MOTT MACDONALD

Expansion of Hong Kong International Airport into a Three-Runway System

Procedures for Mitigation of Aircraft Noise

March 2022

Mott MacDonald
3/F Manulife Place
348 Kwun Tong Road
Kwun Tong
Kowloon
Hong Kong

T +852 2828 5757
mottmac.hk

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This Submission of Procedures for Mitigation of Aircraft Noise

has been reviewed and certified by

the Environmental Team Leader (ETL) in accordance with

Condition 2.21 of Environmental Permit No. EP-489/2014.

Certified by:

Terence Kong
Environmental Team Leader (ETL)
Mott MacDonald Hong Kong Limited

Date 8 March 2022

AECOM
12/F, Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, Hong Kong
香港新界沙田鄉事會路 138 號新城市中央廣場第 2 座 12 樓
www.aecom.com
+852 3922 9000 tel
+852 3922 9797 fax

Our Ref : 60440482/C/JCHL220309

By Email

Airport Authority Hong Kong
HKIA Tower, 1 Sky Plaza Road
Hong Kong International Airport
Lantau, Hong Kong

Attn: Mr. Lawrence M L Tsui, Principal Manager. Environmental Compliance

9 March 2022

Dear Sir,

Contract No. 3102
3RS Independent Environmental Checker Consultancy Services

Procedures for Mitigation of Aircraft Noise

Reference is made to the ET's submission of Procedures for Mitigation of Aircraft Noise under Condition 2.21 of the Environmental Permit No. EP-489/2014 certified by the ET Leader on 8 March 2022.

We would like to inform you that we have no comment on the captioned submission. Therefore we write to verify the captioned submission in accordance with the requirement stipulated in Condition 1.9 of EP-489/2014.

Should you have any query, please feel free to contact the undersigned at 3922 9376.

Yours faithfully,
AECOM Asia Co. Ltd.

Jackel Law
Independent Environmental Checker

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Acronyms

2RS	Two-runway System
3RS	Three-runway System
AAHK	Airport Authority Hong Kong
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
ANSP	Air Navigation Service Provider
CAD	Civil Aviation Department
CDA	Continuous Descent Approach
DEP	Director of Environmental Protection
Doc	Document
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
EM&A	Environmental Monitoring and Audit
EP	Environmental Permit
EPD	Environmental Protection Department
FMS	Flight Management System
GPS	Global Positioning System
ha	Hectare
HK	Hong Kong
HKIA	Hong Kong International Airport
I-2RS	Interim Two-runway System
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
MM	Mott MacDonald
NADP	Noise Abatement Departure Procedure
NEF	Noise Exposure Forecast
NSR	Noise Sensitive Receiver
PANS-OPS	Procedure for Air Navigation Services – Aircraft Operations
QC	Quota Count
RF	Radius-to-Fix
RNP	Required Navigation Performance
RNP-AR	Required Navigation Performance Authorization Required
RWY	Runway
SID	Standard Instrument Departure
T2 Building	Terminal 2 Building

1 Introduction

1.1 Background

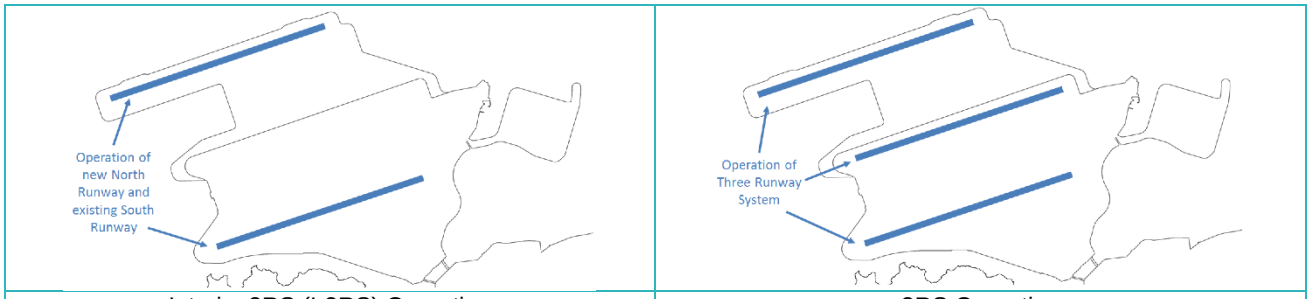
Under the Environmental Impact Assessment Ordinance (EIAO), the Environmental Impact Assessment (EIA) Report and the Environmental Monitoring and Audit (EM&A) Manual (Register No.: AEIAR-185/2014) prepared for the "Expansion of Hong Kong International Airport into a Three-Runway System" (hereafter referred to as the Project or the "3RS Project") have been approved by the Environmental Protection Department (EPD), and an Environmental Permit (EP) (Permit No.: EP-489/2014) has been issued for the Project.

The project is planned to be located on a new land formation area immediately north of existing Hong Kong International Airport (HKIA) in North Lantau, covering a permanent footprint of approximately 650 ha. As stated in the approved 3RS EIA, the project primarily comprises:

- New third runway with associated taxiways, aprons and aircraft stands;
- New passenger concourse building;
- Expansion of the existing Terminal 2 (T2) building; and
- Related airside and landside works, and associated ancillary and supporting facilities.

As presented in the approved 3RS EIA Report, the runway operational configuration will be implemented in phases as shown in **Figure 1.1** below. Upon completion of the new third runway and associated taxiways, the existing north runway will be closed for modification works. During this Interim Phase as described in the approved 3RS EIA Report, the existing south runway and the new third runway will be in operation, which is hereafter referred to as the interim two-runway (I-2RS) operation. Upon completion of all essential infrastructure and facilities, the airport will be operated under the 3RS, which is hereafter referred to as the 3RS operation.

Figure 1.1: Runway Operation Configuration



Interim 2RS (I-2RS) Operation	3RS Operation

The aircraft noise impact assessment completed as part of the approved 3RS EIA Report had assessed the aircraft noise impact associated with the above-mentioned I-2RS and 3RS operation. These covered both the Worst Operation Mode and Design Capacity as two assessment scenarios for the 3RS operation in addition to the Interim Phase scenario for the I-2RS operation. Relevant aircraft noise mitigation measures had been recommended and adopted as operational assumptions in the detailed aircraft noise modelling undertaken for the above-mentioned assessment scenarios.

Taking into account the EIA recommendations and the EP requirements, pursuant to EP Condition 2.21, the Airport Authority Hong Kong (AAHK) is required to prepare and submit the Procedures for Mitigation of Aircraft Noise for the Project to the Director of Environmental Protection (DEP, or hereafter referred to as the Director) for approval no later than 3 months before the operation of the third runway of the Project.

Mott MacDonald (MM) has been appointed by AAHK as the Consultant to provide consultancy services for the 3RS Project, which include, among others, the preparation of the submission under EP Condition 2.21. The Director-General of Civil Aviation has been consulted in the preparation of this submission in accordance with the requirement under EP Condition 2.21.

1.2 Purpose of this Document

This document has been prepared to fulfil EP Condition 2.21 for the I-2RS operation. The Plan will be updated subsequently to present the procedures for mitigation of aircraft noise for the 3RS operation when design details related to the 3RS operation are ready.

1.3 Structure of this Document

Following this introductory section, this Plan is structured as follows:

Section 2 Overview of Aircraft Noise Mitigation Measures

Section 3 West Lamma Channel Departures in East Flow Operation

Section 4 Noise Abatement Departure Procedures in East Flow Operation

Section 5 Continuous Descent Approach from Northeast in West Flow Operation

2 Overview of Aircraft Noise Mitigation Measures

2.1 Introduction

The International Civil Aviation Organization (ICAO) developed the Balanced Approach to Aircraft Noise Management in 2001 and published a relevant ICAO guidance document on the subject in 2004. The Balanced Approach is an internationally agreed approach to managing aircraft noise at large airports. The Balanced Approach involves utilising four different types of measures, including:

1. Reduction of Noise at Source
2. Land-use Planning and Management
3. Noise Abatement Operational Procedures
4. Operating Restrictions

Each of these types of measures aims to tackle noise-related issues from a different dimension and contributes to the overall noise mitigation objectives for an airport.

In Hong Kong, the Civil Aviation Department (CAD) has been implementing a series of aircraft noise mitigation measures and initiatives in accordance with the ICAO's Balanced Approach. These include the following measures as described in Section 7.3.2.5 of the approved 3RS EIA Report:

(i) all noisy jet aircraft which do not comply with the noise standard set out in Chapter 3 of Annex 16 Volume I, Part II to the Convention on International Civil Aviation are not allowed to operate at HKIA since July 2002;
(ii) between midnight and 07:00 am, arriving aircraft are required to land from the southwest, subject to acceptable wind direction and safety consideration since October 1998;
(iii) aircraft departing to the northeast of the airport between midnight and 07:00 am are required to use the southbound route via the West Lamma Channel, subject to acceptable operational and safety consideration since October 1998. The application period was revised to 11:00 pm to 07:00 am since January 1999;
(iv) aircraft departing to the northeast are required to adopt the noise abatement take-off procedures stipulated by ICAO so long as safe flight operations permit;
(v) all aircraft on approach to the HKIA from the northeast between 11:00 pm to 07:00 am are encouraged to adopt the Continuous Descent Approach (CDA).

As described in Sections 7.3.2.7 to 7.3.2.10 of the approved 3RS EIA Report, CAD has been exploring additional measures and new initiatives that could be implemented to further reduce the aircraft noise impact arising from the existing operation at HKIA. AAHK had also initiated a detailed study to develop an environmental charges/ incentives scheme as a means of encouraging airlines to use quieter aircraft; actively managed the night flights demand; and also committed to either the provision of, or to pay for, noise insulation measures at all domestic houses/ structures affected by aircraft noise. These additional measures and initiatives, which have been introduced at HKIA and covered all four aspects of measures under the above-mentioned Balanced Approach promulgated by ICAO, are described in the section below.

2.2 Additional Aircraft Noise Mitigation Measures and Incentives Implemented at HKIA

2.2.1 Reduction of Noise at Source - Further Restrictions on Noisy Aircraft Types

Improved aircraft designs through adoption of new technology mean the newer generation aircraft generate less noise. Each aircraft type is certified for their noise performance based on both engine and the airframe noise as per ICAO Annex 16 and Doc 9501.

As described above, CAD has implemented a ban in July 2002 on jet aircraft that do not comply with the noise standards stipulated in Chapter 3 of ICAO Annex 16 Volume I, Part II to reduce aircraft noise at source.

Those aircraft types that marginally comply with Chapter 3 noise standards are also not allowed in scheduled operations into HKIA since the end of March 2014 between 2300 and 0659 hours, and this requirement had been extended to the whole day since October 2014.

To further improve the local noise environment and to alleviate the aircraft noise impact on the local communities, CAD have implemented a further restriction on aircraft that do not comply with the more stringent Chapter 4 of ICAO Annex 16 Volume I, Part II. These aircraft, which have been referred to as Non-chapter 4 Equivalent Aircraft in the relevant Aeronautical Information Circular (AIC) 18/18 dated 10 September 2018 issued by CAD, have not been allowed to schedule operations at HKIA between 2200 and 0659 hours since March 2019.

2.2.2 Land-use Planning and Management

2.2.2.1 Consideration of Aircraft Noise in planned Comprehensive Development Area in Lok On Pai

Based on the results of the aircraft noise modelling presented for the years 2030 and 2032 scenarios, part of the Noise Exposure Forecast (NEF) 25 contours will encroach onto a Comprehensive Development Area site in Lok On Pai. As described in Sections 7.3.4.8 and 7.3.4.14 of the approved 3RS EIA Report, Planning Department has already been informed of the requirement of allowing non-noise sensitive uses only within the NEF 25 contour in their preparation of the planning brief to control the future development in the Comprehensive Development Area site in Lok On Pai through the established planning mechanism and also in the lease.

It is noted that an outline zoning plan (No. S/TM/35) was subsequently published by the Town Planning Board in December 2018 with a requirement to conduct an environmental assessment for any planned developments at the Comprehensive Development Area site in Lok On Pai.

2.2.2.2 Indirect Noise Mitigation Measures provided for affected villages

The approved 3RS EIA Report had identified that after exhausting all practicable direct noise mitigation measures, it is unavoidable that some village houses/ licensed structures in and around Sha Lo Wan and certain village houses/ licensed structures along North Lantau shorelines would still be situated within the NEF 25 contours, though the extent of encroachment would be reduced once the 3RS becomes operational when the existing south runway could be put on standby at night. In line with the indirect mitigation measures already provided to Sha Lo Wan village at airport opening, AAHK had already delivered its commitment made in Section 7.3.2.10 of the approved 3RS EIA Report to either provide, or to pay for, noise insulation measures at all existing domestic houses/ structures within the other newly affected villages named in Table 7.3.2 of the approved 3RS EIA Report.

2.2.3 Noise Abatement Operational Procedures - Radius-to-Fix Flight Procedures

As described in Section 7.3.2.7 of the approved 3RS EIA Report, CAD has implemented since 2012 a set of departure flight procedures (known as Radius-to-Fix flight procedures) whereby aircraft which are capable to

use satellite-based navigation technology, when departing to the northeast from HKIA, can adhere closely to the nominal flight track when making the turn to the West Lamma Channel, thereby keeping the aircraft at a distance away from the areas in the vicinity of the flight paths, and reducing the noise impact on these areas.

CAD has been encouraging airlines with aircraft equipped with the above-mentioned satellite-based navigation technology to adopt the Radius-to-Fix flight procedures. Since the introduction of the Radius-to-Fix (RF) flight procedures in 2012, the proportion of flights adopting the procedures has steadily increase. These RF departure procedures are now being assigned as the default procedure in preference to the basic flight procedures for aircraft departing from Runways 07 during the noise mitigating period between 2301 and 0700 to further increase their utilisation.

2.2.4 Operating Restriction - Noise Quota Count Pilot Scheme introduced for Existing 2RS Operation

AAHK has completed the detailed study mentioned in Section 7.3.2.9 of the approved 3RS EIA Report to develop an environmental charges/ incentives scheme as a means of encouraging airlines to use quieter aircraft types. Taking into account the study findings, AAHK introduced and implemented a Noise Quota Count (QC) Pilot Scheme for the existing 2RS operation since the Summer Season of 2017 after thorough consultation with the aviation community. AAHK had also managed the night flights demand at HKIA to ensure that the noise contour in the remaining years of existing two-runway operations would not expand into any new Noise Sensitive Receivers (NSRs) on top of the affected villages reported in the approved 3RS EIA Report.

As described in the relevant Aeronautical Information Circular (AIC) 20/20 dated 9 October 2020 issued by CAD, an additional operating restriction has been introduced at HKIA to restrict the operation of noisier Noise Quota Count 4 (QC4) aircraft between 0100 hours and 0659 hours since the start of the Summer Season of 2021, and the operating restriction will be extended to between 2200 hours and 0659 hours from the start of the Summer Season of 2022.

2.3 3RS EP Requirements

The approved 3RS EIA Report has recommended six noise abatement operational procedures for the 3RS operation which have been listed in EP Condition 2.21, as reproduced below:

The Permit Holder shall, no later than 3 months before the operation of the third runway of the Project, submit 3 hard copies and 1 electronic copy of the procedures to the Director for approval. The procedures shall describe at least the following mitigation measures recommended in the approved EIA report (Register No. AEIAR-185/2014):

(i) putting the existing south runway on standby where possible at night between 2300 hours and 0659 hours;
(ii) requiring departures to take the southbound route via West Lamma Channel during east flow at night between 2300 hours and 0659 hours, subject to acceptable operational and safety consideration;
(iii) assigning a new arrival Required Navigation Performance Track 6 for preferential use in the runway 25 direction between 2300 hours and 0659 hours;
(iv) implementing a preferential runway use programme when wind conditions allow such that west flow is used when departures dominate while east flow is used when arrivals dominate during night-time;
(v) adopting the noise abatement take-off procedures stipulated by International Civil Aviation Organization (ICAO) for aircraft departing to the northeast so long as safe flight operations permit; and
(vi) adopting the Continuous Descent Approach (CDA) for all aircrafts on approach to the Hong Kong International Airport (HKIA) from the northeast between 2300 hours and 0700 hours.

The Permit Holder shall consult the Director-General of Civil Aviation in preparing the procedures.

While the above measures, as described in Section 7.3.5.3 and summarised in form of an Implementation Schedule in Table 20.1 (see the extract in **Appendix A**) of the approved 3RS EIA Report, are for the 3RS operation, some of these measures are also planned to be adopted in the I-2RS operation as summarized in **Table 2.1**. Each of the procedures are briefly described in **Sections 2.3.1 to 2.3.6,** with further details of those applicable to I-2RS set out in **Sections 3** to **5.**

Table 2.1: Implementation Schedule of Aircraft Noise Mitigation Measures for I-2RS and 3RS

Item	Measure	Description	Implementation Schedule	
			I-2RS	3RS
i.	South Runway on Standby	Putting existing south runway on standby where possible at night between 2300 and 0659 hours.	Not applicable*	Planned for implementation
ii.	West Lamma Channel Departures	Departures to take southbound West Lamma Channel during east flow at night between 2300 and 0659 hours, subject to acceptable operational and safety considerations.	Planned for implementation	Planned for implementation
iii.	RNP Track 6	Assigning a new arrival Required Navigation Performance (RNP) Track 6 for preferential use in the runway 25 direction (i.e., west flow) between 2300 hours and 0659 hours.	Not applicable**	Planned for implementation
iv.	Preferential Runway Use	Preferential runway use programme when wind conditions allow such that west flow is used when departures dominate while east flow is used when arrivals dominate during night-time.	Not applicable***	Planned for implementation
v.	NADP to the Northeast	Adopting noise abatement departure procedures for aircraft departing to the northeast as long as safe flight operations permit.	Planned for implementation	Planned for implementation
vi.	CDA from the Northeast	Adopting CDA for all aircraft on approach from the northeast between 2300 and 0700 hours	Planned for implementation	Planned for implementation

* South Runway on Standby is not operationally feasible with 2 runways in I-2RS (see Section 2.3.1).

** Taking into account the level of aircraft / aircrew capability and air traffic considerations, the existing RNP Track 6 will continue to be assigned for use in the west flow direction for a limited types of suitably equipped aircraft only when circumstances permit during the I-2RS operation (see Section 2.3.3).

*** The existing preferential use of Runways 07C and 07R will continue to be applied in the I-2RS operation (see Section 2.3.4).

2.3.1 South Runway on Standby

Putting the existing south runway on standby at night will minimise the aircraft noise impact on Sha Lo Wan and other village houses along the Lantau shorelines that would inevitably be situated within the NEF 25 contour given their proximity. Yet, as already pointed out in Section 7.3.4.12 of the approved 3RS EIA Report, this measure is not applicable to both the existing 2RS and in the I-2RS operation as it is operationally not feasible to put the South Runway on stand-by when there are only two runways available in total. Therefore, this measure can only be implemented when the 3RS operation commences with an extra runway to allow the South Runway to be put on standby, while the remaining two runways rotate between operational and maintenance modes. Further details about this procedure will be available when this document is updated for the 3RS operation.

2.3.2 West Lamma Channel Departures

As described under item (iii) in Section 7.3.2.5 of the approved 3RS EIA Report, and relevant requirements are as specified in Section 2.4 of VHHH AD 2.21 of the Hong Kong Aeronautical Information Publication (AIP Hong

Kong) published by the CAD, currently aircraft departing to the northeast of the airport between 2301 and 0700 hours are already required to take a southbound route via the West Lamma Channel, subject to acceptable operational and safety consideration.

This existing noise mitigating procedure will continue to be applied in I-2RS and in the subsequent 3RS operation, including both basic RNP Standard Instrument Departures (SIDs) as well as the RNP SIDs with Radius-to-Fix (RF) segments as described in Section 2.2.3 above for effecting a better noise environment.

Section 3 presents details about the West Lamma Channel Departure procedure for I-2RS operation.

2.3.3 Required Navigation Performance (RNP) Track 6

Currently the RNP Track 6 is already available as the RNP Y Authorization Required (AR) approach for arrival to Runways 25L and 25C in the west flow direction in the existing operation. However, taking into account the level of aircraft / aircrew capability and air traffic considerations, it is expected that the existing RNP Track 6 will continue to be assigned for use in the west flow direction for a limited types of suitably equipped aircraft only when circumstances permit during the I-2RS operation and initial years of the 3RS operation. Assigning the RNP Track 6 for preferential use in the runway 25 direction between 2300 and 0659 hours may only happen when there is a more significant level of approval for operators to utilise the procedures.

2.3.4 Preferential Runway Use

This procedure provides a scheme where the runway direction in use is decided to preferentially enable the bulk of the traffic to arrive from or depart towards the west side of HKIA over waters to minimise the noise impact on populated residential areas to the east of HKIA in the future 3RS operation where practicable. As summarised in **Table 2.1**, this procedure is not due to commence for the I-2RS operation as assumed in the approved 3RS EIA Report.

The existing preferential use of Runways 07C/07R will continue to be applied in the I-2RS operation with a requirement on the preferential use of Runways 07C/07R throughout the night period when wind conditions allow as specified in Section 2.3.1 of VHHH AD 2.21 in the AIP. The 25 runways are only selected for use when operationally required due to unserviceability of navigation aids, adverse weather conditions, aircraft performance or traffic situations, etc.

2.3.5 Noise Abatement Departure Procedures (NADP) to the Northeast

Currently, all departures taking off in east flow operation are already required to adopt NADP as prescribed in ICAO's Doc 8168 Procedure for Air Navigation Services – Aircraft Operations (PANS-OPS) at any time during the day so long as safe flight operations permit. Under these procedures, aircraft are required to reduce their power upon reaching an altitude of 800 feet or above to abate aircraft noise.

This existing noise mitigation procedure, which is detailed in AIP Hong Kong Section "VHHH AD 2.21 Noise Abatement Procedures > 1 ICAO Noise Abatement Departure Procedure RWY 07" and included as a noise abatement good practice as recommended in Section 7.3.5.4 of the approved 3RS EIA Report, will continue to be applied in I-2RS and in the subsequent 3RS operation.

Section 4 presents details about the NADP procedure for I-2RS operation.

2.3.6 Continuous Descent Approach from the Northeast

Currently all aircraft on approach to the HKIA from the northeast between 2301 and 0700 hours are required to adopt the Continuous Descent Approach (CDA). This existing noise mitigating procedure, which is detailed in AIP Hong Kong Section “VHHH AD 2.21 Noise Abatement Procedures > 2 Noise Mitigating Measures > 2.2 Continuous Descent Approach (CDA) Procedure for RWY 25L/25C” and included as a noise abatement good practice as recommended in Section 7.3.5.4 of the approved 3RS EIA Report, will continue to be applied in I-2RS and in the subsequent 3RS operation.

Section 5 presents details about the CDA procedure for I-2RS operation.

3 West Lamma Channel Departures in East Flow Operation

3.1 Introduction

Aircraft on departure typically fly pre-defined tracks called Standard Instrument Departures (SIDs). These are in use at HKIA to allow aircraft to safely and efficiently route away from the airport. SIDs are designed in accordance with ICAO Doc 8168 Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) in terms of obstacle clearance for safety but the alignments of the routes are defined by the local Air Navigation Service Provider (ANSP) which in Hong Kong's case is CAD.

In general, track alignment design takes into consideration many factors including the need to minimise potential aircraft noise impact:

- Terrain and obstacle clearance;
- Efficiency of the routing;
- Maintenance of required separation from other traffic operating to or from other runways or airports;
- Direction of the flight and connection to the desired airways at higher altitudes;
- Avoidance of strategically important infrastructure;
- Avoidance of restricted areas; and
- Potential aircraft noise impact.

Use of the SIDs which route via West Lamma Channel at night by all departing flights while in east flow operation is an existing noise mitigating procedure for reducing the number of departing aircraft overflying populated residential areas and the associated aircraft noise impact.

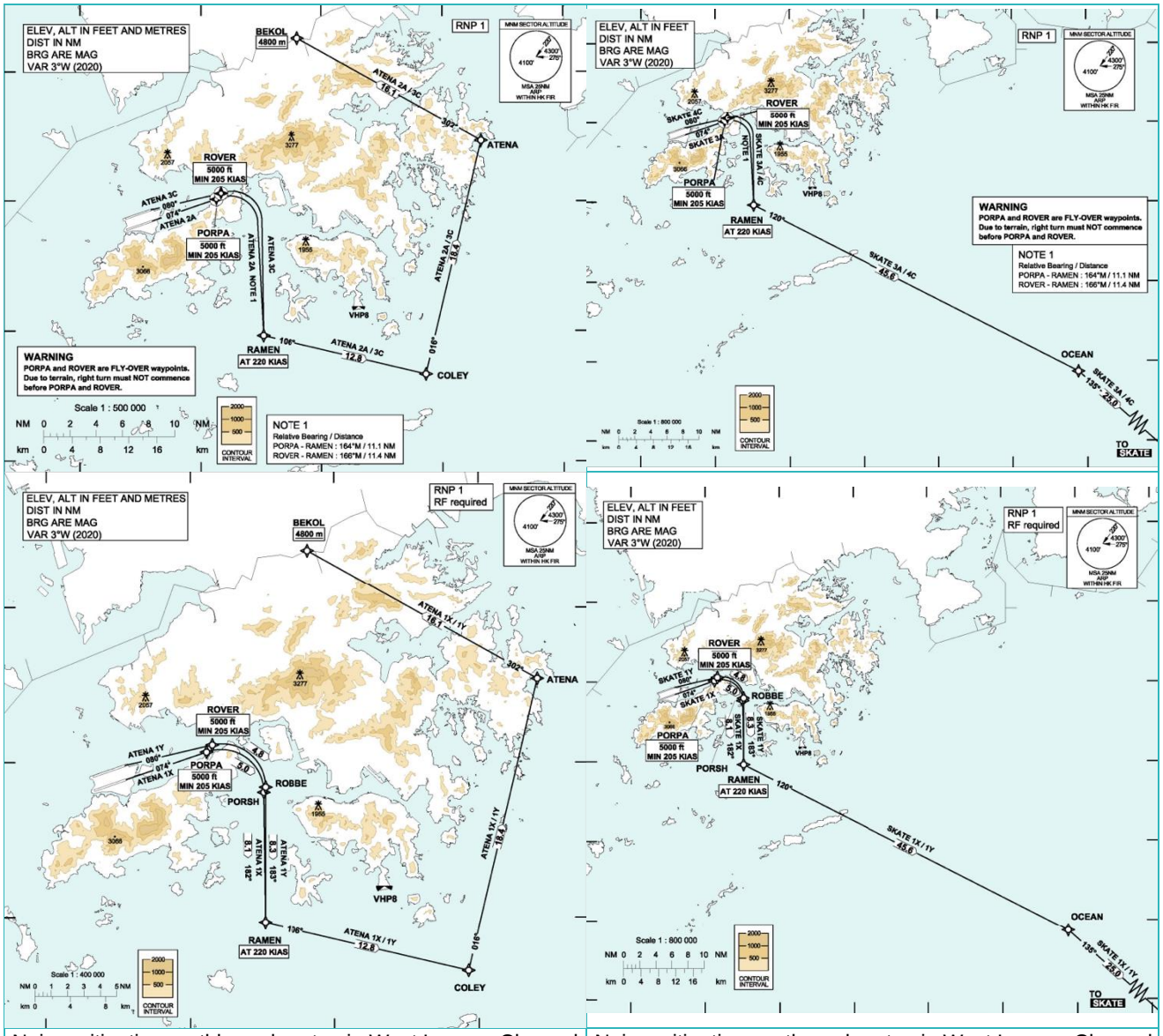
3.2 Implementation Details of the Procedure in Existing 2RS

These procedures are designed to provide noise mitigation from departure flights as the flight paths avoid flying over populated residential areas to the east of HKIA, by requiring all eastbound and northbound flights to, instead of flying over the city via their normal daytime tracks, route away from populated residential areas by initially taking the southbound track via West Lamma Channel before turning east or north over open waters.

These departure procedures have been designed to track over water and RNP procedures are flown with very high navigational accuracy using GPS signals as lateral guidance. Flights are able to follow the prescribed flight paths very precisely thereby achieving the objective of minimising the aircraft noise impact.

These procedures are currently implemented with the following noise mitigating SIDs for northbound and eastbound flights (see **Figure 3.1** and enlarged plans in **Appendix B**). All flights departing HKIA between 2301 and 0700 hours are required to take this track while the airport is in east flow operation.

Figure 3.1: Noise Mitigating SID routings during East Flow in existing HKIA operation



Noise mitigating northbound route via West Lamma Channel	Noise mitigating eastbound route via West Lamma Channel
Source: AIP Hong Kong	Enlarged plans presented in **Appendix B**

Details of the procedure are published in Hong Kong Aeronautical Information Publication (AIP Hong Kong) "Section VHHH AD 2.21 Noise Abatement Procedures > 2 Noise Mitigating Measures > 2.4 Noise Mitigating SIDs RWY 07C/07R".

The procedure charts are in "Section VHHH AD 2.24 Charts Related to an Aerodrome".

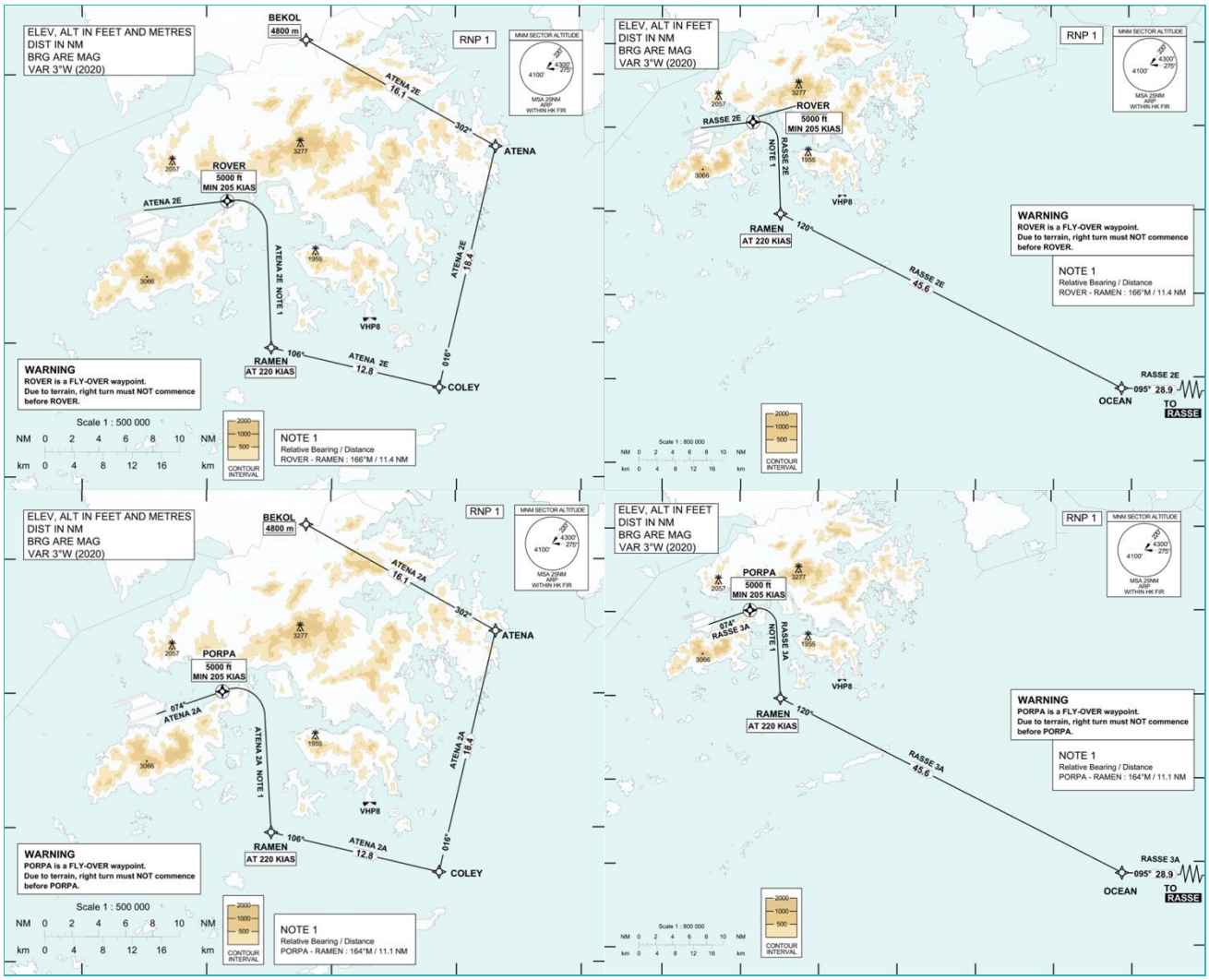
3.3 Planned Implementation for I-2RS Operation

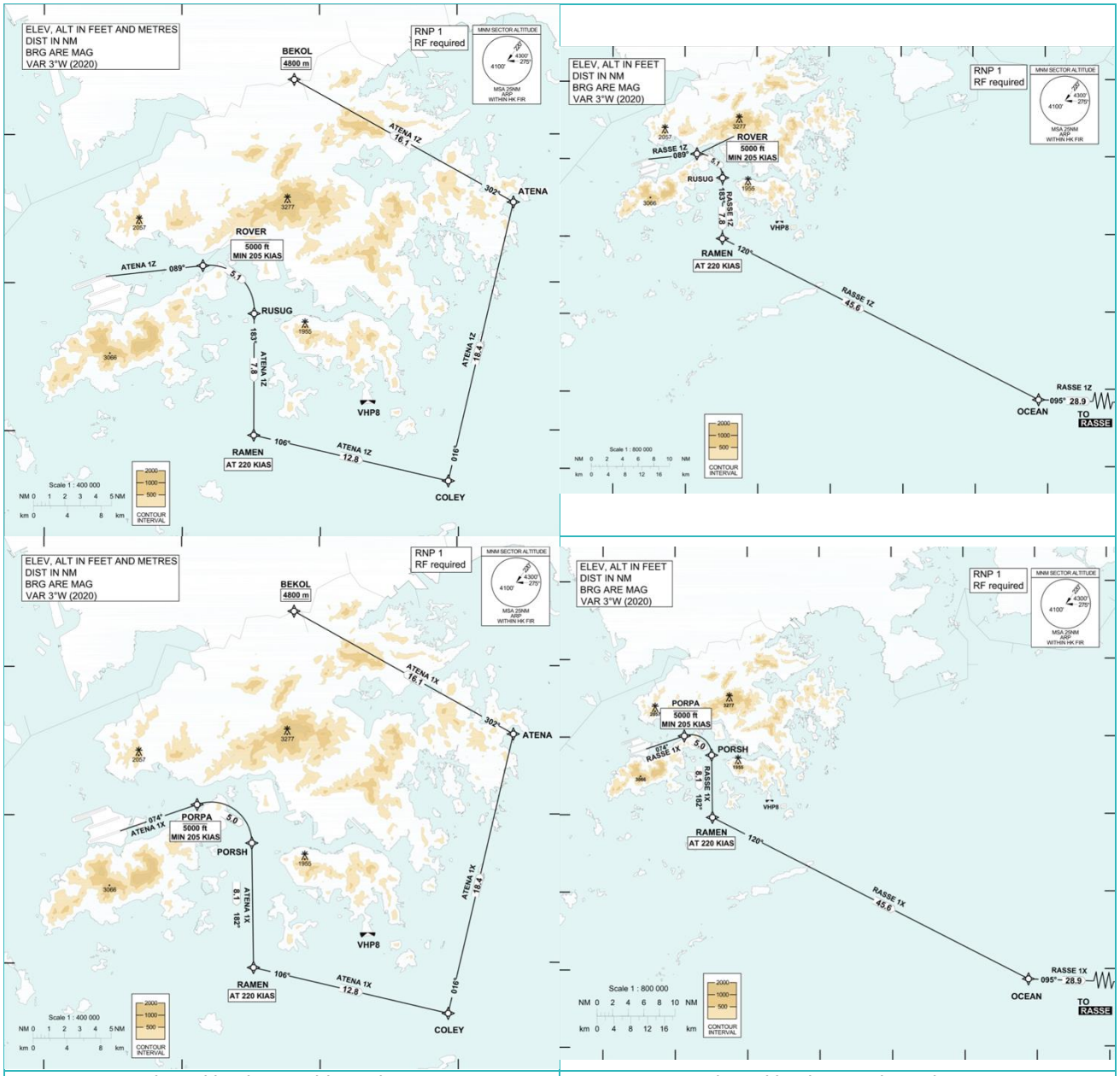
The following actions have been taken for implementation in the I-2RS operation.

3.3.1 Required Procedure Development

CAD has completed the design of the procedures for use with the New North Runway, as illustrated in **Figure 3.2** (also see the enlarged plans in **Appendix C)**. As illustrated with the figures, the existing mitigating procedures will be adapted for use with the New North Runway during the I-2RS operation.

Figure 3.2: Noise Mitigating SID routings during East Flow in I-2RS operation





Noise mitigating northbound route via West Lamma Channel for I-2RS	Noise mitigating eastbound route via West Lamma Channel for I-2RS

Source: CAD

Enlarged plans presented in **Appendix C**

Note: Please refer to the latest publications on the Hong Kong Aeronautical Information Services website (https://www.ais.gov.hk/) for operational details and up-to-date information.

3.3.2 Required Changes to the AIP

The procedures have been published on the Hong Kong Aeronautical Information Services website for advance information to airline operators.

Details already in “Section VHHH AD 2.21 Noise Abatement Procedures > 2 Noise Mitigating Measures > 2.4 Noise Mitigating SIDs RWY 07C/07R” will continue to be valid for RWY 07L/07R in the I-2RS operation with the exception of the timing of the procedure, which will be slightly adjusted from the existing “between 1501 and

2300 UTC" to "between 1500 and 2300 UTC" to cover the time period specified under EP Condition 2.21(ii). The new procedure charts will be published in "Section VHHH AD 2.24 Charts Related to an Aerodrome".

An established schedule is in place for the regular publication of new or modified aeronautical information. The worldwide convention is for the required information to be published at least 56 days in advance of the commencement of operation. This publication schedule is adopted by all aeronautical authorities and operators worldwide including CAD.

4 Noise Abatement Departure Procedures in East Flow Operation

4.1 Introduction

Noise Abatement Departure Procedures (NADPs) are procedures applied by aircraft climbing from 800ft through to 3000ft on departure where engine thrust can be varied to change the noise footprint. General guidance materials are available in ICAO Doc 8168 Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) Part III Section 9. There are two implementations named NADP1 and NADP2 for mitigating noise closer to or further away from an airport respectively.

The requirement to adopt NADP procedures is prescribed in the AIP for operators to follow and comply. All operators are required to adopt either NADP 1 or NADP 2 procedures for all departures from RWY 07L and RWY 07R.

The procedures are flown by pilots with flight management system (FMS) support. As the procedures require customisation of the aircraft operating parameters, the actual procedure adopted will be designed and administered by individual operators and are different between aircraft operators and aircraft types.

4.2 Implementation Details of the Procedure in Existing 2RS

As specified in Section 1.3 of VHHH AD 2.21 of the AIP Hong Kong published by CAD, all operators are required to adopt either NADP 1 or NADP 2 procedures for all departures to the east of HKIA. CAD refers aircraft operators to PANS-OPS for details about the design and implementation of these procedures.

Details of the procedure are published in AIP Hong Kong Section “VHHH AD 2.21 Noise Abatement Procedures > 1 ICAO Noise Abatement Departure Procedure RWY 07”.

4.3 Planned Implementation for I-2RS Operation

The following actions have been taken for implementation in the I-2RS operation.

4.3.1 Required Procedure Development

The use of NADP will continue to be a requirement for aircraft operators for I-2RS. Aircraft operators will utilize runway data for the New North Runway and appropriate obstacle data if required in order for them to develop their own NADP procedures with reference to ICAO guidance. Aircraft operators will need to test and verify their designs before implementation.

4.3.2 Required Changes to the AIP

General details already in AIP Section “VHHH AD 2.21 Noise Abatement Procedures > 1 ICAO Noise Abatement Departure Procedure RWY 07” will continue to apply for all take-offs in the east flow direction during the I-2RS operation.

5 Continuous Descent Approach in West Flow Operation

5.1 Introduction

Aircraft approach an airport by descending gradually from altitude. The most efficient means of doing so is by flying a Continuous Descent Approach (CDA) in which the engine thrust setting is maintained at a minimum and the aircraft operates in a clean configuration for as long as possible. This allows the aircraft to effectively glide down at a constant rate of descent, flying a descent profile approximating a 3° vertical profile. This avoids any level segments which require spooling up and down the engines in order to stop and start the descent, which causes a wastage in fuel and produces additional noise from both the engines and the airframe.

During daytime operation where the traffic demand is high, flights from multiple directions are merged into an orderly sequence for final approach. This involves the air traffic controller giving vectoring instructions to aircraft in order to achieve the desired sequence and to maximise runway throughput. CDAs can be difficult to achieve in such a busy environment.

During the night-time period with lower traffic demand however, there is more flexibility to accommodate CDAs so they are required to be used at night at HKIA for noise abatement purposes.

This procedure is facilitated by CAD's air traffic control techniques which allow the pilots in the approaching aircraft to execute a CDA in accordance with the parameters as stipulated in the AIP.

5.2 Implementation Details of the Procedure in Existing 2RS

This is an existing mitigating procedure where traffic situation and weather permit, aircraft on approach between 2301 and 0700 hours are offered CDA approaches by air traffic control. In west flow operation, CDA starts at 8000ft to achieve a continuous descent profile approximating a 3° vertical profile to intercept the Glide Path.

Details of the procedure are published in AIP Hong Kong Section "VHHH AD 2.21 Noise Abatement Procedures > 2 Noise Mitigating Measures > 2.2 Continuous Descent Approach (CDA) Procedure for RWY 25L/25C".

5.3 Planned Implementation for I-2RS Operation

The following actions have been taken for implementation in the I-2RS operation.

5.3.1 Required Procedure Development

While new flight procedures have been developed for the New North Runway, the existing procedure for continuous descent approaches will continue to apply for I-2RS. No development is required as the CDA procedure will remain the same as present.

5.3.2 Required Changes to the AIP

Details already in “Section VHHH AD 2.21 Noise Abatement Procedures > 2 Noise Mitigating Measures > 2.2 Continuous Descent Approach (CDA) Procedure for RWY 25L/25C” will continue to be valid in general and be updated with the inclusion of RWY 25R approach procedures and the timing of the procedure which will be adjusted from the existing “between 1501 and 2300 UTC” to between “1500 and 2300 UTC” to cover the time period specified under EP Condition 2.21(vi).

Appendices

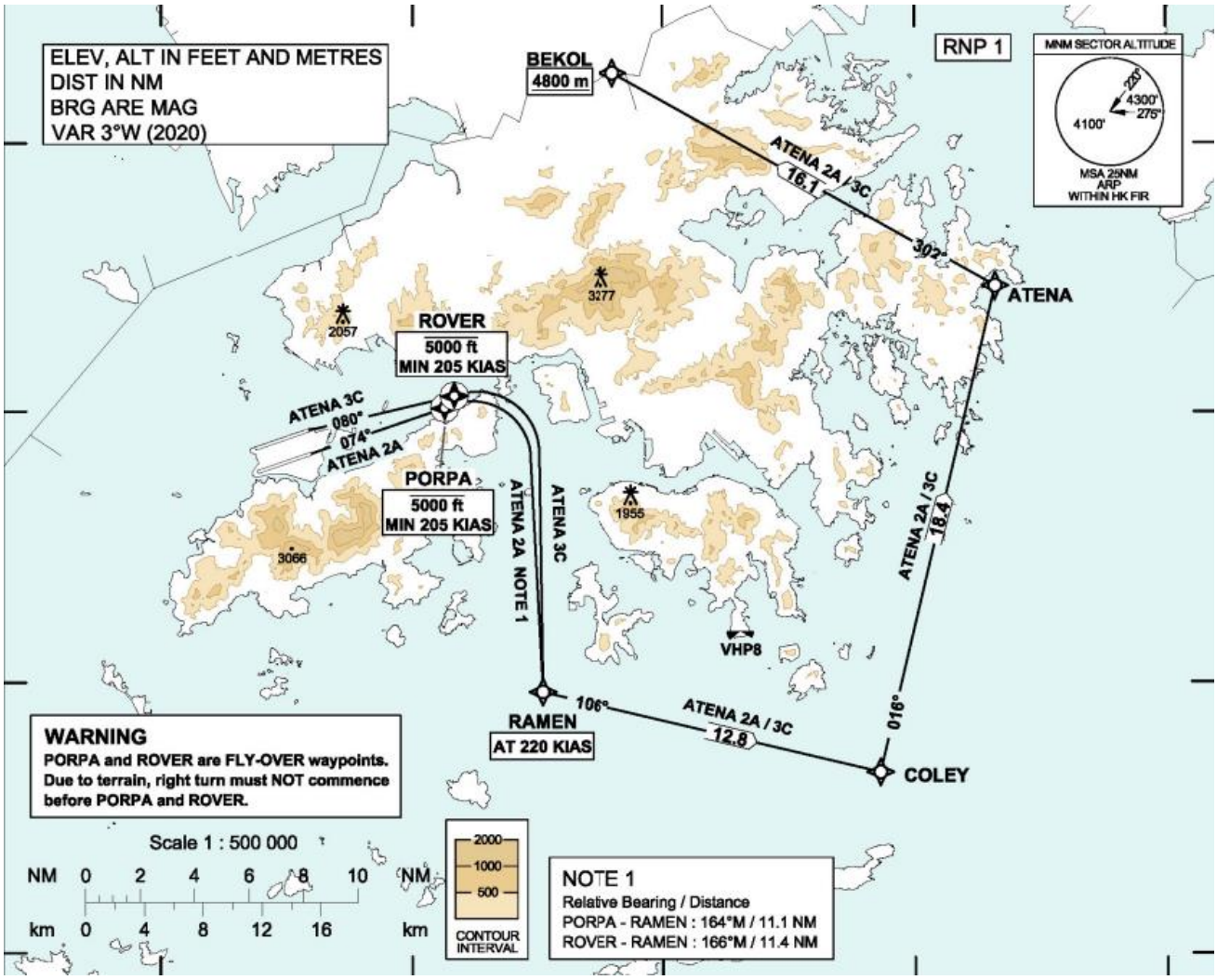
A. Implementation Schedule as presented in Table 20.1 of the approved 3RS EIA Report

Table A.1: Implementation Schedule as presented in Table 20.1 of the approved 3RS EIA Report

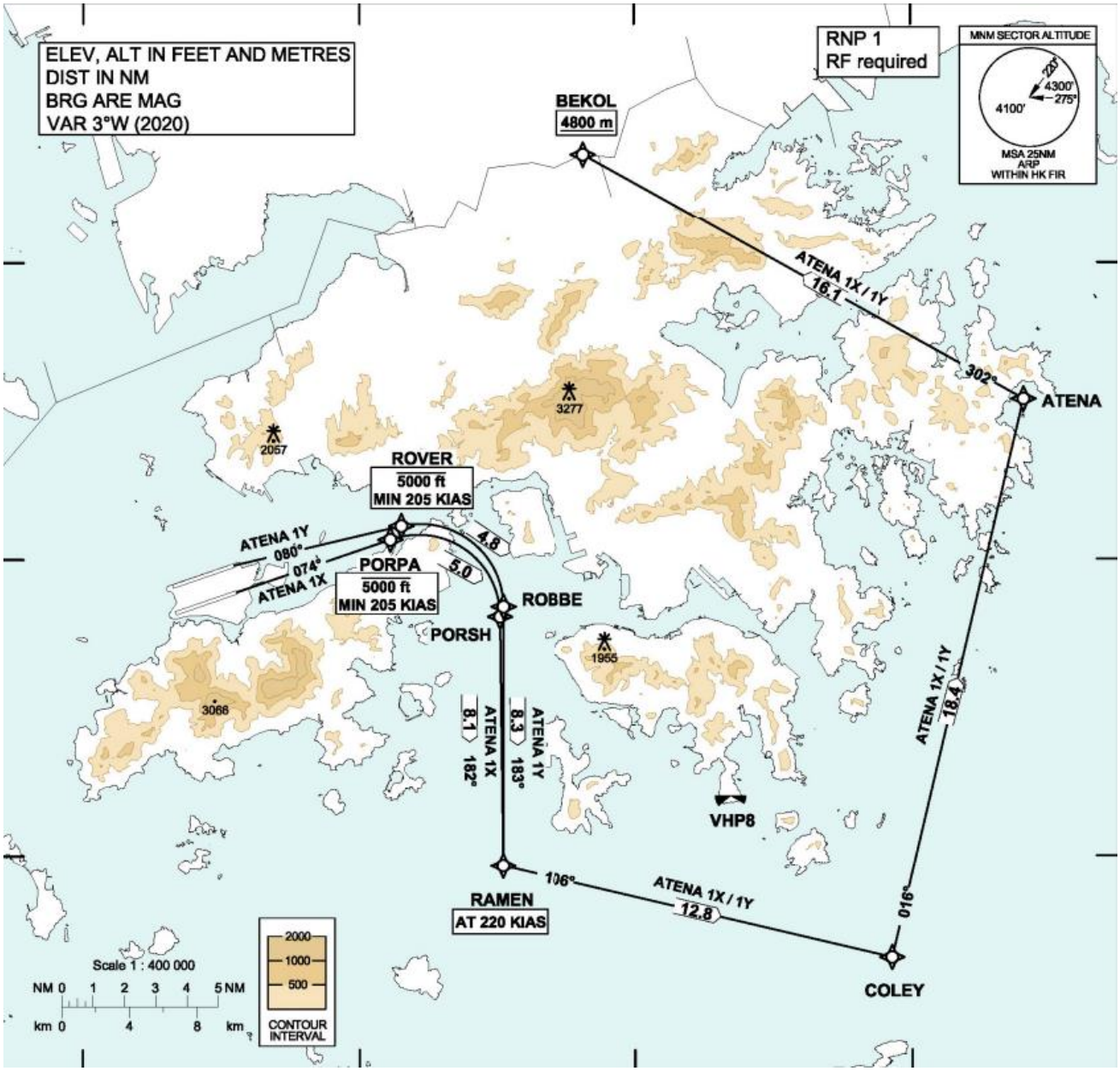
EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Implementation Agent	Implementation Stages
7.3.5.3	4.1	**Aircraft Noise Mitigation Measures under Primary Operating Mode** Aircraft noise mitigation measures as listed below shall be implemented to minimise the impact of aircraft noise on NSRs situated near the flight paths or in the vicinity of HKIA: • Putting the existing south runway on standby where possible at night between 2300 and 0659; • Requiring departures to take the southbound route via West Lamma Channel during east flow at night from 2300 to 0659, subject to acceptable operational and safety consideration; • Assigning a new arrival Required Navigation Performance Track 6 for preferential use in the runway 25 direction between 2300 and 0659; and • Implementing a preferential runway use programme when wind conditions allow such that west flow is used when departures dominate while east flow is used when arrivals dominate during night-time.	Airport operation/ Operation Period	AAHK, CAD	Operation

Source: Table 20.1 of approved 3RS EIA Report (or Appendix C of Updated EM&A Manual).

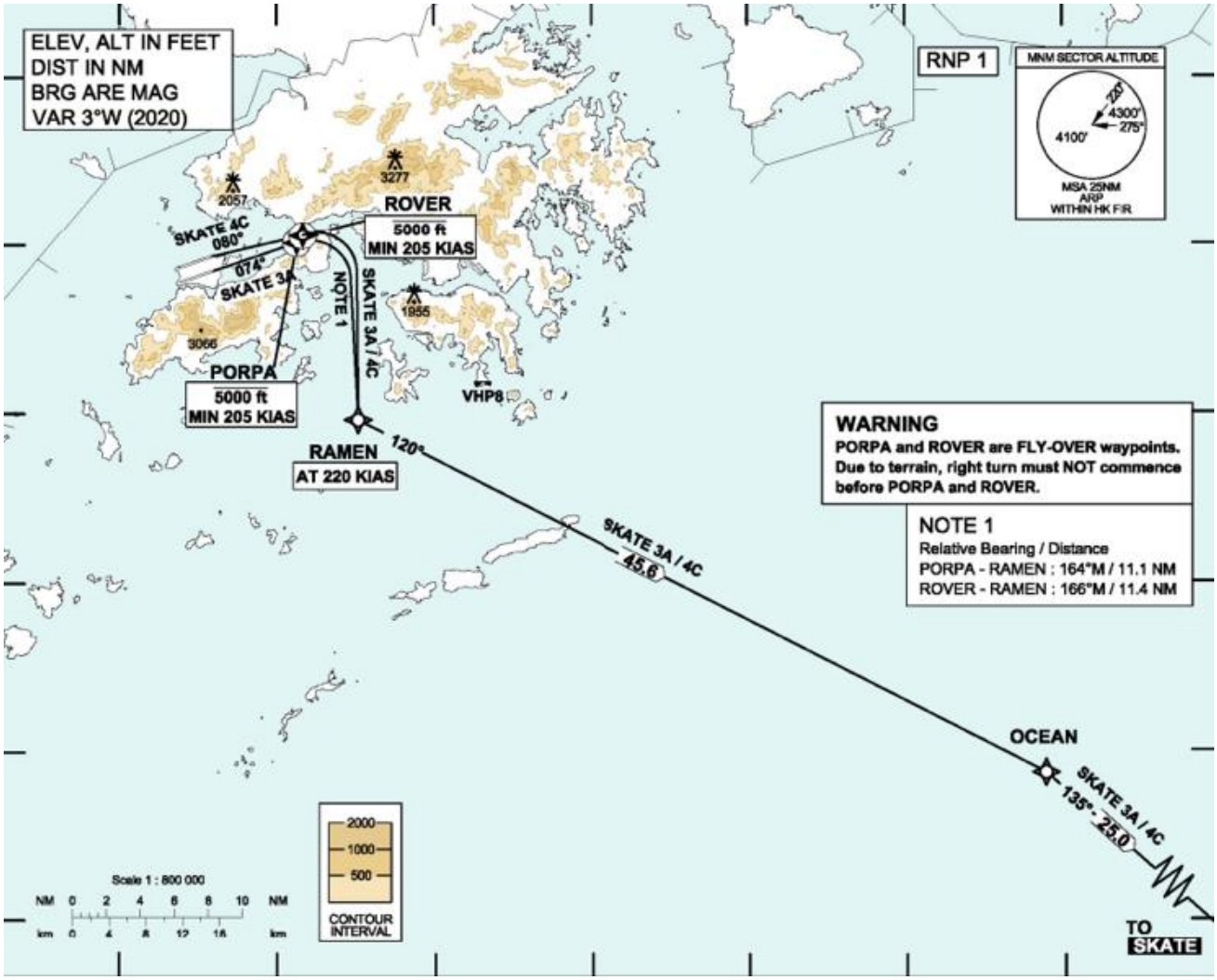
B. Enlarged Plans of Figure 3.1



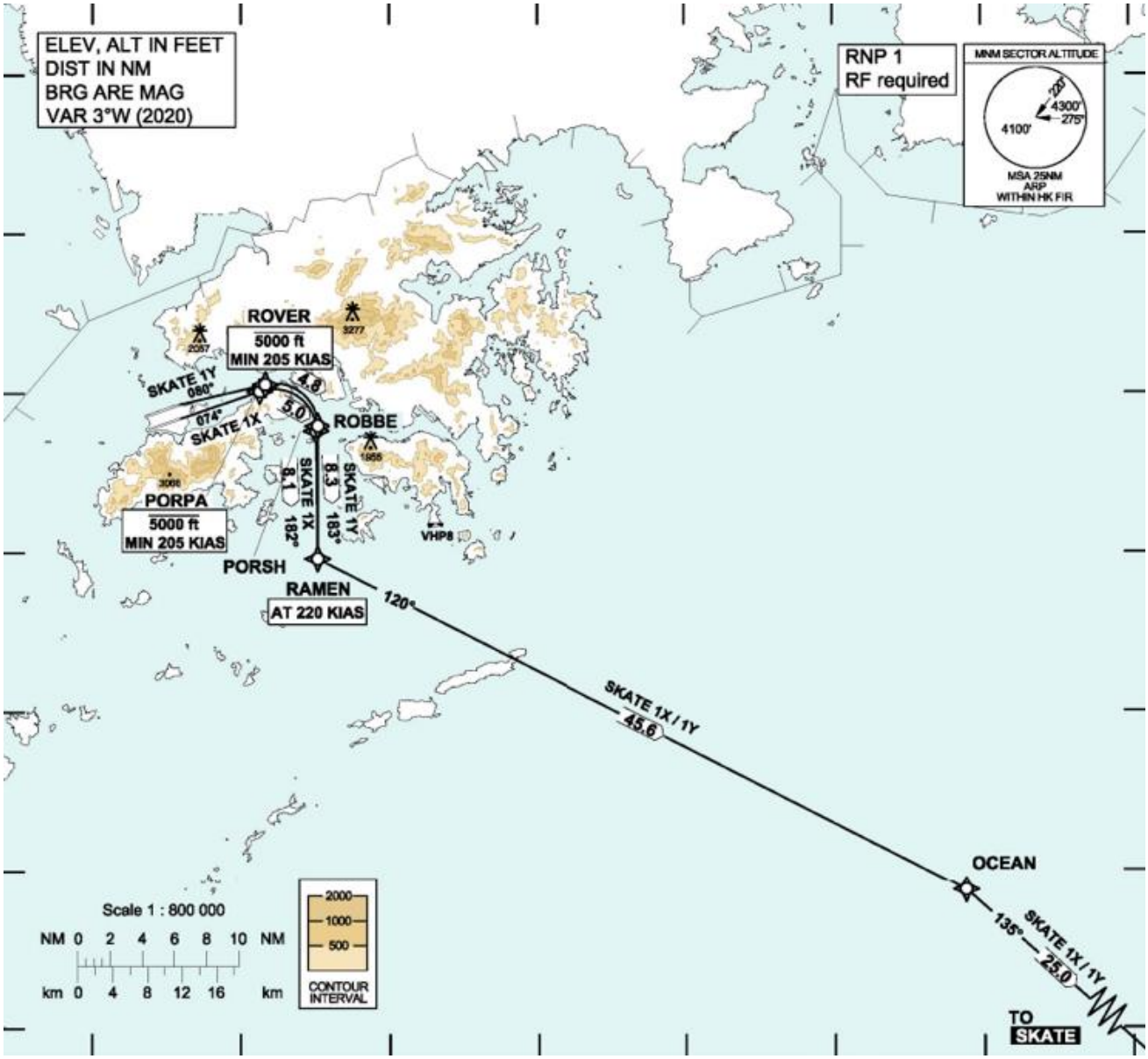
Runway 07C/R noise mitigating northbound route via West Lamma Channel for existing 2RS



Runway 07C/R noise mitigating northbound route via West Lamma Channel for existing 2RS for RF-capable aircraft

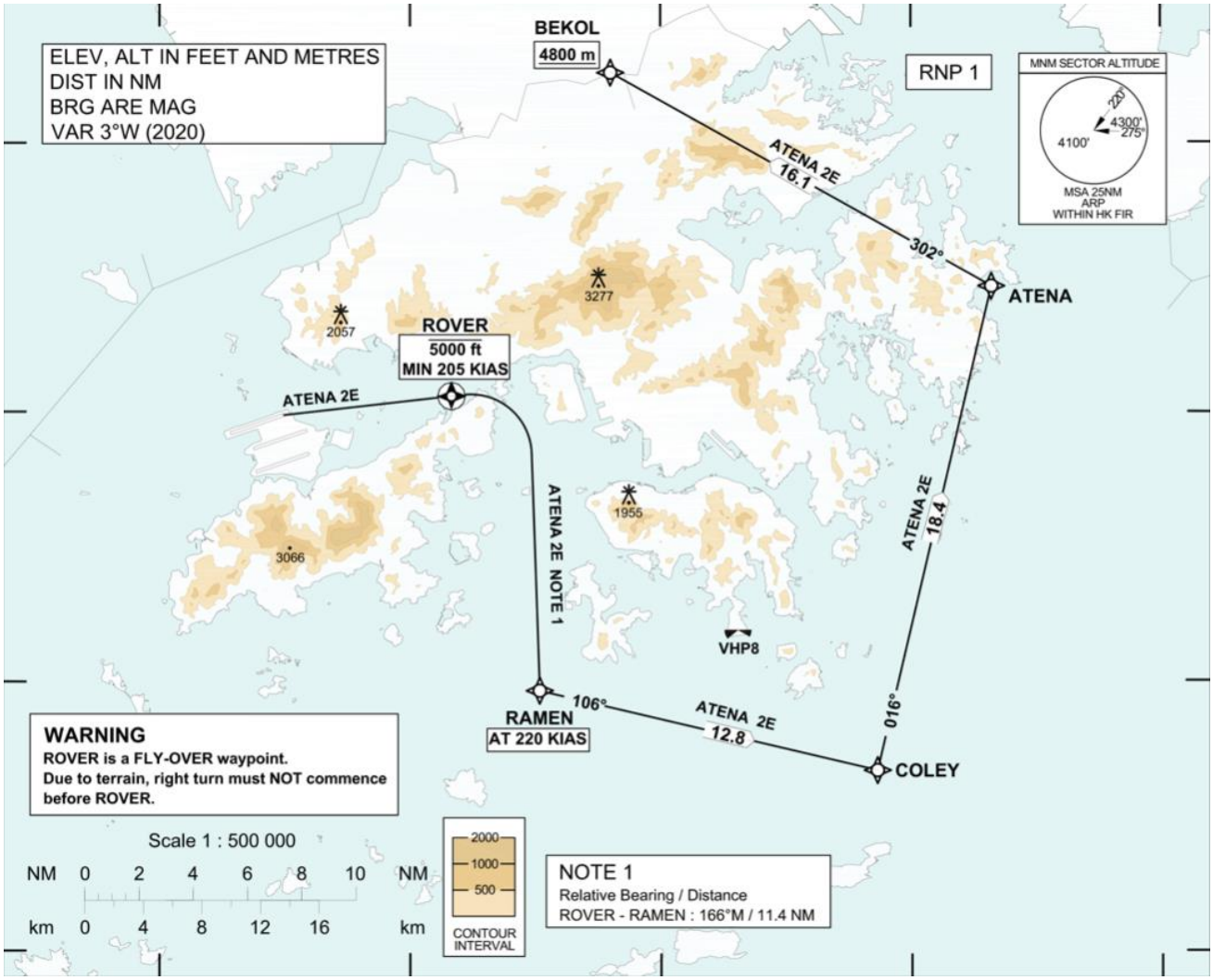


Runway 07C/R noise mitigating eastbound route via West Lamma Channel for existing 2RS

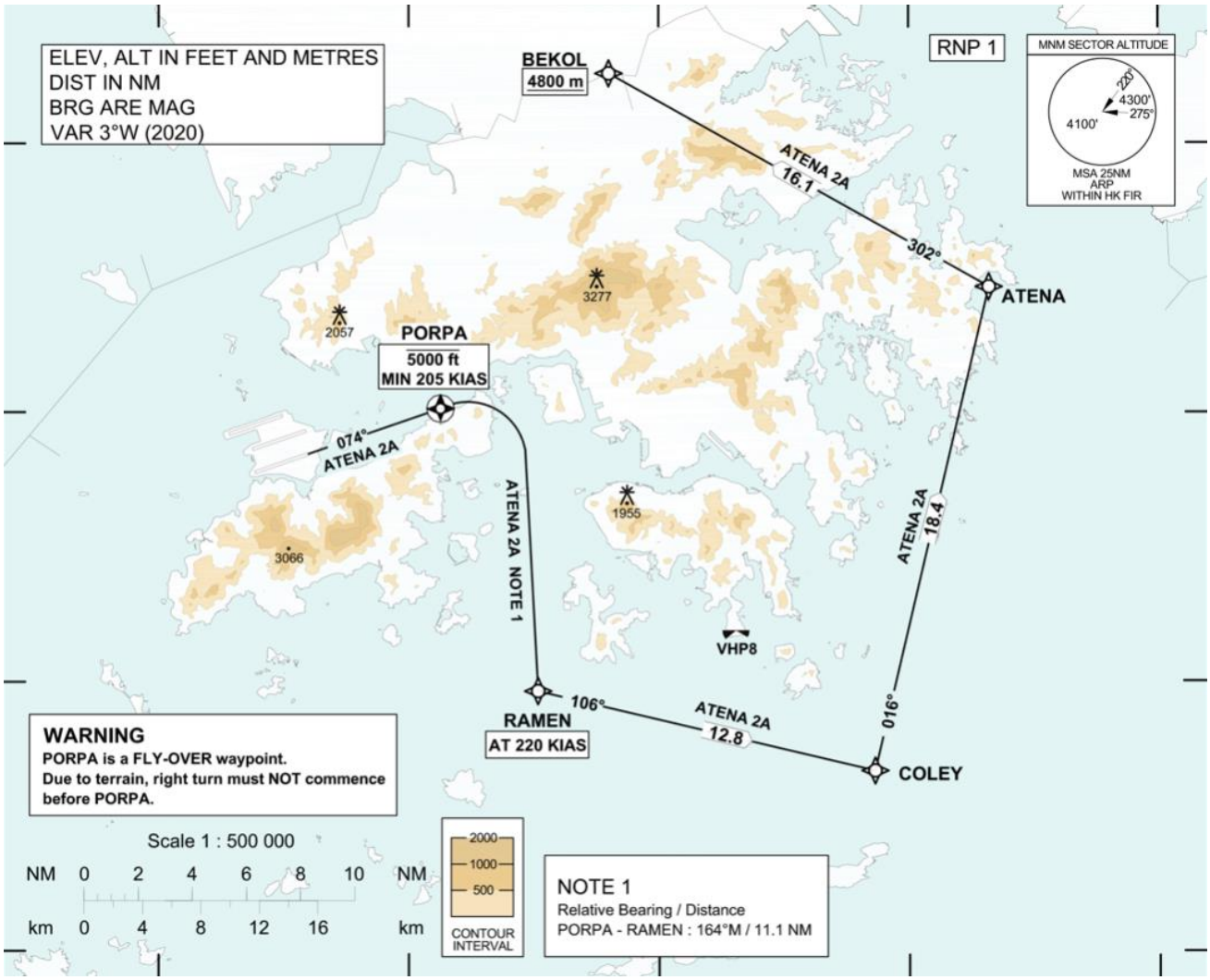


Runway 07C/R noise mitigating eastbound route via West Lamma Channel for existing 2RS for RF-capable aircraft

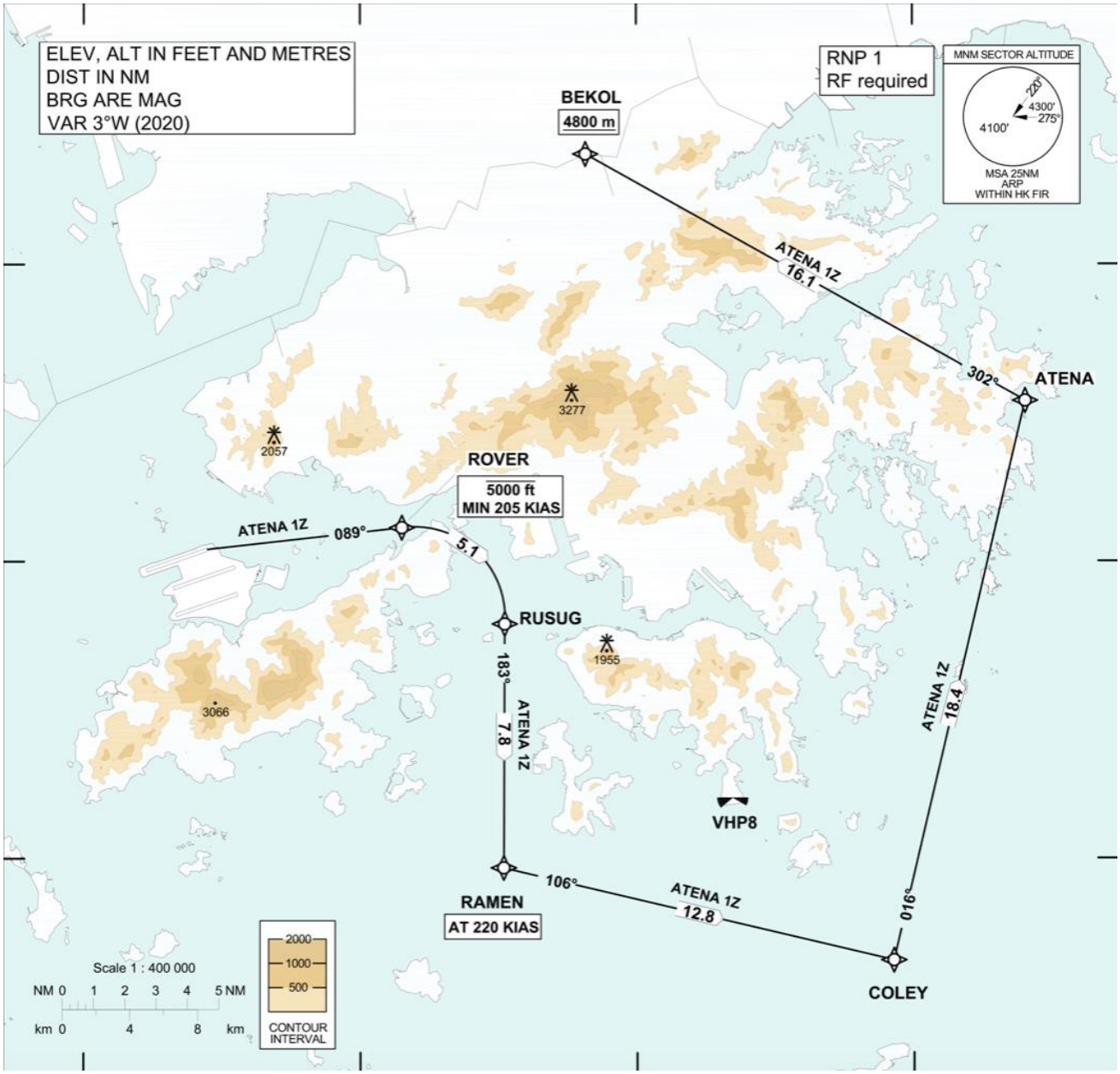
C. Enlarged Plans of Figure 3.2



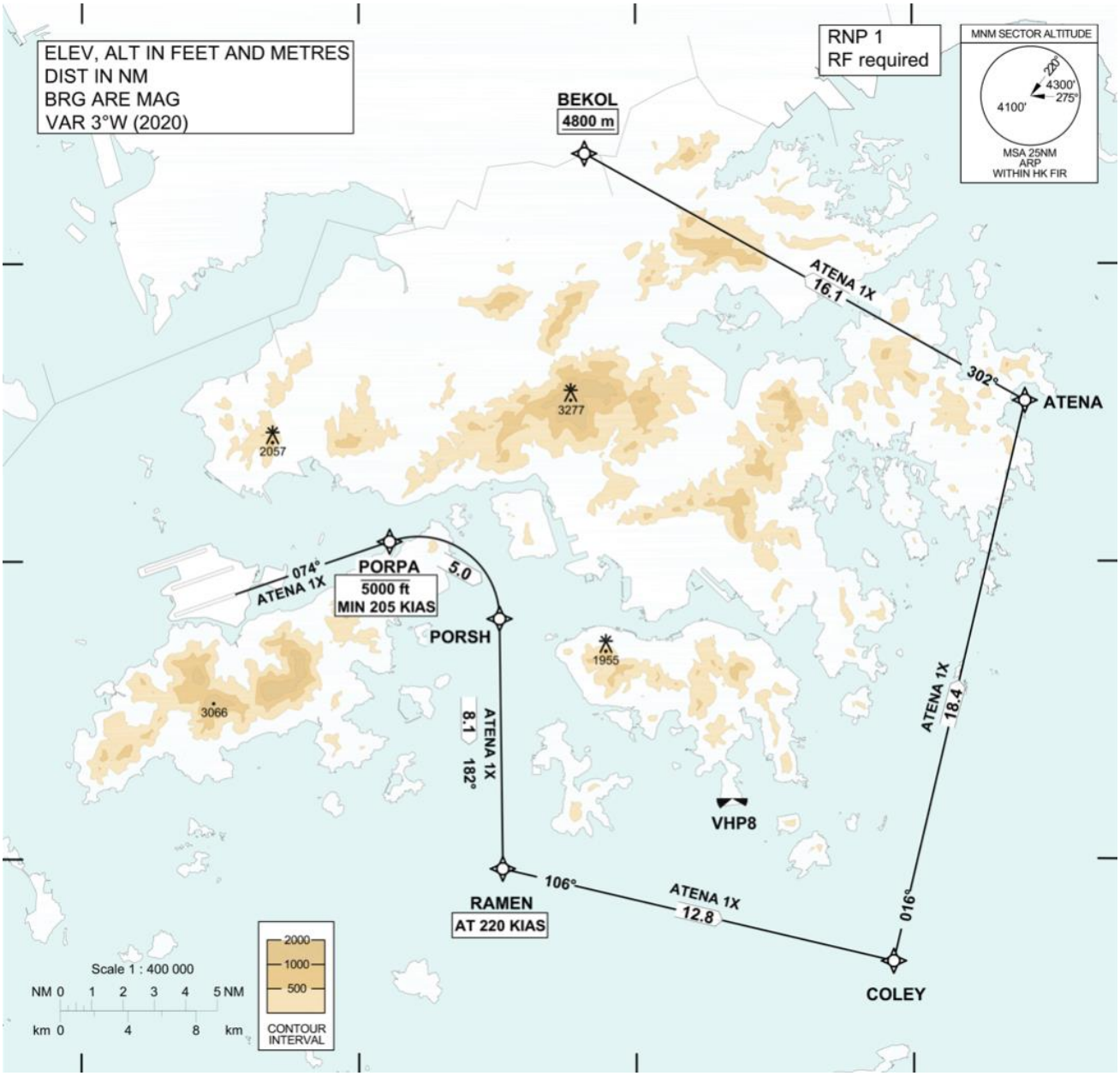
Runway 07L noise mitigating northbound route via West Lamma Channel for I-2RS



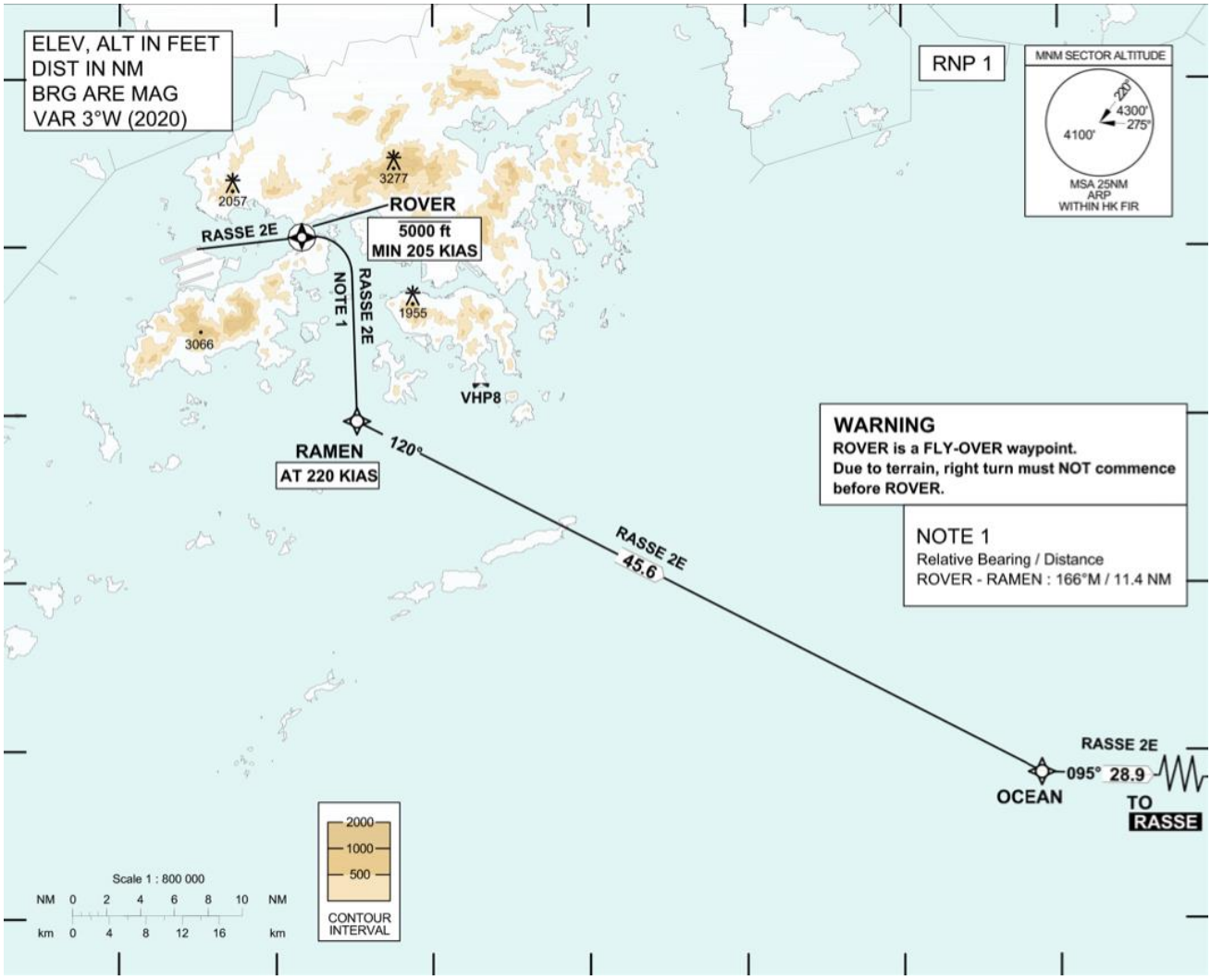
Runway 07R noise mitigating northbound route via West Lamma Channel for I-2RS



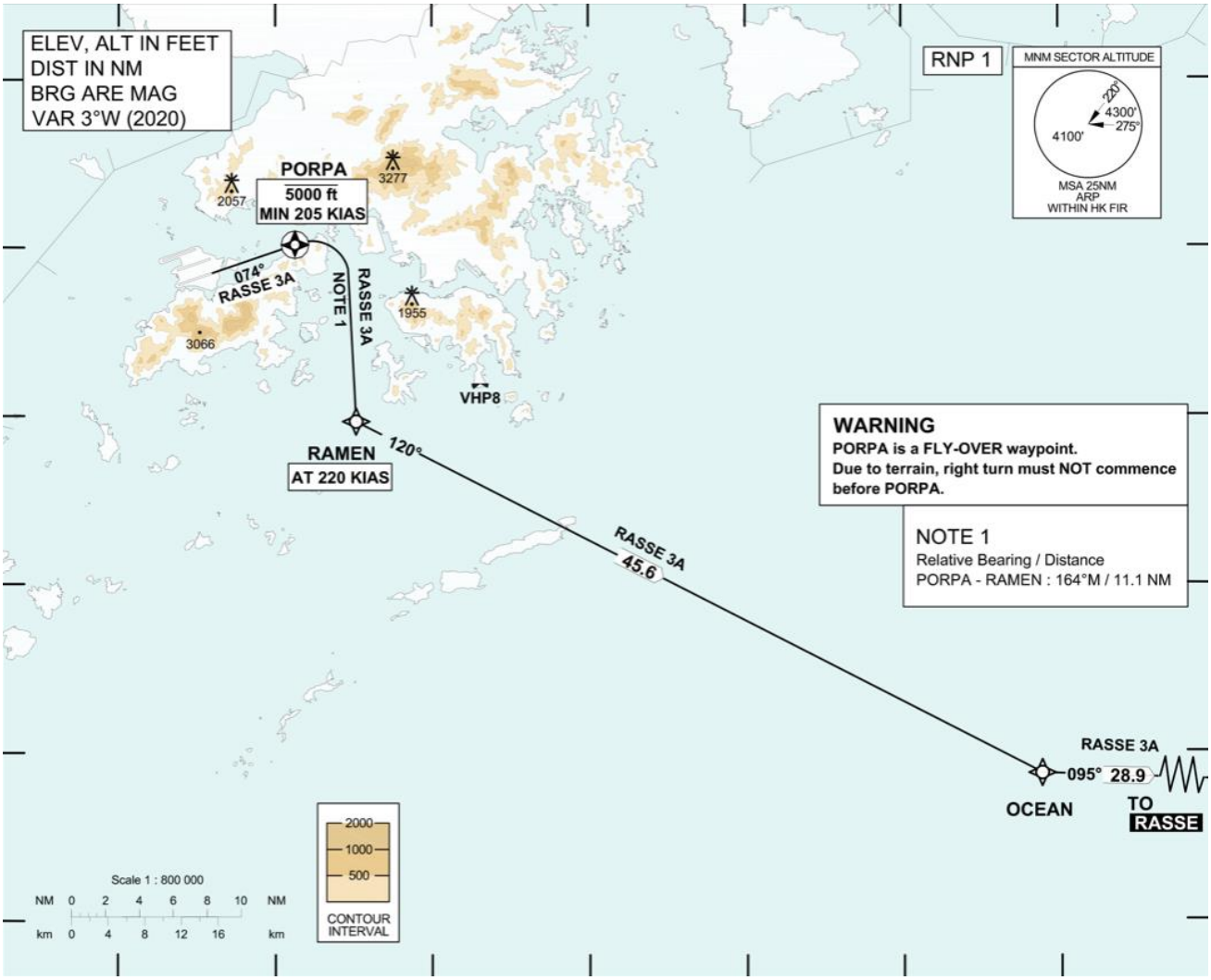
Runway 07L noise mitigating northbound route via West Lamma Channel for I-2RS for RF-capable aircraft



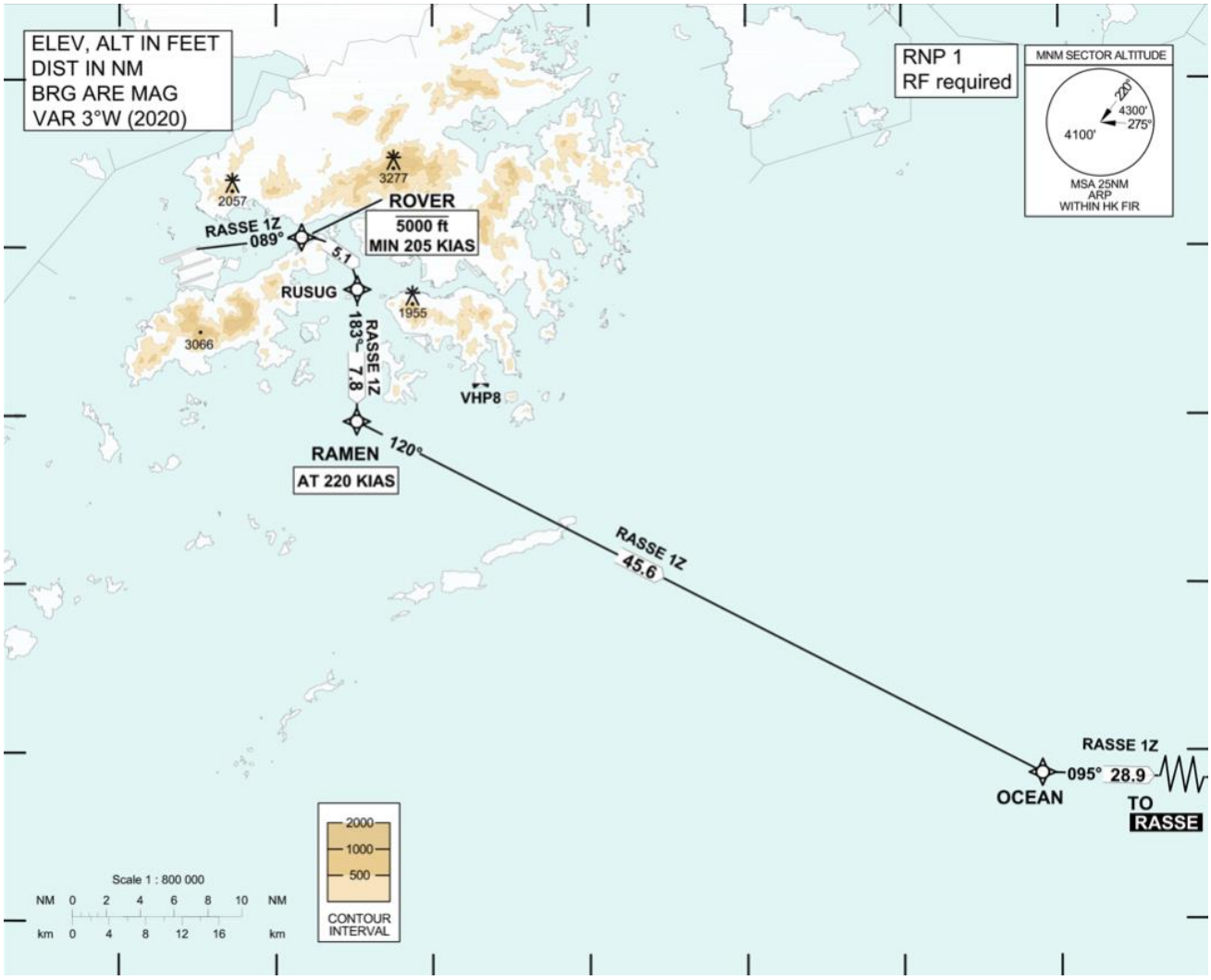
Runway 07R noise mitigating northbound route via West Lamma Channel for I-2RS for RF-capable aircraft



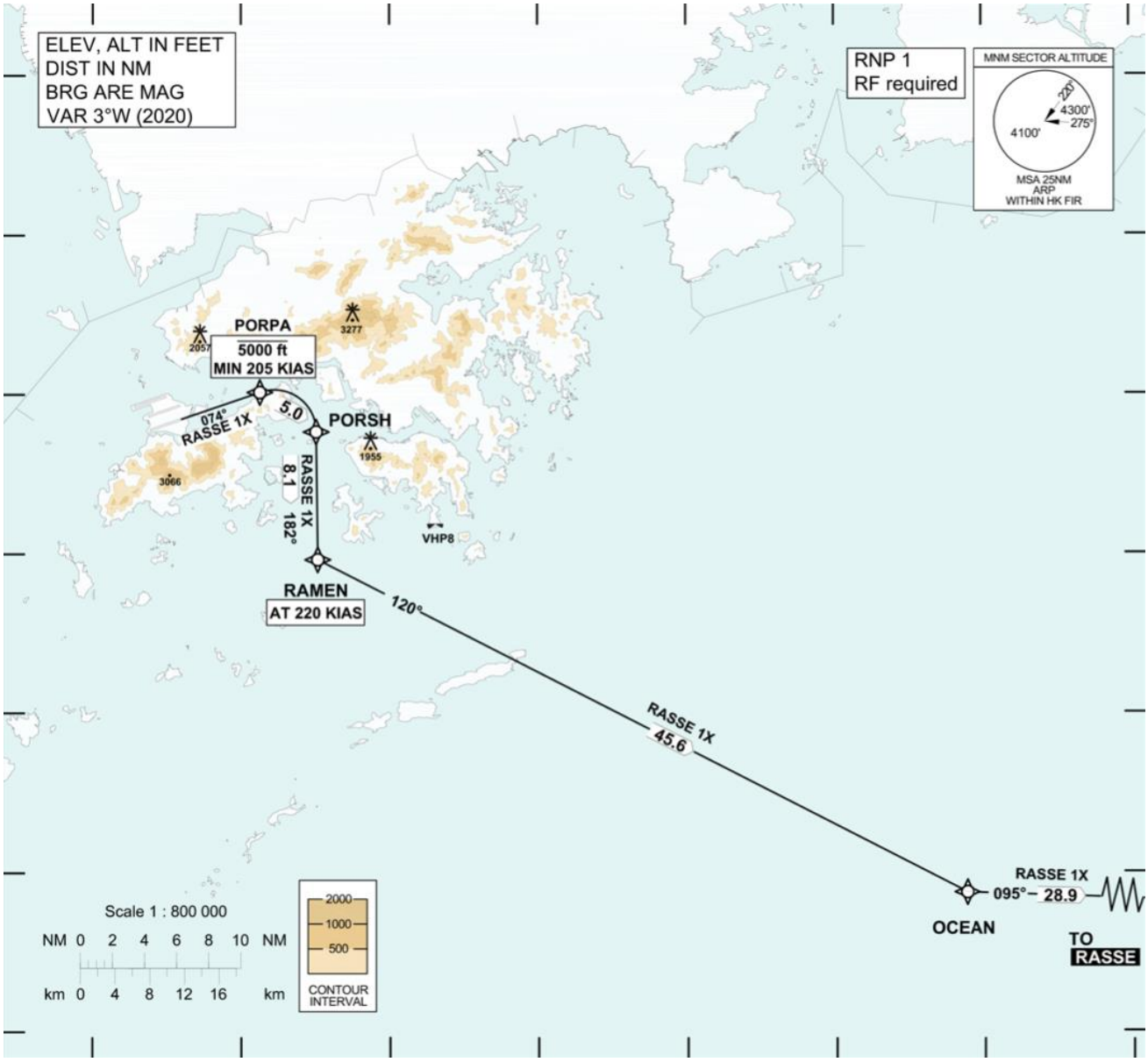
Runway 07L noise mitigating eastbound route via West Lamma Channel for I-2RS



Runway 07R noise mitigating eastbound route via West Lamma Channel for I-2RS



Runway 07L noise mitigating eastbound route via West Lamma Channel for I-2RS for RF capable aircraft



Runway 07R noise mitigating eastbound route via West Lamma Channel for I-2RS for RF capable aircraft

Note: Please refer to the latest publications on the Hong Kong Aeronautical Information Services website (https://www.ais.gov.hk/) for operational details and up-to-date information.

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