tolerance areas have therefore been constructed for GNSS RNAV as this is the most adverse.

At all altitudes the RNAV5 fix tolerance area for DME/DME RNAV is larger than the fix tolerance area for GNSS RNAV. RNAV5 fix tolerance areas have therefore been constructed for DME/DME RNAV as this is the most adverse.

3.7. Waypoint Names and Airways

ICAO approved 5 Letter Name Codes (5LNCs) have been requested from the ICARD system. New airways linking the end of the SIDs to the existing en route network have been issued with names by Tihomir Todorov at Eurocontrol.

All waypoints used in this project and proposed airways have been documented in the “WGS84 Spreadsheet.”. This can be found in the “RNAV” folder.

3.8. Flight Validation

Eleven flight validation sessions have been conducted on four aircraft types. These covered the RNAV1 SIDs, RNAV1 Approach Transitions, RNAV(GNSS) Instrument Approaches, and ILS Instrument Approaches. The results of the flight validation activities are documented in the "Edinburgh ACP Flight Validation Report v2.0 [redacted] pdf".

3.9. Folder Layout

This explains the location of files in the zipped version of this report.

- Calculations — Calculation sheets for each procedure
- Data — Project database and other data files
- Draft charts — NATS Design draft charts
- Drawings — Project AutoCAD DWG files
- Other — Miscellaneous files, including an AIP snapshot
- RNAV — Data pertaining to RNAV calculations and Coding Tables

4. SIDs

4.1. Design Rationale

4.1.1. Routes

The route designs and particular waypoint placement have been developed from feedback received from stakeholders and the requirement to comply with design criteria.

4.1.2. Procedure Naming

During this project the names for each SID have developed in such a way that multiple names are attributable to each SID, with each stakeholder assigning an appropriate name for their needs. Below is a decode table for each route:

Runway	Development Name	Consultation Name	Initial Validation Name	Initial Submission Name	Final Submission Name
24	24 S	A6	Route A	ACORN 1C	EVTOL 1C
24	New	A3	New	ARBOR 1C	ARLER 1C
24	24 SE	B5	Route B1	BRIER 1C	MAVIX 1C
24	24 SW	B2	Route B2	BEECH 1C	LIKLA 1C
24	24 N	C5	Route C	CEDAR 1C	GRICE 4C
24	24 E	D0	Route D	DOWEL 1C	VOSNE 1C
06	06 SW	E7	Route E	ELDER 1D	EMJEE 1D
06	06 N	F2A	Route F	FLORA 1D	GRICE 5D
06	06 E	G5	Route G	DOWEL 1D	VOSNE 1D
06	06 S	H2S	Route H1	HEATH 1D	KRAGY 1D

4.1.3. RWY 06 Initial Leg

In order to avoid overflying Cramond and as the current conventional SIDs do, the RNAV SIDs commence with a left turn following a climb to 500ft aal.

To that end, initial design concepts commenced with a CA leg to 500ft aal followed by a CF to the next WP, which produced a track which was to the north of RWY track. Alone, this configuration would not prevent turns occurring before DER (high performing aircraft might achieve 500ft aal before reaching the DER) and though compliant with PANS-OPS, CAA do not wish this to occur. Therefore, following discussion with CAA and flight simulator validation, the departures now commence with a CF to a FO WP positioned at DER before turning left to the next WP.

4.1.4. Speed Restrictions

Though not required by PANS-OPS, at the request of CAA, in the case of a SID which requires a WP speed restriction (which occurs here in the initial portions of the departures to satisfy PANS-OPS requirements for minimum distances between WPs) a speed restriction of 250KIAS has been placed on the subsequent WP (and then no restrictions at further WP).

4.1.5. Turn Following DF

A number of SIDs feature DF path terminators. The nature of this path terminator means that aircraft may approach the WP from a number of directions, especially when preceded by a large turn. This may result in the possibility of requiring either a left *or* a right turn onto the next leg, in which case no turn direction is specified on the coding table. Where the preceding turn is small then it is most likely that the resultant next turn is able to be defined but for consistency with the other SIDs no turn has been specified here either.

4.1.6. Depiction of Nominal Tracks

In order to represent typical traffic, the turn radius used in depicting the nominal SID tracks is based on aircraft climbing at 10%. Distances used to calculate altitudes at each turn are based on point to point distance between each WP except in the case of FO WPs where the distance to next WP following the FO is measured along the nominal turn, whose radius is calculated based on the altitude achieved at the FO WP. Bank angles are as per instructed in UK CAA design criteria.

4.1.7. Consultation Swathes

For the routes with fly-over waypoints there will be a degree of dispersion around the turn. In order to model this dispersion, historical radar data was used to determine the typical groundspeed and altitude at the fly-over waypoints. Radar data from 01 December 2015 to 31 May 2016 was analysed.

For each fly-over waypoint, all radar returns for departures from the appropriate runway within 0.25NM of the waypoint location were included. From these data samples, the 5^{th} percentile, 50^{th} percentile, and 95^{th} percentile values for groundspeed and altitude were determined.

Each groundspeed was then used to calculate a turn rate and turn radius using the equations from PANS-OPS. If the 95% groundspeed was greater than 220kts then the true airspeed for an aircraft flying at 220KIAS at the 95% altitude was calculated and the lower of these two speeds was used. If the calculated turn rate was greater than 3°/s then a turn rate of 3°/s was used to calculate the turn radius.

The 50% turn radius was then used to draw an average flight path from the fly-over waypoint until it rolled out on a tangential track to the DF waypoint. The 5% and 95% turn radius was used to draw the inner and outer boundaries of the expected traffic swathe. The average flight paths and swathe boundaries were supplied to EAL for use in the consultation documents and to ERCD for noise analysis.

4.1.8. Climb Gradients

In calculating various parameters for which climb gradient is a factor, two methods have been employed.

4.1.8.1. Charts and Obstacle Assessment

For charted gradients and for obstacle clearance calculations the gradients employed have, as per the design criteria, assumed that aircraft are 5m above DER elevation, at the DER.

Some SIDs require level restrictions to be expressed as flight levels which means variations in pressure could mean aircraft having to climb to higher altitudes than on a standard pressure day. To account for this eventuality, in the case that the charted “ATC” gradient is predicated on a “flight level” restriction, the calculation for gradient has added 1000ft to the equivalent standard pressure day flight level. E.g. “FL090” will assume an altitude of 10,000ft in the gradient calculation.

4.1.8.2. Textual Report

To reflect observed aircraft behaviour at the aerodrome, for calculating gradients required to reach WPs, it has been assumed that at the DER aircraft will be 500ft above it. Additionally, it has been assumed that rather than aiming to reach the lower limit of a level restriction, a constant gradient will be taken to reach the highest cleared level restriction on the route.

Gradient calculations have assumed climb to an altitude but some level restrictions are depicted as flight levels meaning that the calculated gradient is applicable only in standard atmospheric conditions. Variations in pressure about the standard value will result in slight variations in the gradients declared in this report.

4.1.9. Initial Turns

CAP778 prohibits turns below 500ft AAL. To prevent this occurring, where required, an initial CA leg to 500ft AAL is specified in the coding table and a warning placed on the chart.

4.1.10. SIDs and Link Routes

In some instances, to design a SID such that it connects with the en route network would make it undesirably long. Some of the SIDs will terminate at a point at which a ‘link route’ will provide connectivity to the network.

4.1.11. WP Spacing

The minimum distance between waypoints in an RNAV procedure is a function of:

- True airspeed
- Magnitude of turn
- Aircraft bank angle
- Altitude
- Type of waypoint (fly-by or fly-over)

For airspace containment this is why there are often speed restrictions imposed at waypoints.

In calculating the minimum distance, a higher altitude will result in a greater true airspeed, a greater aircraft turn radius and therefore a greater minimum distance between waypoints. PANS-OPS indicate that nominally, aircraft climb at 7% and this would be used in calculating altitude at each waypoint. However, it has been observed that Edinburgh traffic includes traffic which is capable of climbing at 15% and above.

Given this performance, the waypoint altitudes have assumed a 20% climb gradient to ensure minimum segment length and obstacle protection areas are adequate to cater for the steepest climbing aircraft and this is the case for both MSD and obstacle protection area calculations.

4.1.12. Protection Areas

There are instances where the first waypoint is located such that the early and late turn point may be located before the altitude specified by the preceding CA leg is achieved. Since it is undesirable to stipulate a procedure climb gradient, for the first turns after the DER, where necessary, the wind spirals for both a turn initiated by the WP (having achieved the CA limit before sequencing the WP) and a turn from the altitude have been considered and the more conservative used to define the obstacle assessment area.

4.1.13. Close-In Obstacles

Close-in obstacles exist for all RWY 24 SIDs and these are listed in Appendix B – Close-in Obstacles.

In producing the table, a check has been carried out to establish whether any DVOF obstacle duplicates a CAP232 survey obstacle. For RWY 24 all DVOF obstacles have been discounted in this way. Any omissions are documented in SID MAVIX 1C 24 RNAV STRAIGHT [redacted]xlsb.

4.1.14. Level Restrictions

Level restrictions have been placed based on the airspace requirements around the tracks.

4.1.15. Calculations

For each procedure, the following spreadsheets have been used:

4.1.15.1. Straight

This spreadsheet has been used to calculate the minimum segment distances for each leg of the procedure, construct the obstacle protection area, and assess the obstacle clearance for the initial straight-ahead climb. For MSD calculations the altitudes have been calculated based on a point-to-point 20% climb gradient from DER and bank angles are in accordance with CAP778.

4.1.15.2. Turn

This file contains the calculations pertaining to the obstacle protection for the area beyond the initial straight climbing portion of the SID and the turn initiation area (TIA).

4.2. EVTOL 1C

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

4.2.1. Procedure Overview

This SID is for non-jet traffic routing to the south via TLA.

4.2.2. Waypoint Placement Rationale

› PHW01 Such that the nominal track avoids Livingston and passes between East Calder and Kirknewton.

› PHS14 Airspace containment.

› EVTOL End of SID.

4.2.3. Speed Restrictions

› PHW01 200KIAS – as requested in initial stakeholder workshops.

› PHS14 250KIAS – as requested by CAA – first WP where a/c can accelerate to 250KIAS.

4.2.4. Procedure Design Gradient

A 4.6% procedure design climb gradient is required to 2200ft aal in order to clear terrain obstacles to the south of the aerodrome by the required MOC.

4.2.5. Climb Gradients

The following climb gradients are required to meet the required level restrictions. The gradients are calculated using point to point distances between WPs.

DER	PHW01	PHS14 +4000ft	EVTOL 6000ft
	5.25%	5.69%	
	5.40%		

4.2.6. Procedure Level Restrictions

› PHS14 At or above 4000alt – to ensure airspace containment into CTA-4.

› EVTOL At 6000alt – as requested by PC.

4.2.7. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

4.2.8. Non-Compliances

None

4.2.9. Additional Comments

From EVTOL aircraft route to TLA VOR via Z509.

4.3. ARLER 1C

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

4.3.1. Procedure Overview

This SID is an RNAV replication of the current TLA 6C SID from RWY24, based on the existing SID instruction. To this end the FO turn at PHW24 best replicates the instruction "…at I-TH D7 turn left onto TLA VOR R345 to TLA VOR…"

4.3.2. Waypoint Placement Rationale

- PHW24 Placed such that departure tracks overhead UW NDB. This FO WP is located at I-TH D7 as per the current conventional turn instruction.
- PHS08 Airspace containment.
- ARLER End of SID.

4.3.3. Speed Restrictions

- PHW24 220KIAS – allowing turn to PHS08, whose position is predicated on the boundary with CTA-4.
- PHS08 250KIAS – to accommodate the turn from PHW24.

4.3.4. Procedure Design Gradient

Standard 3.3% procedure design climb gradient is required.

4.3.5. Climb Gradients

The following climb gradients are required to meet the required level restrictions. The gradients are calculated using point to point distances between WPs.

DER	PHW24 +2500	PHS08 +4000ft	ARLER 6000ft
4.73%	3.96%	9.18%	
5.41%			

4.3.6. Procedure Level Restrictions

- PHW24 At or above 2500alt – to ensure airspace containment into CTA-1. Though the base of CTA-1 is 2500, PHW24 is 2.5NM from the boundary which, if climbing at 3.3%, achieves the additional 500ft required to be clear of the base.
- PHS08 At or above 4000alt – to ensure airspace containment into CTA-4.
- ARLER At 6000alt – as requested by PC.

4.3.7. Procedure Coding of Initial Leg

PANS-OPS III-2-5 App states that if a CF is used as the first leg the design shall be validated for inadvertent low altitude banking of aircraft. The proposed design utilised a CA as the first leg, which PANS-OPS offers as an option to alleviate the possibility of inadvertent banking and at the

same time ensures turns are not made before 500aal. At the request of CAA this CA has been removed. The design has not been assessed for the possibility of low altitude aircraft banking.

4.3.8. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

4.3.9. Non-Compliances

None

4.3.10. Additional Comments

From ARLER aircraft route to TLA VOR via Z507.

4.4. MAVIX 1C

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

4.4.1. Procedure Overview

There are two options for this SID, which is intended for jet traffic only, routing to the south and east via GOSAM.

4.4.2. Options

Two options are presented, the choice of which to implement is dependent on decisions made during the Prestwick Centre (PC) ACP. The differences between the two are the choice of level restriction at PHW30 and MAVIX.

4.4.2.1. Option 1

Option 1 is for use if PC proceeds with a change to the Glasgow hold to RULUR. FL100 is systemised safe above the Glasgow inbounds at min stack or below.

4.4.2.2. Option 2

Option 2 is for use if the LANAK hold remains in operation at the time of implementation. 6000 is vertically separated from the LANAK hold but otherwise departures are tactically climbed as today.

4.4.3. Waypoint Placement Rationale

- PHW06 Placed at the intersection of RWY centreline and the track from MAVIX to NDB UW (which is the current GOSAM SID routing).
- PHW28 Airspace containment.
- PHW30 As requested by PC.
- MAVIX End of SID.

4.4.4. Speed Restrictions

- PHW06 220KIAS – to compliment other SIDs whose speed restriction is required for MSD purposes. Without the speed restriction a catch-up situation could occur between departures on another SID and compromise aircraft separation requirements.
- PHW28 250KIAS – as requested by CAA – first WP where a/c can accelerate to 250KIAS.

4.4.5. Procedure Design Gradient

Standard 3.3% procedure design climb gradient is required.

4.4.6. Climb Gradients

The following climb gradients are required to meet the required level restrictions. The gradients are calculated using point to point distances between WPs.

Option 1				
DER	PHW06	PHW28 +3000	PHW30 +FL90	MAVIX FL100
	4.25%	11.33%	2.70%	
	7.69%		2.70%	

Option 2				
DER	PHW06	PHW28 +3000	PHW30 6000	MAVIX 6000
	4.25%	5.66%	0.00%	
	4.94%		0.00%	

4.4.7. Procedure Level Restrictions

› PHW28 At or above 3000alt – to ensure airspace containment into CTA-1.

› PHW30 Option 1 at or above FL90, Option 2 at 6000alt – as requested by PC.

› MAVIX Option 1 at FL100, Option 2 at 6000alt – as requested by PC.

4.4.8. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

4.4.9. Non-Compliances

None.

4.4.10. Additional Comments

From MAVIX aircraft can route to GOSAM via Z500.

4.5. LIKLA 1C

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

4.5.1. Procedure Overview

This SID is intended for departures to the west via GOW and TRN for jet traffic only.

4.5.2. Options

Two options are presented, the choice of which to implement is dependent on decisions made during the Prestwick Centre (PC) ACP. The differences between the two are the choice of level restriction at PHW31 and LIKLA.

4.5.2.1. Option 1

Option 1 is for use if PC proceeds with a change to the Glasgow hold to RULUR. FL100 is systemised safe above the Glasgow inbounds at min stack or below.

4.5.2.2. Option 2

Option 2 is for use if the LANAK hold remains in operation at the time of implementation. 6000 is vertically separated from the LANAK hold but otherwise departures are tactically climbed as today.

4.5.3. Waypoint Placement Rationale

This route is intended to provide another route to the west to compliment MAVIX 1C.

- PHW10 Placed such that the nominal track of the leg to the north avoids Linlithgow and Broxburn, passing between Uphall and Dechmont.
- PHW27 Airspace containment.
- PHW12 Placed so that the track could turn west, parallel with MAVIX 1C once it was 5NM from MAVIX 1C.
- PHW31 As requested by PC.
- LIKLA End of SID.

4.5.4. Speed Restrictions

- PHW10 220KIAS – to compliment other SIDs whose speed restriction is required for MSD purposes. Without the speed restriction a catch-up situation could occur between departures on another SID and compromise aircraft separation requirements.
- PHW27 250KIAS – as requested by CAA – first WP where a/c can accelerate to 250KIAS.

4.5.5. Procedure Design Gradient

Standard 3.3% procedure design climb gradient is required.

4.5.6. Climb Gradients

The following climb gradients are required to meet the required level restrictions. The gradients are calculated using point to point distances between WPs.

Option 1					
DER	PHW10	PHW27 +3000	PHW12 +4000	PHW31 +FL90	LIKLA FL100
	4.02%	6.09%	14.59%	1.98%	
	7.62%			1.98%	

Option 2					
DER	PHW10	PHW27 +3000	PHW12 +4000	PHW31 6000	LIKLA 6000
	4.02%	6.09%	5.84%	0.00%	
	4.89%			0.00%	

4.5.7. Procedure Level Restrictions

- PHW27 At or above 3000alt – to ensure airspace containment into CTA-1.
- PHW12 At or above 4000alt – to ensure airspace containment into CTA-3 (though the WP is placed 654m into CTA-3 the required gradient from PHW27 means that crossing the CTA boundary, aircraft will nominally be 3870ft alt which is 870ft above the base).
- PHW31 Option 1 at or above FL90, Option 2 at 6000alt – as requested by PC.
- LIKLA Option 1 at FL100, Option 2 6000alt – as requested by PC.

4.5.8. Airspace Containment

Though PHW12 is located beyond the boundary of CTA-3, the gradient required to meet the level restrictions means that aircraft will remain within controlled airspace for the entire procedure.

4.5.9. Non-Compliances

None.

4.5.10. Additional Comments

The minimum altitude at which a turn may commence is 650ft alt due to required MOC in the TIA. For this reason, an initial CA leg to 650ft alt is specified in the coding table and noted on the chart.

From LIKLA aircraft can route to GOW or MAC via N537.

4.6. GRICE 4C

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

4.6.1. Procedure Overview

This SID is for departures of all aircraft types to the north via GRICE.

4.6.2. Waypoint Placement Rationale

- PHW15 This WP is FO and placed at 1NM from DER based on the CAP778 guidance that the turn point shall be no closer to DER than 1NM. This enables the nominal track to overfly the eastern side of Broxburn (which is more industrial than the west), whereas if FB WPs are used the western side of Broxburn is overflown resulting in higher populations being effected.
- PHW26 Placed so that the track to GRICE avoids Blackness.
- PHN19 Airspace containment.
- PHN18 Airspace containment.
- GRICE End of SID.

4.6.3. Speed Restrictions

- PHW26 220KIAS – to accommodate the turn from PHW15.
- PHN19 250KIAS – as requested by CAA – first WP where a/c can accelerate to 250KIAS.

4.6.4. Procedure Design Gradient

Standard 3.3% procedure design climb gradient is required.

4.6.5. Climb Gradients

The following climb gradients are required to meet the level restrictions.

The path terminator at PHW26 is DF which means that, following the FO WP PHW15, there will be a significant variation in track distance flown (determined by a combination of speed, bank angle and when the turn is initiated by the FMS). If the turn is initiated at the earliest point the distance flown to subsequent WPs is reduced. Since this will provide the most adverse required gradient this shortest track is measured in the calculation; if the turn is initiated later then the gradient will reduce since the aircraft has further distance with which to climb to the required altitude.

DER	PHW15	PHW26	PHN19 +4000ft	PHN18 +4500	GRICE 6000
	5.57%		2.88%	4.53%	
	5.57%		3.97%		

4.6.6. Procedure Level Restrictions

- PHN19 At or above 4000alt – to ensure airspace containment into CTA-3.
- PHN18 At or above 4500alt – to ensure airspace containment into TMA-6.
- GRICE At 6000alt – as requested by PC.

4.6.7. Procedure Coding of Initial Leg

The proposed design starts with a CA to 650alt. At the request of the CAA it was investigated as to whether an initial CA leg could be avoided in favour of relying on a level restriction at PHW15. After consideration it is felt that this proposition would be impracticable for this procedure due to the proximity of the first WP to DER. Placing a level restriction here would require publishing a high ATC climb gradient on the chart.

4.6.8. Airspace Containment

The WP level restrictions ensure that aircraft remain in CAS whilst routing to GRICE. The gradient required for the “average” track is lower than that of aircraft turning early but due to the longer track required, gains more altitude than the “early” turn and is higher, at the boundary of CTA-3.

4.6.9. Non-Compliances

None.

4.6.10. Additional Comments

The minimum altitude at which a turn may commence is 650ft alt due to required MOC in the TIA. For this reason, an initial CA leg to 650ft alt is specified in the coding table and noted on the chart.

PANS-OPS does not give guidance on the WP spacing between a FO and the subsequent DF WP. Assurance for the spacing in this design is derived by ensuring that the straight portion of flight by a nominal (10% climb gradient, 20° angle of bank, 220KIAS) aircraft is longer than the MSD required at PHW26 for the required turn by this nominal.

From GRICE aircraft can route via FOYLE to N560, via P600 Eastbound, or leave CAS to the north.

4.7. VOSNE 1C

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

4.7.1. Procedure Overview

This SID is for jet only departures to the south via HAVEN.

4.7.2. Waypoint Placement Rationale

- PHW15 This WP is FO and placed at 1NM from DER based on the CAP778 guidance that the turn point shall be no closer to DER than 1NM. This enables the nominal track to overfly the eastern side of Broxburn (which is more industrial than the west), whereas if FB WPs are used the western side of Broxburn is overflown resulting in higher populations being effected.
- PHN09 Placed so that the track to PHE50 routes over water.
- PHN21 Placed so that a speed restriction of 250KIAS can be placed.
- PHE33 Placed so that a level restriction can be coded for separation against approaches.
- PHE50 Ensures that the route is 3NM inside the edge of Scottish TMA-4 before turning south towards VOSNE.
- VOSNE End of SID. Placed 7NM from the EDIBO protected area.

4.7.3. Speed Restrictions

- PHN09 220KIAS – to accommodate the turn from PHW15.
- PHN21 250KIAS – as requested by CAA – first WP where a/c can accelerate to 250KIAS.

4.7.4. Procedure Design Gradient

Standard 3.3% procedure design climb gradient is required.

4.7.5. Climb Gradients

The following climb gradients are required to meet the level restrictions.

The path terminator at PHN09 is DF which means that, following the FO WP PHW15, there will be a significant variation in track distance flown (determined by a combination of speed, bank angle and when the turn is initiated by the FMS). If the turn is initiated at the earliest point the distance flown to subsequent WPs is reduced. Since this will provide the most adverse required gradient this shortest track is measured in the calculation; if the turn is initiated later then the gradient will reduce since the aircraft has further distance with which to climb to the required altitude.

DER	PHW15	PHN09 +4000	PHN21	PHE33 +FL90	PHE50 +FL110	VOSNE FL150
	9.64%		9.01%	4.18%	8.02%	
	9.64%		9.01%	6.14%		

4.7.6. Procedure Level Restrictions

- PHN09 At or above 4000alt –to ensure separation against RWY 24 approaches.
- PHE33 At or above FL90 – to ensure separation against the EDIBO 1C transition.
- PHE50 At or above FL110 – as requested by PC.
- VOSNE At FL150 – to ensure separation against the EDIBO hold.

4.7.7. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure

4.7.8. Non-Compliances

None.

4.7.9. Procedure Coding of Initial Leg

The proposed design starts with a CA to 650alt. At the request of the CAA it was investigated as to whether an initial CA leg could be avoided in favour of relying on a level restriction at PHW15. After consideration it is felt that this proposition would be impracticable for this procedure due to the proximity of the first WP to DER. Placing a level restriction here would require publishing a high ATC climb gradient on the chart.

4.7.10. Additional Comments

The minimum altitude at which a turn may commence is 650ft alt due to required MOC in the TIA. For this reason, an initial CA leg to 650ft alt is specified in the coding table and noted on the chart.

PANS-OPS does not give guidance on the WP spacing between a FO and the subsequent DF WP. Assurance for the spacing in this design is derived by ensuring that the straight portion of flight by a nominal (10% climb gradient, 20° angle of bank, 220KIAS) aircraft is longer than the MSD required at PHN09 for the required turn by this nominal.

From VOSNE aircraft can route to HAVEN via Z506. This routing interacts with the EDIBO hold; this interaction is discussed in the Route Separation Assurance Document.

The EDIBO hold has been placed in the DWG file to provide context when viewing this SID; it is for reference purposes only.

4.8. EMJEE 1D

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

4.8.1. Procedure Overview

This SID is intended for jet departures via GOSAM and GOW.

4.8.2. Waypoint Placement Rationale

- PHE35 Prevents turns before DER.
- PHE37 Track PHE35 – PHE37 avoids overflying Cramond as per the current conventional procedures.
- PHN11 Establishes the leg to PHW17 over water.
- PHW17 Establishes the leg to EMJEE.
- EMJEE End of SID.

4.8.3. Speed Restrictions

- PHN11 220KIAS – to accommodate the turn from PHE37.
- PHW17 250KIAS – as requested by CAA – first WP where a/c can accelerate to 250KIAS.

4.8.4. Procedure Design Gradient

A 3.9% PDG to 636ft alt is required due to obstacles in the climb out.

4.8.5. Climb Gradients

The following climb gradients are required to meet the level restrictions. The gradients are calculated using point to point distances between WPs.

The path terminator at PHN11 is DF which means that, following the FO WP PHE37, there will be a significant variation in track distance flown (determined by a combination of speed, bank angle and when the turn is initiated by the FMS). If the turn is initiated at the earliest point the distance flown to subsequent WPs is reduced. Since this will provide the most adverse required gradient this shortest track is measured in the calculation; if the turn is initiated later then the gradient will reduce since the aircraft has further distance with which to climb to the required altitude.

DER / PHE35	PHE37	PHN11	PHW17 +FL90	EMJEE FL100
	11.87%		2.74%	

4.8.6. Procedure Level Restrictions

- PHW17 At or above FL90 – as requested by PC.
- EMJEE At FL100 – as requested by PC.

4.8.7. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

4.8.8. Non-Compliances

Since PHE35 is less than 1NM from DER the procedure is not compliant with CAP778 (Chapter 5, para 5.3) however this configuration has been recommended by CAA in order to prevent turns occurring before DER and successfully trialled in flight simulations.

4.8.9. Additional Comments

From EMJEE aircraft can either route via N537 to GOW or MAC or via Z500 to GOSAM.

4.9. GRICE 5D

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N [redacted]dwg

4.9.1. Procedure Overview

This SID is intended for all aircraft types departing to the north via GRICE.

4.9.2. Waypoint Placement Rationale

- PHE35 Prevents turns before DER.
- PHE37 Track PHE35 – PHE37 avoids overflying Cramond as per the current conventional procedures.
- PHN15 Lateral airspace containment (against edge of CTA-2 and 3).
- PHN22 Provides for turn to GRICE whilst maintaining airspace containment.
- GRICE End of SID.

4.9.3. Speed Restrictions

- PHN15 220KIAS – to accommodate the turn from PHE37.
- PHN22 250KIAS – as requested by CAA – first WP where a/c can accelerate to 250KIAS.

4.9.4. Procedure Design Gradient

A 3.9% PDG to 636ft alt is required due to obstacles in the climb out.

4.9.5. Climb Gradients

The following climb gradients are required to meet the level restrictions. The gradients are calculated using point to point distances between WPs.

The path terminator at PHN15 is DF which means that, following the FO WP PHE37, there will be a significant variation in track distance flown (determined by a combination of speed, bank angle and when the turn is initiated by the FMS). If the turn is initiated at the earliest point the distance flown to subsequent WPs is reduced. Since this will provide the most adverse required gradient this shortest track is measured in the calculation; if the turn is initiated later then the gradient will reduce since the aircraft has further distance with which to climb to the required altitude.

DER / PHE35	PHE37	PHN15	PHN22 +4500	GRICE 6000
	4.62%		3.04%	

4.9.6. Procedure Level Restrictions

- PHN22 At or above 4500alt – to ensure airspace containment into CTA-3.
- GRICE At 6000alt – as requested by PC.

4.9.7. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

Note that the routing 2NM from the edge of CAS is less than that required but is the same separation that exists with the current SIDs.

4.9.8. Non-Compliances

Since PHE35 is less than 1NM from DER the procedure is not compliant with CAP778 (Chapter 5, para 5.3) however this configuration has been recommended by CAA in order to prevent turns occurring before DER and successfully trialled in flight simulations.

4.9.9. Additional Comments

From GRICE aircraft can route via FOYLE to N560, via P600 Eastbound, or leave CAS to the north.

4.10. VOSNE1D

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

4.10.1. Procedure Overview

This SID is intended for jet departures to the south via HAVEN.

4.10.2. Waypoint Placement Rationale

- PHE35 Prevents turns before DER.
- PHE47 Track PHE35 – PHE47 avoids overflying Cramond as per the current conventional procedures.
- PHE48 Airspace containment.
- PHE49 So that this route is separated by 25° from KRAGY 1D, this WP defines a track to the north-east such that the turn to the south will be sufficiently separated and remains 3NM inside the edge of Scottish TMA-3.
- PHE50 Ensures that the route is 3NM inside the edge of Scottish TMA-4.
- VOSNE End of SID. Placed 7NM from the EDIBO protected area.

4.10.3. Speed Restrictions

- PHE49 220KIAS – to accommodate MSD for leg to PHE50.
- PHE50 250KIAS – to accommodate MSD.

4.10.4. Procedure Design Gradient

A 3.9% PDG to 636ft alt is required due to obstacles in the climb out.

4.10.5. Climb Gradients

The following climb gradients are required to meet the level restrictions. The gradients are calculated using point to point distances between WPs.

DER / PHE35	PHE47	PHE48 +3000	PHE49 +FL80	PHE50 +FL110	VOSNE FL150
4.17%		17.18%	8.39%	8.02%	
8.54%			8.39%	8.02%	

4.10.6. Procedure Level Restrictions

- PHE48 At or above 3000alt – to ensure airspace containment into CTA-2.
- PHE49 At or above FL80 – Separation against KRAGY 1D.
- PHE50 At or above FL110– as requested by PC.
- VOSNE At FL150 – to ensure separation against the EDIBO hold.

4.10.7. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

4.10.8. Non-Compliances

Since PHE35 is less than 1NM from DER the procedure is not compliant with CAP778 (Chapter 5, para 5.3) however this configuration has been recommended by CAA in order to prevent turns occurring before DER and successfully trialled in flight simulations.

4.10.9. Additional Comments

From VOSNE, aircraft can route via the Z506 link route to Y96. This routing interacts with the EDIBO hold; this interaction is discussed in the Route Separation Assurance Document.

The EDIBO hold has been placed in the DWG file to provide context when viewing this SID; it is for reference purposes only.

4.11. KRAGY 1D

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

4.11.1. Procedure Overview

This SID is intended for non-jet aircraft as a replacement for the current TLA6D.

4.11.2. Waypoint Placement Rationale

- PHE35 Prevents turns before DER.
- PHE42 Track PHE35 – PHE42 avoids overflying Cramond as per the current conventional procedures.
- PHE28 Route to the east avoids tracking over land and with 25° separation from VOSNE 1D.
- PHE29 This position is far enough east and south that the turn back to the west avoids Edinburgh and remains 5NM separated from VOSNE 1D.
- PHE30 In conjunction with previous WP, makes turn to west avoid Edinburgh and Mayfield whilst flying between Dalkeith, Bonnyrigg and Loanhead.
- PHS17 For separation against arrival transitions.
- KRAGY End of SID.

4.11.3. Speed Restrictions

- PHE29 220KIAS – to accommodate MSD requirements for previous segments.
- PHE30 250KIAS – to accommodate MSD requirements.

4.11.4. Procedure Design Gradient

A 3.9% PDG to 636ft alt is required due to obstacles in the straight climb from DER.

4.11.5. Climb Gradients

The following climb gradients are required to meet the level restrictions. The gradients are calculated using point to point distances between WPs.

DER / PHE35	PHE42	PHE28 +3000	PHE29 +4000, FL80	PHE30	PHS17 +FL90	KRAGY FL100
4.75%		3.30%	7.47%		1.98%	
5.69%					1.98%	

4.11.6. Procedure Level Restrictions

- PHE28 At or above 3000alt – to ensure airspace containment into CTA-2.
- PHE29 At or above 4000alt – to ensure airspace containment into CTA-4.
  At or below FL80 – to ensure separation against VOSNE 1D.
- PHS17 At or above FL90 – to ensure separation against the EDIBO 1D transition.
- KRAGY At FL100 – as requested by PC.

4.11.7. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

4.11.8. Non-Compliances

Since PHE35 is less than 1NM from DER the procedure is not compliant with CAP778 (Chapter 5, para 5.3) however this configuration has been recommended by CAA in order to prevent turns occurring before DER and successfully trialled in flight simulations.

4.11.9. Additional Comments

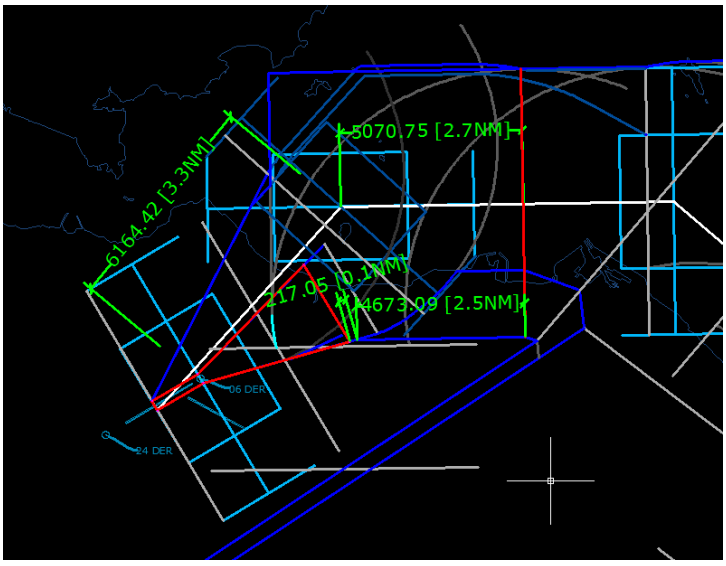
4.11.9.1. Routing Beyond KRAGY

From KRAGY aircraft can route via Z507 to TLA.

4.11.9.2. Obstacle Assessment

Ordinarily, the assessment of a turning SID would involve two workbooks: one for the straight portion and one for the turning area. The turning workbook would assess one obstacle set for everything in the turn area and ensure distances from the TIA or K-K are calculated and tested for clearance. The calculated distance from TIA is 'nearest' and in the case of this SID does not take into account that the route of the SID doubles back on itself thereby resulting in over penalising requirements for some obstacles.

To overcome this problem, two turning workbooks have been used in the assessment of this SID turn area. The first is used conventionally and assesses obstacles up to the red line shown in the illustration below.



The second workbook assesses the remaining obstacles beyond the red line. For the purposes of the variable parameter inputs, dr* (used to calculate the MOC provided by 0.8% of track distance) has been calculated as the sum of the distance of the early track to PHE42 and the distance from PHE42 to the red line; which is considered to be conservative. “Starting altitude” is the min turn at (636ft) plus height gain at 3.3% along the shortest distance to the red line, along the inside of the turn.

4.11.9.3. Vertical Window

The level restriction at PHE29 requires an altitude lower limit and an upper limit flight level. This duality has been considered and it has been established that aircraft FMS are able to cater for both altitude and FL constraints at a waypoint. The FL constraints are considered to be sufficiently far from the transition altitude for there to be sufficient vertical allowance for extreme variance in pressure.

4.12. Omni Directional SIDs

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N [redacted]dwg

Omni directional departures have been designed for each runway. These will provide an obstacle clear route for aircraft which are not RNAV1 equipped to depart, following a departure clearance from ATC.

Both require aircraft to climb to 500ft above aerodrome before making a turn onto desired track and each requires a climb gradient in order to clear obstacles to the south. The gradients also allow aircraft to make a turn earlier than would have been permissible at the standard PDG. Obstacle assessment has been carried out to 6000ft as per the methodology in section 3.4.

5. STARs

5.1. Design Rationale

5.1.1. Routes

The route designs and particular waypoint placement are based on replication of the existing conventional and B-RNAV STARs to TWEED and STIRA. The TWEED STARs are amended to terminate at the new EDIBO hold.

5.1.2. Procedure Naming

As the UK is moving to ICAO compliant procedure naming the STARs will be named based on their start point.

5.1.3. Descent Gradients

The PANS-OPS maximum descent gradient of 8% for the initial approach segment was used for the construction of protection areas and calculation of minimum segment lengths.

5.1.4. Level Restrictions

Level restrictions have been placed based on the airspace requirements around the tracks.

5.1.5. Maximum True Airspeed

In order to limit the True Airspeed (TAS) to a realistic Mach number the altitude calculations were originally limited to 40,000ft. In subsequent revisions the Indicated Airspeed (IAS) was set using the “goal seek” function in Excel to set the TAS to 480kts. However, the original limit of 40,000ft was left in place. In practice, this does not affect the construction of the protection areas as the wind spirals are based on the TAS so any combination of IAS and altitude that produces a TAS of 480kts will result in the same windspiral.

5.1.6. Navigation Specification

The STARs were originally designed using the RNAV1 navigation specification as the RNAV5 navigation specification is not applicable for arrivals within 30NM of the ARP. However, at the request of PC these have been changed to RNAV5 in order to provide arrival routes for non-RNAV1 equipped aircraft.

PANS-OPS does not provide fix tolerance or semi-area widths for the RNAV5 navigation specification within 30NM of the ARP. Based on the RNAV1 values the XTT (cross track tolerance) and ATT (along track tolerance) remain constant for DME/DME RNAV in all phases of flight. The semi-area width has therefore been calculated based on the formula ½A/W = 1.5 x XTT + BV (buffer value). This results in a semi-area width of 5.95NM within 30NM.

5.2. BLACA 1E

Designer	Checker	AutoCAD File
[redacted]	[redacted] and [redacted]	5248 - EGPH - UTM84-30N [redacted] dwg

5.2.1. Procedure Overview

This STAR is an RNAV replication of the current TWEED 2B STAR from BLACA to TLA VOR, based on the existing STAR instruction. Beyond TLA the STAR connects to the new EDIBO hold via GEVEZ.

5.2.2. Waypoint Placement Rationale

- BLACA Existing fix on TWEED 2B STAR.
- TUNSO Existing fix on TWEED 2B STAR.
- PHS45 Placed at the point where the track from TUNSO to TLA crosses the TMA-2 boundary.
- PHS46 Placed 10NM from TLA on track from TUNSO to TLA.
- TLA Existing fix on TWEED 2B STAR.
- GEVEZ Placed 6NM from EDIBO on the inbound holding axis.
- EDIBO Location of new hold.

5.2.3. Speed Restrictions

- PHS46 250KIAS – to enforce existing speed limit on TWEED 2B STAR.
- EDIBO 230KIAS – to align with hold and transition speed.

5.2.4. Procedure Level Restrictions

- TUNSO At or below FL170 – to enforce existing “expect” level on TWEED 2B STAR.
- PHS45 At or above FL130 – to ensure aircraft remain 500ft above the base of P600 airway.
- EDIBO Between FL70 and FL100 – to align with hold and transition levels.

5.2.5. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

5.2.6. Non-Compliances

RNAV5 is not an appropriate navigation specification for use within 30NM of the ARP.

5.2.7. Additional Comments

None

5.3. BLACA 1F

Designer	Checker	AutoCAD File
[redacted]	[redacted] and [redacted]	5248 - EGPH - UTM84-30N [redacted] dwg

5.3.1. Procedure Overview

This STAR is an RNAV replication of the current TWEED 2C STAR from BLACA to TLA VOR, based on the existing STAR instruction. Beyond TLA the STAR connects to the new EDIBO hold via GEVEZ.

5.3.2. Waypoint Placement Rationale

- BLACA Existing fix on TWEED 2C STAR.
- GIRVA Existing fix on TWEED 2C STAR.
- PHS47 Placed 10NM from TLA on track from GIRVA to TLA.
- TLA Existing fix on TWEED 2C STAR.
- GEVEZ Placed 6NM from EDIBO on the inbound holding axis.
- EDIBO Location of new hold.

5.3.3. Speed Restrictions

- PHS47 250KIAS – to enforce existing speed limit on TWEED 2C STAR.
- EDIBO 230KIAS – to align with hold and transition speed.

5.3.4. Procedure Level Restrictions

- GIRVA At or below FL120 – to enforce existing “expect” level on TWEED 2C STAR.
- EDIBO Between FL70 and FL100 – to align with hold and transition levels.

5.3.5. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

5.3.6. Non-Compliances

RNAV5 is not an appropriate navigation specification for use within 30NM of the ARP.

5.3.7. Additional Comments

None

5.4. ESKDO 1E

Designer	Checker	AutoCAD File
[redacted]	[redacted] and [redacted]	5248 - EGPH - UTM84-30N [redacted] dwg

5.4.1. Procedure Overview

This STAR is an RNAV replacement for the current TWEED 3A STAR from ESKDO, based on the existing STAR instruction. The STAR now connects directly from ESKDO to GEVEZ.

5.4.2. Waypoint Placement Rationale

- ESKDO Existing waypoint on TWEED 3A STAR.
- GEVEZ Placed 6NM from EDIBO on the inbound holding axis.
- EDIBO Location of new hold.

5.4.3. Speed Restrictions

- ESKDO 250KIAS – to enforce existing speed limit on TWEED 3A STAR but moved to ESKDO to remove PANS-OPS non-compliant leg from ESKDO to PHS48.
- EDIBO 230KIAS – to align with hold and transition speed.

5.4.4. Procedure Level Restrictions

- ESKDO At or below FL200 – to enforce existing “expect” level at INREV on TWEED 3A STAR.
- EDIBO Between FL70 and FL100 – to align with hold and transition levels.

5.4.5. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

5.4.6. Non-Compliances

RNAV5 is not an appropriate navigation specification for use within 30NM of the ARP.

5.4.7. Additional Comments

The leg from ESKDO to PHS48 did not comply with the minimum segment length requirements in PANS-OPS. Prestwick Centre has agreed that this waypoint can be removed and the 250KIAS speed restriction can be placed at ESKDO instead.

The existing TWEED 3A STAR includes “expect” levels at INPIP and INREV. The portion of airway N601 between INPIP and ESKDO has therefore been shown on the chart as a dashed line along with the waypoints INPIP, UTOGU, and INREV.

5.5. HAVEN 1E

Designer	Checker	AutoCAD File
[redacted]	[redacted] and [redacted]	5248 - EGPH - UTM84-30N [redacted] dwg

5.5.1. Procedure Overview

This STAR is an RNAV replacement for the current TWEED 2D STAR from HAVEN, based on the existing STAR instruction. The STAR now connects directly from HAVEN to GEVEZ.

5.5.2. Waypoint Placement Rationale

- HAVEN Existing fix on TWEED 2D STAR.
- GEVEZ Placed 6NM from EDIBO on the inbound holding axis.
- EDIBO Location of new hold.

5.5.3. Speed Restrictions

- HAVEN 250KIAS – to enforce existing speed limit on TWEED 2D STAR.
- EDIBO 230KIAS – to align with hold and transition speed.

5.5.4. Procedure Level Restrictions

- HAVEN At or below FL260 – to enforce existing “expect” level at AGPED on TWEED 2D STAR.
- EDIBO Between FL70 and FL100 – to align with hold and transition levels.

5.5.5. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

5.5.6. Non-Compliances

RNAV5 is not an appropriate navigation specification for use within 30NM of the ARP.

5.5.7. Additional Comments

The existing TWEED 2D STAR includes an “expect” level at AGPED. The portion of airway Y96 between AGPED and HAVEN has therefore been shown on the chart as a dashed line along with the waypoints AGPED, OTBUN, and IPSAD.

5.6. PTH 1E

Designer	Checker	AutoCAD File
[redacted]	[redacted] and [redacted]	5248 - EGPH - UTM84-30N [redacted] dwg

5.6.1. Procedure Overview

This STAR is an RNAV replication of the current STIRA 1A STAR from PTH VOR, based on the existing STAR instruction.

5.6.2. Waypoint Placement Rationale

- PTH — Existing fix on STIRA 1A STAR.
- EDONU — Existing fix on P600 airway where the base of the airway changes from FL85 to FL55.
- GRICE — Existing fix on STIRA 1A STAR.
- STIRA — Existing fix on STIRA 1A STAR.

5.6.3. Speed Restrictions

- GRICE — 250KIAS – to enforce existing speed limit on STIRA 1A STAR.
- STIRA — 230KIAS – to align with hold speed.

5.6.4. Procedure Level Restrictions

- EDONU — At or above FL90 – to ensure aircraft remain 500ft above the base of P600 airway.
- GRICE — At FL70 – to enforce existing “expect” level on STIRA 1A STAR.
- STIRA — At FL70 – to align with hold level.

5.6.5. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

5.6.6. Non-Compliances

RNAV5 is not an appropriate navigation specification for use within 30NM of the ARP.

5.6.7. Additional Comments

This procedure commences at PTH which is within 30NM of the Edinburgh ARP. The entire procedure should therefore be designed using Initial Approach criteria which includes a speed restriction of 250KIAS. However, as it is replicating the existing STIRA 1A STAR which includes a 250KIAS speed limit point at GRICE the procedure was designed using 315KIAS before GRICE to protect for any aircraft which fly the first portion of the procedure above 250KIAS.

Aircraft in the STIRA hold will be tactically vectored onto the final approach for either Runway 06 or Runway 24. In the rare event of a radar failure, aircraft could be instructed to self-position to the EDN or UW NDB and fly the racetrack initial approach procedure.

6. Approach Transitions

6.1. Design Rationale

6.1.1. Routes

The route designs and particular waypoint placement have been developed from feedback received from stakeholders and the requirement to comply with design criteria.

6.1.2. Procedure Naming

During the project the approach transitions were referred to by their end point. The initial flight validation was conducted using these names. As the UK is moving to ICAO compliant procedure naming the transitions will now be named based on their start point. Below is a decode table for the routes:

Runway	Initial Validation Name	Supplemental Validation Name	Submission Name
06	FAULD 1A	EDIBO 1B	EDIBO 1D
24	FIRTH 1A	EDIBO 1A	EDIBO 1C

6.1.3. Descent Gradients

These procedures have been designed to accommodate Continuous Descent Operations as described in ICAO Doc. 9931. For the final two legs of each procedure (base leg and intermediate approach segment) the nominal altitudes were calculated using the average of the upper limit of 350ft/NM and lower limit of 160ft/NM. (4.2%) For all legs preceding the base leg the nominal altitudes were calculated using the average of the upper limit of 350ft/NM and lower limit of 220ft/NM. (4.7%)

The PANS-OPS maximum descent gradients of 8% for the initial approach segment and 5.2% for the intermediate approach segment were used for the construction of protection areas and calculation of minimum segment lengths.

6.1.4. Level Restrictions

Level restrictions have been placed based on the airspace requirements around the tracks.

6.1.5. ATC Phraseology

Standard ATC phraseology for aircraft leaving the existing TWEED hold is:

"Hold cancelled. Fly heading XXX°." or *"Hold cancelled. Leave TWEED heading XXX°."*

The first phraseology instructs an aircraft to turn immediately onto the specified heading. The second phraseology instructs an aircraft to continue the hold until reaching TWEED then turn onto the specified heading.

Once the approach transitions have been published new phraseology will be required. Potential options are:

"Hold Cancelled. Cleared EDIBO 1C and ILS approach Runway 24. Report localiser established."

This would instruct an aircraft to continue to hold until reaching EDIBO. It would then fly-over EDIBO and fly the EDIBO 1C transition and ILS approach to Runway 24.

"Hold Cancelled. Cleared EDIBO 1D and ILS approach Runway 06. Report localiser established". "Route direct EDIBO."

This would instruct an aircraft to turn immediately to EDIBO. It would then fly-by EDIBO and fly the EDIBO 1D transition and ILS approach to Runway 06. This phraseology could also be used to route aircraft directly to another waypoint on the transition although the controller would be responsible for obstacle clearance until the aircraft had established on the procedure.

Suitable phraseology will need to be agreed before these procedures become effective.

6.2. EDIBO 1C

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

6.2.1. Procedure Overview

A new approach transition linking the EDIBO hold to the ILS or RNAV(GNSS) approach to Runway 24.

6.2.2. Waypoint Placement Rationale

- EDIBO — Location of new hold.
- PHS16 — Placed on the hold axis such that the track from PHS16 to TRIAR would pass between Bonnyrigg and Newtongrange.
- SEEDI — Placed where the track from PHS16 to TRIAR crosses the centre of the current arrival vectoring swathe.
- TRIAR — At the point where the base leg with a 90° turn at ABSEK crosses the coast.
- ABSEK — Location of the IF for the RWY 24 instrument approach procedures.

6.2.3. Speed Restrictions

- EDIBO — 230KIAS – to align with hold speed.
- TRIAR — 185KIAS – to ensure aircraft reduce speed prior to the base leg.

6.2.4. Procedure Level Restrictions

- EDIBO — Between FL70 and FL100 – to align with hold and STAR levels.
- SEEDI — At or below FL80 – to ensure separation against the VOSNE 1C SID.
- TRIAR — At or above 4000alt – to ensure aircraft remain 500ft above the base of CTA-4.
- ABSEK — Between 3000alt and 4000alt – to ensure aircraft remain 500ft above the base of CTA-2.

6.2.5. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

6.2.6. Non-Compliances

None

6.2.7. Additional Comments

None

6.3. EDIBO 1D

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

6.3.1. Procedure Overview

A new approach transition linking the EDIBO hold to the ILS or RNAV(GNSS) approach to Runway 06.

6.3.2. Waypoint Placement Rationale

- EDIBO — Location of new hold.
- BIRCH — Placed to keep the nominal track to the south of Auchengray and Tarbrax.
- PHS18 — Placed where the track from BIRCH to ADLOM crosses 7NM from the LANAK hold.
- ADLOM — At the point where the base leg with a 90° turn at VETID crosses the CTA-4 / CTA-1 airspace boundary.
- VETID — Location of the IF for the RWY 06 instrument approach procedures.

6.3.3. Speed Restrictions

- EDIBO — 230KIAS – to align with hold speed.
- ADLOM — 185KIAS – to ensure aircraft reduce speed prior to the base leg.

6.3.4. Procedure Level Restrictions

- EDIBO — Between FL70 and FL100 – to align with hold and STAR levels.
- BIRCH — At or below FL80 – to ensure separation against the KRAGY 1D SID.
- PHS18 — At or above 6000alt – to ensure separation against aircraft in the LANAK (or replacement) hold.
- ADLOM — At or above 4000alt – to ensure aircraft remain 500ft above the base of CTA-4.
- VETID — Between 3000alt and 4000alt – to ensure aircraft remain 500ft above the base of CTA-1.

6.3.5. Airspace Containment

The level restrictions guarantee that aircraft will remain within controlled airspace for the entire procedure.

6.3.6. Non-Compliances

None

6.3.7. Additional Comments

The currently published LANAK hold has been included in the AutoCAD drawing for reference purposes. The proposed replacement RULUR hold has also been included but the location and orientation may still change.

The currently published charts for the STARs to LANAK do not mention the available holding levels. In order to assure vertical separation between the LANAK hold and EDIBO 1D, we recommend that the vertical limits be added to these charts.

The LANAK hold is closer to the BIRCH – ADLOM track than the currently proposed replacement (RULUR). Waypoint PHS18 therefore provides vertical separation against either the LANAK hold or the RULUR hold.

7. Instrument Approach Procedures

7.1. Design Rationale

7.1.1. Aircraft Modelling

As per ICAO PANS-OPS DOC 8168 Vol. 2 Part II Section I Chapter 1 1.4.7.3 Determination of OCA/H with basic ILS surfaces:

If the basic ILS surfaces listed above are penetrated by objects other than those listed in Table II-1-1-3, the OCA/H may be calculated directly by applying height loss/altimeter margins to obstacles (see 1.4.8.8, "Determination of OCA/H with OAS or basic ILS surfaces")

Table II-1-1-3 Objects which may be ignored in OCA/H calculations

	Maximum height above threshold	Minimum lateral distance from runway centreline
GP Antenna	17m (55ft)	120m
Aircraft taxiing	22m (72ft)	150m
A/C in holding bay or in taxi holding position at a range between threshold and -250m	22m (72ft)	120m
A/C in holding bay or in taxi holding position at a range between threshold and -250m (CAT I only)	15m (50ft)	75m

Aircraft with the tail heights at Edinburgh Airport are considered to be Boeing 747 with maximum tail heights of 19.4m. This aircraft type has been modelled at the relevant holding points and taxiways to simulate aircraft holding or taxiing for the purposes of obstacle assessment.

Aircraft have been modelled as columns dimensions as follows:

	Lateral Tolerance	Max Tail Height above ground
Boeing 747	2m	19.4m

Where surveyed elevations are available – such as at holding points - the maximum elevations are determined by adding the maximum tail height to the surveyed elevation at those points. For the taxiways, aircraft have been modelled along the line between adjacent holding points at a spacing of no more than 100m. For these aircraft, the maximum elevations are determined by adding the maximum tail height to the higher of the adjacent holding points.

7.1.2. ILS Obstacle Assessment

ICAO PANS-OPS Doc 8168 describes three methods to determine the OCA/H for an ILS procedure. They are assessment using the Basic surfaces, Obstacle Assessment Surfaces (OAS) and/or Collision Risk Model (CRM). CRM will only assess the obstacles which penetrate the Basic

surfaces contained within the lateral bounds of the OAS, therefore only obstacles that are contained within the OAS have been considered.

The minima for the ILS approach procedures in this report have been determined by the CRM method; as such no other obstacle analysis methods have been applied.

7.1.3. Baro-VNAV Parameters

METAR data for Edinburgh from 22 August 2011 to 22 December 2016 was downloaded from the Iowa Environmental Mesonet. The surface temperature data was analysed and it was found to rarely fall below -5°C with the lowest readings being -8°C. The minimum temperature for the Baro-VNAV approach procedures was therefore set to -10°C.

7.1.4. RNAV Missed Approach Assessment

Due to the complexity of the RNAV missed approaches, the protection areas have been constructed in four stages then combined to create the complete area for obstacle assessment. The four stages are:

1 Aircraft reach 3000ft at the end of the turn initiation area before turning.

2 Aircraft reach 3000ft before the first missed approach waypoint. Aircraft with a small turn radius arrive at the second missed approach waypoint from the early turn point of the first waypoint.

3 Aircraft reach 3000ft before the first missed approach waypoint. Aircraft with a large turn radius arrive at the second missed approach waypoint from a tangent to the largest calculated nominal turn.

4 Aircraft reach 3000ft before the first missed approach waypoint. The FMS is unable to sequence the second missed approach waypoint so the aircraft continues turning direct to the missed approach hold.

7.2. Minimum Sector Altitudes

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

7.2.1. Procedure Overview

The existing ILS and LOC procedures have IAFs at NDB(L) EDN and NDB(L) UW. The MSAs for these two navigation aids have been reassessed against the latest obstacle data. The new RNAV(GNSS) procedures do not reference any conventional navigation aids and therefore the MSA is centred on the ARP.

According to PANS-OPS the MSA for an RNAV procedure shall be a single sector. However, PANS-OPS also states that if an airport has multiple MSAs that are located less than 5NM apart then the minimum sector altitude for any given sector should be the highest of all altitudes calculated for that specific sector for each of those MSAs.

The CAA has requested that all three MSAs are combined, even though NDB(L) UW is greater than 5NM away from both the ARP and NDB(L) EDN. The ARP MSA has therefore been assessed as a standard four sector MSA and the highest value from all three MSAs for each sector has been used for all instrument approach charts.

7.2.2. Minima

7.2.2.1. MSA ARP

Sector	MOCA	Obstacle ID	Description	Elevation
360° - 090°	2700ft	OSVM12371	Spot Height - OSVM Spot Height	522m
090° - 180°	3900ft	UK0171G521F	MICROWAVE TOWER - TYPE I (HAS REFLECTOR CONE) HEARTHSTANE LOTHIAN L20T	871m
180° - 270°	3900ft	UK0171G521F	MICROWAVE TOWER - TYPE I (HAS REFLECTOR CONE) HEARTHSTANE LOTHIAN L20T	871m
270° - 360°	3400ft	OSVM13631	Spot Height - OSVM Spot Height	721m

7.2.2.2. MSA NDB(L) EDN

Sector	MOCA	Obstacle ID	Description	Elevation
360° - 090°	2700ft	OSVM12371	Spot Height - OSVM Spot Height	522m
090° - 180°	3900ft	UK0171G521F	MICROWAVE TOWER - TYPE I (HAS REFLECTOR CONE) HEARTHSTANE LOTHIAN L20T	871m
180° - 270°	3900ft	UK0171G521F	MICROWAVE TOWER - TYPE I (HAS REFLECTOR CONE) HEARTHSTANE LOTHIAN L20T	871m
270° - 360°	3400ft	OSVM13631	Spot Height - OSVM Spot Height	721m

7.2.2.3. MSA NDB(L) UW

Sector	MOCA	Obstacle ID	Description	Elevation
360° - 090°	3000ft	OSVM13606	Spot Height - OSVM Spot Height	610m
090° - 180°	3900ft	UK0171G521F	MICROWAVE TOWER - TYPE I (HAS REFLECTOR CONE) HEARTHSTANE LOTHIAN L20T	871m
180° - 270°	3900ft	UK0171G521F	MICROWAVE TOWER - TYPE I (HAS REFLECTOR CONE) HEARTHSTANE LOTHIAN L20T	871m
270° - 360°	3400ft	OSVM13631	Spot Height - OSVM Spot Height	721m

7.3. Visual Manoeuvring (Circling)

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

7.3.1. Procedure Overview

The existing ILS and LOC procedures have VM(C) minima published for both the “Total Area” and “North of RWY 06/24”. Both of these minima have been reassessed against the latest obstacle data.

According to PANS-OPS obstacles can be ignored in a specific sector which is bounded by the dimensions of the Annex 14 instrument approach surfaces. While there is a published SRA procedure to runway 30, the Annex 14 instrument approach surfaces for that runway have not been used to construct the sector. This is due to the fact that these minima are only for publication on the approach charts to runway 06/24 and aircraft on these procedures would not enter the Annex 14 surfaces for another runway.

7.3.2. Minima

7.3.2.1. Total Area

Category	MOCA	Obstacle ID	Description	Elevation
Cat A	800ft	UK18637655F	ROTATING CRANE INDUSTRIAL A0141 18	151.00m
Cat B	990ft	UK0171G875F	RADIO TV TOWER - TYPE I	209m
Cat C	1480ft	14942	TREE OBST	329.75m
Cat D	2040ft	DEM_02-0002159	DEM	498.819m

7.3.2.2. North of RWY 06/24

Category	MOCA	Obstacle ID	Description	Elevation
Cat A	800ft	UK18637655F	ROTATING CRANE INDUSTRIAL A0141 18	151.00m
Cat B	990ft	UK0171G875F	RADIO TV TOWER - TYPE I	209m
Cat C	1190ft	UK18613956F	RADIO TV TOWER - TYPE I	240m
Cat D	1210ft	UK0171G857F	RADIO TV TOWER - TYPE I	247m

7.4. ILS/DME RWY 06

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

7.4.1. Procedure Overview

The platform altitude has been lowered from the currently published 4000ft to 3000ft to enable the intermediate approach fix to be placed close to where aircraft are currently vectored onto final approach.

A 3.0° glide path and RDH 54ft has been used.

DME I-VG is zero ranged to THR. See email correspondence for confirmation, which is located in the 'Other' folder supplied as part of this submission.

7.4.2. Intermediate

The Intermediate Segment is 4.0NM long and is aligned with the final approach track. The Intermediate Fix (IF) is positioned at 12.9D. The minimum obstacle clearance altitude (MOCA) is 2000ft AMSL.

Sector	Min Alt	OBS.ID	Description	Elevation
Intermediate	2000 (1890)	UK18613321F	Crane	444.00

7.4.3. Final

The Final Segment commences at the Final Approach Fix (FAF) where the nominal 3.0° glide path reaches 3000ft AMSL on the extended runway centreline, positioned at 8.9D 061°. The FAF will be at 3000ft to align with the RNAV approaches.

ILS CAT I

Aircraft Category	Published Minima	New Minima	OBS.ID	Elevation
A	245 (135)	283 (173)	AC0001	52.37
B	252 (142)	291 (181)	AC0001	52.37
C	262 (152)	300 (190)	AC0001	52.37
D_L	271 (161)	312 (202)	AC0001	52.37

ILS CAT II

Aircraft Category	Published Minima	New Minima	OBS.ID	Elevation
A	158 (48)	169 (59)	AC0001	52.37
B	169 (59)	180 (70)	AC0001	52.37
C	182 (72)	193 (83)	AC0001	52.37
D_L	195 (85)	210 (100)	AC0001	52.37

7.4.4. Missed approach

The missed approach segment commences at the point where the nominal 3.0° glide path reaches the OCA (H).

Missed approach instructions:

'Climb straight ahead to **3000'**, then continue as directed.

Sector	OBS.ID	Description	Elevation
Missed Approach	DEM_02-0002741	Ground	20.048

The missed approach has been assessed out to 25NM from the ARP.

7.4.5. Radio Communications Failure

RCF instructions:

'Climb straight ahead to **3000'**, then turn left to NDB(L) EDN at **3000'**.

Sector	OBS.ID	Description	Elevation
RCF	UK0171G592F	Tower	369.00

7.4.6. Reversal

Orientation – 061°

Direction – Right

Outbound limit – 14.5D

Speed – 210Kts

Maximum Altitude 4000'

Sector	OBS.ID	Description	Elevation
Reversal	UK0171A385F	Tower	591.00

7.4.7. No DME Procedure

This procedure has been removed so does not form part of this assessment so has not been considered.

7.4.8. Obstacle Free Zone

A number of frangible obstacles which penetrate the OFZ have been discounted.

OBS.ID	Description	OBS.ID	Description
13311	06_PAPI	13310	06_PAPI
13312	06_PAPI	13313	06_PAPI

7.4.9. Visual Segment Surface

There are no penetrations of the Visual Segment Surface.

7.5. LOC/DME RWY 06

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

7.5.1. Procedure Overview

The platform altitude has been lowered from the currently published 4000ft to 3000ft to enable the intermediate approach fix to be placed close to where aircraft are currently vectored onto final approach.

A 5.24% gradient and RDH 54ft have been used.

DME I-VG is zero ranged to THR. See email correspondence for confirmation, which is located in the 'Other' folder supplied as part of this submission.

7.5.2. Intermediate

The intermediate is 4.0NM long and is aligned with the final approach track. The intermediate Fix (IF) is positioned at 12.9D. The MOCA is 2000ft AMSL.

Sector	Min Alt	OBS.ID	Description	Elevation
Intermediate	2000 (1890)	UK18614901F	Wind Motor	450.00

7.5.3. Final

The final segment commences at the Final Approach Fix (FAF) where the nominal 5.24% gradient reaches 3000ft AMSL on the extended runway centreline, positioned at 8.9D 062°. The FAF will be at 3000ft to align with the RNAV approaches.

The current draft chart uses a Step Down Fix (SDF) at 4.6D and 2.5D to achieve the currently published minima of 590 (480). The new dataset does not achieve the same minima and no gain can be achieved with these two fixes. One new SDF has been introduced at 2.8D to achieve the new minima.

SDF - 2.8D

Sector	Min Alt	OBS.ID	Description	Elevation
SDF	1010 (900)	UK01710227F	Pile	232.00

LOC Minima

Aircraft Category	Published Minima	New Minima	OBS.ID	Elevation
A - D	590 (480)	640 (530)	16475	119.38

7.5.4. Missed approach

The missed approach point is positioned at 1.0D.

Missed approach instructions:

'Climb straight ahead to **3000'**, then continue as directed.

Sector	OBS.ID	Description	Elevation
Missed Approach	15797	Tree	74.12

The missed approach has been assessed out to 25NM from the ARP.

7.5.5. RCF and Reversal

The assessments for the above sectors are common for both the ILS and LOC procedures as detailed in sections 7.4.5 and 7.4.6.

7.5.6. No DME Procedure

This procedure has been removed so does not form part of this assessment and has not been considered.

7.5.7. Visual Segment Surface

There are no penetrations of the Visual Segment Surface.

7.6. RNAV(GNSS) RWY 06

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

7.6.1. Procedure Overview

This procedure is designed as an overlay of the revised ILS/DME RWY 06 procedure. It is not expected to be used as the primary approach procedure to this runway but would be used for training purposes or in situations when an aircraft is unable to fly the ILS/DME approach.

The platform altitude has been lowered from the currently published 4000ft to 3000ft to enable the intermediate approach fix to be placed close to where aircraft are currently vectored onto final approach.

7.6.2. Technical Detail

7.6.2.1. Intermediate Approach Segment

The procedure commences at VETID which is the IF. VETID is located 12.9NM before the RWY 06 threshold on the runway centreline. Aircraft can reach VETID via the EDIBO 1D approach transition or by receiving vectors from ATC. VETID is a fly-by waypoint with an altitude restriction of “between 3000 and 4000”. The intermediate approach segment is 4.0NM long and terminates at PH06F.

7.6.2.2. Final Approach Segment

The final approach segment commences at PH06F which is the FAF. PH06F is located 8.9NM before the RWY 06 threshold on the runway centreline where the 3.0° VPA reaches an altitude of 3000ft. PH06F is a fly-by waypoint with an altitude restriction of “at 3000”. The final approach segment is 8.9NM long and terminates at RW06.

For the LNAV Only procedure a step down fix has been placed 2.4NM before the RWY 06 threshold. The MOCA prior to the SDF is 930ft and the recommended profile at the SDF is 930ft.

7.6.2.3. Missed Approach Segment

The missed approach segment commences at RW06 which is the MAPt. RW06 is located at the RWY 06 threshold. RW06 is a fly-over waypoint. The missed approach procedure has a maximum IAS of 210kts.

The conventional radio communications failure instruction is “climb straight ahead to 3000, then turn left to NDB(L) UW at 3000.” The equivalent RNAV coding would be to have a CA leg to 3000ft followed by a DF leg back to UW with the turn direction set to left. However UK specific design criteria prohibit this coding due to the risk of aircraft turning in the wrong direction. An alternative missed approach coding was therefore required.

A standard RNAV missed approach might involve three fly-by waypoints with 90° turns creating a “box” that brings aircraft back to the intermediate approach fix. However this would require the downwind leg to be over 5.5NM from the runway centreline and would put aircraft directly over Fife. This could also lead to confusion for air traffic control as it would be completely different from the currently published missed approach.

A new design was therefore produced which emulated the conventional missed approach as closely as possible while complying with the CAA design requirements. The missed approach

includes two additional waypoints which guarantee that aircraft will turn in the correct direction while keeping the turn point and track as similar as possible to the conventional procedure.

The first leg of the missed approach is a CF leg to PHM01 which has been placed 2.6NM beyond the RWY 06 threshold on the runway centreline. This is approximately 7.2NM from UW which provides adequate distance for the worst case turn to PHM02. PHM01 is a fly-over waypoint which ensures all aircraft travel far enough to ensure the remainder of the missed approach procedure is flyable.

This waypoint is followed by a CA leg to 3000ft along the runway centreline to replicate the existing missed approach procedure. Any aircraft that reach 3000ft prior to PHM01 would therefore execute a fly-over turn at PHM01. Any aircraft that are below 3000ft when they reach PHM01 would continue straight ahead until they reach 3000ft.

The third leg is a DF leg to PHM02 which has been placed 4.0NM to the north of the runway centreline abeam the RWY 06 threshold. PHM02 is a fly-by waypoint and ensures that all aircraft turn left towards the Firth of Forth before returning to the hold at UW.

The final leg of the missed approach is a TF leg to UW. UW is a fly-over waypoint with an altitude restriction of “at 3000”. This has been reduced from the currently published 4000ft to coincide with the reduced platform altitude. Aircraft would then enter the UW hold until receiving further instructions from ATC.

7.6.2.4. Visual Segment Surface

There are no penetrations of the Visual Segment Surface.

7.6.3. Minima

7.6.3.1. LNAV/VNAV

Category	OCA	Obstacle ID	Description	Elevation
Cat A	490ft	14684	MAST OBST	113.07m
Cat B	500ft	14684	MAST OBST	113.07m
Cat C	510ft	14684	MAST OBST	113.07m
Cat D	520ft	14684	MAST OBST	113.07m

7.6.3.2. LNAV

Category	MOCA	Obstacle ID	Description	Elevation
Cat A	600ft	16489	TREE OBST	105.70m
Cat B	600ft	16489	TREE OBST	105.70m
Cat C	600ft	16489	TREE OBST	105.70m
Cat D	600ft	16489	TREE OBST	105.70m

7.7. ILS/DME RWY 24

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

7.7.1.1. Procedure Overview

A 3.0° glide path and RDH of 50ft has been used.

DME I-TH is zero ranged to THR. See email correspondence for confirmation, which is located in the 'other' folder supplied as part of this submission.

7.7.1.2. Intermediate

The Intermediate Segment is 4.0NM long and is aligned with the final approach track. The Intermediate Fix (IF) is positioned at 13.0D. The MOCA is 800ft AMSL.

Sector	Min Alt	OBS.ID	Description	Elevation
Intermediate	800 (700)	DEM_01-0015490	Ground	71.15

7.7.2. Final

The final segment commences at the Final Approach Fix (FAF) where the nominal 3.0° glide path reaches 3000ft AMSL on the extended runway centreline, positioned at 9.0D 241°. The FAF will be at 3000ft to align with the RNAV approaches.

ILS CAT I

Aircraft Category	Published Minima	New Minima	OBS.ID	Elevation
A	245 (145)	270 (170)	AC0041	48.08
B	253 (153)	278 (178)	AC0041	48.08
C	261 (161)	288 (188)	AC0041	48.08
D_L	272 (172)	299 (199)	AC0041	48.08

ILS CAT II

Aircraft Category	Published Minima	New Minima	OBS.ID	Elevation
A	153 (53)	166 (66)	AC0041	48.08
B	161 (61)	177 (77)	AC0041	48.08
C	173 (73)	188 (88)	AC0041	48.08
D_L	185 (85)	205 (105)	AC0041	48.08

7.7.3. Missed approach

The missed approach segment commences at the point where the nominal 3.0° glide path reaches the OCA (H).

Missed approach instructions:

'Climb straight ahead to **3000'**, then continue as directed.

Sector	OBS.ID	Description	Elevation
Missed Approach	DEM_02-0000854	Tower	201.2

The missed approach has been assessed out to 25NM from the ARP.

7.7.4. Radio Communications Failure

RCF instructions:

'Climb straight ahead to **3000'**, then turn right to NDB(L) EDN at **3000'**.

Sector	OBS.ID	Description	Elevation
RCF	UK0171A385F	Tower	591.00

7.7.5. Reversal

Orientation – 241°

Direction – Left

Outbound limit – 14.6D

Speed – 210Kts

Maximum Altitude 4000'

Sector	OBS.ID	Description	Elevation
Reversal	DEM_02-00002159	Ground	498.82

7.7.6. No DME Procedure

This procedure has been removed so does not form part of this assessment and has not been considered.

7.7.7. Obstacle Free Zone

A number of frangible obstacles which penetrate the OFZ have been discounted.

OBS.ID	Description	OBS.ID	Description
13311	06_PAPI	13310	06_PAPI
13312	06_PAPI	13313	06_PAPI
13315	24_PAPI	13316	24_PAPI
13317	24_PAPI	13314	24_PAPI

7.7.8. Visual Segment Surface

There are no penetrations of the Visual Segment Surface.

7.8. LOC/DME RWY 24

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

7.8.1. Procedure Overview

A 3.0° glide path and RDH 50ft has been used.

DME I-TH is zero ranged to THR. See email correspondence for confirmation, which is located in the 'other' folder supplied as part of this submission.

7.8.2. Intermediate

The Intermediate Segment is 4.0NM long and is aligned with the final approach track. The Intermediate Fix (IF) is positioned at 13.0D. The MOCA is 800ft AMSL.

Sector	Min Alt	OBS.ID	Description	Elevation
Intermediate	800 (700)	DEM_01-0015490	Ground	71.15

7.8.3. Final

The Final Segment commences at the Final Approach Fix (FAF) where the nominal 3.0° glide path reaches 3000ft AMSL on the extended runway centreline, positioned at 9.0D 241°. The FAF will be at 3000ft to align with the RNAV approaches.

LOC Minima

Aircraft Category	Published Minima	New CRM Minima	OBS.ID	Elevation
A - D	540 (440)	540 (440)	14187	89.13

7.8.4. Missed approach

The missed approach point is positioned at 1.0D.

Missed approach instructions:

'Climb straight ahead to **3000'**, then continue as directed.

Sector	OBS.ID	Description	Elevation
Missed Approach	UK0171R039F	Control Tower	88.00

The missed approach has been assessed out to 25NM from the ARP.

7.8.5. RCF and Reversal

The assessments for the above sectors are common for both the ILS and LOC procedures as detailed in sections 7.7.4 and 7.7.5.

7.8.6. No DME Procedure

This procedure has been removed so does not form part of this assessment and has not been considered.

7.8.7. Visual Segment Surface

There are no penetrations of the Visual Segment Surface.

7.9. RNAV(GNSS) RWY 24

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

7.9.1. Procedure Overview

This procedure is designed as an overlay of the existing ILS/DME RWY 24 procedure. It is not expected to be used as the primary approach procedure to this runway but would be used for training purposes or in situations when an aircraft is unable to fly the ILS/DME approach.

The platform altitude remains at 3000ft.

7.9.2. Technical Detail

7.9.2.1. Intermediate Approach Segment

The procedure commences at ABSEK which is the IF. ABSEK is located 13.0NM before the RWY 24 threshold on the runway centreline. Aircraft can reach ABSEK via the EDIBO 1C approach transition or by receiving vectors from ATC. ABSEK is a fly-by waypoint with an altitude restriction of “between 3000 and 4000”. The intermediate approach segment is 4.0NM long and terminates at PH24F.

7.9.2.2. Final Approach Segment

The final approach segment commences at PH24F which is the FAF. PH24F is located 9.0NM before the RWY 24 threshold on the runway centreline where the 3.0° VPA reaches an altitude of 3000ft. PH24F is a fly-by waypoint with an altitude restriction of “at 3000”. The final approach segment is 9.0NM long and terminates at RW24.

7.9.2.3. Missed Approach Segment

The missed approach segment commences at RW24 which is the MAPt. RW24 is located at the RWY 24 threshold. RW24 is a fly-over waypoint. The missed approach procedure has a maximum IAS of 210kts.

The conventional radio communications failure instruction is “climb straight ahead to 3000, then turn right to NDB(L) EDN at 3000.” The equivalent RNAV coding would be to have a CA leg to 3000ft followed by a DF leg back to EDN with the turn direction set to right. However UK specific design criteria prohibit this coding due to the risk of aircraft turning in the wrong direction. An alternative missed approach coding was therefore required.

A standard RNAV missed approach might involve three fly-by waypoints with 90° turns creating a “box” that brings aircraft back to the intermediate approach fix. However this would require the downwind leg to be over 5.5NM from the runway centreline and would put aircraft directly over Falkirk. This could also lead to confusion for air traffic control as it would be completely different from the currently published missed approach.

A new design was therefore produced which emulated the conventional missed approach as closely as possible while complying with the CAA design requirements. The missed approach includes two additional waypoints which guarantee that aircraft will turn in the correct direction while keeping the turn point and track as similar as possible to the conventional procedure.

The first leg of the missed approach is a CF leg to PHM11 which has been placed 4.4NM beyond the RWY 24 threshold on the runway centreline. This is approximately 7.2NM from EDN which

provides adequate distance for the worst case turn to PHM12. PHM11 is a fly-over waypoint which ensures all aircraft travel far enough to ensure the remainder of the missed approach procedure is flyable.

This waypoint is followed by a CA leg to 3000ft along the runway centreline to replicate the existing missed approach procedure. Any aircraft that reach 3000ft prior to PHM11 would therefore execute a fly-over turn at PHM11. Any aircraft that are below 3000ft when they reach PHM11 would continue straight ahead until they reach 3000ft.

The third leg is a DF leg to PHM12 which has been placed 4.0NM to the north of the runway centreline. PHM12 is a fly-by waypoint and ensures that all aircraft turn right towards the Firth of Forth before returning to the hold at EDN.

The final leg of the missed approach is a TF leg to EDN. EDN is a fly-over waypoint with an altitude restriction of “at 3000”. Aircraft would then enter the EDN hold until receiving further instructions from ATC.

7.9.2.4. Visual Segment Surface

There are no penetrations of the Visual Segment Surface.

7.9.3. Minima

7.9.3.1. LNAV/VNAV

Category	OCA	Obstacle ID	Description	Elevation
Cat A	430ft	14263	TREE OBST	105.14m
Cat B	440ft	14092	TREE OBST	88.35m
Cat C	450ft	14092	TREE OBST	88.35m
Cat D	460ft	14092	TREE OBST	88.35m

7.9.3.2. LNAV

Category	MOCA	Obstacle ID	Description	Elevation
Cat A	540ft	14187	TREE OBST	89.13m
Cat B	540ft	14187	TREE OBST	89.13m
Cat C	540ft	14187	TREE OBST	89.13m
Cat D	540ft	14187	TREE OBST	89.13m

8. Holds

8.1. RNAV1 EDIBO

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N [redacted]dwg

8.1.1. Procedure Overview

This is a new RNAV1 hold to replace the existing TWEED hold used for arrivals from the south.

8.1.2. Technical Detail

The hold is placed at the new waypoint EDIBO which has been designed to optimise the efficiency of the arrival and departure operations without adversely impacting adjacent aerodromes. The fix tolerance for a STAR within 30NM of the ARP has been used.

The right-hand hold has been aligned on a heading of 354° and has been constructed at FL70 (7000ft) and FL140 (14000ft). The upper limit of FL140 has been chosen as it is the maximum level at which a 1 minute hold should be promulgated according to PANS-OPS. The STARs inbound to the EDIBO hold have a level restriction of between FL70 and FL100 at EDIBO in order to ensure aircraft are able to adhere to the Continuous Descent Operation (CDO) guidelines beyond EDIBO. However, if ATC require aircraft to enter the EDIBO hold at levels above FL100 they will instruct aircraft to stop their descent at the appropriate level.

The hold has an outbound limit of 1 minute and a speed of 230KIAS. The protection area has been constructed to protect for entry along the holding axis only. Aircraft should only enter the EDIBO hold via the GEVEZ waypoint. Aircraft entering the hold from any other direction may exit the primary protection area while flying the hold entry.

8.1.3. Minima

As the lowest holding altitude of FL70 is above the 6000ft terrain safe level, an obstacle assessment has not been undertaken.

8.2. RNAV1 STIRA

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

8.2.1. Procedure Overview

This is an RNAV1 overlay of the existing STIRA conventional hold used for arrivals from the north.

8.2.2. Technical Detail

The hold is placed at the published coordinates of STIRA. The fix tolerance for a STAR within 30NM of the ARP has been used.

The right-hand hold has been aligned with the inbound track from GRICE (235°) and has been constructed at FL70 (7000ft) and FL140 (14000ft). The upper limit of FL140 has been chosen as it is the maximum level at which a 1 minute hold should be promulgated according to PANS-OPS. The PTH 1E STAR inbound to the STIRA hold has a level restriction of at FL70 at STIRA in order to enforce the existing “expect” level on the current STIRA 1A STAR. However, if ATC require aircraft to enter the STIRA hold at levels above FL70 they will instruct aircraft to stop their descent at the appropriate level.

The hold has an outbound limit of 1 minute and a speed of 230KIAS. The protection area has been constructed to protect for entry along the holding axis only. Aircraft should only enter the STIRA hold via the GRICE waypoint. Aircraft entering the hold from any other direction may exit the primary protection area while flying the hold entry.

8.2.3. Minima

As the lowest holding altitude of FL70 is above the 6000ft terrain safe level, an obstacle assessment has not been undertaken.

8.3. RNP-APCH EDN

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

8.3.1. Procedure Overview

This is an RNP-APCH overlay of the existing EDN NDB conventional hold used for the missed approaches from runway 24.

8.3.2. Technical Detail

The hold is placed at the published coordinates of the EDN NDB. While the waypoint is within 15NM of the ARP, the fix tolerance for a missed approach waypoint outside 15NM has been used as slow climbing aircraft may travel beyond 15NM from the ARP before reaching 3000ft and turning back to PHM12.

The left-hand hold has been aligned with the final approach track for runway 24 (241°) and has been constructed at 3000ft with an outbound limit of 1 minute and a speed of 210KIAS. The protection area has been constructed to protect for omnidirectional entry.

8.3.3. Minima

LHA	MOCA	Obstacle ID	Description	Elevation
3000ft	2700ft	OSVM08488	Spot Height	493m
3000ft	2700ft	1758	TRIG PILLAR OBST	493m

Note: Both obstacles have exactly the same elevation and therefore generate the same MOCA. They both appear to reference a trig point on the top of a hill to the south-west of Swanston but as the points are 8.6m apart and cannot be definitely tied to the same physical feature they have both been listed as the controlling obstacles.

8.4. RNP-APCH UW

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

8.4.1. Procedure Overview

This is an RNP-APCH overlay of the existing UW NDB conventional hold used for the missed approaches from runway 06.

8.4.2. Technical Detail

The hold is placed at the published coordinates of the UW NDB. While the waypoint is within 15NM of the ARP, the fix tolerance for a missed approach waypoint outside 15NM has been used as slow climbing aircraft may travel beyond 15NM from the ARP before reaching 3000ft and turning back to PHM02.

The right-hand hold has been aligned with the final approach track for runway 06 (061°) and has been constructed at 3000ft with an outbound limit of 1 minute and a speed of 210KIAS. The protection area has been constructed to protect for omnidirectional entry.

8.4.3. Minima

LHA	MOCA	Obstacle ID	Description	Elevation
3000ft	2900ft	OSVM08717	Spot Height - OSVM Spot Height	567m

8.5. NDB(L) EDN

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

8.5.1. Procedure Overview

This is an existing EDN NDB conventional hold used for the missed approaches from runway 24.

8.5.2. Technical Detail

The hold is placed at the published coordinates of the EDN NDB.

The left-hand hold has been aligned with the final approach track for runway 24 (241°) and has been constructed at 3000ft with an outbound limit of 1 minute and a speed of 210KIAS. The protection area has been constructed to protect for omnidirectional entry.

8.5.3. Minima

LHA	MOCA	Obstacle ID	Description	Elevation
3000ft	2900ft	OSVM08479	Spot Height - OSVM Spot Height	579m

8.6. NDB(L) UW

Designer	Checker	AutoCAD File
[redacted]	[redacted]	5248 - EGPH - UTM84-30N[redacted]dwg

8.6.1. Procedure Overview

This is an existing UW NDB conventional hold used for the missed approaches from runway 06.

8.6.2. Technical Detail

The hold is placed at the published coordinates of the UW NDB.

The right-hand hold has been aligned with the final approach track for runway 06 (061°) and has been constructed at 3000ft with an outbound limit of 1 minute and a speed of 210KIAS. The protection area has been constructed to protect for omnidirectional entry.

8.6.3. Minima

LHA	MOCA	Obstacle ID	Description	Elevation
3000ft	3000ft	UK0171A385F	Radion TV Tower	591m

Appendix A – Navigation Infrastructure Assessment

APPENDIX C Detailed Assessment of Glasgow / Edinburgh / Prestwick RNAV 1 Replication Proposals

The DME/DME based RNAV1 position-fixing support within the Scottish TMA has been significantly optimised through the consideration of Dundonald and Green Lowther as future sites when compared against version 1 of this same document.

The analysis below focuses on the major airports within the TMA, namely Glasgow, Edinburgh and Prestwick, and identifies any sub-optimal DME/DME support if any provided to their published SID procedures.

Glasgow and Edinburgh have expressed their intention to redesign their procedures in order to take full benefit of the RNAV1 capabilities. Prestwick on the other hand, has intentions to use its existing procedures.

These procedures are currently promulgated based on conventional navigation however they are due in the short to medium term, to be replaced with RNAV 1 replications which will follow the same ground tracks. The analysis below can therefore be used to assess the RNAV 1 support for these future replications in the case of Prestwick and as guidance for the procedures redesign that Glasgow and Edinburgh are planning.

For reference, the requirement for an aircraft using an RNAV 1 SID to have an automatic runway update capability on their Inertial Navigation/Reference System (INS/IRS) is still assumed in this analysis. This provides the 3000ft minimum DME/DME coverage requirement.

Figure 30-Figure 32 provide an illustration of the 2D routings associated with current Glasgow, Edinburgh and Prestwick airport SID procedures, overlaid on the local DME/DME performance achieved at 3000ft for reference. Please note that Glasgow and Edinburgh procedures are based on replications of existing procedures. It is expected that a major redesign of these procedures will be conducted so these are only to be used as a reference.

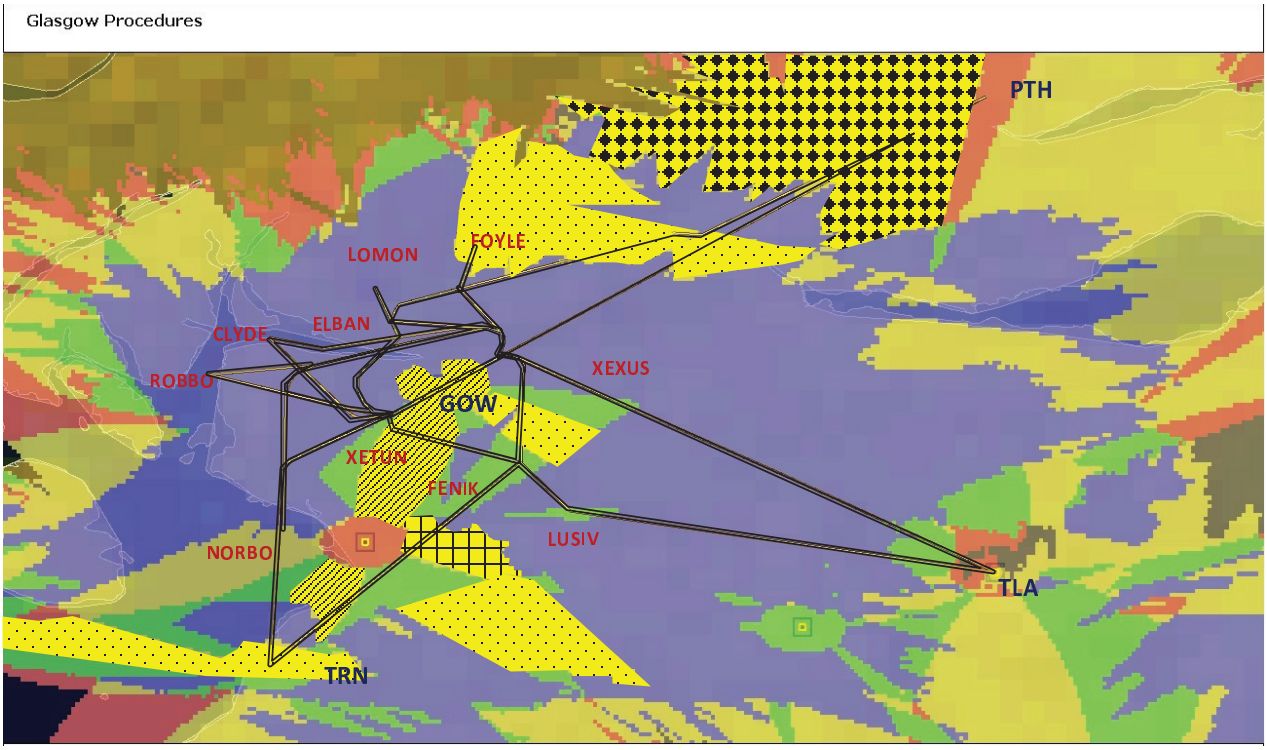


Figure 30: Glasgow SID routings overlaid on local DME/DME performance at 3000 ft.

NOTE: Dundonald is the 'critical' DME;

Talla is the 'critical' DME.

Turnberry is the 'critical' DME.

St. Abbs is the 'critical' DME.

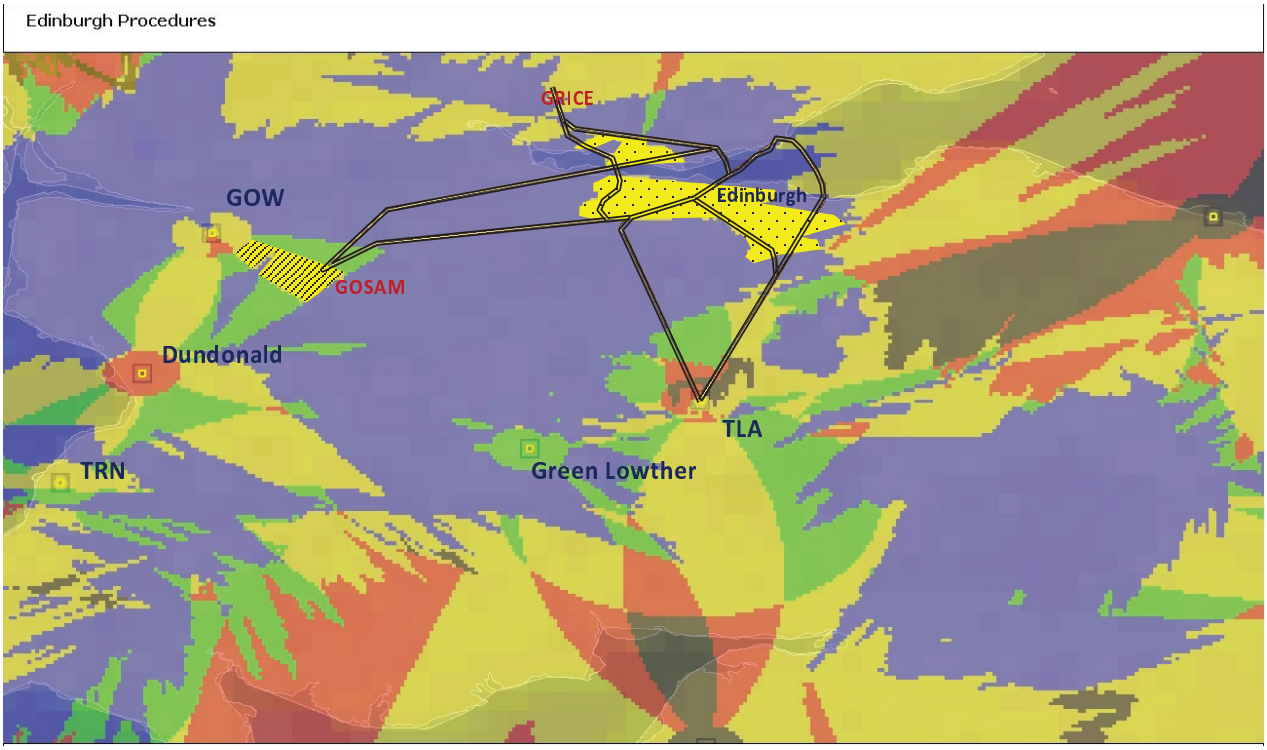


Figure 31: Edinburgh SID routings overlaid on local DME/DME performance at 3000 ft.

NOTE: Glasgow is the 'critical' DME;

Dundonald is the 'critical' DME.

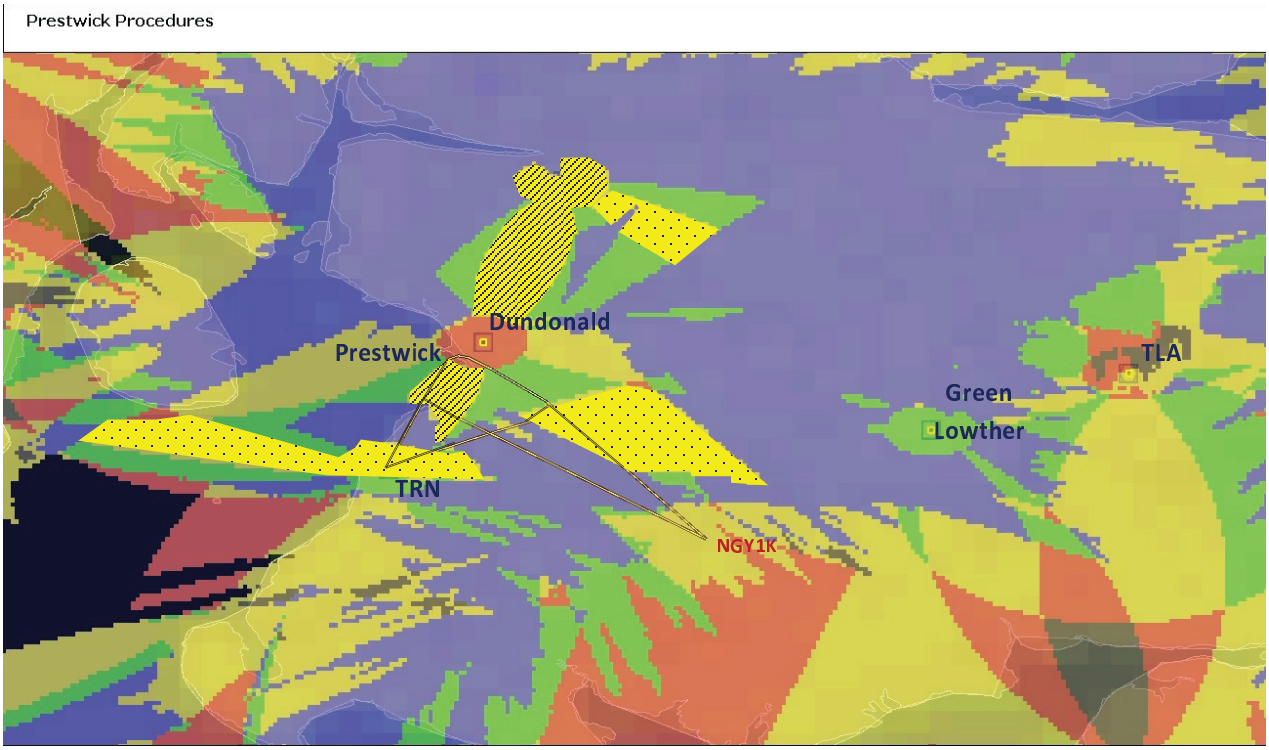


Figure 32: Prestwick SID routings overlaid on local DME/DME performance at 3000 ft.

NOTE: Dundonald is the 'critical' DME;

Talla is the 'critical' DME.

Figure 30-Figure 32 show in general a good level of coverage and redundancy of DME/DME support supporting each of the SID procedures at Glasgow and Edinburgh airports, in terms of a 2D view, at 3000ft, of the environment in the areas of interest. For a more detailed assessment, the DEMETER tool allows for a 3D approximately modelled profile of each procedure and also for a related assessment of performance considering variations in aircraft altitude throughout this profile. The detailed performance charts are not included here for simplicity, however a summary of the results obtained for both airports are given below in Table 5-Table 7 respectively. The key information given in each table is whether each procedure is 'supported' (by some level of DME/DME position-fix capability) for the entirety of its course, and also which DME beacons are identified as 'critical' in terms of areas of limited (Yellow) or no (Red) redundancy.

Procedure ID	Support		Critical DME			
CLYDE 3A	Full				TLA	
CLYDE 3B	Full				TLA	
FOYLE 3A	Full		Dundonald		TLA	
FOYLE 3B	Full		Dundonald		TLA	
LOMON 3A	Full				TLA	
LOMON 3B	Full				TLA	
LUSIV 1A	Full				TLA	

LUSIV 1B	Full				TLA	
NORBO 1H	Full				TLA	
NORBO 1J	Full				TLA	
PERTH 4A	Full		Dundonald	SAB	TLA	
PERTH 4B	Full		Dundonald	SAB	TLA	
ROBBO 2A	Full				TLA	
ROBBO 2B	Full				TLA	
TALLA 5A	Full				TLA	
TALLA 6B	Full				TLA	
TURNBERRY 3A	Full					
TURNBERRY 6B	Full		Dundonnald			TRN

Table 5: Level of DME/DME support and associated 'critical' navigation aids for Glasgow airport SIDs.

(*) **NOTE**: TALLA 6B – DME/DME position-fixing is not available along this SID until 3500ft in altitude which is 'late' in comparison with the standard 3000ft achieved requirement.

Procedure ID	Coverage		Critical DME	
GOSAM 1C	Full		GOW	Dundonald
GOSAM 1D	Full		GOW	Dundonald
GRICE 3C	Full		GOW	
GRICE 4D	Full		GOW	
TALLA 5G	Full		GOW	
TALLA 6C	Full		GOW	
TALLA 6D	Full		GOW	

Table 6: Level of DME/DME support and associated 'critical' navigation aids for Edinburgh airport SIDs.

Procedure ID	Coverage		Critical DME	
NGY 1K	Full			TLA
NGY 1L	Full		Dundonald	
TRN 1K	Full		Dundonald	TLA
TRN 1L	Full		Dundonald	

Table 7: Level of DME/DME support and associated 'critical' navigation aids for Prestwick airport SIDs.

Table 5-Table 7 reflect the overall good nature of DME/DME coverage supporting the potential RNAV 1 SID procedures out of Prestwick, Edinburgh and Glasgow after considering the addition of Dundonald and Green Lowther DMEs in Scotland.

The consideration of these two navaids represents a considerable improvement with respect issue 1 of this document. All reported problems documented in the previous version are solved once these two navaids are included.

There are though still some areas of 'limited' redundancy along the procedures. These can be visualised as the patterned yellow areas in Figure 30 to Figure 32. Thus it is easy to see that there are only 4 'critical' navigational aids that contribute to the limited redundancy areas. These are Talla, Dundonald, Turnberry and Glasgow. It is worth to remark that these limited redundancy areas quickly disappear at altitudes greater than 3000', thus the procedures dependency on these 'critical' navaids is minimal.

The commonly accepted process in the UK to cater for 'critical' navigation aids is to make a specific procedure operationally unavailable should any navigational aid designated as critical to the procedure be out of service. This is usually managed by listing the facility on the appropriate SID procedure chart, which enables the availability of each procedure to be managed tactically.

Appendix B – Close-In Obstacles

SID close-in obstacles were found for runway 24; none for runway 06.

ID	Description	Lat	Long	Elev (m)	Elev (ft)
14708	TREE_OBST	555600.12N	0032431.59W	222.5	729.9
14707	TREE_OBST	555600.15N	0032429.65W	222.1	728.6
16111	TREE_OBST	555621.05N	0032358.78W	189.1	620.4
14681	TREE_OBST	555621.10N	0032358.84W	188.5	618.5
12008	MAST_OBST	555618.20N	0032402.41W	185.6	608.9
14679	TREE_OBST	555621.16N	0032359.69W	178.8	586.7
14680	TREE_OBST	555621.47N	0032401.57W	176.6	579.5
14656	TREE_OBST	555631.85N	0032406.83W	173.9	570.6
12001	LAMP_POST_OBST	555619.98N	0032354.53W	173.4	568.8
12003	LAMP_POST_OBST	555620.06N	0032358.04W	172.4	565.6
14657	TREE_OBST	555631.30N	0032405.98W	172.2	564.9
12002	LAMP_POST_OBST	555620.03N	0032356.22W	172.0	564.1
13148	LAMP_POST_OBST	555620.65N	0032350.88W	170.8	560.4
13144	LAMP_POST_OBST	555620.83N	0032357.19W	170.0	557.7
12004	LAMP_POST_OBST	555620.08N	0032359.74W	169.5	556.0
13156	LAMP_POST_OBST	555620.91N	0032358.94W	169.4	555.6
13145	LAMP_POST_OBST	555620.80N	0032355.79W	169.2	555.2
13146	LAMP_POST_OBST	555620.79N	0032354.22W	169.1	554.9
13143	LAMP_POST_OBST	555621.07N	0032359.19W	168.9	554.2
14678	TREE_OBST	555622.06N	0032359.52W	167.6	549.7
14677	TREE_OBST	555622.47N	0032358.24W	166.9	547.4
10719	LAMP_POST_OBST	555632.02N	0032413.84W	166.7	546.8
13155	LAMP_POST_OBST	555620.99N	0032400.73W	166.1	545.0
10720	LAMP_POST_OBST	555630.80N	0032412.98W	165.9	544.1
14655	TREE_OBST	555628.36N	0032407.25W	164.8	540.8
10721	LAMP_POST_OBST	555629.62N	0032412.21W	164.8	540.6
10741	LAMP_POST_OBST	555620.50N	0032402.66W	164.1	538.4
14666	TREE_OBST	555634.05N	0032353.50W	164.0	538.0
14658	TREE_OBST	555633.04N	0032404.36W	163.9	537.9
14660	TREE_OBST	555632.66N	0032402.47W	163.8	537.4
10738	LAMP_POST_OBST	555620.89N	0032403.29W	163.3	535.8
10723	LAMP_POST_OBST	555628.41N	0032411.42W	162.9	534.4

ID	Description	Lat	Long	Elev (m)	Elev (ft)
13139	LAMP_POST_OBST	555621.40N	0032402.22W	161.9	531.1
12018	LAMP_POST_OBST	555622.74N	0032405.14W	161.1	528.5
14671	TREE_OBST	555625.22N	0032403.95W	160.8	527.4
13137	LAMP_POST_OBST	555622.60N	0032404.14W	160.3	526.0
13138	LAMP_POST_OBST	555621.97N	0032403.21W	160.1	525.2
10799	ROAD_SIGN_OBST	555632.28N	0032408.60W	160.1	525.2
10800	ROAD_SIGN_OBST	555632.27N	0032408.52W	159.9	524.7
10797	ROAD_SIGN_OBST	555632.22N	0032409.41W	159.8	524.4
10796	ROAD_SIGN_OBST	555632.20N	0032409.52W	159.7	524.1
14667	TREE_OBST	555633.27N	0032353.00W	159.4	523.0
14663	TREE_OBST	555634.04N	0032357.55W	159.1	521.9
14659	TREE_OBST	555628.40N	0032404.89W	158.2	519.0
14674	TREE_OBST	555622.83N	0032356.14W	158.1	518.8
14662	TREE_OBST	555634.20N	0032359.07W	157.9	518.2
14664	TREE_OBST	555633.83N	0032355.79W	157.6	517.0
14668	TREE_OBST	555633.22N	0032351.81W	153.5	503.7
14665	TREE_OBST	555634.08N	0032354.61W	151.7	497.6
14673	TREE_OBST	555624.24N	0032356.84W	148.6	487.4
14669	TREE_OBST	555633.19N	0032350.23W	137.4	450.9

Appendix C – Draft Charts and Coding Tables

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

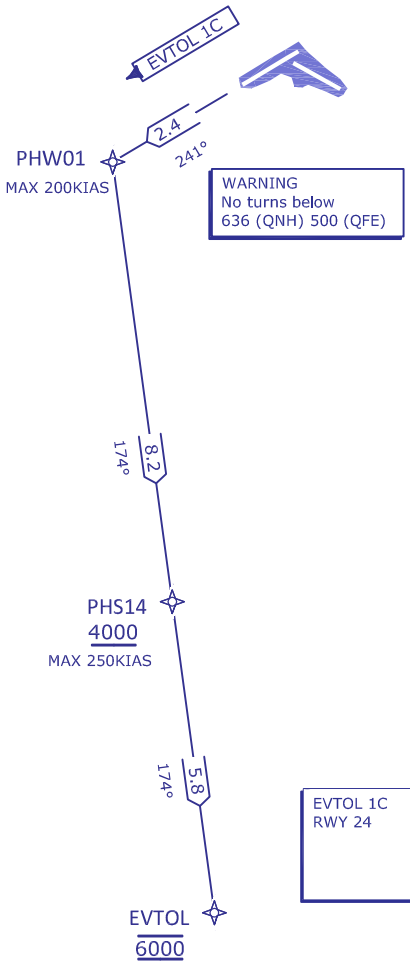
Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Edinburgh

EVTOL 1C RWY 24

Transition ALT and AMA to be completed by cartography

DRAFT CHART:
NOT FOR FLIGHT



WAYPOINTS

PHW01	555515.02N 0032729.97W
PHS14	554710.23N 0032527.78W
EVTOL	554127.28N 0032401.86W

EVTOL 1C RWY 24	Climb straight ahead to **636**, continue ahead to PHW01, left to PHS14 - EVTOL	Z509 Between the hours of 06:00 and 10:00 on weekdays only (one hour earlier in the summer)

ACC	126.300	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		

GENERAL INFORMATION

1: Minimum climb gradient of 4.6% required until reaching 2200 for obstacle clearance
2: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
3: Climb gradient of 6.0% is required for ATC and airspace requirements.
4: Adhere to maximum speed limits where specified by waypoint constraints
5: Maximum 250 KIAS below FL100 unless authorised by ATC
6: Close-in obstacles exist for RWY 24 departures. See Aerodrome Obstacle Chart and EGPH AD 2.10 Aerodrome Obstacles
7: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA

1: DME/DME only procedure: Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart
Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 24 EVTOL 1C

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
EVTOL 1C	001	CA	-	-	-	241° (238.8°)	-2.0	-	-	636	-	RNAV 1
EVTOL 1C	002	CF	PHW01	555515.02N 0032729.97W	-	241° (238.8°)	-2.0	2.4	LEFT	-	-200	RNAV 1
EVTOL 1C	003	TF	PHS14	554710.23N 0032527.78W	-	174° (171.9°)	-2.0	8.2	-	+4000	-250	RNAV 1
EVTOL 1C	004	TF	EVTOL	554127.28N 0032401.86W	-	174° (171.9°)	-2.0	5.8	-	6000	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

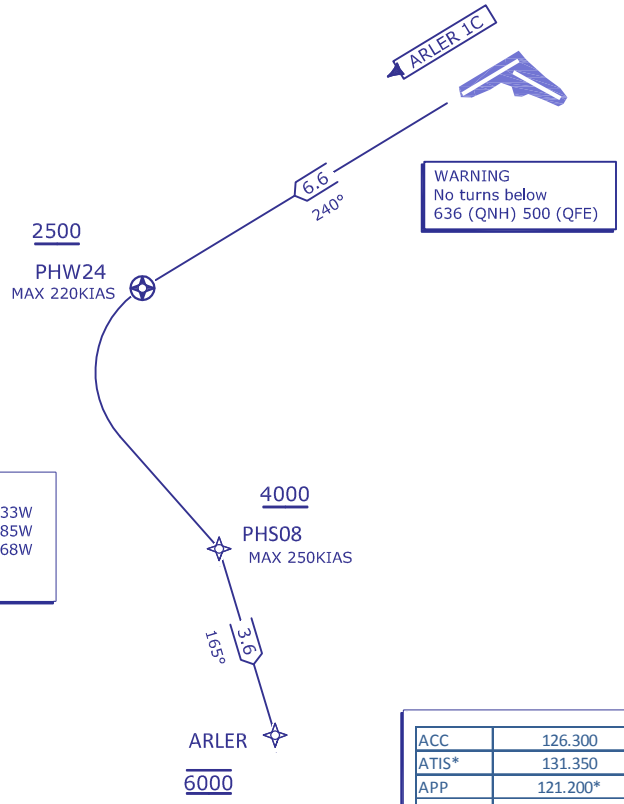
Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Edinburgh

ARLER 1C RWY 24

Transition ALT and AMA to be completed by cartography

DRAFT CHART:
NOT FOR FLIGHT



WARNING
No turns below
636 (QNH) 500 (QFE)

WAYPOINTS

PHW24	555304.49N 0033342.33W
PHS08	554817.49N 0033107.85W
ARLER	554452.31N 0032915.68W

ACC	126.300	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		

ARLER 1C RWY 24	Climb to PHW24, left direct to PHS08 - ARLER	N507

GENERAL INFORMATION

1: Minimum climb gradient of 3.8% required until reaching 1440 for obstacle clearance
2: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
3: Climb gradient up to 7.1% is required for ATC and airspace requirements.
4: Adhere to maximum speed limits where specified by waypoint constraints
5: Maximum 250 KIAS below FL100 unless authorised by ATC
6: Close-in obstacles exist for RWY 24 departures. See Aerodrome Obstacle Chart and EGPH AD 2.10 Aerodrome Obstacles
7: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA

1/ DME/DME only procedure: Procedure not available if GOW DME is u/s
2/ RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart
Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 24 ARLER 1C

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
ARLER 1C	001	CF	PHW24	555304.49N 0033342.33W	Y	240° (238.4°)	-2.0	6.6	LEFT	+2500	-220	RNAV 1
ARLER 1C	002	DF	PHS08	554817.49N 0033107.85W	-	-	-2.0	-	-	+4000	-250	RNAV 1
ARLER 1C	003	TF	ARLER	554452.31N 0032915.68W	-	165° (162.9°)	-2.0	3.6	-	6000	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

Edinburgh

MAVIX 1C RWY 24

(Option 1)

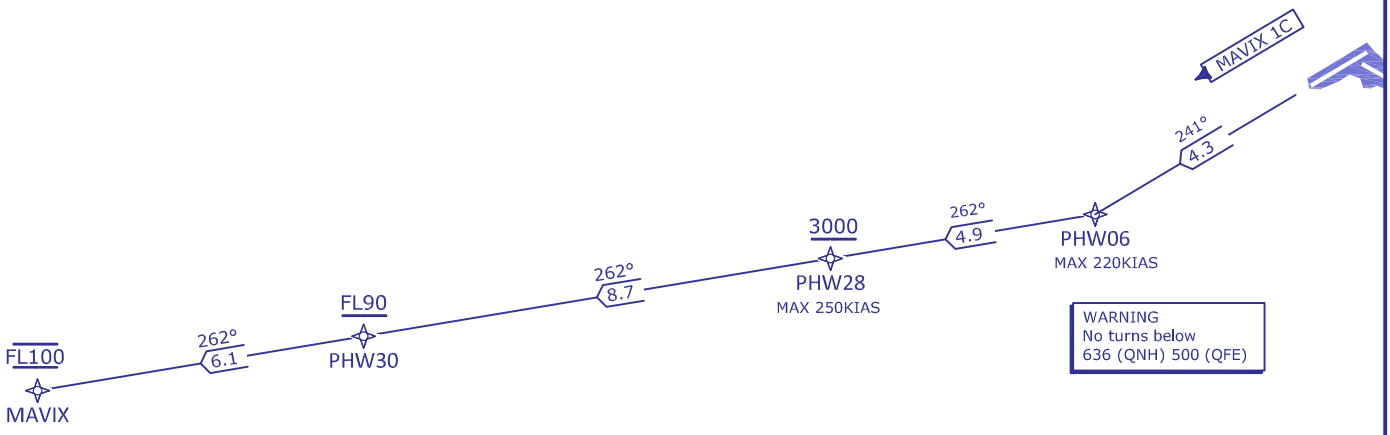
Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Transition ALT and AMA to be completed by cartography

DRAFT CHART:
NOT FOR FLIGHT

WAYPOINTS

PHW06	555417.62N 0033018.55W
PHW28	555326.54N 0033857.78W
PHW30	555155.00N 0035412.23W
MAVIX	555049.76N 0040450.12W



WARNING
No turns below
636 (QNH) 500 (QFE)

MAVIX 1C RWY 24	Climb straight ahead to PHW06, right to PHW28 - PHW30 - MAVIX	Z500

ACC	124.825	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		

GENERAL INFORMATION
1: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
2: Climb gradient up to 9.1% is required for ATC and airspace requirements.
3: Adhere to maximum speed limits where specified by waypoint constraints
4: Maximum 250 KIAS below FL100 unless authorised by ATC
5: Close-in obstacles exist for RWY 24 departures. See Aerodrome Obstacle Chart and EGPH AD 2.10 Aerodrome Obstacles
6: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA
1: DME/DME only procedure: Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart
Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 24 MAVIX 1C **Option 1**

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
MAVIX 1C	001	CF	PHW06	555417.62N 0033018.55W	-	241° (238.8°)	-2.0	4.3	RIGHT	-	-220	RNAV 1
MAVIX 1C	002	TF	PHW28	555326.54N 0033857.78W	-	262° (260.1°)	-2.0	4.9	-	+3000	-250	RNAV 1
MAVIX 1C	003	TF	PHW30	555155.00N 0035412.23W	-	262° (260.0°)	-2.0	8.7	-	+FL90	-	RNAV 1
MAVIX 1C	004	TF	MAVIX	555049.76N 0040450.12W	-	262° (259.8°)	-2.0	6.1	-	FL100	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Edinburgh

MAVIX 1C RWY 24

(Option 2)

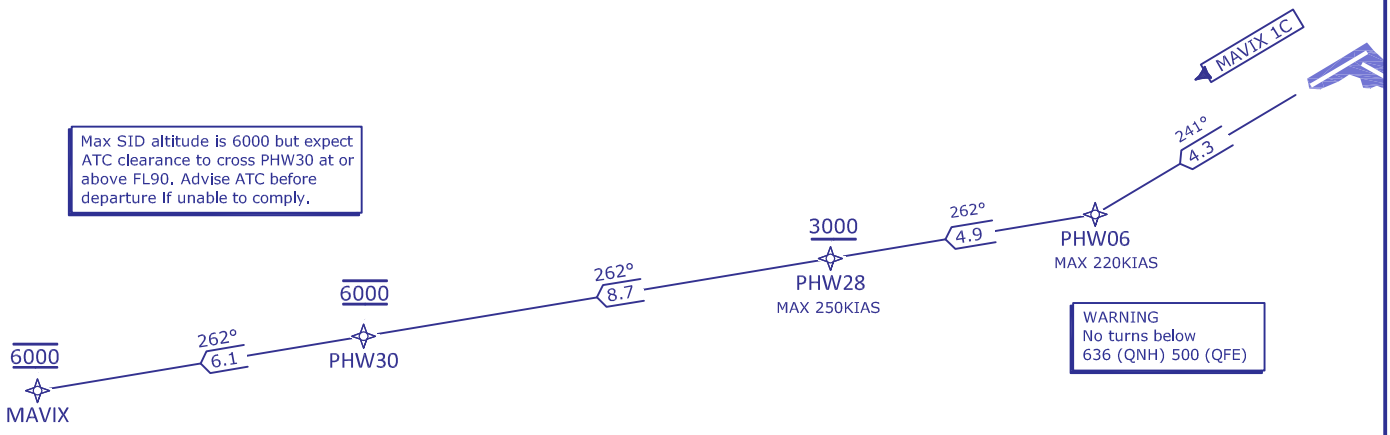
Transition ALT and AMA to be completed by cartography

DRAFT CHART:
NOT FOR FLIGHT

WAYPOINTS

PHW06	555417.62N 0033018.55W
PHW28	555326.54N 0033857.78W
PHW30	555155.00N 0035412.23W
MAVIX	555049.76N 0040450.12W

Max SID altitude is 6000 but expect ATC clearance to cross PHW30 at or above FL90. Advise ATC before departure if unable to comply.



WARNING
No turns below
636 (QNH) 500 (QFE)

MAVIX 1C RWY 24	Climb straight ahead to PHW06, right to PHW28 - PHW30 - MAVIX	Z500

ACC	124.825	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		

GENERAL INFORMATION
1: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
2: Climb gradient up to 5.4% is required for ATC and airspace requirements.
3: Adhere to maximum speed limits where specified by waypoint constraints
4: Maximum 250 KIAS below FL100 unless authorised by ATC
5: Close-in obstacles exist for RWY 24 departures. See Aerodrome Obstacle Chart and EGPH AD 2.10 Aerodrome Obstacles
6: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA
1: DME/DME only procedure: Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart
Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 24 MAVIX 1C **Option 2**

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
MAVIX 1C	001	CF	PHW06	555417.62N 0033018.55W	-	241° (238.8°)	-2.0	4.3	RIGHT	-	-220	RNAV 1
MAVIX 1C	002	TF	PHW28	555326.54N 0033857.78W	-	262° (260.1°)	-2.0	4.9	-	+3000	-250	RNAV 1
MAVIX 1C	003	TF	PHW30	555155.00N 0035412.23W	-	262° (260.0°)	-2.0	8.7	-	6000	-	RNAV 1
MAVIX 1C	004	TF	MAVIX	555049.76N 0040450.12W	-	262° (259.8°)	-2.0	6.1	-	6000	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Edinburgh

LIKLA 1C RWY 24

(Option 1)

Transition ALT and AMA to be completed by cartography

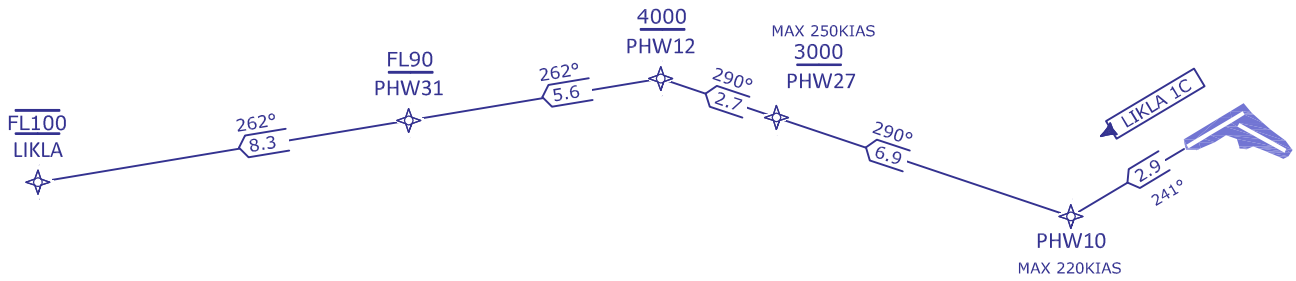
DRAFT CHART:
NOT FOR FLIGHT

VAR 2.0° W 2019

N

WAYPOINTS

PHW10	555500.51N 0032812.60W
PHW27	555708.41N 0033948.87W
PHW12	555758.42N 0034423.07W
PHW31	555701.20N 0035416.51W
LIKLA	555529.90N 0040848.96W



WARNING
No turns below
650 (QNH) 514 (QFE)

LIKLA 1C RWY 24	Climb straight ahead to **650,** continue ahead to PHW10, right to PHW27 - PHW12, left to PHW31 - LIKLA	N537 Between the hours of 06:00 and 23:00 only (one hour earlier in the summer).

ACC	124.825	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		

GENERAL INFORMATION
1: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
2: Climb gradient up to 9.0% is required for ATC and airspace requirements.
3: Adhere to maximum speed limits where specified by waypoint constraints
4: Maximum 250 KIAS below FL100 unless authorised by ATC
5: Close-in obstacles exist for RWY 24 departures. See Aerodrome Obstacle Chart and EGPH AD 2.10 Aerodrome Obstacles
6: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA
1: DME/DME only procedure: Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart
Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 24 LIKLA 1C **Option 1**

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
LIKLA 1C	001	CA	-	-	-	241° (238.8°)	-2.0	-	-	650	-	RNAV 1
LIKLA 1C	002	CF	PHW10	555500.51N 0032812.60W	-	241° (238.8°)	-2.0	2.9	RIGHT	-	-220	RNAV 1
LIKLA 1C	003	TF	PHW27	555708.41N 0033948.87W	-	290° (288.2°)	-2.0	6.9	-	+3000	-250	RNAV 1
LIKLA 1C	004	TF	PHW12	555758.42N 0034423.07W	-	290° (288°)	-2.0	2.7	LEFT	+4000	-	RNAV 1
LIKLA 1C	005	TF	PHW31	555658.92N 0035416.46W	-	262° (259.9°)	-2.0	5.6	-	+FL90	-	RNAV 1
LIKLA 1C	006	TF	LIKLA	555529.90N 0040848.96W	-	262° (259.8°)	-2.0	8.3	-	FL100	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Edinburgh

LIKLA 1C RWY 24

(Option 2)

Transition ALT and AMA to be completed by cartography

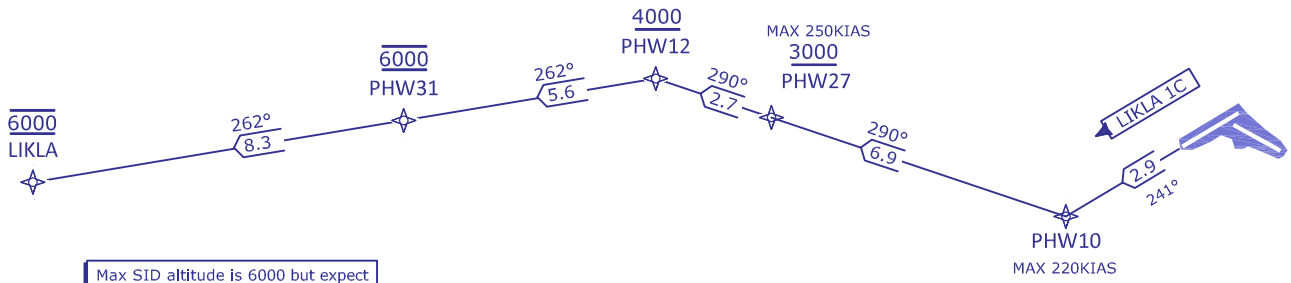
DRAFT CHART:
NOT FOR FLIGHT

VAR 2.0° W 2019

N

WAYPOINTS

PHW10	555500.51N 0032812.60W
PHW27	555708.41N 0033948.87W
PHW12	555758.42N 0034423.07W
PHW31	555701.20N 0035416.51W
LIKLA	555529.90N 0040848.96W



Max SID altitude is 6000 but expect ATC clearance to cross PHW31 at or above FL90. Advise ATC before departure if unable to comply.

WARNING
No turns below
650 (QNH) 514 (QFE)

LIKLA 1C RWY 24	Climb straight ahead to **650,** continue ahead to PHW10, right to PHW27 - PHW12, left to PHW31 - LIKLA	N537 Between the hours of 06:00 and 23:00 only (one hour earlier in the summer).

ACC	124.825	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		

GENERAL INFORMATION
1: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
2: Climb gradient up to 5.1% is required for ATC and airspace requirements.
3: Adhere to maximum speed limits where specified by waypoint constraints
4: Maximum 250 KIAS below FL100 unless authorised by ATC
5: Close-in obstacles exist for RWY 24 departures. See Aerodrome Obstacle Chart and EGPH AD 2.10 Aerodrome Obstacles
6: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA
1: DME/DME only procedure: Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart
Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 24 LIKLA 1C **Option 2**

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
LIKLA 1C	001	CA	-	-	-	241° (238.8°)	-2.0	-	-	650	-	RNAV 1
LIKLA 1C	002	CF	PHW10	555500.51N 0032812.60W	-	241° (238.8°)	-2.0	2.9	RIGHT	-	-220	RNAV 1
LIKLA 1C	003	TF	PHW27	555708.41N 0033948.87W	-	290° (288.2°)	-2.0	6.9	-	+3000	-250	RNAV 1
LIKLA 1C	004	TF	PHW12	555758.42N 0034423.07W	-	290° (288°)	-2.0	2.7	LEFT	+4000	-	RNAV 1
LIKLA 1C	005	TF	PHW31	555658.92N 0035416.46W	-	262° (259.9°)	-2.0	5.6	-	6000	-	RNAV 1
LIKLA 1C	006	TF	LIKLA	555529.90N 0040848.96W	-	262° (259.8°)	-2.0	8.3	-	6000	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Edinburgh

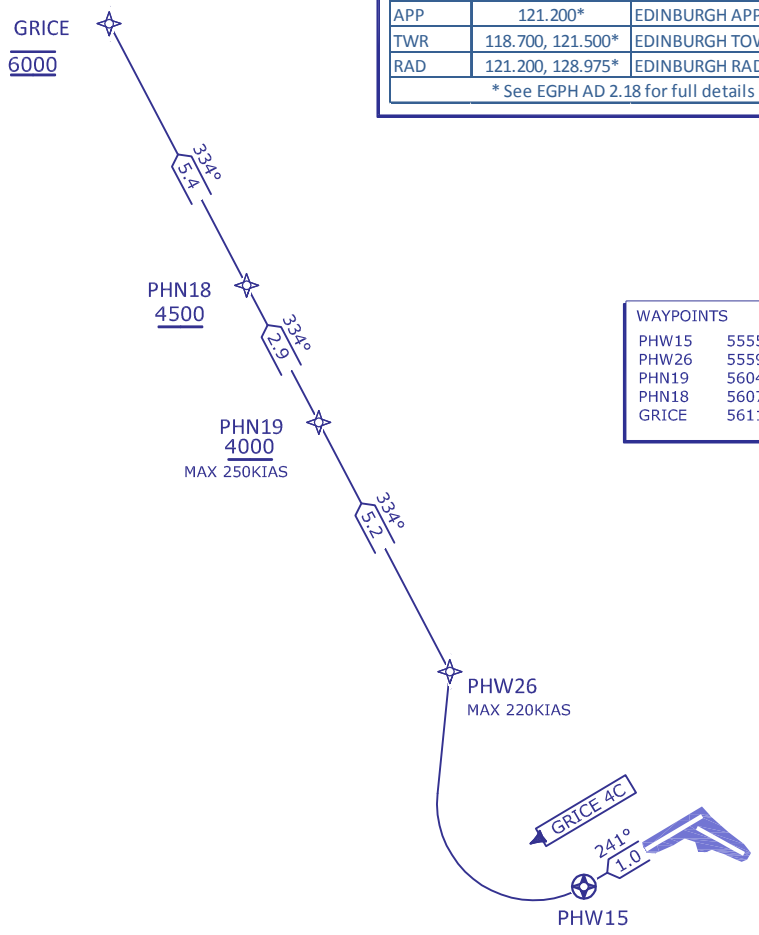
GRICE 4C RWY 24

Transition ALT and AMA to be completed by cartography

DRAFT CHART:
NOT FOR FLIGHT

VAR 2.0° W 2019
N

ACC	124.500	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		



WAYPOINTS

PHW15	555559.91N 0032517.89W
PHW26	555956.23N 0032944.31W
PHN19	560430.17N 0033406.49W
PHN18	560700.71N 0033631.07W
GRICE	561148.00N 0034107.79W

WARNING
No turns below
650 (QNH) 514 (QFE)

GRICE 4C RWY 24	Climb straight ahead to **650**, continue ahead to PHW15, right direct to PHW26 to PHN19 - PHN18 - GRICE	N560 via **FOYLE**, P600 Eastbound, and for A/C leaving CAS North of **GRICE.**

GENERAL INFORMATION
1: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
2: Climb gradient up to 6.4% is required for ATC and airspace requirements.
3: Adhere to maximum speed limits where specified by waypoint constraints
4: Maximum 250 KIAS below FL100 unless authorised by ATC
5: Close-in obstacles exist for RWY 24 departures. See Aerodrome Obstacle Chart and EGPH AD 2.10 Aerodrome Obstacles
6: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA
1: DME/DME only procedure: Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart
Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 24 GRICE 4C

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
GRICE 4C	001	CA	-	-	-	241° (238.8°)	-2.0	-	-	650	-	RNAV 1
GRICE 4C	002	CF	PHW15	555559.91N 0032517.89W	Y	241° (238.8°)	-2.0	1.0	RIGHT	-	-	RNAV 1
GRICE 4C	003	DF	PHW26	555956.23N 0032944.31W	-	-	-2.0	-	-	-	-220	RNAV 1
GRICE 4C	004	TF	PHN19	560430.17N 0033406.49W	-	334° (331.8°)	-2.0	5.2	-	+4000	-250	RNAV 1
GRICE 4C	005	TF	PHN18	560700.71N 0033631.07W	-	334° (331.8°)	-2.0	2.9	-	+4500	-	RNAV 1
GRICE 4C	006	TF	GRICE	561148.00N 0034107.79W	-	334° (331.8°)	-2.0	5.4	-	6000	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Edinburgh

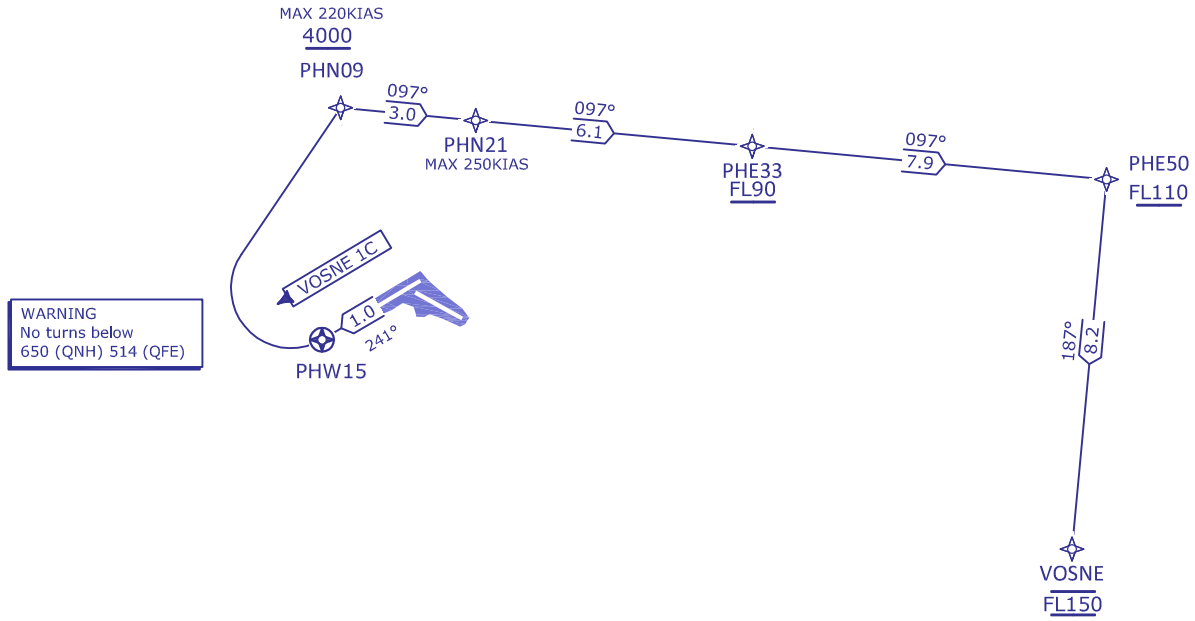
VOSNE 1C RWY 24

Transition ALT and AMA to be completed by cartography

DRAFT CHART:
NOT FOR FLIGHT

VAR 2.0° W 2019

N



WARNING
No turns below
650 (QNH) 514 (QFE)

WAYPOINTS	
PHW15	555559.91N 0032517.89W
PHN09	560107.32N 0032437.40W
PHN21	560051.50N 0031917.81W
PHE33	560018.44N 0030824.19W
PHE50	555934.65N 0025426.84W
VOSNE	555125.28N 0025549.51W

ACC	124.500	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		

VOSNE 1C RWY 24	Climb straight ahead to **650,** continue ahead to PHW15, right direct to PHN09 to PHN21 - PHE33 - PHE50, right to VOSNE.	Z506 Between the hours of 06:00 and 14:00 on weekdays only (one hour earlier in the summer).

GENERAL INFORMATION
1: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
2: Climb gradient up to 13.4% may be required for ATC and airspace requirements.
3: Adhere to maximum speed limits where specified by waypoint constraints
4: Maximum 250 KIAS below FL100 unless authorised by ATC
5: Close-in obstacles exist for RWY 24 departures. See Aerodrome Obstacle Chart and EGPH AD 2.10 Aerodrome Obstacles
6: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA
1: DME/DME only procedure: Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart
Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 24 VOSNE 1C

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
VOSNE 1C	001	CA	-	-	-	241° (238.8°)	-2.0	-	-	650	-	RNAV 1
VOSNE 1C	002	CF	PHW15	555559.91N 0032517.89W	Y	241° (238.8°)	-2.0	1.0	RIGHT	-	-	RNAV 1
VOSNE 1C	003	DF	PHN09	560107.32N 0032437.40W	-	-	-2.0	-	-	+4000	-220	RNAV 1
VOSNE 1C	004	TF	PHN21	560051.50N 0031917.81W	-	097° (095.0°)	-2.0	3.0	-	-	-250	RNAV 1
VOSNE 1C	005	TF	PHE33	560018.44N 0030824.19W	-	097° (095.1°)	-2.0	6.1	-	+FL90	-	RNAV 1
VOSNE 1C	006	TF	PHE50	555934.65N 0025426.84W	-	097° (095.2°)	-2.0	7.9	RIGHT	+FL110	-	RNAV 1
VOSNE 1C	007	TF	VOSNE	555125.28N 0025549.51W	-	187° (185.4°)	-2.0	8.2	-	FL150	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Edinburgh

EMJEE 1D RWY 06

Transition ALT and AMA to be completed by cartography

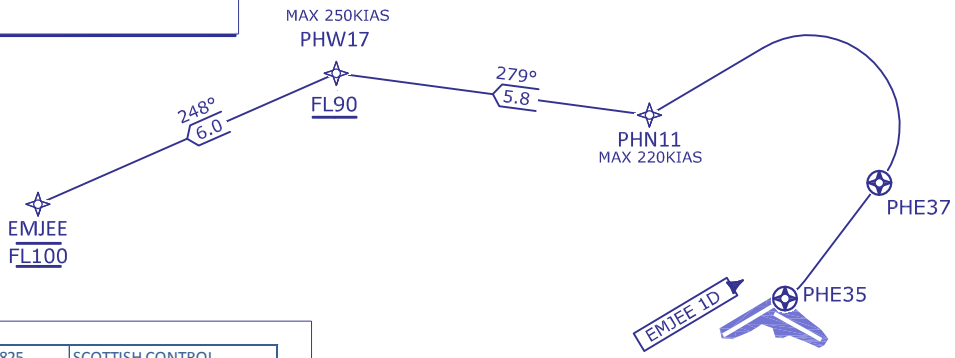
DRAFT CHART:
NOT FOR FLIGHT

VAR 2.0° W 2019

N

WAYPOINTS

PHE35	555722.19N 0032115.28W
PHE37	555930.39N 0031810.79W
PHN11	560043.88N 0032544.03W
PHW17	560127.33N 0033601.69W
EMJEE	555859.67N 0034546.50W



ACC	124.825	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		

WARNING
No turns below
636 (QNH) 500 (QFE)

EMJEE 1D RWY 06	Climb straight ahead to PHE35 - upon reaching **636**, turn left, direct to PHE37, left direct to PHN11, right to PHW17, left to EMJEE.	N537, Z500 Between the hours of 06:00 and 23:00 only (one hour earlier in the summer)

GENERAL INFORMATION

1: Minimum climb gradient of 3.9% required until reaching 636 for obstacle clearance
2: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
3: Climb gradient up to 14.0% is required for ATC and airspace requirements.
4: Adhere to maximum speed limits where specified by waypoint constraints
5: Maximum 250 KIAS below FL100 unless authorised by ATC
6: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA

1: DME/DME only procedure: Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart

Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 06 EMJEE 1D

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
EMJEE 1D	001	CF	PHE35	555722.19N 0032115.28W	Y	061° (058.9°)	-2.0	-	-	-	-	RNAV 1
EMJEE 1D	002	CA	-	-	-	061° (058.9°)	-2.0	-	LEFT	636	-	RNAV 1
EMJEE 1D	003	DF	PHE37	555930.39N 0031810.79W	Y	-	-2.0	-	LEFT	-	-	RNAV 1
EMJEE 1D	004	DF	PHN11	560043.88N 0032544.03W	-	-	-2.0	-	-	-	-220	RNAV 1
EMJEE 1D	005	TF	PHW17	560127.33N 0033601.69W	-	279° (277.2°)	-2.0	5.8	LEFT	+FL90	-250	RNAV 1
EMJEE 1D	006	TF	EMJEE	555859.67N 0034546.50W	-	248° (245.8°)	-2.0	6.0	-	FL100	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Edinburgh

GRICE 5D RWY 06

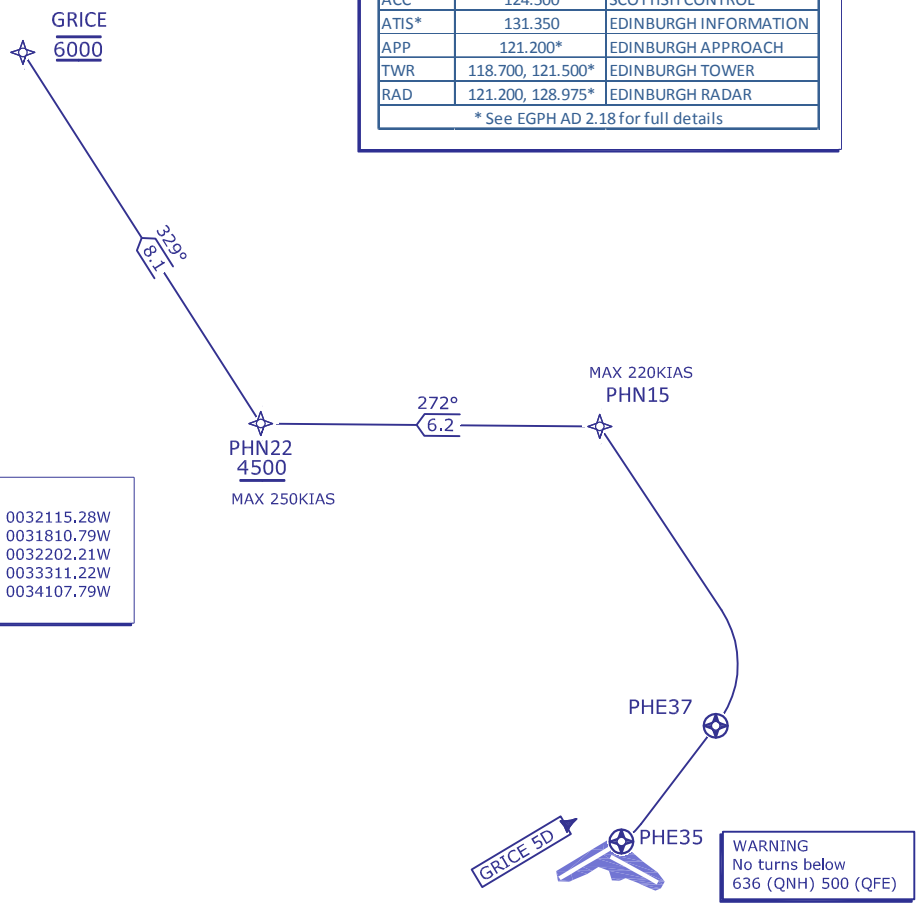
Transition ALT and AMA to be completed by cartography

DRAFT CHART:
NOT FOR FLIGHT

VAR 2.0° W 2019

N

ACC	124.500	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		



WAYPOINTS

PHE35	555722.19N 0032115.28W
PHE37	555930.39N 0031810.79W
PHN15	560500.16N 0032202.21W
PHN22	560500.88N 0033311.22W
GRICE	561148.00N 0034107.79W

WARNING
No turns below
636 (QNH) 500 (QFE)

GRICE 5D RWY 06	Climb straight ahead to PHE35 - upon reaching **636** turn left, direct to PHE37, left direct to PHN15 - left to PHN22, right to GRICE.	N560 via **FOYLE**, P600 Eastbound, and for A/C leaving CAS North of **GRICE.**

GENERAL INFORMATION

1: Minimum climb gradient of 3.9% required until reaching 636 for obstacle clearance
2: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
3: Climb gradient up to 5.2% is required for ATC and airspace requirements.
4: Adhere to maximum speed limits where specified by waypoint constraints
5: Maximum 250 KIAS below FL100 unless authorised by ATC
6: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA

1: DME/DME only procedure: Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart

Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 06 GRICE 5D

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
GRICE 5D	001	CF	PHE35	555722.19N 0032115.28W	Y	061° (058.9°)	-2.0	-	-	-	-	RNAV 1
GRICE 5D	002	CA	-	-	-	061° (058.9°)	-2.0	-	LEFT	636	-	RNAV 1
GRICE 5D	003	DF	PHE37	555930.39N 0031810.79W	Y	-	-2.0	-	-	-	-	RNAV 1
GRICE 5D	004	DF	PHN15	560500.16N 0032202.21W	-	-	-2.0	-	-	-	-220	RNAV 1
GRICE 5D	005	TF	PHN22	560500.88N 0033311.22W	-	272° (270.2°)	-2.0	6.2	RIGHT	+4500	-250	RNAV 1
GRICE 5D	006	TF	GRICE	561148.00N 0034107.79W	-	329° (326.9°)	-2.0	8.1	-	6000	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

Altitudes in feet
Tracks are magnetic
Distances in nautical miles

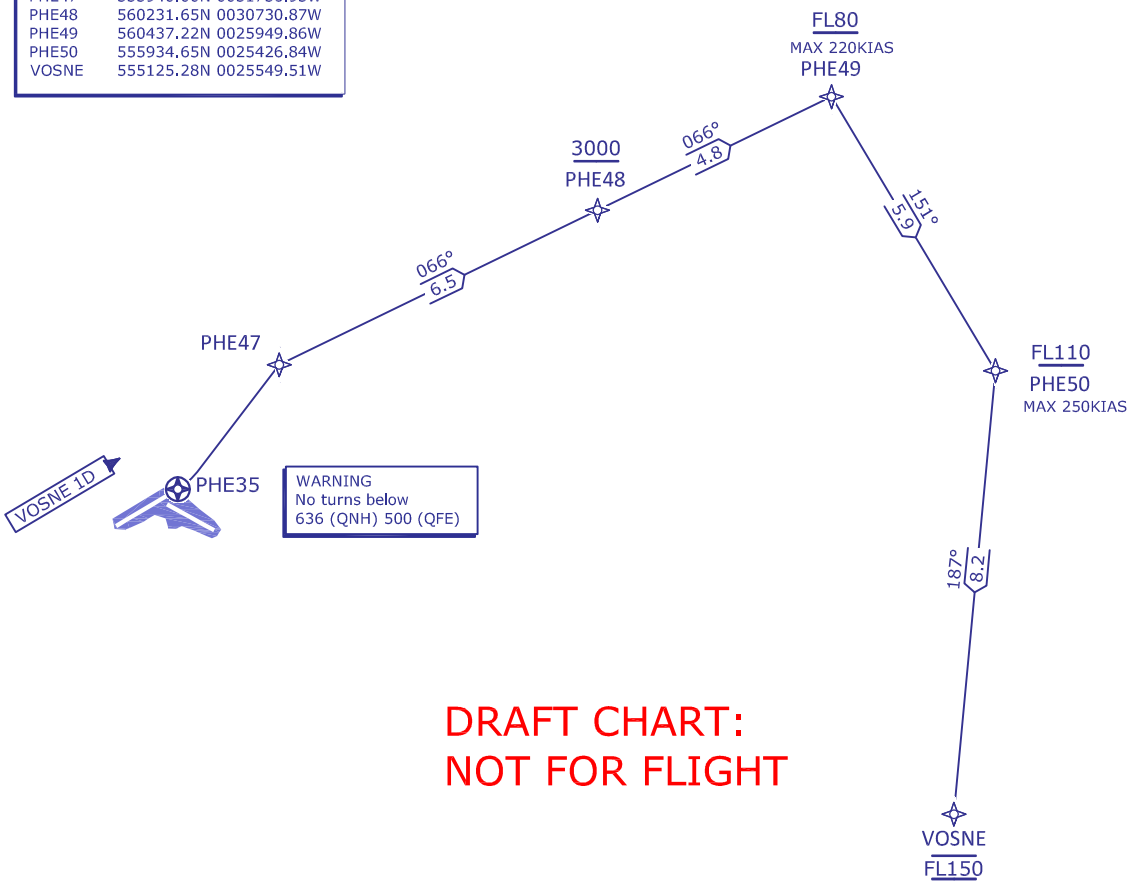
Edinburgh

VOSNE 1D RWY 06

Transition ALT and AMA to be completed by cartography

WAYPOINTS

PHE35	555722.19N 0032115.28W
PHE47	555940.00N 0031756.93W
PHE48	560231.65N 0030730.87W
PHE49	560437.22N 0025949.86W
PHE50	555934.65N 0025426.84W
VOSNE	555125.28N 0025549.51W



DRAFT CHART:
NOT FOR FLIGHT

ACC	124.500	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		

VOSNE 1D RWY 06	Climb straight ahead to PHE35 - upon reaching **636**, turn left, direct to PHE47, right to PHE48 - PHE49, right to PHE50, right to VOSNE.	Z506

GENERAL INFORMATION

1: Minimum climb gradient of 3.9% required until reaching 636 for obstacle clearance
2: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
3: Climb gradient up to 10.3% is required for ATC and airspace requirements.
4: Adhere to maximum speed limits where specified by waypoint constraints
5: Maximum 250 KIAS below FL100 unless authorised by ATC
6: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA

1: DME/DME only procedure:Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart

Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 06 VOSNE 1D

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
VOSNE 1D	001	CF	PHE35	555722.19N 0032115.28W	Y	061° (058.9°)	-2.0	-	-	-	-	RNAV 1
VOSNE 1D	002	CA	-	-	-	061° (058.9°)	-2.0	-	LEFT	636	-	RNAV 1
VOSNE 1D	003	DF	PHE47	555940.00N 0031756.93W	-	-	-2.0	-	-	-	-	RNAV 1
VOSNE 1D	004	TF	PHE48	560231.65N 0030730.87W	-	066° (063.8°)	-2.0	6.5	-	+3000	-	RNAV 1
VOSNE 1D	005	TF	PHE49	560437.22N 0025949.86W	-	066° (064.0°)	-2.0	4.8	RIGHT	+FL80	-220	RNAV 1
VOSNE 1D	006	TF	PHE50	555934.65N 0025426.84W	-	151° (149.1°)	-2.0	5.9	RIGHT	+FL110	-250	RNAV 1
VOSNE 1D	007	TF	VOSNE	555125.28N 0025549.51W	-	187° (185.4°)	-2.0	8.2	-	FL150	-	RNAV 1

STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

RNAV1 (DME/DME or GNSS)

Altitudes in feet
Tracks are magnetic
Distances in nautical miles

Edinburgh

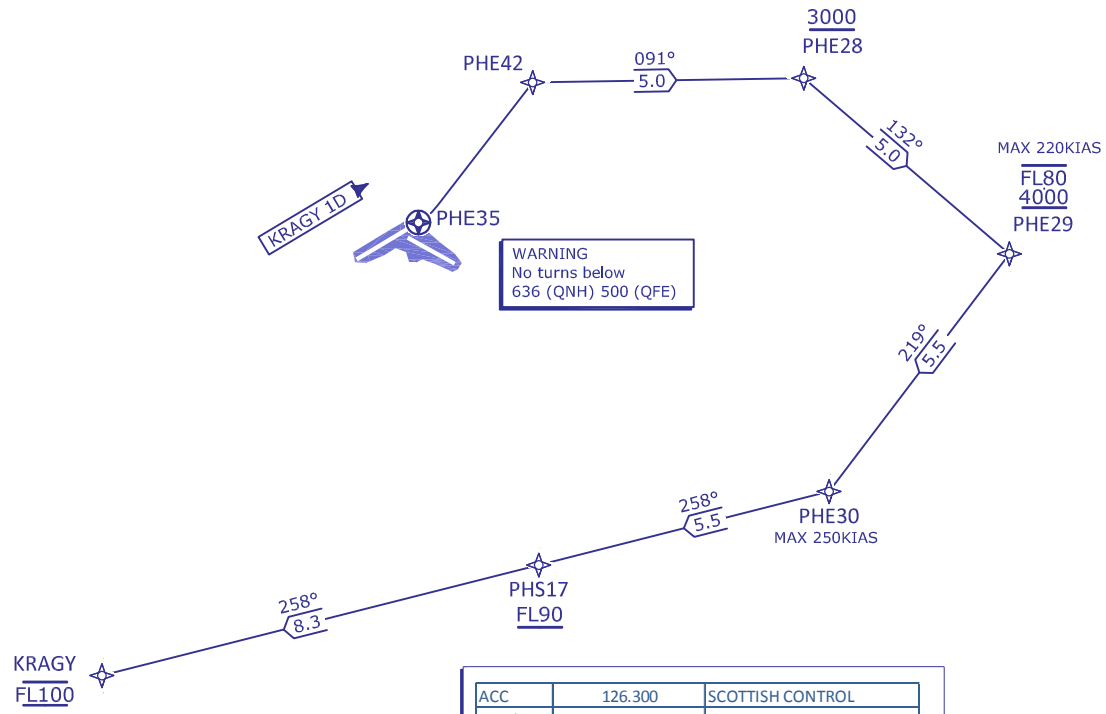
KRAGY 1D RWY 06

Transition ALT and AMA to be completed by cartography

VAR 2.0° W 2019

N

WAYPOINTS	
PHE35	555722.19N 0032115.28W
PHE42	555957.35N 0031731.93W
PHE28	560003.02N 0030838.24W
PHE29	555649.46N 0030153.00W
PHE30	555226.90N 0030746.81W
PHS17	555104.85N 0031715.94W
KRAGY	554859.99N 0033131.12W



ACC	126.300	SCOTTISH CONTROL
ATIS*	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details		

KRAGY 1D RWY 06	Climb straight ahead to PHE35 - upon reaching **636**, turn left, direct to to PHE42, right to PHE28, right to PHE29, right to PHE30, right to PHS17 - KRAGY.	Z507 Non-Jet A/C: H24 Jet A/C: between the hours of 23:00 and 06:00 only (one hour earlier in the summer)

GENERAL INFORMATION

1: Minimum climb gradient of 3.9% required until reaching 636 for obstacle clearance
2: SIDs reflect Noise Preferential Routeings. See EGPH AD 2.21 for Noise Abatement Procedures.
3: Climb gradient up to 6.7% is required for ATC and airspace requirements.
4: Adhere to maximum speed limits where specified by waypoint constraints
5: Maximum 250 KIAS below FL100 unless authorised by ATC
6: En route cruising levels will be allocated after take-off by 'Scotish Control'. Report callsign, SID designator, current altitude and cleared altitude on first contact with 'Scottish Control'.

ADDITIONAL RNAV DATA

1: DME/DME only procedure:Procedure not available if GOW DME is u/s
2: RNAV1 SIDs are available only for approved aircraft that are either GNSS equipped or that have DME/DME and INS/IRU with automatic runway updating capability.

Change: New Chart

Report v4.0

Standard Instrument Departure Coding Tables

Edinburgh Runway 06 KRAGY 1D

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
KRAGY 1D	001	CF	PHE35	555722.19N 0032115.28W	Y	061° (058.9°)	-2.0	-	-	-	-	RNAV 1
KRAGY 1D	002	CA	-	-	-	061° (058.9°)	-2.0	-	LEFT	636	-	RNAV 1
KRAGY 1D	003	DF	PHE42	555957.35N 0031731.93W	-	-	-2.0	-	-	-	-	RNAV 1
KRAGY 1D	004	TF	PHE28	560003.02N 0030838.24W	-	091° (088.9°)	-2.0	5.0	RIGHT	+3000	-	RNAV 1
KRAGY 1D	005	TF	PHE29	555649.46N 0030153.00W	-	132° (130.4°)	-2.0	5.0	RIGHT	-FL80 +4000	-220	RNAV 1
KRAGY 1D	006	TF	PHE30	555226.90N 0030746.81W	-	219° (217.2°)	-2.0	5.5	RIGHT	-	-250	RNAV 1
KRAGY 1D	007	TF	PHS17	555104.85N 0031715.94W	-	258° (255.7°)	-2.0	5.5	-	+FL90	-	RNAV 1
KRAGY 1D	008	TF	KRAGY	554859.99N 0033131.12W	-	258° (255.6°)	-2.0	8.3	-	FL100	-	RNAV 1

Omni Directional Departure RWY 06

	Description	Restriction
RWY 06	Climb straight ahead MAG track 061° to altitude 636ft then turn left MAG track 041° and climb to enroute safety altitude/MSA.	PDG 4.8% to 1600ft then 3.3%. No turn before DER.

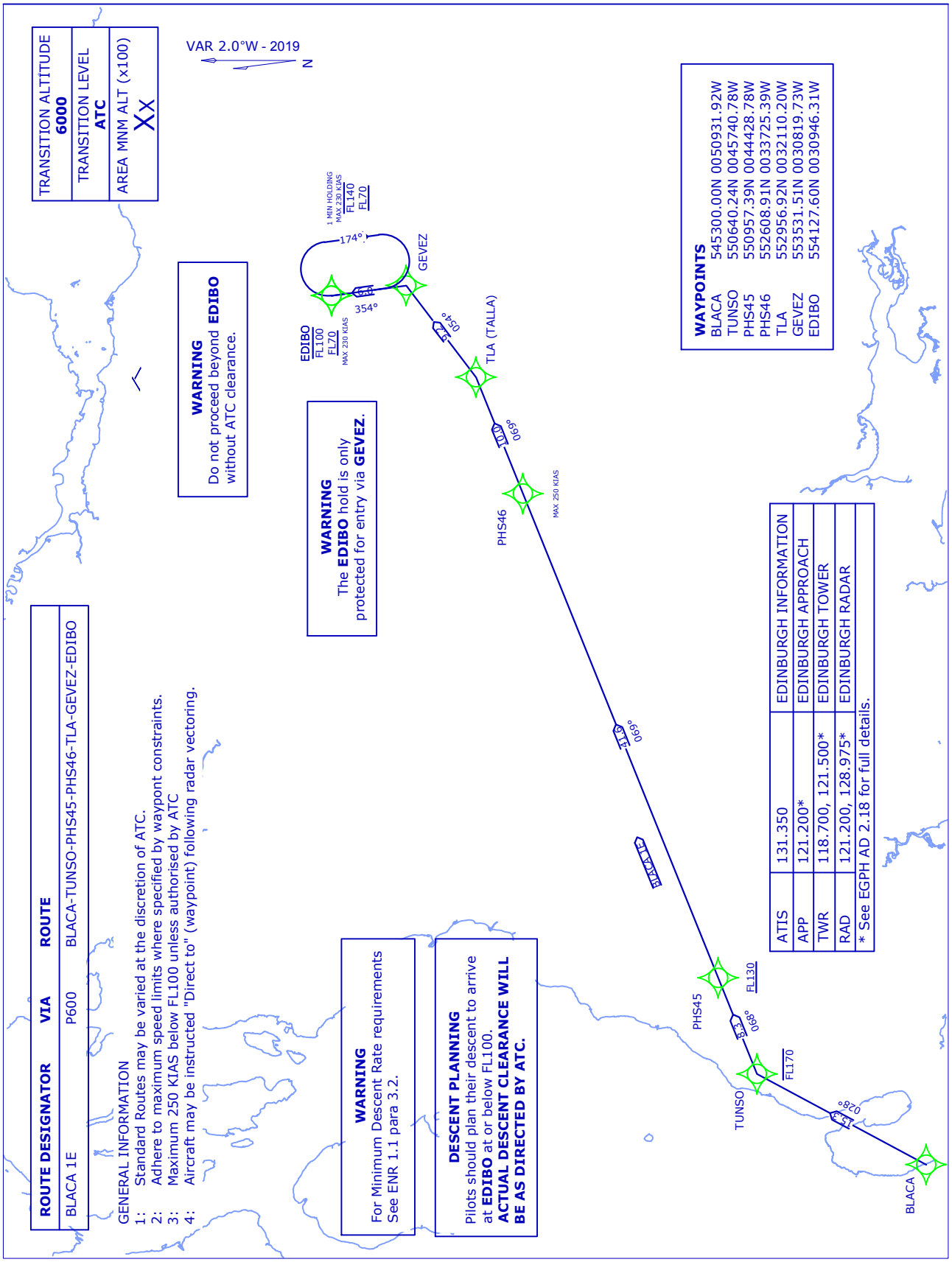
Omni Directional Departure RWY 24

	Description	Restriction
RWY 24	Climb straight ahead MAG track 241° to altitude 636ft then turn on track climbing to enroute safety altitude/MSA.	PDG 4.6% to 2200ft then 3.3%. No turn before DER. Close-in obstacles exist for RWY 24 departures. See Aerodrome Obstacle Chart and EGPH AD 2.10 Aerodrome Obstacles.

RNAV5 (DME/DME or GNSS) STANDARD ARRIVAL CHART - INSTRUMENT (STAR) - ICAO

DISTANCES IN NAUTICAL MILES
TRACKS ARE MAGNETIC
ALTITUDES AND ELEVATIONS ARE IN FEET

EDINBURGH
BLACA 1E



Standard Instrument Arrival Coding Tables

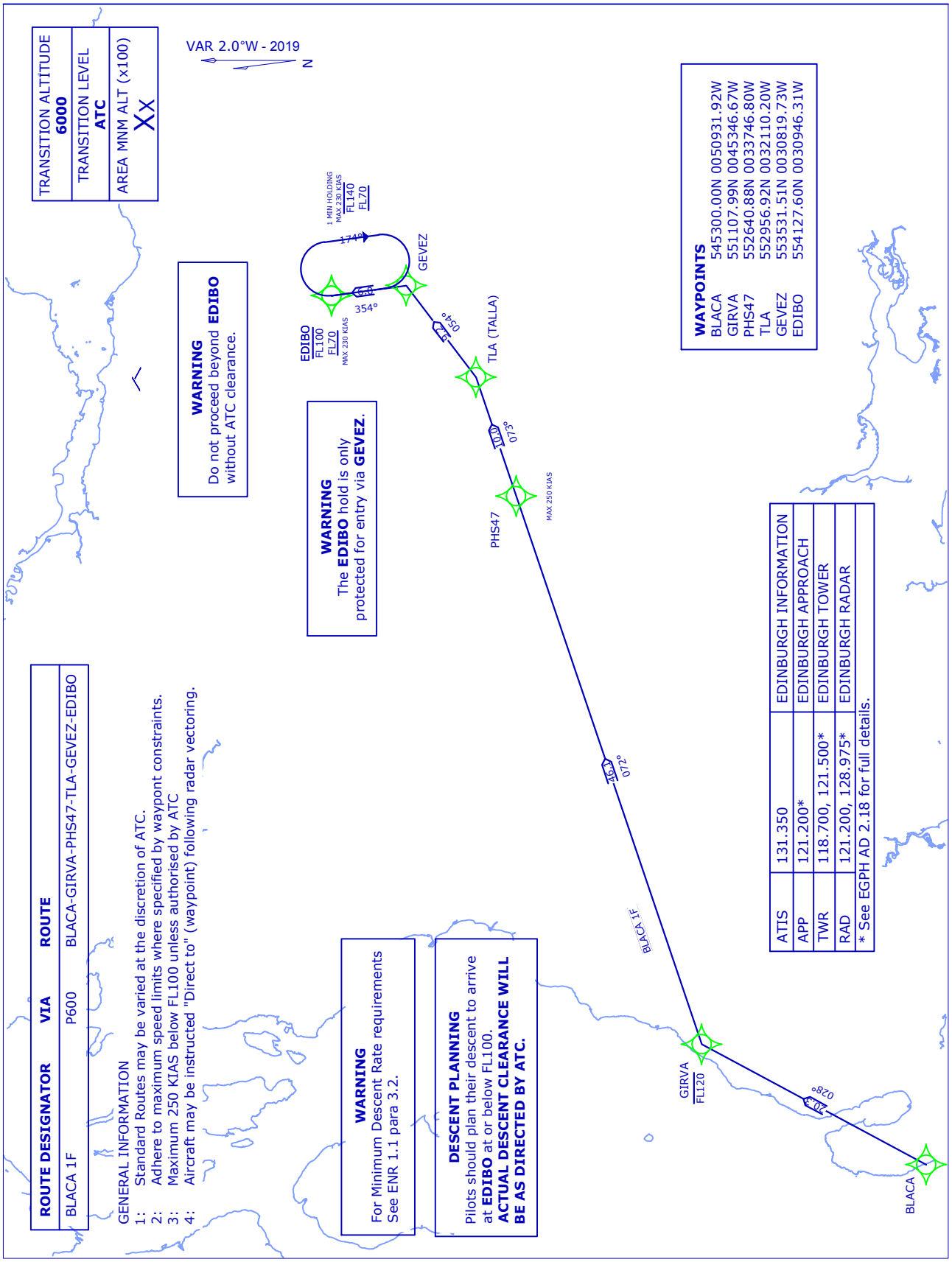
Edinburgh BLACA 1E

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
BLACA 1E	001	IF	BLACA	545300.00N 0050931.92W	-	-	-	-	-	-	-	RNAV 5
BLACA 1E	002	TF	TUNSO	550640.24N 0045740.78W	-	028° (026.4°)	-2.0	15.3	RIGHT	-FL170	-	RNAV 5
BLACA 1E	003	TF	PHS45	550957.39N 0044428.78W	-	068° (066.4°)	-2.0	8.3	-	+FL130	-	RNAV 5
BLACA 1E	004	TF	PHS46	552608.91N 0033725.39W	-	069° (066.6°)	-2.0	41.6	-	-	-250	RNAV 5
BLACA 1E	005	TF	TLA	552956.92N 0032110.20W	-	069° (067.5°)	-2.0	10.0	LEFT	-	-	RNAV 5
BLACA 1E	006	TF	GEVEZ	553531.51N 0030819.73W	-	054° (052.5°)	-2.0	9.2	LEFT	-	-	RNAV 5
BLACA 1E	007	TF	EDIBO	554127.60N 0030946.31W	-	354° (352.2°)	-2.0	6.0	-	-FL100 +FL70	-230	RNAV 5

RNAV5 (DME/DME or GNSS) STANDARD ARRIVAL CHART - INSTRUMENT (STAR) - ICAO

DISTANCES IN NAUTICAL MILES
TRACKS ARE MAGNETIC
ALTITUDES AND ELEVATIONS ARE IN FEET

EDINBURGH
BLACA 1F



Standard Instrument Arrival Coding Tables

Edinburgh BLACA 1F

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
BLACA 1F	001	IF	BLACA	545300.00N 0050931.92W	-	-	-	-	-	-	-	RNAV 5
BLACA 1F	002	TF	GIRVA	551107.99N 0045346.67W	-	028° (026.4°)	-2.0	20.3	RIGHT	-FL120	-	RNAV 5
BLACA 1F	003	TF	PHS47	552640.88N 0033746.80W	-	072° (069.7°)	-2.0	46.1	-	-	-250	RNAV 5
BLACA 1F	004	TF	TLA	552956.92N 0032110.20W	-	073° (070.8°)	-2.0	10.0	LEFT	-	-	RNAV 5
BLACA 1F	005	TF	GEVEZ	553531.51N 0030819.73W	-	054° (052.5°)	-2.0	9.2	LEFT	-	-	RNAV 5
BLACA 1F	006	TF	EDIBO	554127.60N 0030946.31W	-	354° (352.2°)	-2.0	6.0	-	-FL100 +FL70	-230	RNAV 5

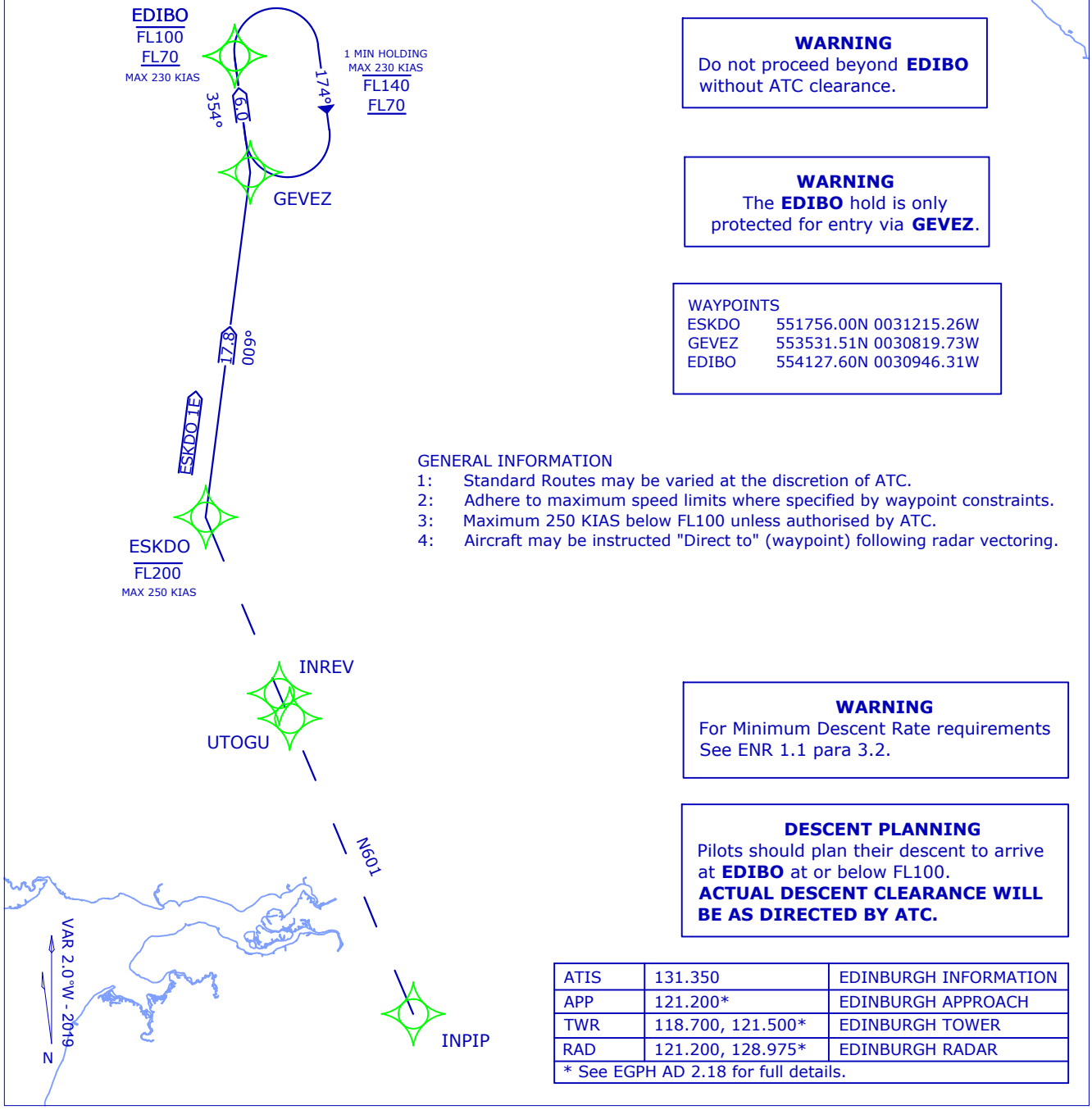
RNAV5 (DME/DME or GNSS) STANDARD ARRIVAL CHART - INSTRUMENT (STAR) - ICAO

DISTANCES IN NAUTICAL MILES
TRACKS ARE MAGNETIC
ALTITUDES AND ELEVATIONS ARE IN FEET

EDINBURGH
ESKDO 1E

TRANSITION ALTITUDE
6000
TRANSITION LEVEL
ATC
AREA MNM ALT (x100)
XX

ROUTE DESIGNATOR	VIA	ROUTE	EXPECTED LEVELS
ESKDO 1E	N601	ESKDO-GEVEZ-EDIBO	FL260 or below by INPIP FL200 or below by INREV



WARNING
Do not proceed beyond **EDIBO** without ATC clearance.

WARNING
The **EDIBO** hold is only protected for entry via **GEVEZ**.

WAYPOINTS

ESKDO	551756.00N 0031215.26W
GEVEZ	553531.51N 0030819.73W
EDIBO	554127.60N 0030946.31W

GENERAL INFORMATION
1: Standard Routes may be varied at the discretion of ATC.
2: Adhere to maximum speed limits where specified by waypoint constraints.
3: Maximum 250 KIAS below FL100 unless authorised by ATC.
4: Aircraft may be instructed "Direct to" (waypoint) following radar vectoring.

WARNING
For Minimum Descent Rate requirements See ENR 1.1 para 3.2.

DESCENT PLANNING
Pilots should plan their descent to arrive at **EDIBO** at or below FL100.
ACTUAL DESCENT CLEARANCE WILL BE AS DIRECTED BY ATC.

ATIS	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details.		

Standard Instrument Arrival Coding Tables

Edinburgh ESKDO 1E

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
ESKDO 1E	001	IF	ESKDO	551756.00N 0031215.26W	-	-	-	-	-	-FL200	-250	RNAV 5
ESKDO 1E	002	TF	GEVEZ	553531.51N 0030819.73W	-	009° (007.2°)	-2.0	17.8	LEFT	-	-	RNAV 5
ESKDO 1E	003	TF	EDIBO	554127.60N 0030946.31W	-	354° (352.2°)	-2.0	6.0	-	-FL100 +FL70	-230	RNAV 5

RNAV5 (DME/DME or GNSS) STANDARD ARRIVAL CHART - INSTRUMENT (STAR) - ICAO

DISTANCES IN NAUTICAL MILES
TRACKS ARE MAGNETIC
ALTITUDES AND ELEVATIONS ARE IN FEET

EDINBURGH HAVEN 1E

TRANSITION ALTITUDE
6000
TRANSITION LEVEL
ATC
AREA MNM ALT (x100)
XX

ROUTE DESIGNATOR	VIA	ROUTE	EXPECTED LEVELS
HAVEN 1E	Y96	HAVEN-GEVEZ-EDIBO	FL260 level by AGPED

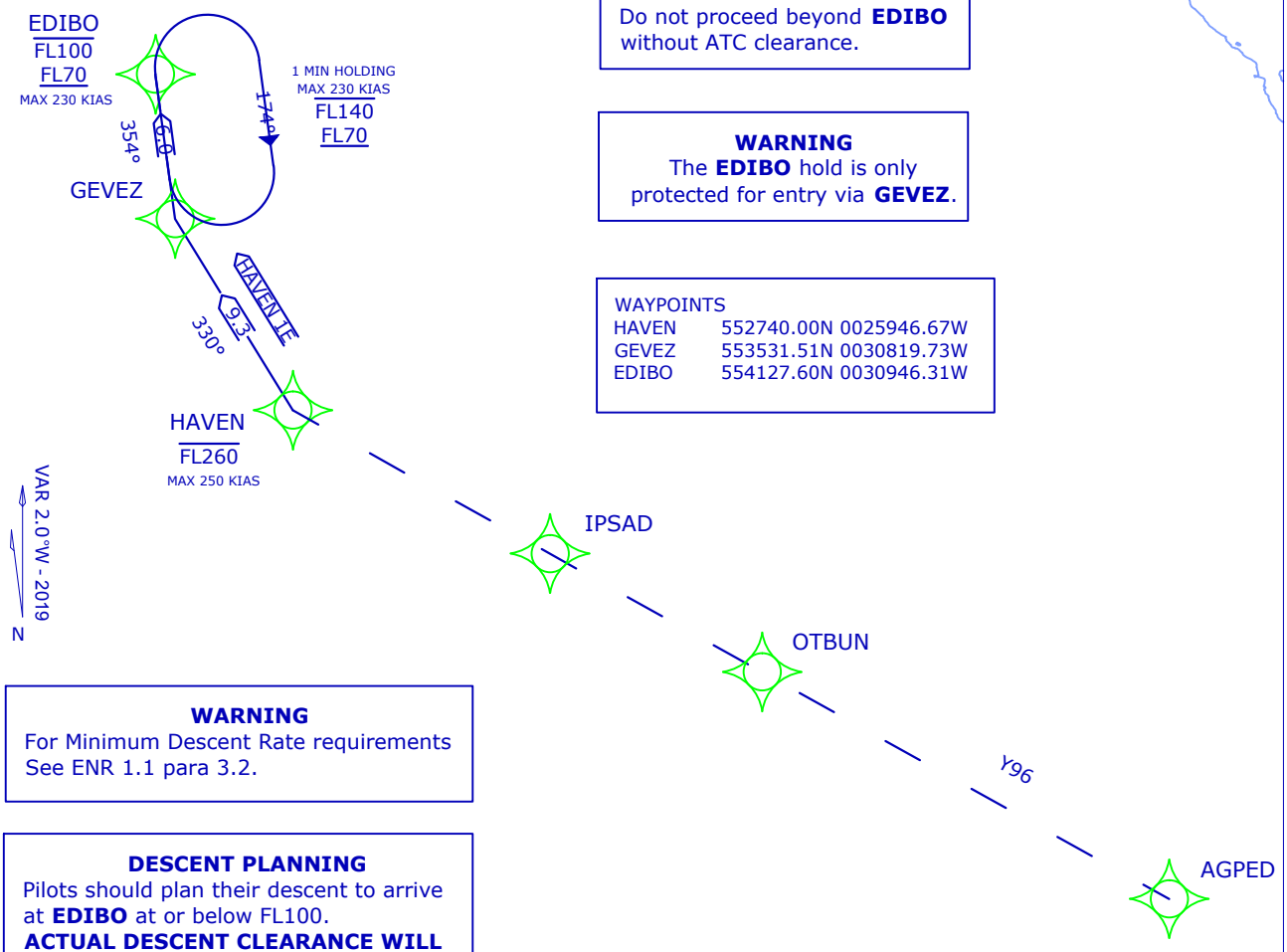
GENERAL INFORMATION
1: Standard Routes may be varied at the discretion of ATC.
2: Adhere to maximum speed limits where specified by waypoint constraints.
3: Maximum 250 KIAS below FL100 unless authorised by ATC.
4: Aircraft may be instructed "Direct to" (waypoint) following radar vectoring.

WARNING
Do not proceed beyond **EDIBO** without ATC clearance.

WARNING
The **EDIBO** hold is only protected for entry via **GEVEZ**.

WAYPOINTS

HAVEN	552740.00N 0025946.67W
GEVEZ	553531.51N 0030819.73W
EDIBO	554127.60N 0030946.31W



WARNING
For Minimum Descent Rate requirements See ENR 1.1 para 3.2.

DESCENT PLANNING
Pilots should plan their descent to arrive at **EDIBO** at or below FL100.
ACTUAL DESCENT CLEARANCE WILL BE AS DIRECTED BY ATC.

ATIS	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details.		

Standard Instrument Arrival Coding Tables

Edinburgh HAVEN 1E

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
HAVEN 1E	001	IF	HAVEN	552740.00N 0025946.67W	-	-	-	-	-	-FL260	-250	RNAV 5
HAVEN 1E	002	TF	GEVEZ	553531.51N 0030819.73W	-	330° (328.4°)	-2.0	9.3	RIGHT	-	-	RNAV 5
HAVEN 1E	003	TF	EDIBO	554127.60N 0030946.31W	-	354° (352.2°)	-2.0	6.0	-	-FL100 +FL70	-230	RNAV 5

RNAV5 (DME/DME or GNSS) STANDARD ARRIVAL CHART - INSTRUMENT (STAR) - ICAO

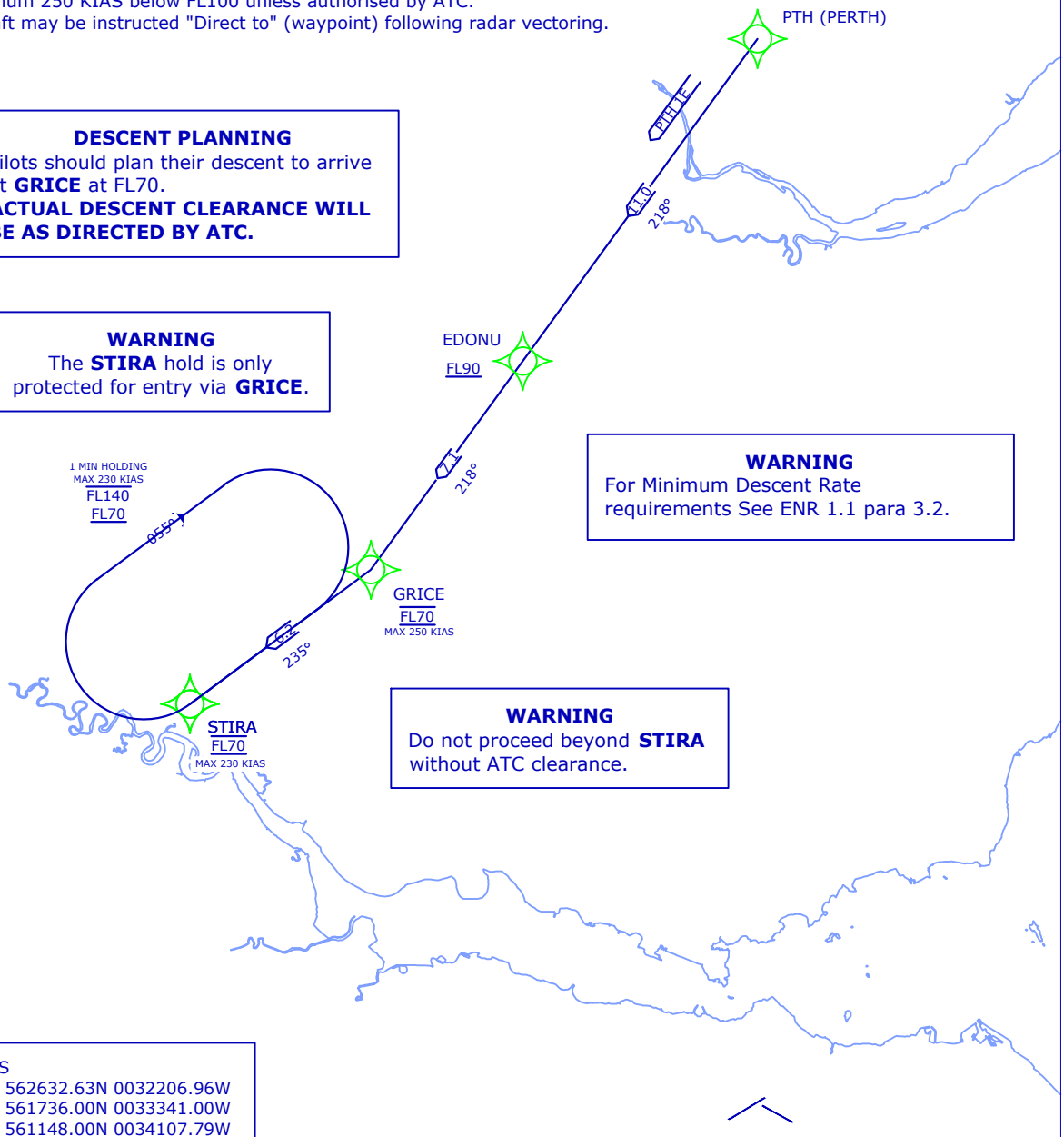
DISTANCES IN NAUTICAL MILES
TRACKS ARE MAGNETIC
ALTITUDES AND ELEVATIONS ARE IN FEET

EDINBURGH
PTH (PERTH) 1E

ROUTE DESIGNATOR	VIA	ROUTE
PTH (PERTH) 1E	P600	PTH-EDONU-GRICE-STIRA

TRANSITION ALTITUDE
6000
TRANSITION LEVEL
ATC
AREA MNM ALT (x100)
XX

GENERAL INFORMATION
1: Standard Routes may be varied at the discretion of ATC.
2: Adhere to maximum speed limits where specified by waypoint constraints.
3: Maximum 250 KIAS below FL100 unless authorised by ATC.
4: Aircraft may be instructed "Direct to" (waypoint) following radar vectoring.



WAYPOINTS	
PTH	562632.63N 0032206.96W
EDONU	561736.00N 0033341.00W
GRICE	561148.00N 0034107.79W
STIRA	560802.11N 0035000.98W

ATIS	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details.		

VAR 2.0°W - 2019
N

Standard Instrument Arrival Coding Tables

Edinburgh PTH (PERTH) 1E

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
PTH 1E	001	IF	PTH	562632.63N 0032206.96W	-	-	-	-	-	-	-	RNAV 5
PTH 1E	002	TF	EDONU	561736.00N 0033341.00W	-	218° (215.8°)	-2.0	11.0	-	+FL90	-	RNAV 5
PTH 1E	003	TF	GRICE	561148.00N 0034107.79W	-	218° (215.6°)	-2.0	7.1	RIGHT	FL70	-250	RNAV 5
PTH 1E	004	TF	STIRA	560802.11N 0035000.98W	-	235° (232.9°)	-2.0	6.2	-	FL70	-230	RNAV 5

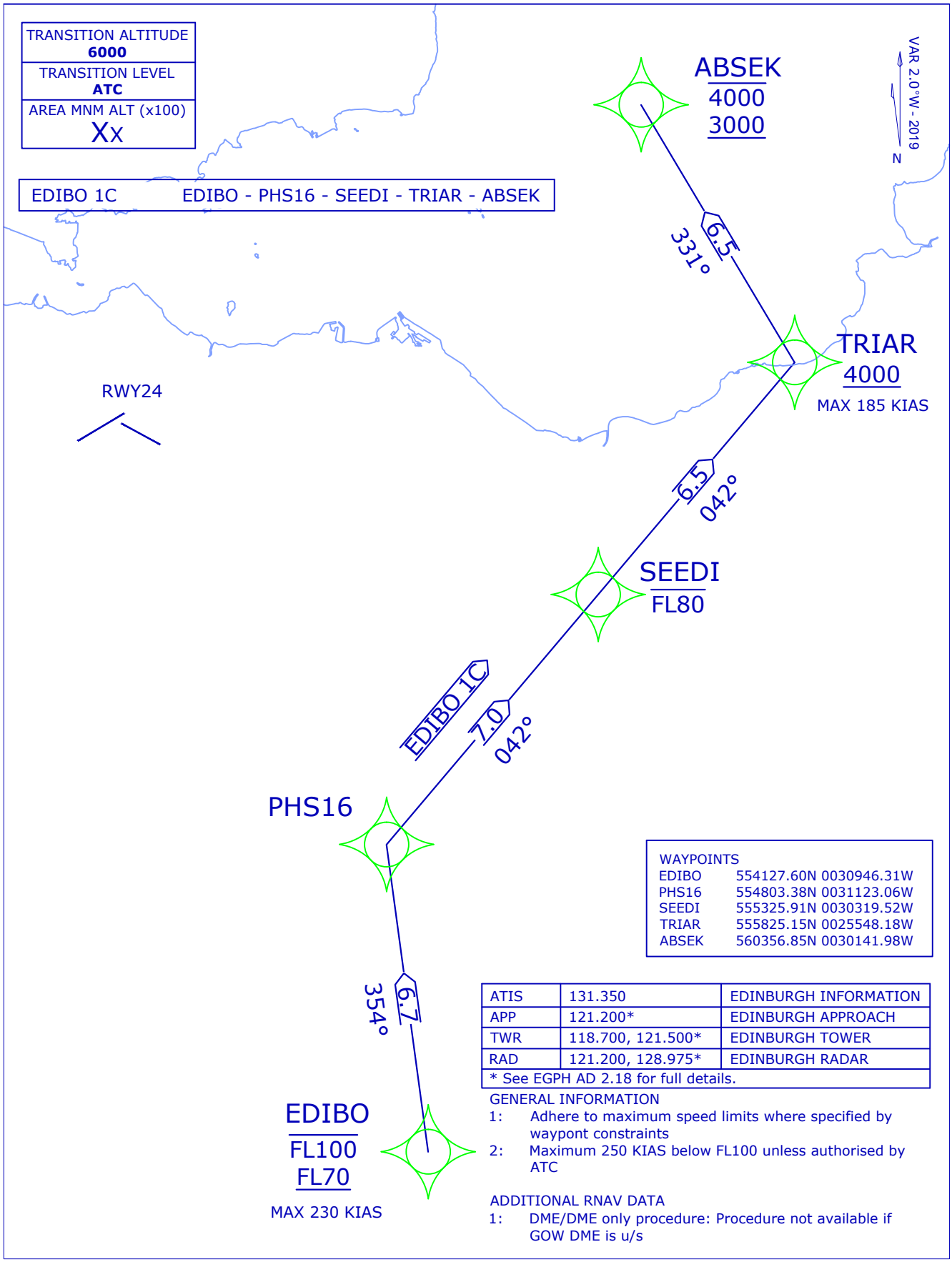
RNAV1 (DME/DME or GNSS)
APPROACH TRANSITION CHART -
INSTRUMENT - ICAO

DISTANCES IN NAUTICAL MILES
TRACKS ARE MAGNETIC
ALTITUDES AND ELEVATIONS ARE IN FEET

EDINBURGH
RWY 24
EDIBO 1C

TRANSITION ALTITUDE
6000
TRANSITION LEVEL
ATC
AREA MNM ALT (x100)
Xx

EDIBO 1C EDIBO - PHS16 - SEEDI - TRIAR - ABSEK



WAYPOINTS	
EDIBO	554127.60N 0030946.31W
PHS16	554803.38N 0031123.06W
SEEDI	555325.91N 0030319.52W
TRIAR	555825.15N 0025548.18W
ABSEK	560356.85N 0030141.98W

ATIS	131.350	EDINBURGH INFORMATION
APP	121.200*	EDINBURGH APPROACH
TWR	118.700, 121.500*	EDINBURGH TOWER
RAD	121.200, 128.975*	EDINBURGH RADAR
* See EGPH AD 2.18 for full details.		

GENERAL INFORMATION
1: Adhere to maximum speed limits where specified by waypont constraints
2: Maximum 250 KIAS below FL100 unless authorised by ATC

ADDITIONAL RNAV DATA
1: DME/DME only procedure: Procedure not available if GOW DME is u/s

Approach Transition Coding Tables

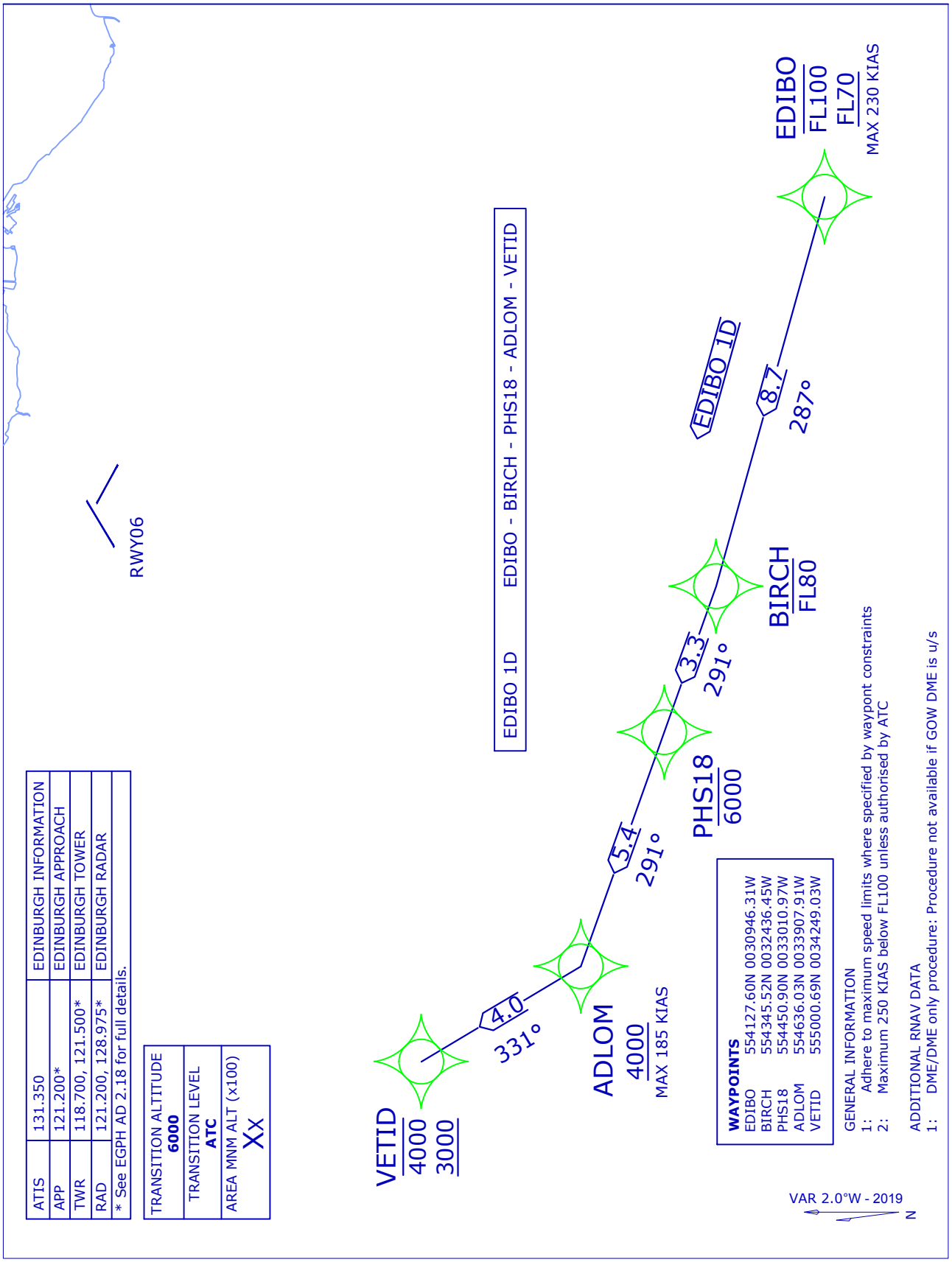
Edinburgh Runway 24 EDIBO 1C

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
EDIBO 1C	001	IF	EDIBO	554127.60N 0030946.31W	-	-	-	-	-	-FL100 +FL70	-230	RNAV 1
EDIBO 1C	002	TF	PHS16	554803.38N 0031123.06W	-	354° (352.2°)	-2.0	6.7	RIGHT	-	-	RNAV 1
EDIBO 1C	003	TF	SEEDI	555325.91N 0030319.52W	-	042° (040.1°)	-2.0	7.0	-	-FL80	-	RNAV 1
EDIBO 1C	004	TF	TRIAR	555825.15N 0025548.18W	-	042° (040.2°)	-2.0	6.5	LEFT	+4000	-185	RNAV 1
EDIBO 1C	005	TF	ABSEK	560356.85N 0030141.98W	-	331° (329.2°)	-2.0	6.5	-	-4000 +3000	-	RNAV 1

RNAV1 (DME/DME or GNSS)
APPROACH TRANSITION CHART -
INSTRUMENT - ICAO

DISTANCES IN NAUTICAL MILES
TRACKS ARE MAGNETIC
ALTITUDES AND ELEVATIONS ARE IN FEET

EDINBURGH
RWY 06
EDIBO 1D



ATIS	131.350
APP	121.200*
TWR	118.700, 121.500*
RAD	121.200, 128.975*
* See EGPH AD 2.18 for full details.	

EDINBURGH INFORMATION	
EDINBURGH APPROACH	
EDINBURGH TOWER	
EDINBURGH RADAR	

TRANSITION ALTITUDE	**6000**
TRANSITION LEVEL	**ATC**
AREA MNM ALT (x100)	XX

WAYPOINTS

EDIBO	554127.60N 0030946.31W
BIRCH	554345.52N 0032436.45W
PHS18	554450.90N 0033010.97W
ADLOM	554636.03N 0033907.91W
VETID	555000.69N 0034249.03W

GENERAL INFORMATION
1: Adhere to maximum speed limits where specified by waypoint constraints
2: Maximum 250 KIAS below FL100 unless authorised by ATC

ADDITIONAL RNAV DATA
1: DME/DME only procedure: Procedure not available if GOW DME is u/s

Approach Transition Coding Tables

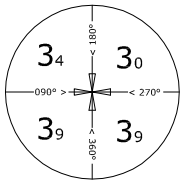
Edinburgh Runway 06 EDIBO 1D

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
EDIBO 1D	001	IF	EDIBO	554127.60N 0030946.31W	-	-	-	-	-	-FL100 +FL70	-230	RNAV 1
EDIBO 1D	002	TF	BIRCH	554345.52N 0032436.45W	-	287° (285.4°)	-2.0	8.7	RIGHT	-FL80	-	RNAV 1
EDIBO 1D	003	TF	PHS18	554450.90N 0033010.97W	-	291° (289.1°)	-2.0	3.3	-	-6000	-	RNAV 1
EDIBO 1D	004	TF	ADLOM	554636.03N 0033907.91W	-	291° (289.2°)	-2.0	5.4	RIGHT	+4000	-185	RNAV 1
EDIBO 1D	005	TF	VETID	555000.69N 0034249.03W	-	331° (328.7°)	-2.0	4.0	-	-4000 +3000	-	RNAV 1

INSTRUMENT APPROACH CHART - ICAO

EDINBURGH ILS/DME RWY 06

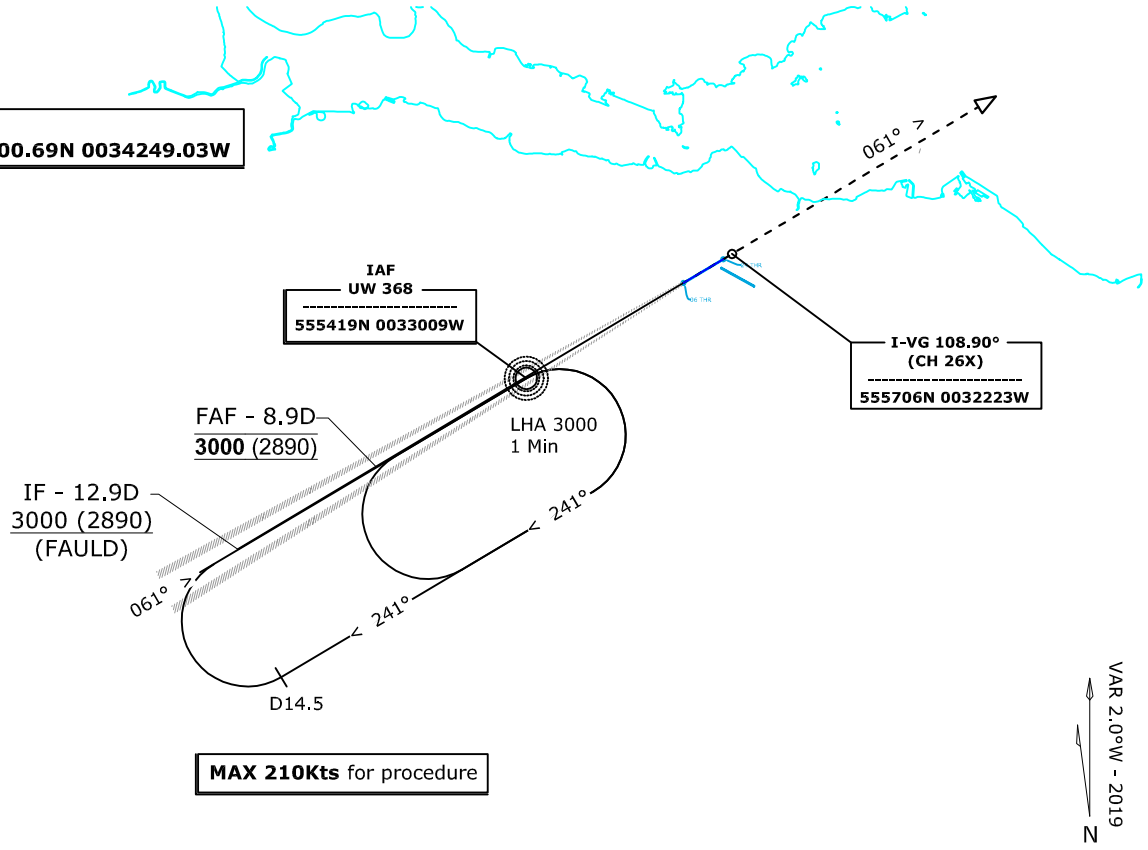
(ACFT CAT A, B, C, D)



MSA 25NM NDB(L) UW

APP 121.200	EDINBURGH APPROACH	AD ELEVATION 136	
TWR 118.700	EDINBURGH TOWER	THR ELEVATION 110	
121.750	EDINBURGH GROUND	OBSTACLE ELEVATION xxxx AMSL (xxx) (ABOVE THR)	TRANSITION ALTITUDE 6000
RAD 121.200, 128.975	EDINBURGH RADAR		
ATIS 131.350	EDINBURGH INFORMATION	BEARINGS ARE MAGNETIC	

WAYPOINTS
FAULD 555000.69N 0034249.03W

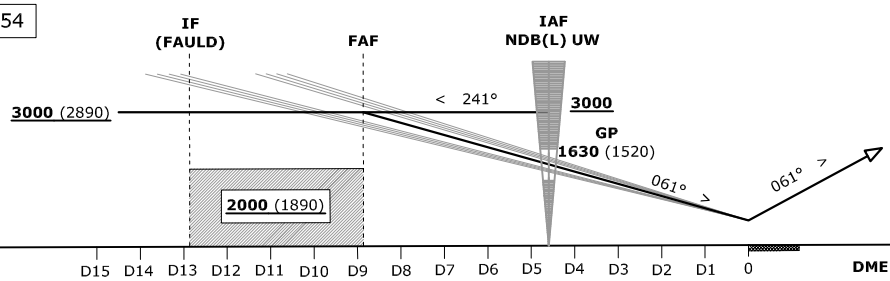


MAX 210Kts for procedure

RECOMMENDED PROFILE GLIDE PATH 3.0°, 318FT/NM

DME I-VG	8	7	6	5	4	3	2	1
ALT(HGT)	**2710**(2600)	**2390**(2280)	**2070**(1960)	**1760**(1650)	**1440**(1330)	**1120**(1010)	**800**(690)	**480**(370)

RDH 54



DME I-VG zero ranged to THR RWY 06

Climb straight ahead to **3000**, then continue as directed.

RCF: Climb straight ahead to **3000**, then turn left to **NDB(L) UW** at **3000**.

Aircraft category		A	B	C	D
OCA (OCH)	CAT I	**283** (173)	**291**(181)	**300** (190)	**312** (202)
	CAT II	**169** (59)	**180** (70)	**193** (83)	**210** (100)
VM(C) OCA (OCH AAL)	Total Area	**780** (644)	**990** (854)	**1480** (1344)	**2040** (1904)
	North of RWY 06/24	**780** (644)	**990** (854)	**1190** (1054)	**1210** (1074)

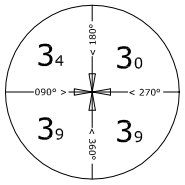
Rate of descent	G/S Kts	160	140	120	100	80
	FT/MIN	850	740	640	530	420

NOTES:
1. See AD2.22 / 1.d and 4.a for speed restrictions.

INSTRUMENT APPROACH CHART - ICAO

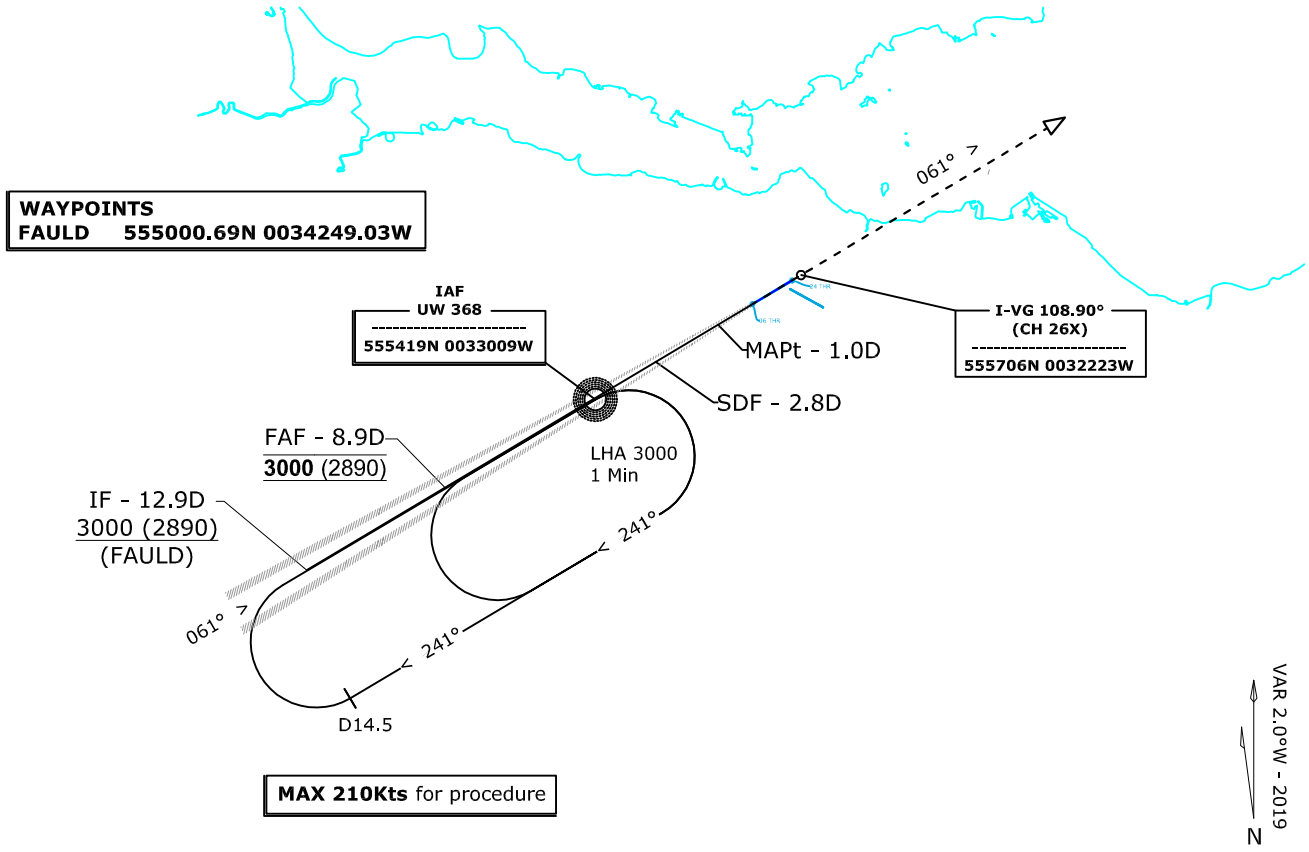
EDINBURGH LOC/DME RWY 06

(ACFT CAT A, B, C, D)



MSA 25NM NDB(L) UW

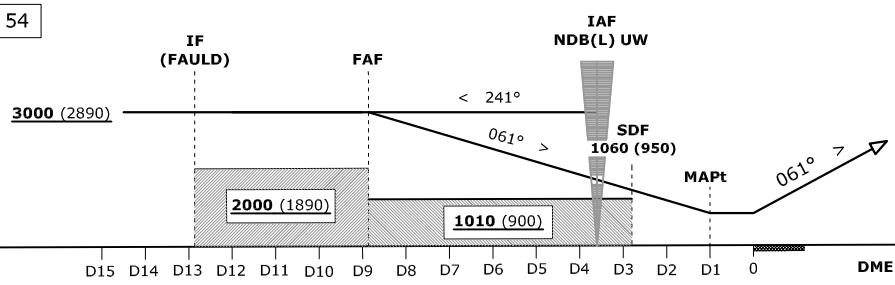
APP 121.200	EDINBURGH APPROACH	AD ELEVATION 136	
TWR 118.700	EDINBURGH TOWER	THR ELEVATION 110	
121.750	EDINBURGH GROUND	OBSTACLE ELEVATION xxxx AMSL (xxx) (ABOVE THR)	TRANSITION ALTITUDE 6000
RAD 121.200, 128.975	EDINBURGH RADAR		
ATIS 131.350	EDINBURGH INFORMATION	BEARINGS ARE MAGNETIC	



RECOMMENDED PROFILE Gradient 5.2%, 320FT/NM

DME I-VG	8	7	6	5	4	3	2.8 (SDF)	2
ALT(HGT)	**2710**(2600)	**2390**(2280)	**2070**(1960)	**1760**(1650)	**1440**(1330)	**1120**(1010)	**1060**(950)	**800**(690)

RDH 54



DME I-VG zero ranged to THR RWY 06

MAPt I-VG DME 1

Climb straight ahead to **3000**, then continue as directed.

RCF: Climb straight ahead to **3000**, then turn left to **NDB(L) UW** at **3000**.

Aircraft category		A	B	C	D
OCA (OCH)	LOC	**640** (530)	**640** (530)	**640** (530)	**640** (530)
VM(C) OCA (OCH AAL)	Total Area	**780** (644)	**990** (854)	**1480** (1344)	**2040** (1904)
	North of RWY 06/24	**780** (644)	**990** (854)	**1190** (1054)	**1210** (1074)

Rate of descent	G/S Kts	160	140	120	100	80
	FT/MIN	850	740	640	530	420

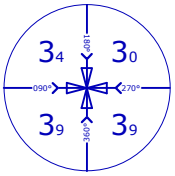
NOTES:

1. See AD2.22 / 1.d and 4.a for speed restrictions.

DRAFT CHART - NOT FOR FLIGHT

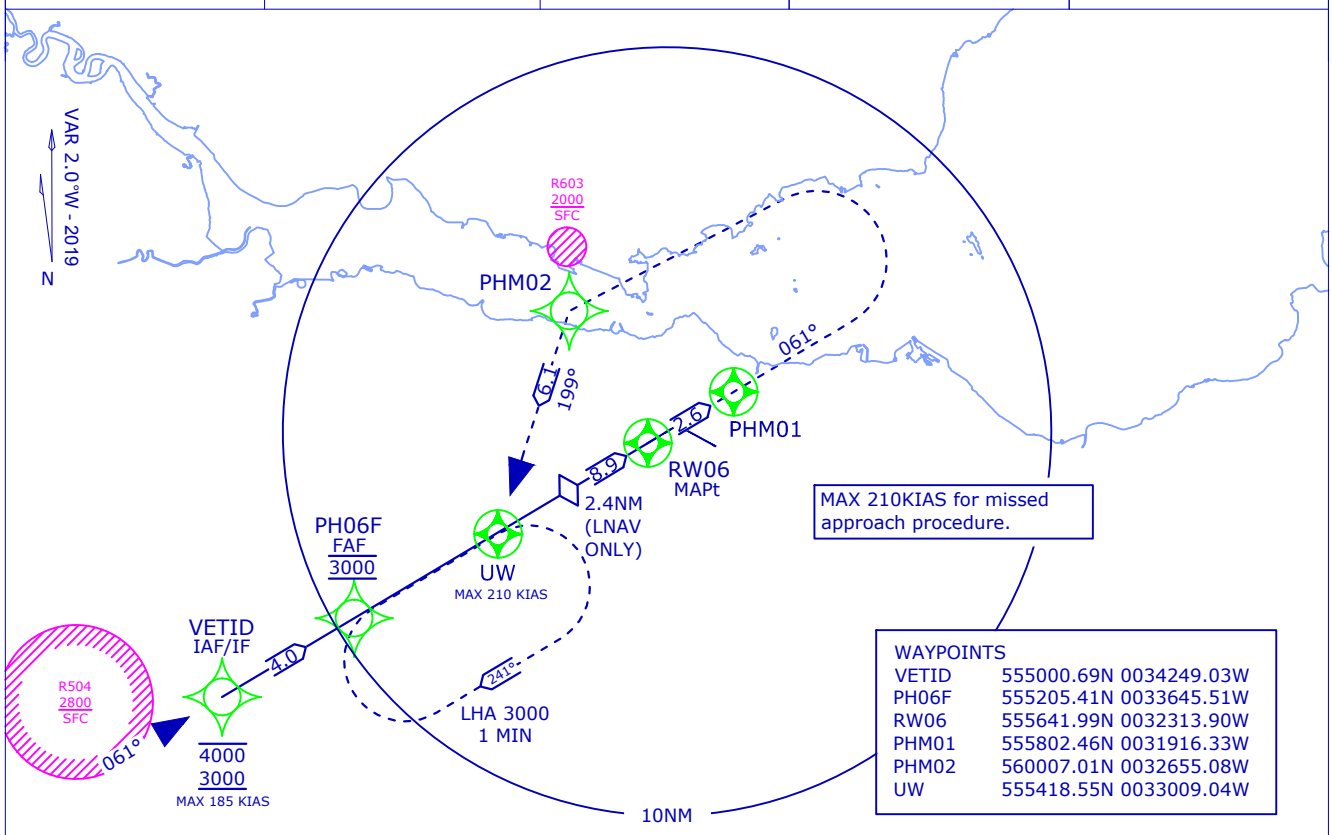
INSTRUMENT APPROACH CHART - ICAO

EDINBURGH
RNAV(GNSS)
RWY 06
(ACFT CAT A,B,C,D)



MSA 25NM ARP

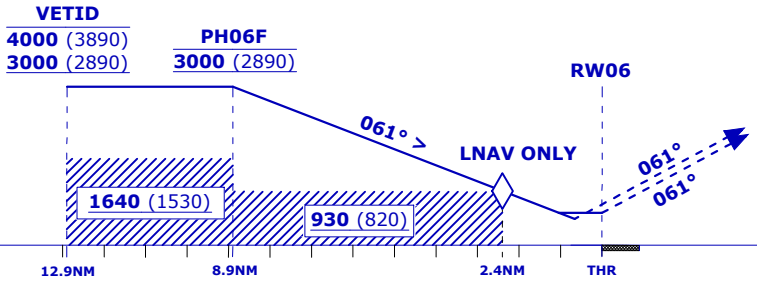
APP 121.200	EDINBURGH APPROACH	AD ELEVATION **136**	
TWR 118.700	EDINBURGH TOWER	THR ELEVATION **110**	
121.750	EDINBURGH GROUND	OBSTACLE ELEVATION **XXXX AMSL** (XXXX) (ABOVE THR)	MIN TEMP -10°C
RAD 121.200, 128.975	EDINBURGH RADAR		TRANSITION ALTITUDE **6000**
ATIS 131.350	EDINBURGH INFORMATION	BEARINGS ARE MAGNETIC	



RECOMMENDED PROFILE VERTICAL PATH ANGLE 3.0° (LNAV 5.2%) 320FT/NM

NM to RW06	**8**	**7**	**6**	**5**	**4**	**3**	**2.4 (LNAV SDF)**	**2**
ALT(HGT)	**2710**(2600)	**2390**(2280)	**2070**(1960)	**1760**(1650)	**1440**(1330)	**1120**(1010)	**930**(820)	**800**(690)

TCH 54



MAPt (LNAV) RW06

Continuous climb to **3000**. Initially climb straight ahead to **PHM01** or **3000**, whichever is later, then turn left to **PHM02 - UW** to join the hold or as directed by ATC.

Aircraft Category		**A**	**B**	**C**	**D**
OCA (OCH)	**LNAV/VNAV**	**490**(380)	**500**(390)	**510**(400)	**520**(410)
	LNAV	**600**(490)	**600**(490)	**600**(490)	**600**(490)
VM(C)OCA (OCH AAL)	**Total Area**	**800**(664)	**990**(854)	**1480**(1344)	**2040**(1904)
	North of RWY 06/24	**800**(664)	**990**(854)	**1190**(1054)	**1210**(1074)

Rate of descent	**G/S KT**	160	140	120	100	80
	FT/MIN	850	740	640	530	420

GENERAL INFORMATION - ADDITIONAL NOTES MAY BE ADDED BY ATC AS REQUIRED.

Instrument Approach Procedure Coding Tables

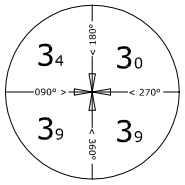
Edinburgh Runway 06 RNAV (GNSS) Instrument Approach Procedure v4.0

Designator	Sequence Number	Path Term-inator	Waypoint Name	Fly-over	Course/ Track °M (°T)	Turn Direction	Level Constraint	Speed Constraint	Co-ordinates	Remarks and Distance to MAPt
R06	001	IF	VETID	-	-	-	-4000 +3000	-185	555000.69N 0034249.03W	IF / 12.9
R06	002	TF	PH06F	-	061° (058.6°)	-	3000	-	555205.41N 0033645.51W	FAF / 8.9
R06	003	TF	RW06	Y	061° (058.7°)	-	-	-	555641.99N 0032313.90W	MAPt
R06	004	CF	PHM01	Y	061° (058.9°)	-	-	-	555802.46N 0031916.33W	-
R06	005	CA	-	-	061° (058.9°)	LEFT	3000	-	-	-
R06	006	DF	PHM02	-	-	LEFT	-	-	560007.01N 0032655.08W	-
R06	007	TF	UW	Y	199° (197.4°)	-	3000	-210	555418.55N 0033009.04W	HOLD

INSTRUMENT APPROACH CHART - ICAO

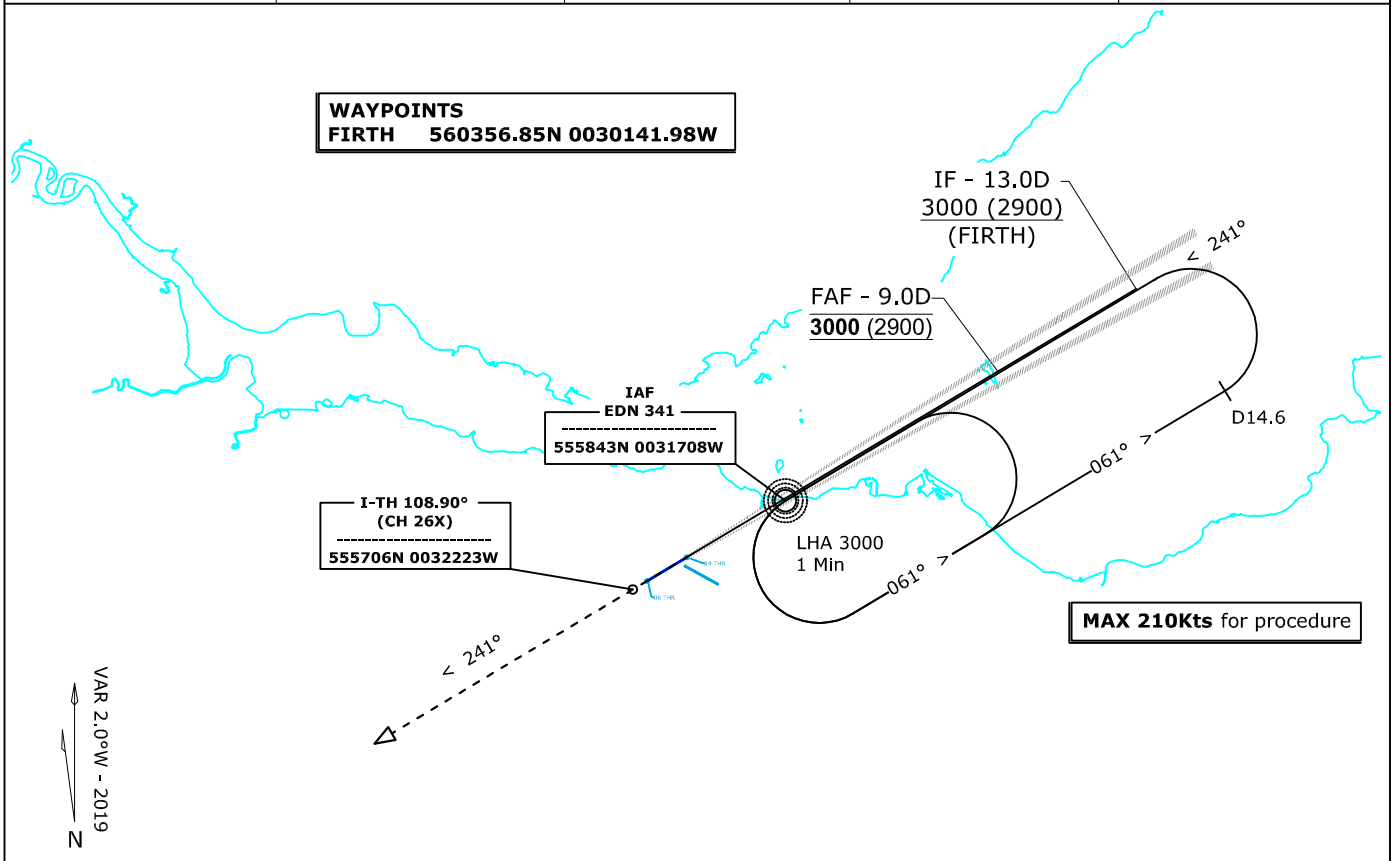
EDINBURGH ILS/DME RWY 24

(ACFT CAT A, B, C, D)



MSA 25NM NDB(L) EDN

APP 121.200	EDINBURGH APPROACH	AD ELEVATION 136	
TWR 118.700	EDINBURGH TOWER	THR ELEVATION 100	
121.750	EDINBURGH GROUND	OBSTACLE ELEVATION xxxx AMSL (xxx) (ABOVE THR)	
RAD 121.200, 128.975	EDINBURGH RADAR		TRANSITION ALTITUDE 6000
ATIS 131.350	EDINBURGH INFORMATION	BEARINGS ARE MAGNETIC	

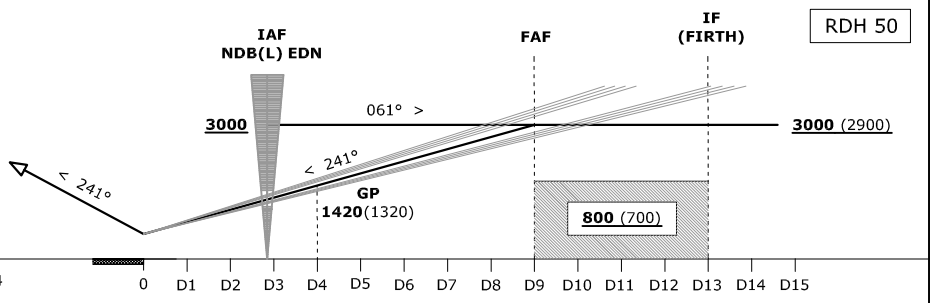


RECOMMENDED PROFILE GLIDE PATH 3.0°, 318FT/NM

DME I-TH	8	7	6	5	4	3	2	1
ALT(HGT)	**2700**(2600)	**2380**(2280)	**2060**(1960)	**1740**(1640)	**1420**(1320)	**1110**(1010)	**790**(690)	**470**(370)

Climb straight ahead to **3000**, then continue as directed.

RCF: Climb straight ahead to **3000**, then turn right to **NDB(L) EDN** at **3000**.



DME I-TH zero ranged to THR RWY 24

Aircraft category		A	B	C	D
OCA (OCH)	CAT I	**270** (170)	**278**(178)	**288** (188)	**299** (199)
	CAT II	**166** (66)	**177** (77)	**188** (88)	**205** (105)
VM(C) OCA (OCH AAL)	Total Area	**780** (644)	**990**(854)	**1480** (1344)	**2040** (1904)
	North of RWY 06/24	**780** (644)	**990** (854)	**1190** (1054)	**1210** (1074)

Rate of descent	G/S Kts	160	140	120	100	80
	FT/MIN	850	740	640	530	420

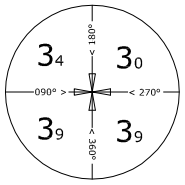
NOTES:

1. See AD2.22 / 1.d and 4.a for speed restrictions.

INSTRUMENT APPROACH CHART - ICAO

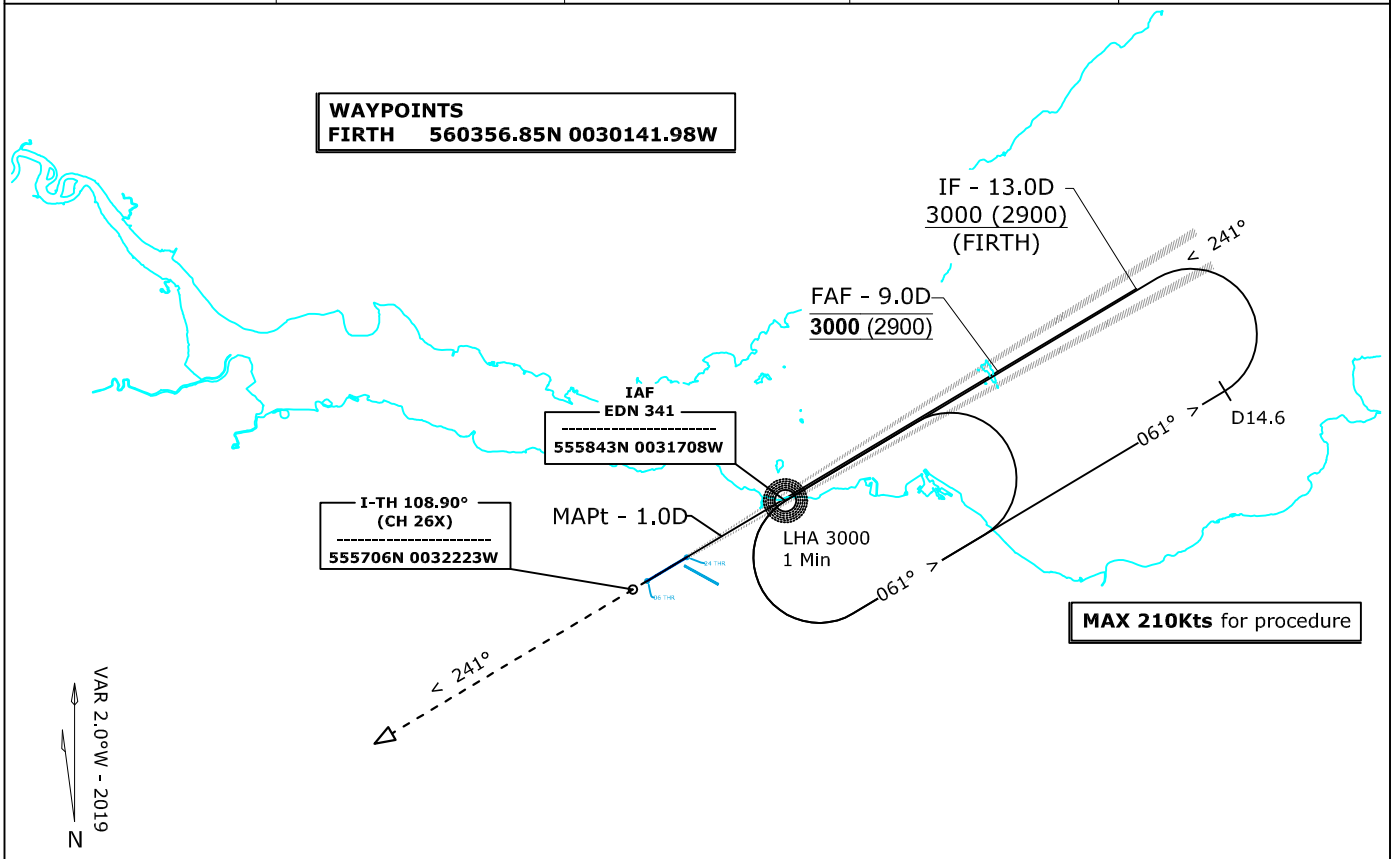
EDINBURGH LOC/DME RWY 24

(ACFT CAT A, B, C, D)



MSA 25NM NDB(L) EDN

APP 121.200	EDINBURGH APPROACH	AD ELEVATION 136	
TWR 118.700	EDINBURGH TOWER	THR ELEVATION 100	
121.750	EDINBURGH GROUND	OBSTACLE ELEVATION xxxx AMSL (xxx) (ABOVE THR)	
RAD 121.200, 128.975	EDINBURGH RADAR		TRANSITION ALTITUDE 6000
ATIS 131.350	EDINBURGH INFORMATION	BEARINGS ARE MAGNETIC	



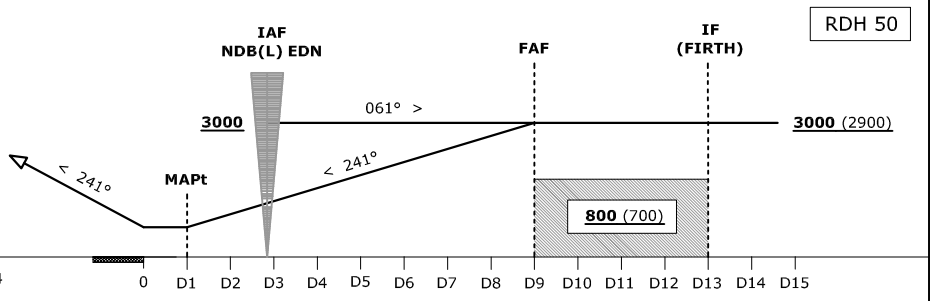
RECOMMENDED PROFILE Gradient 5.2%, 320FT/NM

DME I-TH	8	7	6	5	4	3	2
ALT(HGT)	**2700**(2600)	**2380**(2280)	**2060**(1960)	**1740**(1640)	**1420**(1320)	**1110**(1010)	**790**(690)

MAPt I-TH DME 1

Climb straight ahead to **3000**, then continue as directed.

RCF: Climb straight ahead to **3000**, then turn right to **NDB(L) EDN** at **3000**.



DME I-TH zero ranged to THR RWY 24

Aircraft category		A	B	C	D
OCA (OCH)	LOC	**540** (440)	**540** (440)	**540** (440)	**540** (440)
VM(C) OCA (OCH AAL)	Total Area	**780** (644)	**990** (854)	**1480** (1344)	**2040** (1904)
	North of RWY 06/24	**780** (644)	**990** (854)	**1190** (1054)	**1210** (1074)

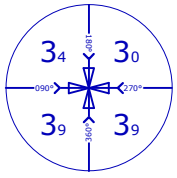
Rate of descent	G/S Kts	160	140	120	100	80
	FT/MIN	850	740	640	530	420

NOTES:

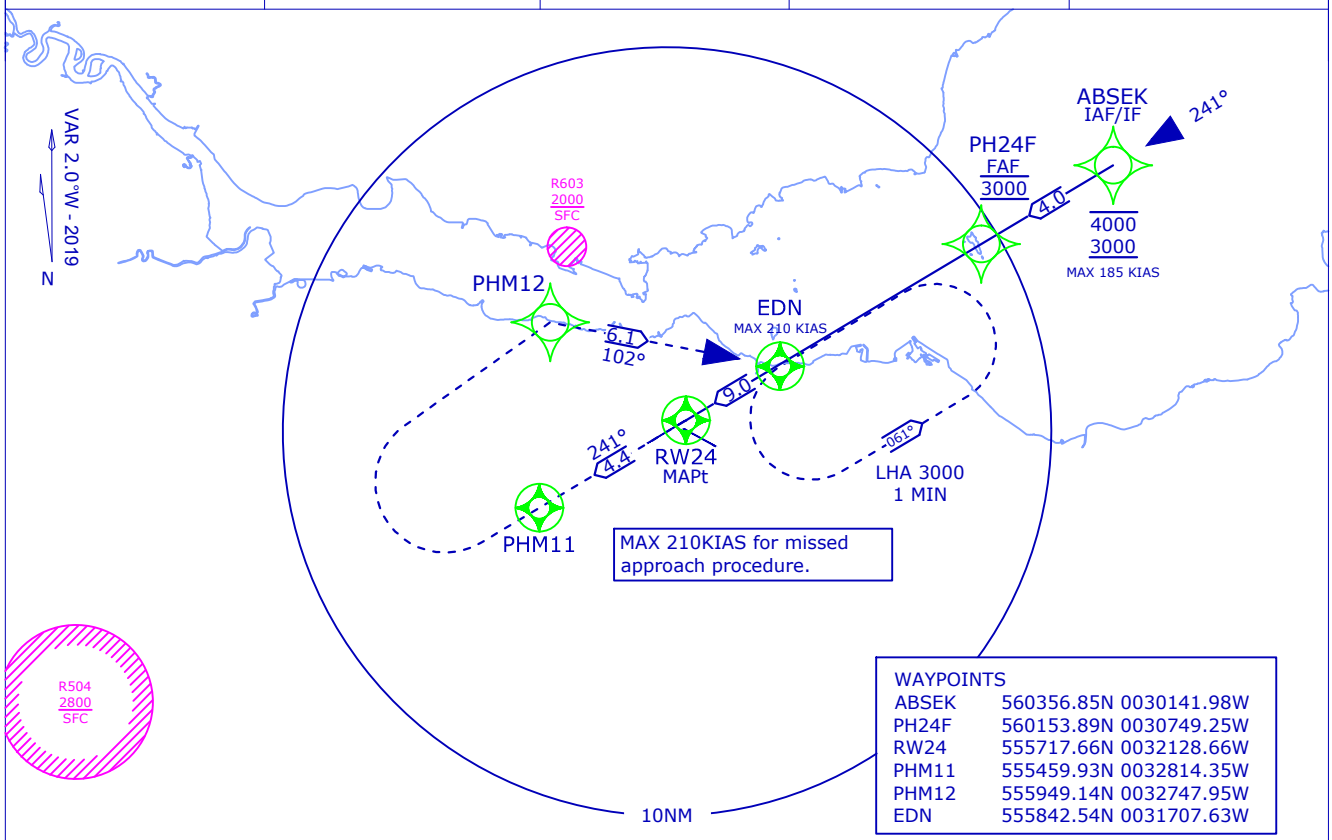
1. See AD2.22 / 1.d and 4.a for speed restrictions.

INSTRUMENT APPROACH CHART - ICAO

EDINBURGH
RNAV(GNSS)
RWY 24
(ACFT CAT A,B,C,D)



APP 121.200	EDINBURGH APPROACH	AD ELEVATION **136**	
TWR 118.700	EDINBURGH TOWER	THR ELEVATION **100**	
121.750	EDINBURGH GROUND	OBSTACLE ELEVATION **XXXX AMSL** (XXXX) (ABOVE THR)	MIN TEMP -10°C
RAD 121.200, 128.975	EDINBURGH RADAR		TRANSITION ALTITUDE **6000**
ATIS 131.350	EDINBURGH INFORMATION	BEARINGS ARE MAGNETIC	



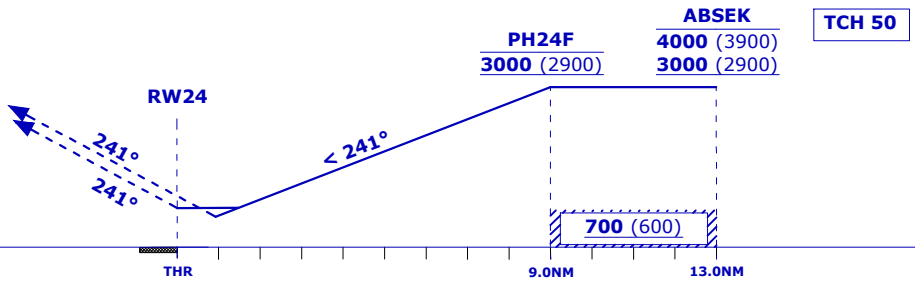
WAYPOINTS	
ABSEK	560356.85N 0030141.98W
PH24F	560153.89N 0030749.25W
RW24	555717.66N 0032128.66W
PHM11	555459.93N 0032814.35W
PHM12	555949.14N 0032747.95W
EDN	555842.54N 0031707.63W

RECOMMENDED PROFILE VERTICAL PATH ANGLE 3.0° (LNAV 5.2%) 320FT/NM

NM to RW24	8	7	6	5	4	3	2	1
ALT(HGT)	**2700**(2600)	**2380**(2280)	**2060**(1960)	**1740**(1640)	**1420**(1320)	**1110**(1010)	**790**(690)	**470**(370)

MAPt (LNAV) RW24

Continuous climb to **3000**. Initially climb straight ahead to **PHM11** or **3000**, whichever is later, then turn right to **PHM12** - **EDN** to join the hold or as directed by ATC.



Aircraft Category		A	B	C	D
OCA (OCH)	**LNAV/VNAV**	**430**(330)	**440**(340)	**450**(350)	**460**(360)
	LNAV	**540**(440)	**540**(440)	**540**(440)	**540**(440)
VM(C)OCA (OCH AAL)	**Total Area**	**800**(664)	**990**(854)	**1480**(1344)	**2040**(1904)
	North of RWY 06/24	**800**(664)	**990**(854)	**1190**(1054)	**1210**(1074)

Rate of descent	G/S KT	160	140	120	100	80
	FT/MIN	850	740	640	530	420

GENERAL INFORMATION - ADDITIONAL NOTES MAY BE ADDED BY ATC AS REQUIRED.

Instrument Approach Procedure Coding Tables

Edinburgh Runway 24 RNAV (GNSS) Instrument Approach Procedure v4.0

Designator	Sequence Number	Path Term-inator	Waypoint Name	Fly-over	Course/ Track °M (°T)	Turn Direction	Level Constraint	Speed Constraint	Co-ordinates	Remarks and Distance to MAPt
R24	001	IF	ABSEK	-	-	-	-4000 +3000	-185	560356.85N 0030141.98W	IF / 13.0
R24	002	TF	PH24F	-	241° (239.2°)	-	3000	-	560153.89N 0030749.25W	FAF / 9.0
R24	003	TF	RW24	Y	241° (239.1°)	-	-	-	555717.66N 0032128.66W	MAPt
R24	004	CF	PHM11	Y	241° (238.9°)	-	-	-	555459.93N 0032814.35W	-
R24	005	CA	-	-	241° (238.9°)	RIGHT	3000	-	-	-
R24	006	DF	PHM12	-	-	RIGHT	-	-	555949.14N 0032747.95W	-
R24	007	TF	EDN	Y	102° (100.4°)	-	3000	-210	555842.54N 0031707.63W	HOLD

RNAV Hold Coding Tables

Edinburgh EDIBO Hold

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Time (MIN)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
EDIBO	-	-	EDIBO	554127.60N 0030946.31W	N	354° (352.2°)	-2.0	1 MIN	RIGHT	-FL140 +FL70	-230	RNAV 1

Edinburgh STIRA Hold

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Time (MIN)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
STIRA	-	-	STIRA	560802.11N 0035000.98W	N	235° (232.9°)	-2.0	1 MIN	RIGHT	-FL140 +FL70	-230	RNAV 1

Edinburgh UW Hold

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Time (MIN)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
UW	-	-	UW	555418.55N 0033009.04W	N	061° (058.7°)	-2.0	1 MIN	RIGHT	3000	-210	RNP APCH

Edinburgh EDN Hold

Designator	Sequence Number	Path Terminator	Waypoint Name	Waypoint Co-ordinates	Fly-over	Course Track °M (°T)	Magnetic Variation	Time (MIN)	Turn Direction	Level Constraint	Speed Constraint	Navigation Performance
EDN	-	-	EDN	555842.54N 0031707.63W	N	241° (239.1°)	-2.0	1 MIN	LEFT	3000	-210	RNP APCH

Appendix D – APD Validation Reports

APD VALIDATION REPORT			
Airport Name	Edinburgh		
	Name	Approval No	Signature
Procedure Designer	[redacted]		
Validating Designer			

Requirement Correlation Matrix:

Requirement No	Description of Requirement	Compliance Status			Comments
		Non-Compliant	Partially Compliant	Fully Compliant	
1	SID EVTOL 1C			✓	
2	SID ARLER 1C			✓	
3	SID EMJEE 1D		✓		PHE35 < 1NM DER
4	SID GRICE 4C			✓	
5	SID GRICE 5D		✓		PHE35 < 1 NM DER
6	SID KRAKY 1D		✓		PHE35 < 1 NM DER
Date	12/6/18				

APD VALIDATION REPORT			
Airport Name	Edinburgh		
	Name	Approval No	Signature
Procedure Designer	[redacted]		
Validating Designer			

Requirement Correlation Matrix:

Requirement No	Description of Requirement	Compliance Status			Comments
		Non-Compliant	Partially Compliant	Fully Compliant	
1	SID LIKLA 1C OPT 1			✓	
2	SID LIKLA 1C OPT 2			✓	
3	SID MAVIX 1C OPT1			✓	
4	SID MAVIX 1C OPT2			✓	
5	SID VOSNE 1C			✓	
6	SID VOSNE 1D		✓		PHEJS < 1NM DER
Date	12/6/18				

APD VALIDATION REPORT					
Airport Name	Edinburgh				
Procedure Designer	Name	Approval No	Signature		
Validating Designer	[redacted]				
Requirement Correlation Matrix:					
Requirement No	Description of Requirement	Compliance Status			Comments
		Non-Compliant	Partially Compliant	Fully Compliant	
1	SID OMNI RWY 06			✓	
2	SID OMNI RWY 24			✓	
3					
4					
5					
6					
Date	12/6/18				

SPECIFIC PROCEDURES

Procedure Name	EVTOL 1C
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	ARLER 1C
Reference Aids	DME/DME , GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	EMSEE 10
Reference Aids	PME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	GRICE 4C
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	GRICE 5D
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	KRAGY 1D
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	LIKLA 1C OPT 1
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	LIKLA 1C 09R2
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	MAVIX 1C OPT 1
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	MANIX 1C OPT 2
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	VOSNE 1C
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	VOSNE 1D
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	OMNI 06
Reference Aids	—

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	OMNI 24
Reference Aids	—

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
Departure	✓	✓	✓	✓	[redacted]

General Comments

We hereby declare that the procedures(s) as detailed COMPLY / DO NOT COMPLY with the DAP CAS process requirements.

	Name	Signature	Date
DESIGNER	[redacted]	[redacted]	12/6/18
CHECKER	[redacted]	[redacted]	12th June 2018

APD VALIDATION REPORT					
Airport Name	Edinburgh				
	Name	Approval No	Signature		
Procedure Designer	[redacted]				
Validating Designer					

Requirement Correlation Matrix:

Requirement No	Description of Requirement	Compliance Status			Comments
		Non-Compliant	Partially Compliant	Fully Compliant	
1	STAR BLACA 1E			✓	
2	STAR BLACA 1F			✓	
3	STAR ESIDO 1E			✓	
4	STAR HAVEN 1E			✓	
5	STAR PTH 1E			✓	
6	HOLD EDIBO			✓	
Date	12/6/18				

APD VALIDATION REPORT			
Airport Name	Edinburgh		
	Name	Approval No	Signature
Procedure Designer	[redacted]		
Validating Designer			

Requirement Correlation Matrix:

Requirement No	Description of Requirement	Compliance Status			Comments
		Non-Compliant	Partially Compliant	Fully Compliant	
1	HOLD STIRA			✓	
2	HOLD EDN			✓	
3	HOLD JW			✓	
4					
5					
6					
Date	12/6/18				

Hold	Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
1	EDIBO	✓	✓	N/A	N/A	[redacted]
2	STIRA	✓	✓	N/A	N/A	
3	EDN	✓	✓	✓	✓	
4	UW	✓	✓	✓	✓	

	Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
1						
2						
3						
4						
5						
6						
7						

SPECIFIC PROCEDURES

Procedure Name	BLACA 1E
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Arrival	✓	✓	NA	N/A	[redacted]

SPECIFIC PROCEDURES

Procedure Name	BLACA 1F
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Arrival	✓	✓	N/A	N/A	[redacted]

SPECIFIC PROCEDURES

Procedure Name	ESKDO 1E
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Arrival	✓	✓	N/A	N/A	[redacted]

SPECIFIC PROCEDURES

Procedure Name	HAVEN 1E
Reference Aids	GNSS, DME/DME

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Arrival	✓	✓	N/A	N/A	[redacted]

SPECIFIC PROCEDURES

Procedure Name	PTH 1E
Reference Aids	DME/DME, GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Arrival	✓	✓	N/A	N/A	[redacted]

General Comments

We hereby declare that the procedures(s) as detailed COMPLY / DO NOT COMPLY with the DAP CAS process requirements.

	Name	Signature	Date
DESIGNER	[redacted]	[redacted]	12/06/18
CHECKER	[redacted]	[redacted]	12/6/18

APD VALIDATION REPORT			
Airport Name	Edinburgh		
	Name	Approval No	Signature
Procedure Designer	[redacted]		
Validating Designer			

Requirement Correlation Matrix:

Requirement No	Description of Requirement	Compliance Status			Comments
		Non-Compliant	Partially Compliant	Fully Compliant	
1	EDIBO 1C Transition			✓	
2	EDIBO 1D Transition			✓	
3	MSA			✓	
4	VMC			✓	
5	RNAV (GNSS) RWY 06			✓	
6	RNAV (GNSS) RWY 24			✓	
Date	12/6/18				

MSA	Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
1	ARP / UW / EDN COMBINED	✓	✓	✓	✓	[redacted]
2						
3						
4						
5						
6						
7						
8						
TAA	**Segment Name**	**Construction Correct**	**Obstacle Clearance Proven**	**Dominant Obstacle Identified**	**Minimum Altitude & MOC Declared**	**Validating APD Signature/Initial**
1	—					
2						
3						
4						

VMC	Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
1	Total	✓	✓	✓	✓	[redacted]
2	N of 06/24	✓	✓	✓	✓	
3						
4						
VSS	**Segment Name**	**Construction Correct**	**Obstacle Clearance Proven**	**Dominant Obstacle Identified**	**Minimum Altitude & MOC Declared**	**Validating APD Signature/Initial**
1	RNAV 06	✓	✓	✓	✓	[redacted]
2	RNAV 24	✓	✓	✓	✓	
3						
4						
5						
6						
7						

SPECIFIC PROCEDURES

Procedure Name	RNAV RWY 06
Reference Aids	GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Initial Approach	✓	✓	✓	✓	[redacted]
Intermediate Approach	✓	✓	✓	✓	
Final Approach	✓	✓	✓	✓	
Initial Missed Approach	✓	✓	✓	✓	
Intermediate Missed Approach	✓	✓	✓	✓	
Final Missed Approach	✓	✓	✓	✓	

SPECIFIC PROCEDURES

Procedure Name	RNAV RWY 24
Reference Aids	GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Initial Approach	✓	✓	✓	✓	[redacted]
Intermediate Approach	✓	✓	✓	✓	
Final Approach	✓	✓	✓	✓	
Initial Missed Approach	✓	✓	✓	✓	
Intermediate Missed Approach	✓	✓	✓	✓	
Final Missed Approach	✓	✓	✓	✓	

SPECIFIC PROCEDURES

Procedure Name	EDI 60 1C
Reference Aids	DME/DME , GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Arrival	✓	✓	✓	✓	[redacted]

SPECIFIC PROCEDURES

Procedure Name	EDIBO 1D
Reference Aids	DME/DME , GNSS

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Arrival	✓	✓	✓	✓	[redacted]

General Comments

We hereby declare that the procedures(s) as detailed COMPLY / DO NOT COMPLY with the DAP CAS process requirements.

	Name	Signature	Date
DESIGNER	[redacted]		14/06/18
CHECKER			12th June 2018

APD VALIDATION REPORT			
Airport Name	EDINBURGH		
	Name	Approval No	Signature
Procedure Designer	[redacted]		
Validating Designer			

Requirement Correlation Matrix:

Requirement No	Description of Requirement	Compliance Status			Comments
		Non-Compliant	Partially Compliant	Fully Compliant	
1	ILS RWY 06			✓	
2	LOC RWY 06			✓	
3	ILS RWY 24			✓	
4	LOC RWY 24			✓	
5					
6					
Date	12/6/18				

VMC	Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
1	—					
2	—					
3	—					
4	—					

VSS	Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC Declared	Validating APD Signature/Initial
1	ILS/LOC 06	✓	✓	✓	✓	[redacted]
2	ILS/LOC 24	✓	✓	✓	✓	
3						
4						
5						
6						
7						

SPECIFIC PROCEDURES

Procedure Name	ILS RWY 06
Reference Aids	OW, I-VG

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Initial Approach	✓	✓	✓	✓	[redacted]
Intermediate Approach	✓	✓	✓	✓	
Final Approach	✓	✓	✓	✓	
Initial Missed Approach	✓	✓	✓	✓	
Intermediate Missed Approach	✓	✓	✓	✓	
Final Missed Approach	✓	✓	✓	✓	

SPECIFIC PROCEDURES

Procedure Name	LOC RWY 06
Reference Aids	UW, I-VG

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Initial Approach	✓	✓	✓	✓	[redacted]
Intermediate Approach	✓	✓	✓	✓	
Final Approach	✓	✓	✓	✓	
Initial Missed Approach	✓	✓	✓	✓	
Intermediate Missed Approach	✓	✓	✓	✓	
Final Missed Approach	✓	✓	✓	✓	

SPECIFIC PROCEDURES

Procedure Name	ILS RWY 24
Reference Aids	EDN, I-TH

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Initial Approach	✓	✓	✓	✓	[redacted]
Intermediate Approach	✓	✓	✓	✓	
Final Approach	✓	✓	✓	✓	
Initial Missed Approach	✓	✓	✓	✓	
Intermediate Missed Approach	✓	✓	✓	✓	
Final Missed Approach	✓	✓	✓	✓	

SPECIFIC PROCEDURES

Procedure Name	LOC RWY 24
Reference Aids	EDN, I-TH

Segment Name	Construction Correct	Obstacle Clearance Proven	Dominant Obstacle Identified	Minimum Altitude & MOC declared	Validating APD Signature/Initial
Initial Approach	✓	✓	✓	✓	[redacted]
Intermediate Approach	✓	✓	✓	✓	
Final Approach	✓	✓	✓	✓	
Initial Missed Approach	✓	✓	✓	✓	
Intermediate Missed Approach	✓	✓	✓	✓	
Final Missed Approach	✓	✓	✓	✓	

General Comments

We hereby declare that the procedures(s) as detailed COMPLY / DO NOT COMPLY with the DAP CAS process requirements.

	Name	Signature	Date
DESIGNER	[redacted]		12th June 2018
CHECKER			12/6/18