



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

Aircraft Noise Monitoring Plan

November 2024

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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November 2024

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This Submission of Aircraft Noise Monitoring Plan

has been reviewed and certified by

the Environmental Team Leader (ETL) in accordance with

Condition 2.23 of Environmental Permit No. EP-489/2014.

Certified by:



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

Date

8 November 2024

Our Ref : 60440482/C/RMKY241108

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

8 November 2024

Dear Sir,

Contract No. 3102
3RS Independent Environmental Checker Consultancy Services

Verification of Aircraft Noise Monitoring Plan

Reference is made to the ET's submission of Aircraft Noise Monitoring Plan under Condition 2.23 of the Environmental Permit No. EP-489/2014 certified by the ET Leader on 8 November 2024.

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 2.23 of EP-489/2014.

Should you have any query, please feel free to contact the undersigned at 37290380.

Yours faithfully,
AECOM Asia Co. Ltd.



Roy Man
Independent Environmental Checker

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Glossary

2RS	Two-Runway System
3RS	Three-Runway System
AAHK	Airport Authority Hong Kong
AEDT	Aviation Environmental Design Tool
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
ANFTMS	Aircraft Noise and Flight Track Monitoring System
ANM&A	Aircraft Noise Monitoring and Audit
ANMP	Aircraft Noise Monitoring Plan
ANP	Aircraft Noise and Performance
AODB	Airport Operational Database
ATM	Air Traffic Movement
CAD	Civil Aviation Department
CDA	Continuous Descent Approach
DNL	Day-Night Average Sound Level
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
EIAO-TM	Technical Memorandum on Environmental Impact Assessment Process
EM&A	Environmental Monitoring and Audit
EP	Environmental Permit
EPD	Environmental Protection Department
EPNL	Effective Perceived Noise Level
ETL	Environmental Team Leader
FAA	Federal Aviation Administration
HKIA	Hong Kong International Airport
HKO	Hong Kong Observatory
I-2RS	Interim Two-Runway System
ICAO	International Civil Aviation Organization
IEC	Independent Environmental Checker
INM	Integrated Noise Model
MM	Mott MacDonald
NADP	Noise Abatement Departure Procedure
NEF	Noise Exposure Forecast
NMT	Noise Monitoring Terminal
NSR	Noise Sensitive Receiver
PANS-OPS	Procedures for Air Navigation Services – Aircraft Operations
RNP	Required Navigation Performance
RNP-AR	Required Navigation Performance – Authorization Required
SEL	Sound Exposure Level
T2 Building	Terminal 2 Building

In Appendix J:

ARP	Office of Airports in the U.S.
DOT	Department of Transport in the U.S.
EA	Environmental Assessment
EIS	Environmental Impact Statement
FICON	Federal Interagency Committee on Noise in the U.S.
FONSI	Finding of No Significant Impact
NEPA	National Environmental Policy Act in the U.S.
ROD	Record of Decision
USC	United States Code

1 Introduction

1.1 Background

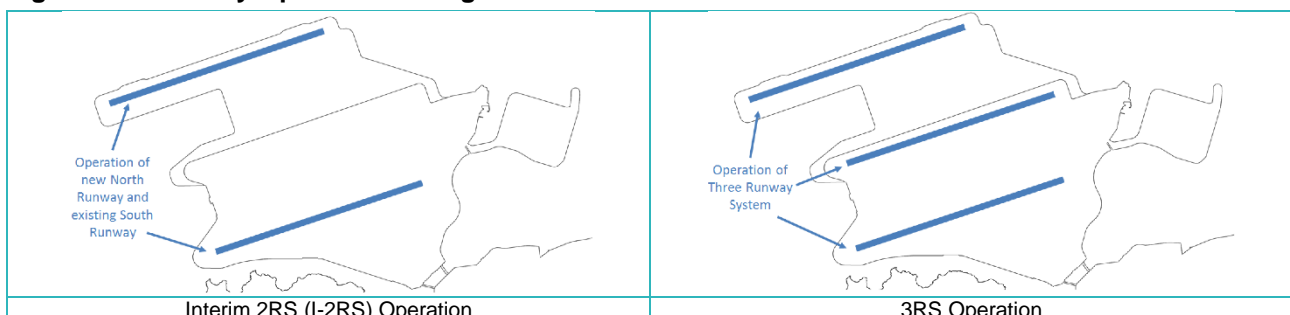
Under the Environmental Impact Assessment Ordinance (EIAO), the Environmental Impact Assessment (EIA) Report and the Environmental Monitoring and Audit (EM&A) Manual (Register No.: AEIAR-185/2014) prepared for the “Expansion of Hong Kong International Airport into a Three-Runway System” (hereafter as 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 located on a new land formation area immediately north of the original Hong Kong International Airport (HKIA) in North Lantau, covering a permanent footprint of approximately 650 ha. As stated in the approved 3RS EIA Report, 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 and with operation familiarisation of the runway started on 8 July 2022 and formal commencement of operation started since 25 November 2022, the previous north runway is temporarily closed for modification works. During this interim period as described in the approved 3RS EIA Report, the existing South Runway and the new third runway (which is designated as the new North Runway) are currently in operation, and this 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



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 Scenario and Design Capacity Scenario 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 2.23, the Airport Authority Hong Kong (AAHK) is required to submit an Aircraft Noise Monitoring Plan (ANMP) 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 Project (i.e., no later than 3 months before the 3RS operation). 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 this Plan.

1.2 Purpose of the Plan

This ANMP has been prepared to fulfil the aircraft noise monitoring requirements set out under EP Condition 2.23 for the 3RS operation.

1.3 Structure of this Plan

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

- Section 2 EP Requirements and Proposed Review Process
- Section 3 Review of Aircraft Noise Monitoring Data
- Section 4 Review of Implementation Status of Aircraft Noise Mitigation Measures

2 EP Requirements and Proposed Review Process

2.1 Introduction

This submission is for compliance with the requirements stipulated under EP Condition 2.23 on submission of an *Aircraft Noise Monitoring Plan*. The Plan sets out the methodologies, quarterly reviews and annual reporting process planned by AAHK to review the available noise data and to assess the effectiveness of the aircraft noise mitigation measures implemented for meeting the relevant requirements. Further details are presented in **Sections 2.2** and **2.4** below.

There are also other aircraft noise related submission requirements stipulated under EP Conditions 2.21 and 2.22 and in the Updated EM&A Manual, which are also elaborated for information in **Section 2.3** below.

2.2 EP Condition 2.23

Specifics of EP Condition 2.23 are reproduced in italics below:

The Permit Holder shall, no later than 3 months before the operation of the Project, submit an Aircraft Noise Monitoring Plan (The Plan) to the Director for approval. The Plan shall include monitoring aircraft noise at representative locations in Tung Chung, Ma Wan, Tsing Yi, Tsuen Wan, Ting Kau, Siu Lam and Tuen Mun. The Plan shall make use of the available aircraft noise and flight track monitoring data including measured noise levels in terms of dB(A) and their distribution, flight tracks, aircraft fleet mix data and other relevant information at these locations. The Plan shall also include an action plan, as approved by Director-General of Civil Aviation, to review the noise data to assess the effectiveness of the mitigation measures and to take appropriate action with reference to the prevailing internationally recognized standards in aircraft noise mitigation.

In preparing The Plan, the Permit Holder shall confirm with the Director-General of Civil Aviation on the implementation of restrictions on specific aircraft types to follow the guidelines laid down by the International Civil Aviation Organization to tackle the problem of aircraft noise problems at source.

2.3 Other Aircraft Noise related EP Conditions and Updated EM&A Manual requirements

2.3.1 EP Condition 2.21

In addition to the above-mentioned EP Condition 2.23, EP Condition 2.21 has also specified the need for a *Submission of Procedures for Mitigation of Aircraft Noise* no later than 3 months before the operation of the third runway of the Project (i.e., no later than 3 months before I-2RS operation) to DEP for approval.

This required Submission of Procedures for Mitigation of Aircraft Noise was made by AAHK in March 2022 under the EP Condition 2.21 before the I-2RS operation. The Submission has now been updated for the planned 3RS operation.

2.3.2 EP Condition 2.22

In addition to EP Conditions 2.23 and 2.21 mentioned above, there is the separate EP Condition 2.22 that requires AAHK to review the operational data annually after the submission of an updated Noise Exposure Forecast (NEF) 25 contour for the first full year of the Project (i.e., the 3RS operation), and AAHK shall update the NEF 25 contour if there are major deviations from the assumptions adopted in the approved 3RS EIA Report.

2.3.3 Relevant Updated EM&A Manual Requirements

The requirements set out in Section 4.1.4 of the Updated EM&A Manual regarding the annual review and reporting process involves the analysis of available radar data, operational noise data, wind record, etc. collected from the relevant parties. These requirements are in line with those stipulated in EP Conditions 2.22 and 2.23. The annual review and reporting process will allow AAHK to measure exactly how it stands compared to predicted operations adopted at the 3RS EIA stage.

2.4 Quarterly Reviews and Annual Reporting Process

The available aircraft noise and flight track monitoring data including measured noise levels in terms of dB(A) and their distribution, flight tracks, aircraft fleet mix data and other relevant information will be collected by AAHK and reviewed on a quarterly basis, with a Review Report to be prepared on an annual basis.

AAHK has planned to carry out the review of aircraft noise monitoring data and also the review of implementation status of aircraft noise mitigation measures on a quarterly basis so that necessary action, if required, can be identified earlier in the quarterly reviews before completion of the annual review. The quarterly reviews are considered adequate for identifying the trends and patterns of the aircraft noise monitoring results and also the implementation status of aircraft noise mitigation measures for purpose of assessing any potential significant effect on the NEF 25 contour. Findings of the quarterly reviews and the Annual Review Reports shall be submitted to EPD.

The relevant processes and procedures with respect to the quarterly reviews of aircraft noise monitoring data and quarterly reviews of aircraft noise mitigation measures, and actions that should be taken by AAHK in the event where relevant environmental quality performance limits, set out as the action and limit levels as defined in Annex 21 of the Technical Memorandum on Environmental Impact Assessment (EIAO-TM), are exceeded are detailed in **Section 3** and **Section 4** respectively. The action plans presented as part of the Event and Action Plans in **Sections 3.5** and **4.7** have been approved by the Director-General of Civil Aviation in accordance with EP Condition 2.23. Also, it has been confirmed with the Director-General of Civil Aviation that the implementation of restrictions on specific aircraft types is in accordance with the guidelines laid down by the International Civil Aviation Organization to tackle the problem of aircraft noise problems at source. The Implementation Schedule of aircraft noise mitigation measures as presented in Table 20.1 of the approved 3RS EIA Report and also Appendix C of the Updated EM&A Manual under the EM&A requirements is set out in **Appendix A**.

3 Review of Aircraft Noise Monitoring Data

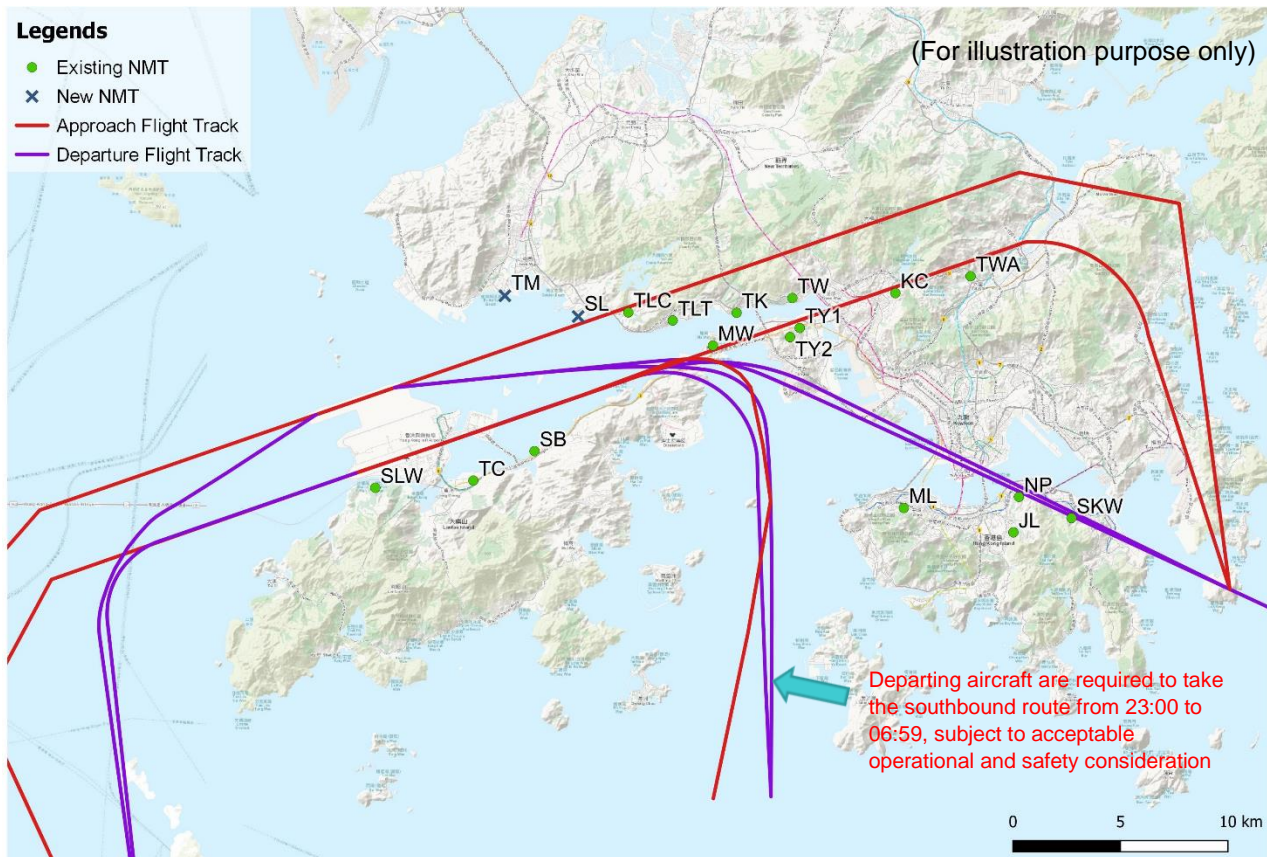
3.1 Aircraft Noise Monitoring

The noise caused by aircraft operations is currently monitored through a computerised Aircraft Noise and Flight Track Monitoring System (ANFTMS) established by the Civil Aviation Department (CAD). The ANFTMS is comprised of multiple outdoor noise monitoring terminals (NMTs) which are located along or close to the flight paths operating into and out of the HKIA to collect noise data, and a computer system which correlates noise data collected with actual aircraft flight tracks detected by CAD’s radar system.

3.1.1 Noise Monitoring in current I-2RS Operation

The flight tracks adopted in the current I-2RS operation are similar to those used in the previous 2RS operation. Yet, with the new North Runway in operation together with the South Runway while the previous north runway is closed for modification works, the flight path associated with the arrivals to the new North Runway has been shifted north, as illustrated in **Figure 3.1**. In view of the commencement of operation familiarisation of the North Runway from 8 July 2022 and formal commencement of operation started since 25 November 2022, the ANFTMS has been expanded through the installation of additional NMTs at locations close to the flight paths of the North Runway i.e., two new NMTs in Siu Lam (SL) and Tuen Mun (TM) as illustrated in **Figure 3.1**.

Figure 3.1: Locations of existing and new NMTs established for I-2RS operation



3.1.2 Noise Monitoring in planned 3RS Operation

The planned 3RS operation will involve the use of existing flight tracks that are already in use in the previous 2RS operation or the current I-2RS operation, as well as updated flight tracks. To ensure the effective monitoring of the aircraft noise situation under the 3RS operation, additional NMTs will be installed at locations close to the updated flight tracks and operated as part of the ANFTMS. **Figure 3.2** shows the locations of the existing and planned NMTs.

It can be noted that among the existing and planned NMTs shown in **Figure 3.2**, seven of the existing NMTs are situated close to the NEF 25 contour obtained under the Worst Operation Scenario or the Design Capacity Scenario of the aircraft noise impact assessment undertaken for the 3RS operation in the approved 3RS EIA Report. These seven NMTs, namely N1 to N7, are further illustrated in **Figure 3.3** and summarised in **Table 3.1**. There are 5 other NMTs, namely F1 to F5 as also illustrated in **Figure 3.3** and listed as part of **Table 3.1** and these involve NMTs that are situated further away from the NEF 25 contour, but have been specifically named in EP Condition 2.23. The remaining NMTs, namely O1 to O6 and P1 to P4 as shown in **Figure 3.3** and listed in **Table 3.1**, are located far away from the NEF 25 contour.

Figure 3.2: Locations of existing and planned NMTs for 3RS operation

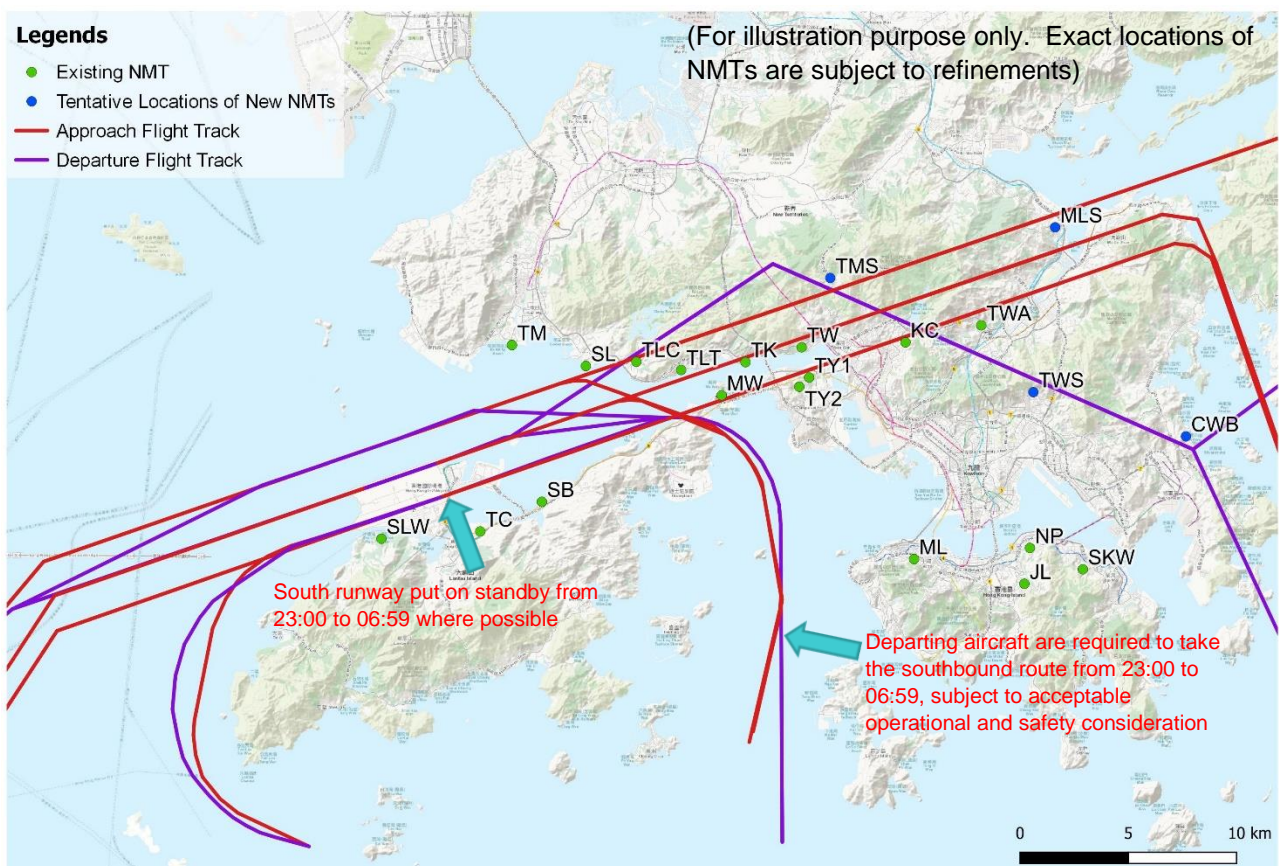


Figure 3.3: Locations of Representative NMTs

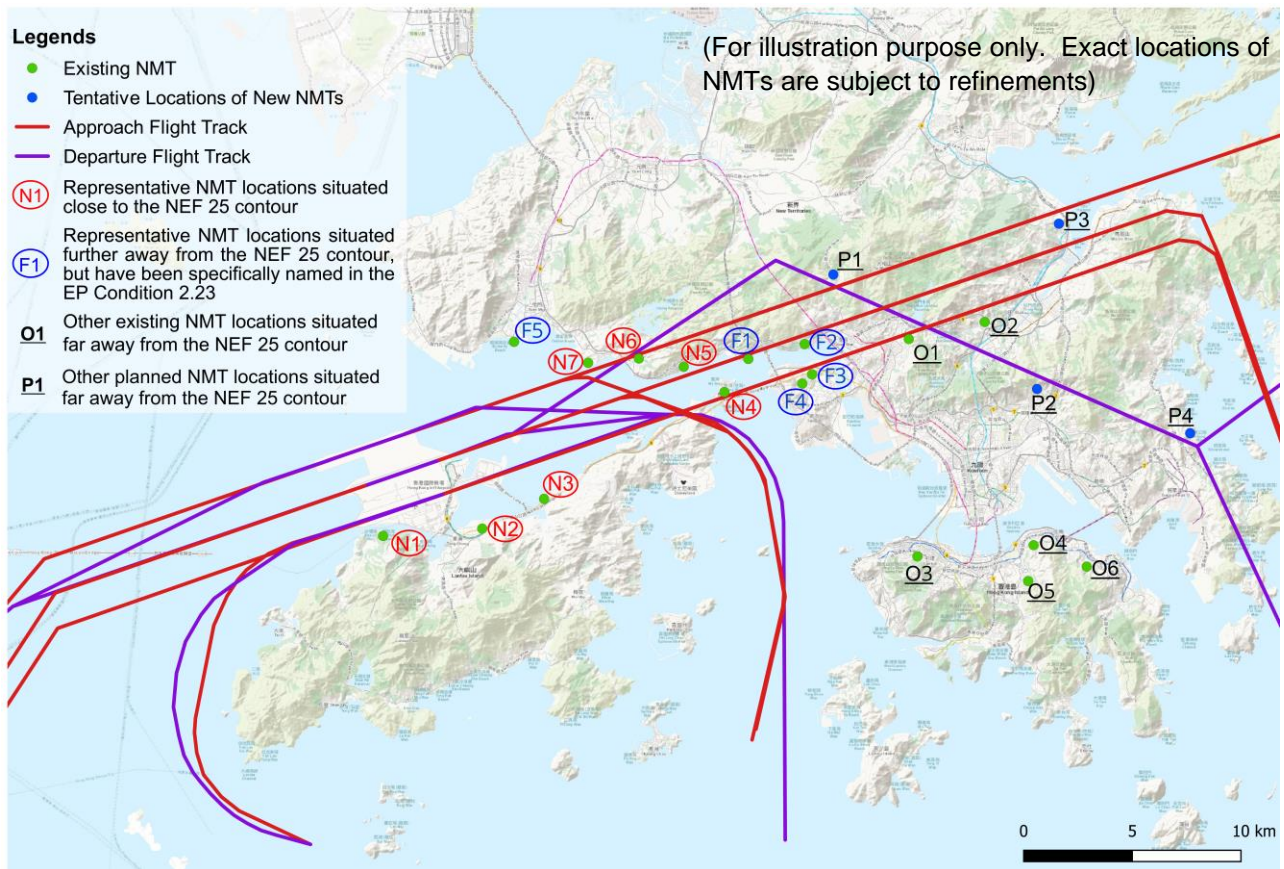


Table 3.1: Noise Monitoring Locations

NMT ID.	Location of existing NMTs
<i>Representative NMT locations situated close to the NEF 25 contour</i>	
N1	Sha Lo Wan (SLW)
N2	Tung Chung (TC)
N3	Sunny Bay (SB)
N4	Ma Wan (MW)
N5	Tsing Lung Tau (TLT)
N6	Tai Lam Chung (TLC)
N7	Siu Lam (SL)
<i>Representative NMT locations situated further away from the NEF 25 contour, but have been specifically named in EP Condition 2.23</i>	
F1	Ting Kau (TK)
F2	Tsuen Wan (TW)
F3	Tsing Yi #1 (TY1)
F4	Tsing Yi #2 (TY2)
F5	Tuen Mun (TM)
<i>Other NMT locations situated far away from the NEF 25 contour</i>	
O1	Kwai Chung (KC)
O2	Tai Wai (TWA)
O3	Mid-Levels (ML)

NMT ID.	Location of existing NMTs
O4	North Point (NP)
O5	Jardine's Lookout (JL)
O6	Shau Kei Wan (SKW)
NMT ID.	Planned locations of new NMTs
P1	Tai Mo Shan (TMS)
P2	Tsz Wan Shan (TWS)
P3	Ma Liu Shui (MLS)
P4	Clear Water Bay (CWB)

3.2 Monitoring Equipment and Method

The NMTs are generally equipped with a wind shielded microphone mounted on a mast erected at a distance from nearest hard surface together with a bird spike and lightning rod. The microphone is connected via weatherproof cabling to a sound meter housed in a weatherproof cabinet with peripheral equipment for power supply and telecommunication, including a backup battery. The noise meters are in compliance with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) or of comparable professional quality. The NMTs are designed to operate 24-hours a day.

Real-time noise data are streamed to the ANFTMS, either via wireless or fixed-line network connection. A computer system operated and maintained as part of the ANFTMS allows correlation of the available noise data monitored with actual aircraft flight tracks detected by the radar system for identification of aircraft noise events. A regular maintenance programme (e.g. preventive maintenance, calibration tests, etc.) for the ANFTMS is in place to ensure the serviceability and proper functionality of the system.

3.3 Quarterly Reviews of Aircraft Noise Monitoring Data

AAHK shall obtain the following data from the relevant parties including the Hong Kong Observatory (HKO) and CAD for conducting the quarterly reviews:

- Measured noise levels of aircraft noise events at representative locations including Tung Chung, Ma Wan, Tsing Yi, Tsuen Wan, Ting Kau, Siu Lam and Tuen Mun obtained via the ANFTMS;
- Radar data including available information on but not limited to the following:
 - Flight tracks;
 - Aircraft fleet mix data;
 - Flight track utilisation;
 - Flight tracks dispersion (inherent in radar data); and
 - Runway modes of operation and utilisation, etc.
- Meteorological data measured and reported by HKO;
- Details of any unexpected events affecting flight and runway operations.

All aforementioned data shall be requested from the relevant parties on a regular basis for conducting an initial checking and analysis upon receipt of the data. This shall include but not limited to the checking and analysis of the radar data against available data from the Airport Operational Database (AODB) of AAHK for consistency of the available data and identification of any missing data, information gap and/or abnormalities in the available data. Any information gap, abnormalities or unforeseen circumstances should be addressed via engaging in further discussions and coordination with the relevant parties providing the data.

In addition, pre-processing of the data shall take place to facilitate the undertaking of the quarterly reviews, which includes:

- Removal of irrelevant radar data, such as those related to helicopter, military and government operations; and
- Removal of aircraft operated within the terminal area but did not arrive at or depart from HKIA.

The measured noise levels of aircraft noise events obtained at representative locations, including the distribution of the measured noise levels, shall be analysed for examining and identifying any potential trends and patterns in the aircraft noise monitoring results. Specifically, taking into account that the NEF is the only aircraft noise criterion stipulated in the EIAO-TM, the quarterly reviews of noise levels measured at the NMTs shall focus on representative locations which are close to the NEF 25 contour (i.e., NMT ID. N1 to N7), while the noise levels measured at other representative locations situated at areas further away from the NEF 25 contour but have been specifically named in EP Condition 2.23 shall also be reviewed (i.e., NMT ID. F1 to F5). At the remaining locations that are situated far from the NEF 25 contour (i.e., NMT ID. O1 to O6 and P1 to P4), the available noise data may also be referenced as needed when analysing the potential trends and patterns of the aircraft noise monitoring results obtained at the representative locations.

The available noise data of aircraft noise events collected at the representative locations shall be analysed on a rolling 12-month basis in each quarterly review. As the NEF aircraft noise criterion adopted under the EIAO-TM is based on the Effective Perceived Noise Level (EPNL) as the single event sound level descriptor, and while it is not practicable to carry out routine noise monitoring in EPNL, the annual daily average of Leq (24 hours) may be calculated from available sound exposure level (SEL) data obtained at the NMTs. SEL is a measure of the total sound energy of each aircraft noise event, which is normalised to a reference duration of one second and can be used to derive the Leq (24 hours) metric (see **Appendix B** for the relevant calculation method). The review of the annual daily average of Leq (24 hours) on a quarterly basis will facilitate a good understanding of the trends and patterns of the aircraft noise monitoring results.

3.4 Preparation of Annual Review Report

With consideration of the findings from the quarterly reviews using the noise metric proposed above, a Review Report shall be prepared on an annual basis and this shall present the following information to facilitate readers' understanding of the trends and patterns of the aircraft noise monitoring results obtained at the representative locations for the 3RS operation:

- Reporting of the annual daily average of Leq (24 hours) noise levels calculated from available SEL data of noise events at representative locations (i.e., at NMT ID. N1 to N7 and also NMT ID. F1 to F5 as mentioned above); and
- Identification of any significant differences or abnormalities in the above-mentioned analysis.

The quarterly reviews of aircraft noise monitoring data and the annual reporting process may continue throughout the 3RS operation. A proforma illustrating how the noise monitoring results, presented in form of the annual daily average of Leq (24 hours) noise levels obtained at representative locations, may be presented is set out in **Appendix C**. Relevant figures may be presented to visualise the changes over time, based on the results obtained from the quarterly reviews.

3.5 Event and Action Plan for Review of Aircraft Noise Monitoring Data

A flow diagram that has summarised the process involved in the quarterly reviews of aircraft noise monitoring data and annual reporting process as described in **Sections 3.3 to 3.4**, together with the Event and Action Plan presented in this section is set out in **Appendix E**.

3.5.1 Planned Actions related to the Action Level by AAHK

As set out in Section 4.1.5 of the Updated EM&A Manual, AAHK has made a commitment to have the NEF 25 contour updated at least every 5 years using actual flight data obtained from the local Air Traffic Control radar systems.

The quarterly reviews and annual reporting of aircraft noise monitoring data, when analyzed and presented in terms of the annual daily average of Leq (24 hours) noise levels monitored at the representative locations, will help track the trends and patterns of aircraft noise experienced at the Noise Sensitive Receivers (NSRs) situated close to the NEF 25 contour in years before the next updated NEF 25 contour will be presented under the 5-year reporting cycle.

Accordingly, as detailed as part of the Event and Action Plan presented in **Table 3.2**, where major variances, discrepancies or abnormalities are identified in the annual daily average of Leq (24 hours) noise levels monitored at the representative locations (i.e., when the highest value of the latest rolling 12-month annual daily average of Leq (24 hours) noise levels obtained at the representation locations has increased by 1.5 dB(A) or more above the baseline noise level (see **Appendix D** for details of the baseline noise level and the basis of the proposed action level), the action level is considered to be triggered and an early investigation should be launched by AAHK with a view to identifying the possible causes of the variances, discrepancies or abnormalities, including the need to assess for any significant effect on the NEF 25 contour by undertaking relevant noise contour analysis. Based on the analysis results, AAHK should then evaluate the need for any improvement actions and liaise with the relevant parties for actions.

3.5.2 Planned Actions related to the Limit Level by AAHK

As NEF is the only aircraft noise criterion stipulated in the EIAO-TM, the limit level is considered to be triggered at such time it is determined that the NEF 25 contour may start to encroach onto any additional NSRs, or when it is considered that there are major deviations from the assumptions adopted in the approved 3RS EIA Report. Under these circumstances, additional analysis will also be necessary to update the NEF 25 contour for confirming if there are any encroachment onto any new NSRs. If required, the need and feasibility of introducing additional mitigation measures as remedial actions shall be assessed and AAHK shall discuss with the relevant parties for implementation of the additional measures.

Table 3.2: Event and Action Plan for Review of Aircraft Noise Monitoring Data

Event	Actions by AAHK
Action Level	
<p>Major variances / discrepancies / abnormalities identified in the trends of the aircraft noise monitoring results obtained at representative locations from the quarterly reviews</p> <p>i.e., when the highest value of the latest rolling 12-month annual daily average of Leq (24 hours) noise levels obtained at the representative locations has increased by 1.5 dB(A) or more above the baseline noise level as mentioned in Appendix D *</p>	<p>(a) Launch an early investigation to examine the major variances / discrepancies / abnormalities identified at the representative locations, with a view to identifying the possible causes and these may include but not limited to:</p> <ul style="list-style-type: none"> ● Identification of any unexpected events affecting airport and flight operation; ● Review and identification of any potential seasonal variations; ● Review of wind records from nearest relevant meteorological station operated by HKO; ● Identification of any aircraft noise mitigation measure(s) that would be potentially affecting the aircraft noise monitoring results obtained at the representative locations, followed by a review of any variances / discrepancies / abnormalities in the trends or patterns of achievement rates of the concerned mitigation measure(s); ● Review and identification of any potential correlation between specific overflights and contribution to noise events, with the use of the aircraft data (e.g., fleet mix); ● Review and analysis of measured noise levels obtained at all relevant representative locations; ● Carry out early analysis to update the NEF 25 contour to confirm that there is no encroachment onto any new NSRs other than those predicted in the approved 3RS EIA Report. <p>(b) Based on the investigation results, evaluate the need for any improvement actions and liaise with relevant parties for actions.</p>
Limit Level	
<p>NEF 25 (as specified in Annex 5 of the EIAO-TM)</p>	<p>Based on the available airport operational data and with consideration of the findings of the action level related investigation presented above, if it is determined that the NEF 25 contour may start to encroach onto any additional NSRs, or when it is considered that there are major deviations from the assumptions adopted in the approved 3RS EIA Report, the limit level is considered to be triggered and the following actions shall be taken:</p> <ul style="list-style-type: none"> ● Update the NEF 25 contour to confirm if there are any encroachments onto new NSRs other than those predicted in the approved 3RS EIA Report; ● Assess the need and feasibility of introducing any additional mitigation measures that may need to be in place as remedial actions; and ● Discuss with the relevant parties for implementation of the additional mitigation measures.

* See **Appendix D** for the basis of the proposed action level. Both the action and limit level events are proposed by AAHK in accordance with the criteria set out in Annex 21 of the EIAO-TM. The action level shall be reviewed and refined as appropriate after the first year of 3RS operation, when the first updated NEF25 contour for 3RS operation is produced based on actual airport operational data.

4 Review of Implementation Status of Aircraft Noise Mitigation Measures

4.1 Overview of Aircraft Noise Mitigation Measures¹

Sections 7.3.3.11 and 7.3.5.3 of the approved 3RS EIA Report have recommended a number of direct noise mitigation measures for the future 3RS operation, including the following which have been included and listed under EP Condition 2.21, as reproduced in italics below:

- (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.*

In addition to the direct noise mitigation measures listed above, Section 7.3.5.4 of the approved 3RS EIA Report has also recommended that the existing noise abatement good practices, including the use of noise abatement take-off procedures (also known as Noise Abatement Departure Procedures (NADPs)) and Continuous Descent Approach (CDA), which have been implemented at HKIA since the previous 2RS operation and in the current I-2RS operation, to continue to be applied in the 3RS operation. These measures have accordingly been included and also listed under EP Condition 2.21, as reproduced in italics below:

- (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;*
- (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.*

As summarised in **Table 4.1** below, three of the above-listed measures, including items (ii), (v) and (vi), have already been implemented in the current I-2RS operation and all of the six measures are planned for the 3RS operation.

Regarding item (iii) of the measures i.e., the arrival Required Navigation Performance (RNP) Track 6, an Aeronautical Information Circular (AIC) 20/23 of 21 August 2023 titled “*Preferential Use of RNP Y (AR) APCH Procedures to Runway 25 at Hong Kong International Airport (HKIA) during noise mitigation period*” (reproduced in **Appendix F**) was issued on 21 August 2023 to promote the increased use of the arrival RNP Track 6 effective from 3 September 2023. AAHK is also considering introducing a relevant incentive scheme at HKIA to promote the increased use of the RNP Track 6. It is expected that the use of the RNP Track 6 may increase progressively as assumed in the approved 3RS EIA Report with airlines increasingly equipping themselves with the necessary capabilities to meet the more stringent requirements².

Besides, regarding item (iv) of the measures i.e., the Preferential Runway Use Programme, it can be noted that the existing noise mitigation measure implemented in the current I-2RS operation and the previous 2RS operation mainly relies on preferential use of the 07 runways as specified under Clause 2.3.1 in AD2.21 of the

¹ For details of the implementation of aircraft noise mitigation measures for the 3RS operation, please refer to the Submission under EP Condition 2.21 – *Procedures for Mitigation of Aircraft Noise*.

² RNP-Authorization Required (“RNP-AR”) capabilities are required for the use of Track 6. In order to perform RNP-AR for using Track 6, the aircraft must have a high level of navigation performance as they need to navigate precisely along the predetermined path over complex terrain; and the flight crew must also meet specific training requirements. In addition, authorization from relevant civil aviation authorities is required.

Hong Kong Aeronautical Information Publication (AIP Hong Kong) published by CAD and also described in Section 7.3.3.25 of the approved 3RS EIA Report. For the 3RS operation, relevant aircraft noise modelling undertaken for both the Worst Operation Scenario and Design Capacity Scenario at the 3RS EIA stage were based on a forecast where the air traffic movements (ATMs) at HKIA would grow beyond the maximum practicable capacity of 420,000 ATMs per year applicable to the I-2RS and previous 2RS operation towards the 607,480 ATMs per year under the Worst Operation Scenario and 620,000 ATMs per year under the Design Capacity Scenario. A number of aircraft noise mitigation measures as mentioned in the 3RS EP would need to be implemented to mitigate the predicted aircraft noise impact.

Specifically, the introduction of the planned Preferential Runway Use Programme (such that west flow is used when departures dominate while east flow is used when arrivals dominate during night-time when wind conditions allow), when identified to be necessary for the 3RS operation, will enable the majority of traffic to arrive from or depart towards the western side of HKIA over water during night-time. As already pointed out under the sub-section on *Control of night flight movement over residential area* in Section 7.3.4.9 of the approved 3RS EIA Report, for arrivals to HKIA in the runway 25 direction, together with increased use of the arrival RNP Track 6 designed for preferential use that will allow suitably equipped aircraft to reduce the portion of their approach path over populated areas, the implementation of the Preferential Runway Use Programme will also reduce the number of arriving aircraft overflying populated residential areas.

The introduction of the Preferential Runway Use Programme will be dependent on a number of factors, inter alia, air traffic growth, night-time schedule demand and patterns, on-time performance of night flights, air traffic control procedures, usage and impact of different flight tracks, etc. The quarterly reviews of aircraft noise monitoring data, with details presented in **Section 3**, will provide data on trends and patterns of aircraft noise. All relevant factors will need to be carefully considered, taking into account the findings of the quarterly reviews, in order to decide when the Preferential Runway Use Programme will be required and can be implemented in the most appropriate manner, with a view to ensuring that the NEF 25 contour would not be encroaching onto any new NSRs. AAHK will closely monitor the situation and provide updates as appropriate.

Table 4.1: Implementation Status of Aircraft Noise Mitigation Measures for I-2RS and 3RS

Item Measure	Description	Implementation Status	
		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.	Under 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 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.	Under implementation	Planned for implementation
vi. CDA from the Northeast	Adopting CDA for all aircraft on approach from the northeast between 2300 and 0700 hours.	Under implementation	Planned for implementation

* South Runway on Standby not operationally feasible with 2 runways in I-2RS.

** Taking into account the level of aircraft / aircrew capability and air traffic considerations, the existing RNP Track 6 had been assigned for use in the west flow direction for suitably equipped aircraft only when circumstances permit during the I-2RS operation. To effect the increased use of the RNP Track 6 progressively in the 3RS operation as assumed in the

Item Measure	Description	Implementation Status	
		I-2RS	3RS
	approved 3RS EIA Report, an Aeronautical Information Circular (AIC) 20/23 of 21 August 2023 (reproduced in Appendix F) had been issued to promote the increased use of the RNP Track 6 from 3 September 2023. AAHK is also considering introducing a relevant incentive scheme at HKIA to promote the increased use of the RNP Track 6. It is expected that the use of the RNP Track 6 may increase progressively as assumed in the approved 3RS EIA Report with airlines increasingly equipping themselves with the necessary capabilities to meet the more stringent requirements.		
	*** The introduction of the Preferential Runway Use Programme will be dependent on a number of factors, inter alia, air traffic growth, night-time schedule demand and patterns, on-time performance of night flights, air traffic control procedures, usage and impact of different flight tracks, etc. The quarterly reviews of aircraft noise monitoring data will provide data on trends and patterns of aircraft noise. All relevant factors will need to be carefully considered in order to decide when the Preferential Runway Use Programme will be required and can be implemented in the most appropriate manner, with a view to ensuring that the NEF 25 contour would not be encroaching onto any new NSRs. AAHK will closely monitor the situation and provide updates as appropriate.		

4.2 Monitoring of Implementation Status of Aircraft Noise Mitigation Measures

Taking into account the nature and implementation status of the aircraft noise mitigation measures as described above, it is considered that the quarterly reviews of implementation status, including the reporting of the rolling 12-month average achievement rates of the mitigation measures on a quarterly basis, should first focus on the following measures in the 3RS operation and the monitoring plans are set out in the sections that follow.

- Putting the existing south runway on standby where possible at night between 2300 hours and 0659 hours;
- 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.

As part of the annual reporting process, AAHK shall provide an update of the latest status in the planning of the incentive scheme to promote the use of the RNP Track 6, including details of the incentive scheme once it is developed and the latest update on the implementation status of the scheme, as appropriate. Also, as mentioned in **Section 4.1**, all relevant factors will need to be carefully considered, taking into account the findings of the quarterly reviews, in order to decide when the Preferential Runway Use Programme will be required and can be implemented in the most appropriate manner, with a view to ensuring that the NEF 25 contour would not be encroaching onto any new NSRs. AAHK will need to closely monitor the situation and will provide further updates on the implementation status of the following mitigation measures, as appropriate.

- Assigning a new arrival RNP Track 6 for preferential use in the runway 25 direction between 2300hours and 0659 hours;
- 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.

Concerning the adoption of NADPs for aircraft departing to the northeast, and also CDA for all aircraft on approach from the northeast during night-time, there are a number of factors such as weather conditions, aircraft weight, engine settings, etc. that can lead to variations in flight profiles of NADPs and CDA. Therefore, the exact procedures applied can differ among aircraft operators, aircraft types and individual pilot performance. As such, it is considered that while the proactive monitoring on a quarterly basis for adoption of these good practices may not be the most effective means to obtain the latest update on the implementation status, AAHK may liaise with the airlines to understand the implementation status, where necessary.

4.3 Data Collection Process

To examine the performance of the applicable aircraft noise mitigation measures that are implemented during night-time as described in **Section 4.2** above, the following airport operation related data shall be collected from the relevant parties on a regular basis (with relevant data already described in **Section 3.3**) for conducting the quarterly reviews:

- Basic flight data / attributes for all flights from existing databases:
 - Call-signs, arrival / departure, aircraft types;
 - Actual take-off time and actual landing time;
 - Runway used;
- Meteorological data;
- Radar data containing information on flight tracks, aircraft types, etc.

Besides, as already described in **Section 3.3**, there shall be an initial checking and analysis of the data once these are received, including the need to check and analyse the radar data against available data from the AODB of AAHK for confirming the consistency of the data and identification of any missing data, information gap and/or abnormalities in the available data.

Other data and calculations required for monitoring of the implementation of the above listed mitigation measures are further detailed in the sections below.

4.4 South Runway on Standby

Putting the south runway on standby where possible at night between 2300 and 0659 hours will minimise the aircraft noise impact on Sha Lo Wan and other village houses along the Lantau shorelines that would be located within the NEF 25 contour given their proximity to the runway, as predicted and presented in Section 7.3.4.9 of the approved 3RS EIA Report. 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. Besides, taking into account operational requirements such as recovering from an incident or other major operational disruption (e.g., typhoon), it was assumed in the 3RS EIA stage that the south runway would only be used for 1% of total yearly night period in the aircraft noise modelling undertaken for both the Worst Operation Scenario and Design Capacity Scenario.

4.4.1 Key Metrics and Calculations

The key metric to be considered for this mitigation measure in the quarterly reviews is the rolling 12-month average percentage of flight movements operating on the other two runways, namely the North and Centre Runways between 2300 and 0659 hours. To calculate the percentage, the following numbers shall be derived from the raw data collected (see **Section 4.3**) between 2300 hours and 0659:

- Total number of flights;
- Number of flights operated on the North and Centre Runways; and
- Number of flights operated on the South Runway.

Hence, the percentage achievement (monthly, and also the rolling 12-month average) = $\frac{\text{Number of flights operated on the North and Centre Runways}}{\text{Total number of flights}}$. A proforma for calculating and recording the percentage achievement is given in **Table G.1** in **Appendix G**.

4.4.2 Presentation of Monitoring Results

The achievement rate can be presented by plotting the percentages of all flights operated on the North and Centre Runways, in comparison with the performance from previous years for the 3RS operation.

4.5 West Lamma Channel Departures during East Flow Operation

This measure aims at reducing the number of aircraft overflying populated areas during east flow operation between 2300 and 0659 hours, by requiring all departing flights to, instead of flying over the city via their normal daytime tracks, route away from the main populated residential areas by initially taking the southbound track via West Lamma Channel, subject to acceptable operational and safety consideration, before turning east or north over open waters.

For the monitoring of the implementation of this mitigation measure in the planned 3RS operation, relevant airport operational data including available radar data will be obtained from the relevant parties for analysis. The use of the procedure would be determined on the basis of each departing aircraft's ground track as recorded by the radar data.

4.5.1 Key Metrics and Calculations

The key metric to be considered for this mitigation measure is the rolling 12-month average percentage of departures following the West Lamma Channel out of all departures during east flow operation between 2300 and 0659 hours. To calculate the percentage, the following numbers shall be derived from the raw data collected (see **Section 4.3**) between 2300 hours and 0659:

- Total number of departures in East Flow; and
- Number of departures following West Lamma Channel in East Flow.

Hence, the percentage achievement (monthly, and also the rolling 12-month average) = number of departures following West Lamma Channel in East Flow / total number of departures in East Flow. A proforma for calculating and recording the percentage achievement is given in **Table G.2** in **Appendix G**.

4.5.2 Presentation of Monitoring Results

The percentage achievement can be compared to previous years' results. Additionally, plotting the monthly metrics of West Lamma Channel departures as a percentage of all east flow night departures (as illustrated in **Figure H.1** of **Appendix H**) can allow greater understanding of particular periods and events which may have led to discrepancies in performance when compared to previous Annual Review Reports.

4.6 Quarterly Reviews and Annual Reporting Process

Similar to the review of monitored noise levels at representative locations, AAHK has planned to review the implementation status of the aircraft noise mitigation measures described in **Section 4.4** and **Section 4.5** above on a quarterly basis, using the collected data as listed in **Section 4.3**. Relevant analysis may be undertaken on a rolling 12-month basis in each quarterly review for identification of the following:

- Any irregular achievement rates;
- Any abnormalities or significant differences in the rolling 12-month average achievement rates when compared to historical data; and
- Any unexpected significant deviations from the relevant assumptions made in the approved 3RS EIA Report.

The findings from the quarterly reviews shall be presented as part of the Review Report to be prepared on an annual basis. The comparison of achievement rates of mitigation measures against previous achievement rates may continue throughout the 3RS operation.

4.7 Event and Action Plan for Review of Implementation Status of Aircraft Noise Mitigation Measures

A flow diagram that has summarised the process involved in the quarterly reviews of implementation status of aircraft noise mitigation measures and the annual reporting process as described in **Sections 4.3 to 4.6**, together with the Event and Action Plan presented in this section is set out in **Appendix I**.

4.7.1 Planned Actions related to the Action Level by AAHK

As part of the quarterly reviews of the aircraft noise mitigation measures, where major variances, discrepancies or abnormalities are identified in the trends of achievement rates of aircraft noise mitigation measures (i.e., when the latest rolling 12-month average achievement rate of any of the specific mitigation measures has decreased by more than 10% when compared with that recorded in the previous reporting year), the action level is considered to be triggered and an early investigation should be launched, including the need to assess for any significant effect on the NEF 25 contour by undertaking relevant noise contour analysis (see **Table 4.2** for details of the relevant Event and Action Plan). Based on the analysis results, AAHK should then evaluate the need for any improvement actions and liaise with the relevant parties for actions.

4.7.2 Planned Actions related to the Limit Level by AAHK

Details of the actions that should be taken are the same as that described in **Section 3.5.2**.

Table 4.2: Event and Action Plan for Review of Implementation Status of Aircraft Noise Mitigation Measures

Event	Actions by AAHK
Action Level	
Major variances / discrepancies / abnormalities identified in the trends of achievement rates of aircraft noise mitigation measures from the quarterly reviews, i.e., when the latest rolling 12-month average achievement rates of any of the specific mitigation measures have decreased by more than 10% when compared with that of the previous reporting year *.	<p>(a) Launch an early investigation to examine the major variances / discrepancies / abnormalities identified of the concerned mitigation measure(s), with a view to identifying the possible causes and these may include but not limited to:</p> <ul style="list-style-type: none"> ● Identification of any unexpected events affecting airport and flight operation; ● Review and identification of any potential seasonal variations; ● Identification of representative location(s) that is/ are susceptible to the concerned mitigation measure(s), with consideration of available noise data obtained at all relevant representative locations for cross-checking of any potential impacts on the monitored noise levels during the time of identified variances / discrepancies / abnormalities in the collected data; and ● Carry out early analysis to update the NEF 25 contour to confirm that there is no encroachment onto any new NSRs other than those predicted in the approved 3RS EIA Report. <p>(b) Based on the investigation results, evaluate the need for any improvement actions, and initiate early discussion with relevant parties for actions.</p>
Limit Level	
NEF 25 (as specified in Annex 5 of the EIAO-TM)	Please refer to Section 3.5.2 for details on the actions that should be taken.

* Both the action and limit level events are proposed by AAHK in accordance with the criteria set out in Annex 21 of the EIAO-TM. The action level shall be reviewed and refined as appropriate after the first year of 3RS operation, when the first updated NEF25 contour for 3RS operation is produced based on actual airport operational data.

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A. Implementation Schedule

Table A.1: Implementation Schedule

EIA Ref.	EM&A Ref.	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Implementation Agent	Implementation Stages
7.3.5.5	4.1	<p>Aircraft Noise Mitigation Measures under Primary Operating Mode</p> <p>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:</p> <ul style="list-style-type: none"> • 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. Methodology for Aircraft Noise Calculation

B.1 Calculation of annual daily average of Leq (24 hours) from sound exposure levels (SEL) data of aircraft noise events

The SEL of an aircraft noise event is the sound level, in dB(A), that would be obtained if the entire event energy were uniformly compressed into a reference time of one second. The available SEL data obtained from NMTs erected at representative locations may be used to calculate the corresponding annual daily average of Leq (24 hours) of the noise events using the following equations³:

$$L_{eq} = \overline{SEL} + 10 \log_{10} N - 10 \log_{10} T$$

$$\overline{SEL} = 10 \log_{10} \left[\frac{1}{N} \sum 10^{SEL_i/10} \right]$$

where

\overline{SEL} is the logarithmic average sound exposure level (SEL);

N is the number of aircraft events that occurred during the measurement period T; and

T is the measurement period in second.

Where necessary, background noise at specific NMTs during the aircraft noise events shall be quantified such that a relevant level correction may be introduced in calculating the logarithmic average SEL. The need for such background noise correction shall be reviewed as appropriate after the first year of 3RS operation.

³ Environmental Research and Consultancy Department, Civil Aviation Authority, ERCD Report 0904, *Metrics for Aircraft Noise*, K Jones and R Cadoux, January 2009 (accessible at: <https://www.caa.co.uk/publication/download/13689>)

C. Proforma for reporting Aircraft Noise Monitoring Results

Table C.1: Annual Daily Average of Leq (24 hours) calculated from SEL data obtained at NMTs of Representative Locations

NMT ID.	Location of NMT	Annual Daily Average of Leq (24 hours) dB(A)
<i>Representative NMT locations situated close to the NEF 25 contour</i>		
N1	Sha Lo Wan	
N2	Tung Chung	
N3	Sunny Bay	
N4	Ma Wan	
N5	Tsing Lung Tau	
N6	Tai Lam Chung	
N7	Siu Lam	
<i>Representative NMT locations situated further away from the NEF 25 contour, but have been specifically named in EP Condition 2.23</i>		
F1	Ting Kau	
F2	Tsuen Wan	
F3	Tsing Yi #1	
F4	Ting Yi #2	
F5	Tuen Mun	

D. Establishment of Action Level

As the actual airport operational data for 3RS operation is not available when this ANMP is being prepared, the action level for aircraft noise monitoring is established with consideration of historical monitoring data collected during the previous 2RS operation, i.e., before commencement of operation of the third runway on 8 July 2022.

Based on a review of the annual total air traffic movement (ATM) from 2015 to 2021 for the 2RS operation as summarized in **Table D.1**, 2018 is the year with the highest annual total ATM before the start of operation of the third runway in July 2022.

Table D.1: Annual Total ATM under Previous 2RS Operation from 2015 to 2021

Year	Annual Total ATM*
2015	406 048
2016	411 566
2017	420 659
2018	427 766
2019	419 795
2020	160 666
2021	144 810

* Note that the decrease in ATMs from 2019 to 2021 in the previous 2RS operation was due to the social unrest that happened in the second quarter of 2019 and the COVID-19 pandemic that started in the first quarter of 2020. Between 2022 and 2024, air traffic at HKIA has continued to recover after the pandemic but the latest 12-month ATMs involved in the I-2RS operation are still lower than the ATMs reported in year 2018 for the previous 2RS operation.

It is considered that the highest value of the annual daily average of Leq (24 hours) that may be calculated from available SEL data obtained at the NMTs erected at the representative locations situated close to the NEF 25 contour (i.e., N1 to N6 and F1 to F4)⁴ during the previous 2RS operation in 2018 when the ATM at HKIA was highest may serve as a good baseline for establishing the Action Level. This is calculated to be annual daily average of Leq (24 hours) 55.9 dB(A) which happened at the representative NMT at Tsing Lung Tau (i.e., NMT ID. N5) amongst the NMTs situated at representative locations outside the NEF 25 contour.

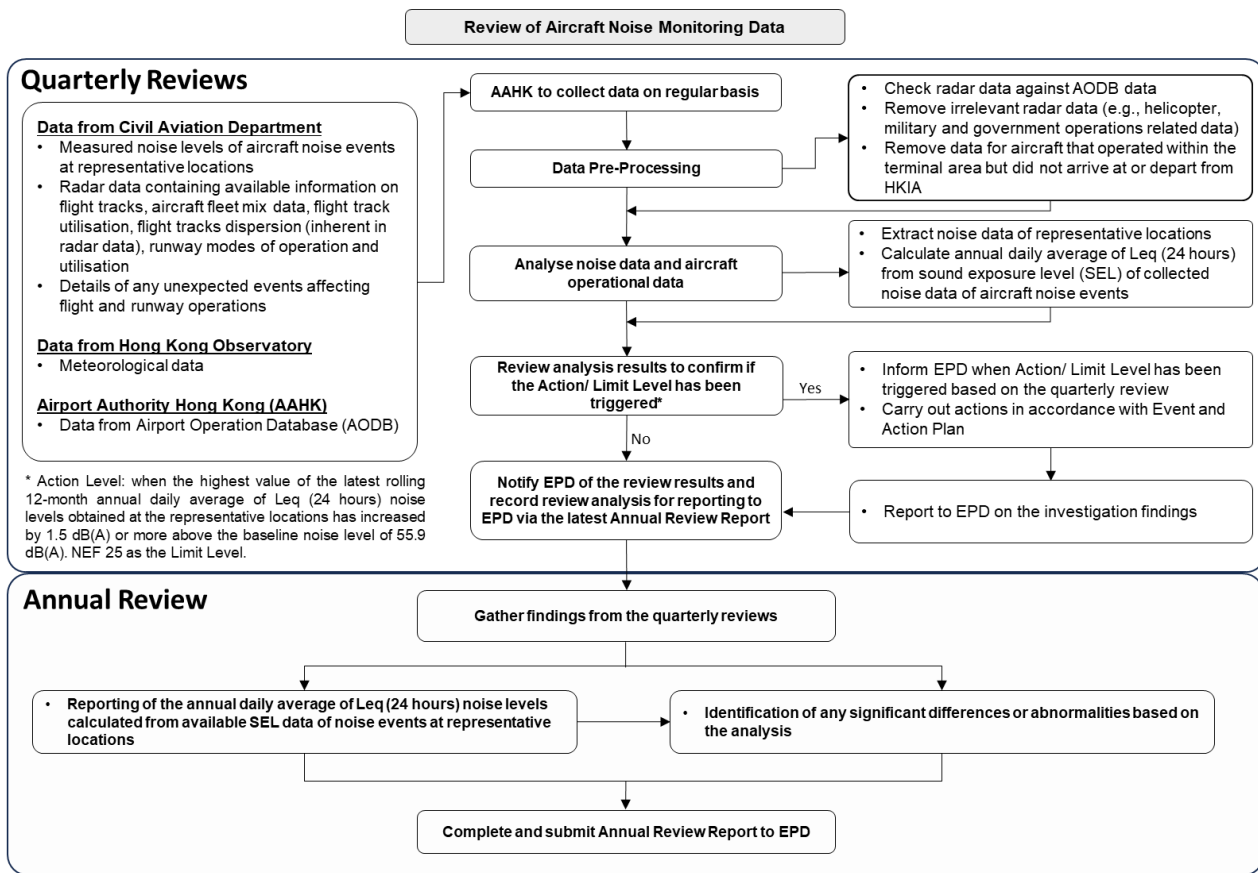
Accordingly, it is considered that the action level may be set at a level when the highest value of the latest rolling 12-month annual daily average of Leq (24 hours) noise levels obtained at the representative locations has increased by 1.5dB(A) or more above the above-mentioned baseline noise level.

The “1.5 dB(A) increase” is based on a similar significance threshold for aircraft noise adopted by FAA for consideration in relevant aircraft noise analysis i.e., when there is a 1.5 dB(A) or more increase in noise over noise sensitive areas within the Day-Night Average Sound Level (DNL) of 65 dB(A) noise contour, further analysis will need to be carried out.⁵

⁴ Note that the NMTs at Siu Lam and Tuen Mun (i.e., NMT ID. N7 and F5) are not relevant as these two new NMTs were only erected in 2022 before the commencement of the I-2RS operation.

⁵ See pages 13 and 14 in Sections 7 and 8 of Chapter 17 of the FAA’s *Environmental Desk Reference for Airport Actions* as extracted and presented in **Appendix J** (also accessible at: https://www.faa.gov/sites/faa.gov/files/airports/environmental/environmental_desk_ref/desk-ref-chap17.pdf)

E. Review of Aircraft Noise Monitoring Data – Flow Diagram for illustrating the Process



Note: The action level shall be reviewed and refined as appropriate after the first year of 3RS operation, when the first updated NEF25 contour for 3RS operation is produced based on actual airport operational data.

F. Aeronautical Information Circular (AIC) 20/23 dated 21 August 2023

HONG KONG SPECIAL ADMINISTRATIVE REGION
PEOPLE'S REPUBLIC OF CHINA
AERONAUTICAL INFORMATION SERVICE

PHONE	+852 2910 6174
FAX	+852 2910 1180
AFS	VHHHYOYX
EMAIL	aic@cad.gov.hk

(ISO 9001 CERTIFIED)
AIR TRAFFIC MANAGEMENT DIVISION
CIVIL AVIATION DEPARTMENT
HONG KONG INTERNATIONAL AIRPORT

AIC 20 / 23 21 August 2023

PREFERENTIAL USE OF RNP Y (AR) APCH PROCEDURES TO RUNWAY 25
AT HONG KONG INTERNATIONAL AIRPORT (HKIA)
DURING NOISE MITIGATION PERIOD

1. Introduction

- 1.1 In line with the ICAO initiative for the implementation of Performance Based Navigation, Hong Kong Civil Aviation Department (CAD) first published RNP AR APCH procedures in 2010. A number of additional RNP AR APCH procedures have been published since that time, enabling the benefits of RNP AR specification to be realized in terms of shorter arrival paths, avoidance of terrain-rich/built-up areas and enhanced flight management. To date, usage is limited to an on-request basis when traffic permits.
- 1.2 AIC 04/20 dated 17 January 2020 outlined application procedures by foreign aircraft operators for authorization to conduct RNP AR APCH procedures at HKIA. To date, a number of operators have already been issued with authorization from CAD. The goal is to encourage aircraft operators to achieve a higher percentage of RNP AR capability to realize the early benefits in terms of operational efficiency, track miles, and environmental sustainability.

2. Preferential Approach Sequencing

- 2.1 To further promote and encourage the usage of RNP AR APCH procedures, with effect from **1500 UTC 3 September 2023**, Hong Kong ATC will endeavor to preferentially sequence those arrival flights having authorization to conduct **RNP Y (AR) APCH** to HKIA, under the following conditions:
- i. Between the hours of 1500-2300 UTC daily; and
 - ii. Runway 25 direction is in use (Note: This does not supersede the preferential use of Runway 07 direction when wind conditions are suitable as per AIP HK VHHH AD 2.21); and
 - iii. Meteorological conditions are suitable for RNP AR APCH.

- 2.2 Under such conditions, Hong Kong ATC will ascertain the RNP AR authorization status from the flight crew. Those flights with authorization will be facilitated and assigned the appropriate STAR or radar vectors to GUAVA for the RNP Y RWY 25 (AR) procedure to the runway in use.
- 2.3 Those flights without RNP AR authorization will be processed via the ILS/LOC or RNP Z (LNAV/VNAV) approach and may be accorded lower priority in sequencing with flights conducting RNP AR APCH, subject to prevailing traffic situation and/or weather conditions.

3. Future Operational Usage of RNP AR APCH

- 3.1 Aircraft operators, with the appropriate capabilities stated in AIC 04/20, who have not yet sought authorization, are strongly encouraged to submit their applications as soon as possible with a view to achieving the tangible benefits afforded by such procedures together with CAD's commitment to promote and facilitate more extended usage of RNP AR APCH procedures throughout the whole day at HKIA in the coming years.
- 3.2 Aircraft operators, without the appropriate capabilities stated in AIC 04/20, are strongly encouraged to take into account this AIC in their business plan and expedite their readiness with a view to realizing the said tangible benefits by taking RNP AR APCH procedures.
- 3.3 Enquiries on this circular may be directed to Senior Operations Officer (Operations)1 atmdsooo1@cad.gov.hk.

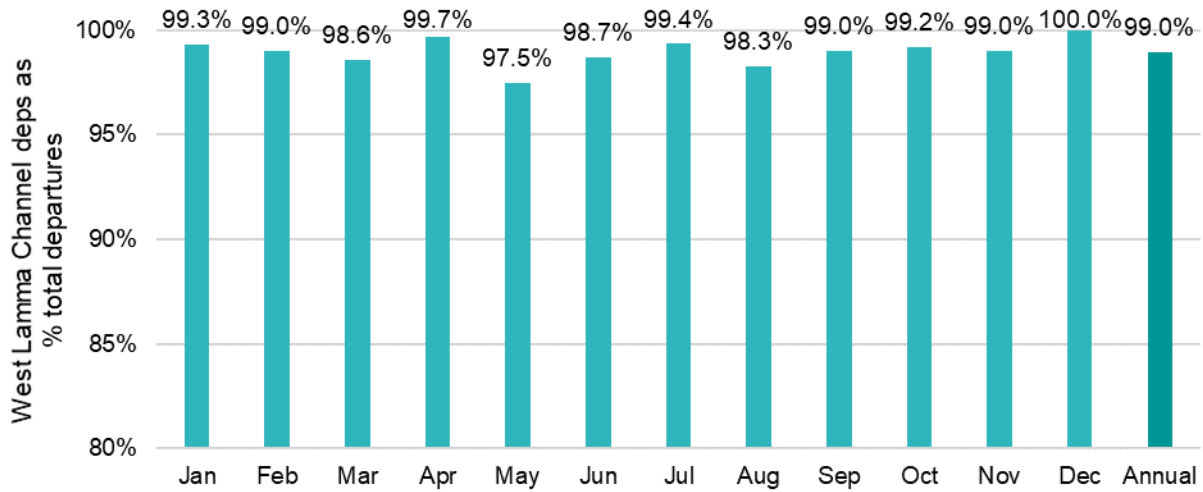
G. Proformas for reporting Achievement Rates of Aircraft Noise Mitigation Measures

Table G.1 Record and Calculation of Achievement Rates for South Runway on Standby during night-time (between 2300 and 0659 hours)

Month Year	Total number of flights	Number of flight operated on the North and Centre Runways	Number of flight operated on the South Runway	Achievement Rate (%) (B/A x 100)
	(A)	(B)	(C)	
Rolling 12- month average				

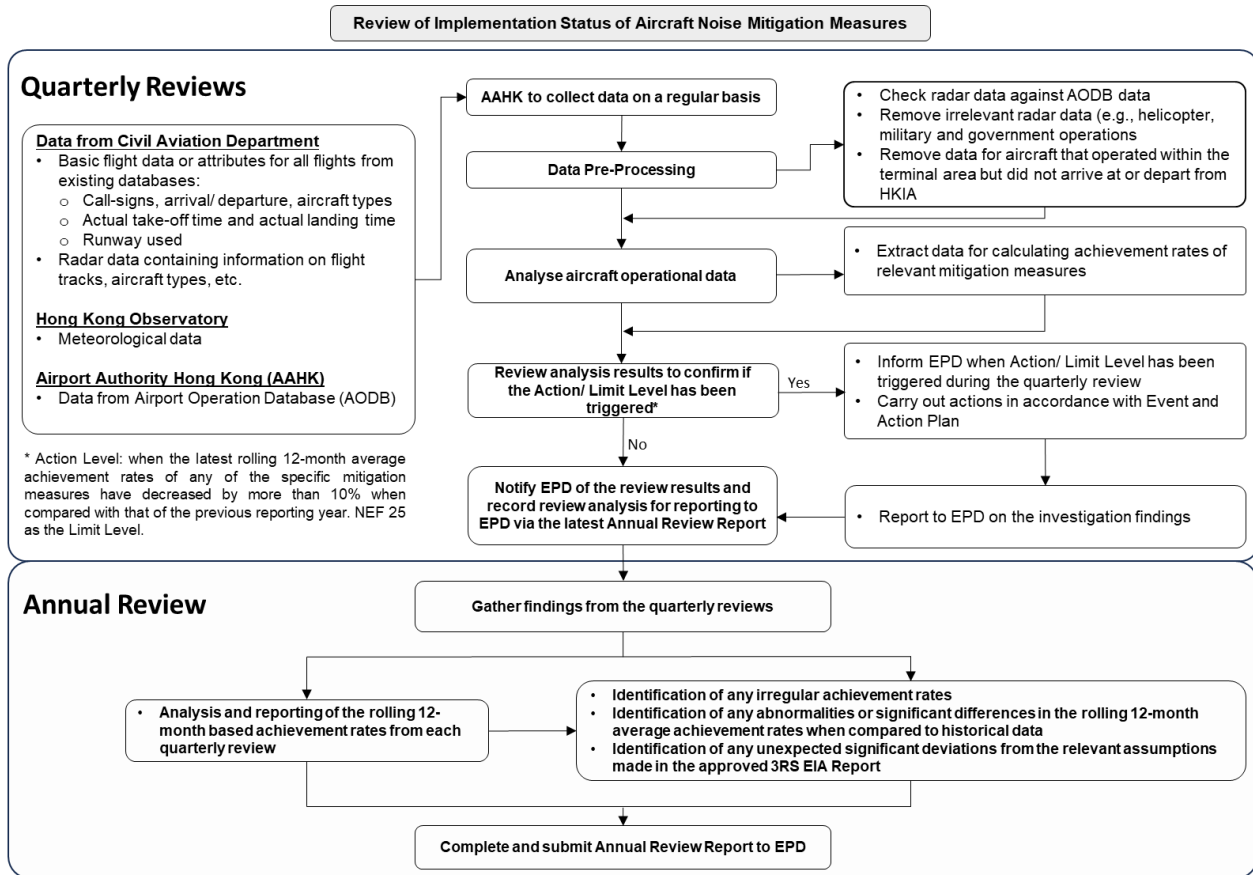
H. Example of Achievement Rates Presentation

Figure H.1: Indicative West Lamma Channel Departure Route - Achievement Rates evaluated on monthly basis (Example for Illustration Only)



Note: Example data for illustration only, not actual data.

I. Review of Implementation Status of Aircraft Noise Mitigation Measures – Flow Diagram for illustrating the Process



Notes:

- For details of the implementation of aircraft noise mitigation measures, please refer to the Submission under EP Condition 2.21 – *Procedures for Mitigation of Aircraft Noise*.
- The action level shall be reviewed and refined as appropriate after the first year of 3RS operation, when the first updated NEF25 contour for 3RS operation is produced based on actual airport operational data.

J. An Excerpt from Sections 7 and 8 of Chapter 17 of FAA's *Environmental Desk Reference for Airport Actions*

7. DETERMINING IMPACT SIGNIFICANCE.

a. **Significant impact.** Use the information obtained during the analysis completed to meet other sections of this chapter and the thresholds in the following table to determine if an action would cause a significant effect. Local land use compatibility standards do not alter this threshold for NEPA purposes.

ORDER 1050.1E THRESHOLD	FACTORS TO CONSIDER
<p>- For most areas: When an action, compared to the no action alternative for the same timeframe, would cause noise sensitive areas located at or above DNL 65 dB to experience a noise increase of at least DNL 1.5 dB. An increase from DNL 63.5 dB to DNL 65 dB over a noise sensitive area is a significant impact.</p> <p>- For national parks, national wildlife refuges and historic sites, including traditional cultural properties where a quiet setting is a generally recognized feature: The DNL 65 dB level at which residential land uses are compatible does not adequately address noise impacts on visitors to these areas. As a result, relevant and/or supplemental noise analysis is appropriate in certain circumstances. Responsible FAA officials must be cognizant that Part 150 guidelines do not adequately address the effects of noise on visitors to areas within a historic site or national park or wildlife refuge protected under Section 4(f) of the DOT Act (see Chapter 7 of this Desk Reference for information on Section 4(f), recodified as 49 USC Section 303) and where non-aircraft noise is very low and a quiet setting is a generally recognized feature or attribute of the site's significance.</p>	<p>ARP reminds the responsible FAA official that for NEPA purposes, DNL 3 dB impacts over residential areas between the DNL 60 and 65 dB contours do not cause significant adverse noise impacts. However, the potential for mitigating noise in those areas should be weighed, including consideration of the same range of mitigation options available at DNL 65 dB and higher and eligibility for Federal funding.</p>

From: Table 7-1, FAA Order 5050.4B

b. **Mitigated Finding of No Significant Impact (FONSI).** If sufficient mitigation that would reduce all potentially significant noise impacts below threshold levels measures is included as part of a project and the sponsor has made binding commitments to carry out those measures within its authority, then an EIS is not necessary (absent significant impacts in other categories). In such cases, FAA may conclude the action by issuing a FONSI. The FONSI or FONSI/Record of Decision (ROD) must list the measures FAA has made a condition

of project approval, including those the sponsor will be required to carry out through grant assurances or other means.

8. ENVIRONMENTAL IMPACT STATEMENT CONTENT.

a. General. A potentially significant noise impact often has corresponding impacts on land uses. FAA must prepare an EIS, if mitigation will not reduce impacts below the noise thresholds in section 7 of this chapter. Preparers should avoid repeating information presented in the EIS's Compatible Land Use chapter. As appropriate, preparers should refer the reader to either the EIS's Noise chapter or the Compatible Land Use chapter, depending on how the preparers have addressed noise and compatible land use issues.

b. Information needed when FAA determines a significant noise impact. The EIS should include information discussed in earlier sections of this chapter in the EIS. It should also include the following information as needed.

(1) Refined information. If the sponsor prepared an EA, revise the text and graphics as needed to meet EIS requirements. The EIS must thoroughly explain significant noise impacts. Sometimes, a more complete description of the noise events contributing to the DNL contours with added tables charts, aerial photographs, maps, or metrics is sufficient. In other cases, supplemental analyses may include using metrics other than DNL (see section 8.d of this chapter for supplemental analysis information).

(2) The DNL 60 dB contour. Where an airport development project has a potentially significant impact on noise sensitive areas (i.e., a DNL 1.5 dB or more noise increase within the DNL 65 dB noise contour), the EIS noise analysis must depict the DNL 60 dB contour as well. Further analysis is required in this circumstance to evaluate potential increases of DNL 3 dB and greater between DNL 65 and 60 dB and potential mitigation measures.

This information helps to further disclose potential project-related noise changes in the airport area.⁷ Additional contours are optional, as discussed in paragraph 1f, above. Provide figures showing noise sensitive land uses within the DNL 60 dB contour and the DNL exposure level for each of the following scenarios.

⁷ FAA has adopted the recommendation of FICON to examine DNL 3 dB or greater noise increases within the DNL 60-65 dB contour where a project has significant impacts. A DNL 3 dB increase in this contour causes a 3 percent increase in the percentage of people highly annoyed (FICON, 1992, Technical Report, Section 3, pg. 3-17).

