

# 立法會

## *Legislative Council*

LC Paper No. CB(4)650/14-15(06)

Ref : CB4/PL/EDEV

### **Panel on Economic Development Meeting on 23 March 2015**

### **Background brief on the development of the Three-Runway System at the Hong Kong International Airport**

#### **Purpose**

This paper provides background information on the latest development of the three-runway system ("3RS") at the Hong Kong International Airport ("HKIA") and summarizes concerns and views expressed by Members on the subject.

#### **Background**

2. In 2014, 63.4 million passengers used HKIA and some 4.38 million tonnes of air cargo passed through Hong Kong. HKIA is connected to about 180 destinations, including 45 in the Mainland, through over 1 000 daily flights by more than 100 airlines.<sup>1</sup>

#### The need for 3RS

3. In December 2006, the Airport Authority Hong Kong ("AAHK") released a 20-year plan, HKIA 2025, which envisaged that HKIA would serve close to 80 million passengers and handle 8 million tonnes of cargo and 490 000 air traffic movements ("ATMs") per year by 2025. It also indicated that AAHK would work with the Civil Aviation Department ("CAD") to assess the feasibility of a third runway.

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<sup>1</sup> Source: Website of AAHK <http://www.hongkongairport.com/eng/business/about-the-airport/welcome.html>  
Passenger traffic includes originating, terminating, transfer and transit passengers. Transfer and transit passengers are counted twice. Cargo throughput includes import, export and transshipment cargo. Transshipment cargo throughput is counted twice.

4. In July 2008, AAHK commissioned the HKIA Master Plan 2030 Study ("Master Plan 2030") to review the infrastructural development needs of the airport up to 2030. AAHK also commissioned a study on the engineering and environmental feasibility of a 3RS.

5. On 2 June 2011, AAHK released the Master Plan 2030 in which two different development options for HKIA's future expansion were proposed. Option 1 maintained the existing 2RS but made enhancements to the terminal and apron facilities to increase HKIA's capacity. Option 2 envisaged the construction of a third runway, and associated concourses and apron facilities, which required land reclamation of about 650 hectares to the north of the existing airport island. The public was consulted on the options between June and September 2011, and AAHK, on the basis of a clear majority preference for adopting the 3RS option, submitted the two options together with its recommendations for proceeding with option 2 to the Government on 29 December 2011.

#### The Government's views on AAHK's recommendation

6. On 20 March 2012, the Executive Council advised and the Chief Executive ordered that –

- (a) approval, in-principle, should be given to AAHK's recommendation to adopt the option of expanding into a 3RS as the future development option for HKIA for planning purpose;
- (b) AAHK should be asked to proceed with the planning related to the development of 3RS, which include specifically the statutory environmental impact assessment ("EIA"), the associated design details, and the financial arrangements; and
- (c) AAHK should be asked to report to the Government after completion of the planning work at (b) above. A final decision on whether to proceed with the implementation of 3RS would be made when the relevant inputs are available.

7. According to the relevant Legislative Council Brief (File Ref.: THB(T)CR 3/930/08) ("LegCo Brief") issued on 20 March 2012, the Administration acknowledged the benefits generated by HKIA which would make a significant impact on the entire economy, and create the necessary environment for Hong Kong's economy to continue to grow by driving its productivity and efficiency. The Administration noted that according to the AAHK's consultant, the air traffic demand by 2030 would be way beyond the runway capacity of HKIA's existing 2RS.

8. The Administration has engaged consultant(s) to vet and validate independently (a) the economic benefits that would be generated by the two development options submitted by AAHK and (b) the preliminary financial analysis on the capital investment carried out by AAHK. According to the Administration's consultant(s), the methodologies of both (a) and (b) were largely in order and generally reasonable.

#### Statutory EIA

9. On 15 September 2014, the Advisory Council on the Environment ("ACE") endorsed the EIA Report of 3RS submitted by AAHK with specific conditions and recommendations. ACE requested the Director of Environmental Protection ("DEP") to consider imposing conditions in the environmental permit ("EP") for AAHK to address the concerns of ACE regarding the environmental issues. On 7 November 2014, DEP issued an EP for the 3RS project. The Panel on Environmental Affairs ("EA Panel") has been following up matters relating to statutory EIA and other environmental concerns arising from the development of the 3RS project.

#### Design details

10. According to the information paper provided by AAHK (Annex to LC Paper No. CB(1)1626/13-14(03)), the 3RS project broadly comprises the following major works:

- (a) formation of approximately 650 hectares of land;
- (b) construction of the third runway and the third runway concourse ("TRC");
- (c) construction of apron, taxiways, areas for airport support facilities and utilities;
- (d) expansion of Terminal 2 ("T2") and construction of associated road network;
- (e) provision of a new Automated People Mover System and maintenance depot; and
- (f) provision of a new Baggage Handling System to serve T2 and TRC.

The layout of the 3RS is at **Appendix I**.

### Financial arrangements

11. According to the LegCo Brief, the construction cost of option 2 was estimated to be HK\$86.2 billion (in 2010 dollars) or HK\$136.2 billion (at money-of-the-day prices). AAHK's consultant also envisaged that there would be a funding shortfall of about \$102 billion (at money-of-the-day prices) for the 3RS option. Apart from this, the Government would need to carry out associated public works the capital cost of which would need to be further worked out by the Administration.

### 3RS-related initiatives under the 2015 Policy Address

12. In connection with the 2015 Policy Address, the Transport and Housing Bureau ("THB") has briefed the Panel on Economic Development ("the EDEV Panel") at its meeting held on 2 February 2015, among others, on 3RS-related initiatives to be undertaken by the Administration -

- (a) working with AAHK to develop the North Commercial District on the airport island so as to maximize the development potential of this site, taking into account the future development of HKIA (including 3RS) as well as the synergy with Lantau and the Western Pearl River Delta ("PRD") Region;
- (b) working with AAHK to implement initiatives which enhance airport capacity and airport services, including the midfield expansion project, and actively assisting AAHK in taking forward the development of 3RS at HKIA to meet the long-term air traffic demand of Hong Kong; and
- (c) improving air traffic management through optimizing the use of airspace and implementing measures to enhance the air traffic control system. The three parties, i.e. CAD, Civil Aviation Administration of China and Civil Aviation Authority of Macao, ("the tripartite working group") will continue to enhance the airspace volume and air traffic management efficiency while ensuring safety and smooth operation of air traffic.

13. According to THB, AAHK has completed the remaining planning work of 3RS, including the associated design details and financial arrangement study of the project, and submitted its recommendations to the Government in mid-January 2015. Subject to the necessary approvals, AAHK wishes to be able to commence the construction works as early as possible in 2016 with a view to commissioning 3RS in 2023.

## Other information

14. Members may wish to refer to the Information Note prepared by the Research Office of the LegCo Secretariat on "Development of the Hong Kong International Airport" (LC Paper No. IN06/14-15) for a detailed background on air traffic growth, airport connectivity and aircraft mix, runway capacity, airspace constraints, airport enhancements and 3RS project.

## **Members' views on the proposed third runway**

### Discussion by the Panel on Economic Development

15. In addition to the policy briefing held on 2 February 2015, EDEV Panel also discussed the proposed 3RS at its meeting on 23 June 2014, and held two joint meetings with EA Panel on 30 September and 7 October 2014 to receive public views on the 3RS project and the relevant EIA report. As EA Panel has further discussed twice on the EIA for the 3RS project in November 2014 and January 2015 and will be following up the relevant issues, the ensuing paragraphs sum up the views of the two Panels' members on matters other than environmental concerns.

### *Existing runway capacity*

16. Members noted a deputation's view that HKIA was originally built and designed in accordance with the 1992 New Airport Master Plan ("1992 NAMP") with a design capacity meeting the forecast passenger and cargo throughput for up to 2040 (i.e. an annual demand for cargo volume of 9 million tonnes and passenger traffic of some 87 million), and there was sufficient space and infrastructure available in HKIA to meet the design capacity without having to construct a third runway. Moreover, the planning parameters at that time had not taken into consideration the latest development of information technology and other technological advancement that could increase runway capacity. Members further noted that the cargo volume and passenger traffic handled by HKIA in 2013 were only 4.12 million tonnes and 59.9 million respectively, representing 46% and 69% of the design capacity of 2RS for cargo and passenger traffic, which did not justify for constructing 3RS.

17. AAHK responded that the design of HKIA allowed it to handle the growth in cargo volume anticipated in 1992. The bottleneck of the existing HKIA rested with runway capacity and therefore 3RS was required to cope with the latest anticipated growth in air traffic. The Administration explained that the 1992 NAMP had not taken into account various factors such as the geographic location and surrounding terrain of HKIA and other

limitations of HKIA's runway deployment. It further advised that the cargo traffic volume handled by HKIA had a continuous growth in the past years and the rate of year-on-year increase reached 6% in 2014.

18. On whether the existing 2RS in HKIA could handle a maximum of 68 or 86 air traffic movements ("ATMs") per hour, Panel members noted that the Aviation Policy and Research Centre of the Chinese University of Hong Kong had conducted investigation and published research report on this subject. Former Deputy Chairman of the Cathay Pacific Airways Limited, Mr Philip CHEN, had mentioned that the capacity of HKIA's runway could be increased to 75 ATMs per hour by implementing improvement measures that were found feasible. A Panel member pointed out that the 1992 NAMP had estimated that the two runways of HKIA could handle between 82 and 86 ATMs, and if this could be achieved, the need for the third runway would not be justified.

19. According to the written information provided by AAHK on the maximum practical runway capacity of 2RS (LC Paper No. CB(4)259/14-15(02)), the 1992 NAMP did indicate the 2RS could achieve different capacity in the range of 52 to 86 ATMs per hour. However, it also indicated that in the case of Chek Lap Kok Airport, due to the surrounding terrain notably Lantau's high mountain obstruction, the highest capacity operation mode of 86 ATMs per hour under the "independent mixed mode"<sup>2</sup> of runway operation could NOT be possible or practicable since it did not comply with the International Civil Aviation Organization ("ICAO") standards on flight procedures. Following the 1992 NAMP, separate consultants were engaged in 1994 who confirmed that the maximum capacity of the dual runway was no more than 63 ATMs per hour. Subsequently in 2008, the "National Air Traffic Services" appointed by AAHK confirmed that, after implementing 46 improvements recommendations, the capacity of the two runways could be increased to 68 ATMs per hour. This study result was accepted by CAD. Nevertheless, both AAHK and the Administration did not address the remark made by Mr Philip CHEN that the capacity of 2RS could be increased to 75 ATMs per hour by implementing improvement measures.

20. Members noted the advice of AAHK that the presence of Lantau Island to the south of HKIA had imposed physical constraints on the design of flight paths and procedures by CAD that ruled out independent mixed mode of operations; and the adoption of such mode might not meet ICAO's safety requirements. However, as pointed out by a deputation, the 1992 NAMP had already suggested that consideration should be given to removing the terrains of two peaks, namely Tai Yam Teng and Fa Peng Teng in the

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<sup>2</sup> Both departures and approaches can take place on each of the two runways separately without the need of coordination with operations on the other runway.

northeast Lantau Island, when operational demand of HKIA required increasing capacity provided for independent departures<sup>3</sup>. It was believed that new aviation technologies were emerging which would allow air movements of the existing runways to be increased without contravening ICAO's safety requirements.

21. According to AAHK, terrain removal could only reduce the climb gradient of the contingency departure flight procedures under parallel departures' situation but it could not remove completely the constraints that prohibited the two runways from operating in an independent mixed mode.

22. According to the written information provided by the Administration after the policy briefing on 2 February 2015 (LC Paper No. CB(4)589/14-15(01)), the practical maximum capacity of HKIA's 2RS of 68 ATMs per hour is arrived after taking into account all relevant objective factors, including the minimum lateral spacing requirements between aircraft, airspace dimension, terrain, operating environment in the vicinity of airport, the mix of aircraft types operating at the airport, and airport infrastructures, etc.

23. Subject to the concurrent occurrences of various conditions that are favourable to flight and runway operations, including fine weather in the Hong Kong Flight Information Region, acceptable visibility level, suitable wind speed and direction in the vicinity of airport, suitable mix of operating aircraft types, etc, the actual number of runway movements operated under 2RS at HKIA might be able to slightly exceed 68 ATMs per hour occasionally. Nevertheless, as these favourable conditions are beyond control, unpredictable and infrequent, the actual number of runway movements above 68 ATMs per hour could not be sustained continuously. According to CAD's statistics, the total number of occasions where runway movements at HKIA exceeded 68 per hour was 28, accounting for 0.44% of the total number of hours of the 2RS operation at HKIA in 2014.

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<sup>3</sup> Page 5-1 of the 1992 NAMP states that "The terrain in and around Hong Kong precludes constraint-free operations within the low altitude airspace surrounding Chep Lap Kok. ... There is however, adequate usable airspace in the vicinity of Hong Kong and with the use of the latest technology in navigation aids, radar, and communications, the airspace will accommodate the traffic generated by the airport. ...consideration should be given to terrain removal of two peaks in the Tai Yam Tend and Fa Peng Teng areas of northeast Lantau Island later in the planning period (2005 to 2015) **when operational demand requires increased capacity provided by independent departures.**"

*Airspace constraints and the problem of "air wall"*

24. Some members expressed concerns about airspace restriction and the problem of "air wall"<sup>4</sup>. If this problem was not tackled, the effectiveness of 3RS in expanding the runway capacity to 102 ATMs per hour remained very doubtful. AAHK stressed that the "air wall" would only affect the altitude at which departing aircrafts entered the airspace of the Mainland, but it had no impact on the capacity of the runways. Given the close proximity between HKIA and its Shenzhen counterpart, the "air wall" requirement would in fact improve rather than lower the efficiency in the management of airspace utilization.

25. Addressing a deputation's view that the current airspace constraints would affect the permissible number of aircraft movements in each of HKIA's two runways, AAHK advised that the tripartite working group had reached consensus on the target and measures relating to the planning of optimizing the PRD airspace structure by 2020. The Administration added that the target and measures were drawn up on the understanding that both HKIA and the Shenzhen Bao'an International Airport ("Shenzhen Airport") would eventually operate under 3RS while the Guangzhou Baiyun Airport under 5RS. In drawing up the plan, factors including the safety standards promulgated by ICAO and the requirements of the airspace by the Mainland's People's Liberation Army Air Force had been taken into account.

*Other measures to obviate the construction of 3RS*

26. Members noted with concern that some of the present air movements at HKIA were taken up by more narrow-bodied aircrafts serving secondary destinations in the Mainland. If airlines were encouraged to use bigger aircrafts for use at HKIA (such as by imposing a surcharge on smaller aircraft), higher passenger and cargo throughputs could be achieved without the need for the third runway. AAHK explained that about 63% of the aircrafts using HKIA were wide-bodied models, and the passenger and cargo volume carried by each aircraft departing from HKIA were among the highest in the world. The suggestion of imposing a peak-hour surcharge on small aircrafts would not be effective to encourage airlines to deploy bigger aircrafts, the choice of which was primarily market-driven.

27. In response to a member's concern that HKIA could collaborate with the Shenzhen Airport to achieve load diversion through division of work to obviate the need for constructing 3RS, the Administration advised that the

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<sup>4</sup> "Air wall" refers to the requirement imposed by Mainland authorities that an aircraft departing from Hong Kong must reach the designated handover altitude of 15 700 feet before it enters the Mainland airspace. The handover altitude has since 2005 been lowered to 12 800 feet for aircraft entering the Mainland airspace during specified non-peak hours at night (i.e. 11 pm to 7 am the next day).



matter should be considered comprehensively in the context of air traffic rights. Hong Kong and Shenzhen had its own air traffic arrangement, of which the traffic rights were strictly non-transferrable. Most importantly, transferring flights from Hong Kong to Shenzhen would undermine the status of Hong Kong as the international aviation hub.

*Other issues*

28. Some members cast doubt on the Administration's ability to control cost and prevent cost overruns when taking forward the 3RS project. The Administration advised that AAHK had engaged consultants to work out cost estimates and explore means to generate income from the project to offset the construction cost. The Administration would also appoint independent consultants to evaluate the financing options to be put forth by AAHK. It was estimated that the consultancy study would be completed by the end of 2014.

29. In addition, some members considered that the planned commencement of the construction of 3RS in 2016 was too optimistic, given that LegCo might require time for scrutinizing the project and approving the funding requests. In this connection, members asked about the economic loss that Hong Kong would suffer each year if the implementation of 3RS was delayed.

30. In response, the Administration advised that the current plan to commence construction works of 3RS in 2016 for commissioning in 2023 was pragmatic and achievable. According to AAHK's latest forecast, HKIA would reach the point of saturation in 2016. While detailed assessment was yet to be completed, if 3RS could not come into operation by 2023, Hong Kong might suffer an economic loss estimated to be around \$9 billion to \$10 billion each year. However, as the project estimate for 3RS was still being worked out, the increase in construction expenditure due to delay in project could not be evaluated yet.

31. As regards measures to cope with the increasing passenger and cargo volume during the interim before the commissioning of 3RS by 2023 the earliest, the Administration advised that AAHK was in the process of exploring measures to optimize the capacity of 2RS. CAD would also explore, after the commencement of the new ATC system, whether there was room to further enhance the operation of the runways at HKIA taking into account the safety of aircraft movements.

32. Concerns were raised about whether the Administration would allow the import of labour for the 3RS project to ensure its timely completion, and whether it would introduce measures to attract more workers to take up

employment in the airport. In reply, the Administration advised that it would remain open in respect of the means to ensure a sufficient supply of labour to ensure timely completion of the project. It had also maintained regular communication with the local community and bus operators on the feasibility of increasing bus frequencies and the provision of travelling subsidies for local workers.

### **Council Meetings**

33. At the Council meetings on 15 October 2014, 4 and 25 February 2015, Hon Kenneth LEUNG, Hon Gary FAN and Hon WU Chi-wai raised questions on ATMs and 3RS at HKIA, and development of Hong Kong's air freight industry respectively. In its written replies, the Administration advised that CAD did not have any breakdown on airspace control implemented by the Mainland or on the destinations of the delayed flights, nor the statistics regarding delayed arrival flights from the Mainland. As regards runway capacity, it has no relationship with air traffic management arrangement which seeks to safeguard flight safety. As regards air traffic rights, the Administration indicated that it would not disclose the details of the bilateral negotiations and sensitive information concerning air traffic rights to third parties. Hyperlinks to the relevant written replies from the Administration were provided in **Appendix II**.

### **Latest development**

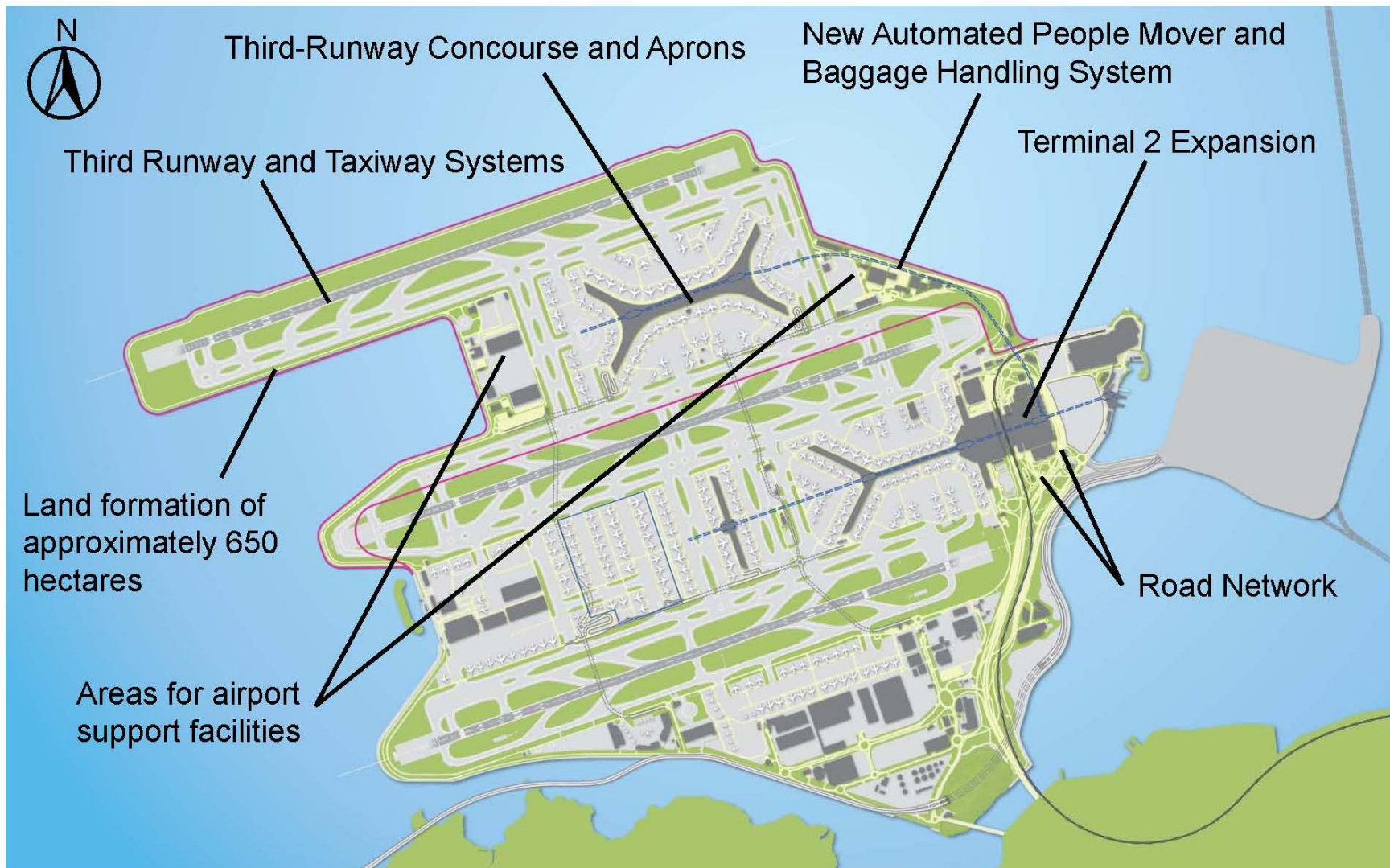
34. At his Budget Speech delivered on 25 February 2015, the Financial Secretary said he envisaged that the construction works for the 3RS could commence in 2016 for commissioning in 2023. AAHK estimated that, with full operation of the system, the airport could handle 100 million passengers and 9 million tonnes of cargo annually by 2030.

35. At the meeting on 23 March 2015, the Administration and AAHK will brief the EDEV Panel on the latest development of the 3RS project, including the outcome of the relevant planning work, design details and financial arrangement.

### **Relevant papers**

36. A list of relevant papers which are available on the LegCo Website (<http://www.legco.gov.hk>) is in **Appendix II**.

# Layout of Three-Runway System



June 2014

*(Source: The layout of the 3RS (Appendix A of LC Paper No. CB(1)1626/13-14(03))*

## List of relevant papers

Issued by	Meeting date/ Issue date	Paper
Panel on Economic Development	27 January 2014	<a href="#">Agenda</a> <a href="#">Minutes</a> <a href="#">Administration's paper on 2014 Policy Address - Policy Initiatives of Transport and Housing Bureau: Transport Branch</a>
	23 June 2014	<a href="#">Agenda</a> <a href="#">Minutes</a> <a href="#">Background brief</a> <a href="#">Information paper issued by the Administration</a>
	2 February 2015	<a href="#">Agenda</a> <a href="#">Administration's paper on 2015 Policy Address - Policy Initiatives of Transport and Housing Bureau: Transport Branch</a>
Joint meetings of Panel on Economic Development and Panel on Environmental Affairs	30 September 2014	<a href="#">Agenda</a> <a href="#">Minutes</a> <a href="#">Background brief</a> <a href="#">Information paper issued by the Administration</a> <a href="#">List of follow-up actions</a> <a href="#">Administration and Airport Authority Hong Kong's paper on follow-up actions</a>
	7 October 2014	<a href="#">Agenda</a> <a href="#">Minutes</a> <a href="#">Background brief</a> <a href="#">Information paper issued by the Administration</a> <a href="#">List of follow-up actions</a> <a href="#">Administration and Airport Authority Hong Kong's paper on follow-up actions</a>

<b>Issued by</b>	<b>Meeting date/ Issue date</b>	<b>Paper</b>
Panel on Environmental Affairs	24 November 2014	<a href="#"><u>Agenda</u></a> <a href="#"><u>Minutes</u></a> <a href="#"><u>Background brief</u></a> <a href="#"><u>Information paper issued by the Administration</u></a>
	6 January 2015	<a href="#"><u>Agenda</u></a> <a href="#"><u>Background brief</u></a> <a href="#"><u>Information note issued by LegCo Research Office</u></a> <a href="#"><u>Information paper issued by the Administration</u></a>
Council Meeting	15 October 2014	<a href="#"><u>Written reply by the Secretary for Transport and Housing to a question on "Air traffic movements at the Hong Kong International Airport" raised by the Hon Kenneth LEUNG</u></a>
	4 February 2015	<a href="#"><u>Written reply by the Secretary for Transport and Housing to a question on "PRD Region air traffic management" raised by the Hon Gary FAN</u></a>
	25 February 2015	<a href="#"><u>Written reply by the Secretary for for Transport and Housing to a question on "Development of Hong Kong's air freight industry" raised by the Hon WU Chi-wai</u></a>
Legislative Council Brief	2 June 2011	<a href="#"><u>Hong Kong International Airport Master Plan 2030</u></a>
Council Meeting	25 February 2015	<a href="#"><u>Budget Speech delivered by Financial Secretary</u></a>