

**For Discussion  
on 5 December 2016**

**Legislative Council Subcommittee  
to Follow Up Issues Relating to the  
Three-Runway System at the Hong Kong International Airport**

**Overview, Scope and Progress Update of the  
Three-Runway System Development**

**Introduction**

This paper provides :

- (a) an overview and scope of the Three-Runway System (“3RS”) project; and
- (b) a progress update of the 3RS.

**Background**

2. Hong Kong International Airport (“HKIA”) has been experiencing strong traffic growth since its opening in 1998. In 2015, HKIA received 68.5 million passengers, 4.38 million tonnes of cargo and handled 406,000 air traffic movements, representing a year-on-year growth of 8.1%, 0.1% and 3.8% respectively. With more than 100 airlines operating over 1,100 daily flights to approximately 190 destinations worldwide, including 47 on the Mainland, HKIA continues to be a leading global and regional aviation hub that helps maintain Hong Kong’s status as “Asia’s World City”.

3. To enhance the handling capacity of HKIA, the Airport Authority Hong Kong (“AAHK”) has been taking forward various initiatives, including the West Apron Expansion and the Midfield Development Project, which have been in full operation since January 2015 and March 2016 respectively. The remaining phase of Midfield Development is targeted for completion by 2020. Details of these initiatives are set out at **Enclosure 1** for reference. However, these initiatives, whilst increasing ground handling capacity in the short to medium term, will not increase the airport’s overall handling capacity as the bottleneck now lies in the airport’s runway capacity which is capped at 68 air traffic movements per hour. A third runway is still needed to meet long-term traffic demand.

4. At the meeting of the former Subcommittee to Follow Up Issues Relating to the Three-Runway System at the Hong Kong International Airport (“former Subcommittee”) on 3 November 2015, Members were given an overview of the 3RS project, covering, inter alia, the statutory gazettal processes as well as the latest progress (LC Paper No. CB(4)143/15-16(01)). On 26 April 2016, the Chief Executive-in-Council approved the draft Chek Lap Kok Outline Zoning Plan under the Town Planning Ordinance (Cap. 131) and authorised the proposed reclamation for the expansion of HKIA into a 3RS under the Foreshore and Sea-bed (Reclamations) Ordinance (Cap. 127).

5. Subsequent to the completion of the statutory gazettal processes, AAHK has been taking forward the project progressively. Construction works of 3RS commenced on 1 August 2016.

6. As explained in LC Paper No. CB(4)143/15-16(01), the 3RS project is more than building an additional runway. The project includes the following seven core components :

- (a) formation of approximately 650 hectares of land north of the existing airport island by reclamation partly on top of disused contaminated mud pits using non-dredged methods including deep cement mixing (“DCM”) technique for ground improvement;
- (b) construction of the Third Runway, taxiways and apron;
- (c) construction of the Third Runway Passenger Building (“TRPB”) with 57 parking positions upon 3RS commissioning;
- (d) expansion of the existing Terminal 2 (“T2”) and construction of associated road network;
- (e) provision of a new automated people mover system (“APM”) and an integrated maintenance depot;
- (f) provision of a new high-speed baggage handling system (“BHS”) serving TRPB and T2; and
- (g) construction of airport support infrastructure, utilities and facilities.

7. The layout plan for the 3RS is at **Enclosure 2**. Details of the scope of the 3RS project are included in LC Paper No. CB(4)275/15-16(01) presented to the former Subcommittee for discussion at its meeting on 1 December 2015 (at **Enclosure 3**).

8. The project is estimated to cost \$141.5 billion in money-of-the-day prices. The construction of the project would take some eight years to complete. The latest developments of the 3RS project, namely updates on (a) construction; (b) environmental-related issues; and (c) financial arrangement proposal, are summarised in the paragraphs below.

### **Progress Update on 3RS**

#### **(a) Construction**

9. Construction works for the 3RS will generally proceed in the following order: diversion of existing utilities (mainly submarine power cables and aviation fuel pipelines); land formation; and construction of infrastructure and superstructure.

#### **Diversion of Existing Utilities**

10. The existing airport island is currently supplied with aviation fuel via twin 500 millimetres diameter submarine aviation fuel pipelines that originate from Tuen Mun permanent aviation fuel facility to the aviation fuel receiving facility at Sha Chau, and then to the aviation fuel tank farm on the airport island. The diversion of the pipeline between Sha Chau and the airport island using a horizontal directional drilling method is required, such that they will not be affected by reclamation which covers the area of the existing pipelines. Early works commenced in July 2015 and the diversion is targeted for completion in January 2018.

11. There is currently one set of 11 kV of undersea power cables located below the seabed that provides power supply from the northwest of the airport island to Sha Chau and Lung Kwu Chau islands. As the cables will be affected by the future reclamation, they would have to be diverted by China Light and Power Hong Kong Limited. Diversion of these submarine cables is currently underway and is targeted for completion in the first quarter of 2017. The diversion will ensure uninterrupted power supply to the facilities at Sha Chau.

12. A location plan of the works described in paragraphs 10 and 11 above is at **Enclosure 4**.

### Reclamation Works

13. All designs for reclamation have been substantially completed and approved by the Buildings Department (“BD”). To-date, AAHK has awarded all major works contracts for the reclamation and its associated ground improvement works, comprising five DCM contracts and the main reclamation contract.

14. DCM works which are required to improve ground conditions of the reclamation area commenced on 1 August 2016 and are progressing on schedule. As at mid-November 2016, the DCM contractors are assembling the DCM barges at various shipyards at full steam. Four barges have arrived in Hong Kong and more are due to arrive in the coming months from Mainland China, Korea, Vietnam and Japan. In the meantime, the advanced works for DCM, including the laying of geotextile and sand blanket, has commenced. It is expected that the entire DCM works will take around two years to complete, with phased handover to the follow-on reclamation works.

### Detailed Design

#### *Expansion of T2*

15. The existing T2 will need to be re-configured to provide full-fledged terminal services serving arrival, departure and transfer operations. Some major works such as extending the APM to connect T2 with the TRPB and other terminal/ SkyPier facilities, and accommodating a new high-speed BHS underneath T2 to service TRPB passengers, will be carried out as part of the works.

16. The detailed design of T2, which commenced in June 2015, is progressing on schedule. Advanced works of the new coach staging area have been approved by the BD and are scheduled to commence in December 2016; while the design for the relocation of antenna farm and pumping station has been completed and is awaiting approval from relevant Government authorities.

#### *Other Design Consultancies*

17. The design consultancy services for the APM and BHS which were awarded in September 2015 are in good progress. Reference designs for APM and BHS have been substantially completed and preparation of the tender

documents for the design and build contract is underway. The design consultancy service for the TRPB was awarded in October 2016.

**(b) Environmental-Related Issues**

18. Members have been briefed on the environmental mitigation measures and enhancement initiatives to be implemented by AAHK at the meeting of the former Subcommittee on 16 February 2016. A copy of the discussion paper (LC Paper No. CB(4)576/15-16(01)) is at **Enclosure 5**.

19. AAHK attaches great importance to addressing all environmental impacts associated with 3RS. Through the statutory Environmental Impact Assessment (“EIA”) process, AAHK has ensured that all the potential environmental impacts are properly avoided, minimised and compensated. On 7 November 2014, the Director of Environmental Protection granted the Environmental Permit (“EP”) for the 3RS project to AAHK. The EP sets out a number of conditions covering proposed environmental mitigation measures, enhancement initiatives, monitoring, and submission requirements during different stages of the project.

20. AAHK continues to fulfil the commitments made in the EIA Report and comply with the respective conditions stipulated in the EP. Specific progress has been made in the areas set out below.

21. In discussing LC Paper No. CB(4)576/15-16(01) at the meeting on 16 February 2016, former Subcommittee Members noted that AAHK would establish a Marine Ecology Enhancement Fund (“MEEF”) and a Fisheries Enhancement Fund (“FEF”) with a total budget of HK\$400 million. As prescribed in the EP, AAHK has established a Management Committee for each of MEEF and FEF, and a Steering Committee to provide overall directional guidance for the operation of the funds. These Committees comprise members from different stakeholder groups including academics, green groups, dolphin experts and fishermen etc., and held their inaugural meetings in November 2016. Applications for funding from MEEF and FEF will be invited in December 2016, with successful applicants expected to be informed by mid-2017. Third-party groups such as non-governmental organisations, academic institutions and organisations from the fisheries sector may submit applications. The two management committees will be responsible for vetting and selecting relevant applications in an independent and objective manner based on the merits of the project proposed by each competing application, and ensuring by way of reviews that selected projects are properly and effectively conducted by the successful applicants during the relevant financial year.

22. The EP also requires, amongst others, the setting up of Professional and Community Liaison Groups, and the submission of various plans to the Environmental Protection Department, three months prior to the commencement of reclamation works. To this end, the Professional Liaison Group (“PLG”) and five Community Liaison Groups (“CLGs”) have each held two rounds of meetings – the PLG met in April and September 2016, and the CLGs met in April and August 2016 respectively. Members of the PLG and CLGs were updated on the latest progress of the 3RS project and associated environmental matters. AAHK has also finalised all the EP submissions required prior to the commencement of 3RS works. These submissions, along with the Monthly Environmental Monitoring and Audit Reports and environmental monitoring data, are available to the public through a dedicated website (<http://env.threerunwaysystem.com/en/index.html>).

**(c) Financial Arrangement Proposal**

23. Members have been briefed on AAHK’s financial arrangement proposal for the 3RS project, including the study on the financial arrangements for the 3RS conducted by its financial advisor, at the meeting of the former Subcommittee on 5 January 2016. A copy of the discussion paper (LC Paper No. CB(4)399/15-16(01)) is at **Enclosure 6**. A diagram summarising the overall 3RS funding plan is at **Enclosure 7**.

24. AAHK has appointed the Hongkong and Shanghai Banking Corporation Limited as its financial advisor to consider the financial arrangement proposal for the 3RS project. In considering the financial arrangements for the 3RS, AAHK has adopted the “joint contribution” principle. In short, whilst AAHK will fund part of the project cost, users of HKIA, including passengers and airlines etc. will also contribute. With the advice of its financial consultant, AAHK will fund the 3RS through the following three sources:

- (a) AAHK’s operating surplus after reviewing and adjusting existing fees and charges;
- (b) introduction of a new Airport Construction Fee (“ACF”); and
- (c) third party debts raised from the market leveraging on AAHK’s financial capability and credit rating.

25. The revenue generated by (a) and (b) above will provide around 51% of the funding required to finance the 3RS project. The remaining 49% will be raised from the market as mentioned in (c).

26. As part of the financial arrangement for the construction of the 3RS, AAHK has begun collecting the ACF on air tickets issued on or after 1 August 2016 for departing passengers at HKIA. The ACF regime differentiates charging levels according to short haul/long haul passengers<sup>1</sup>; premium class/economy class passengers<sup>2</sup>; and origination and destination/transfer and transit (“TT”) passengers.

27. The ACF for short-haul departing passengers in economy class is set at \$90, while the charge for short-haul passengers in first/business class is set at \$160. For long-haul passengers, the charges for flying in economy and first/business classes are set at \$160 and \$180 respectively. To maintain the competitiveness of HKIA as a hub airport, the ACF for short-haul TT passengers in economy class is set at \$70. A table summarising the ACF scheme is as below.

ACF (HK\$ per departing passenger)		Premium	Economy
	Long haul	\$180	\$160
	Short haul	\$160	<b>\$90*</b>

\* To maintain the competitiveness of HKIA’s hub status, ACF for short haul economy TT passengers is set at \$70.

28. In devising the ACF regime with differential charging levels, AAHK has taken into account feedback from the consultation with key stakeholders, including home-based carriers and the travel industry, and passenger surveys.

29. AAHK also implemented the increase in landing and parking charges to be paid by airlines on 1 September 2016.

<sup>1</sup> The definition of long/short hauls follows that adopted by the Civil Aviation Department in determining fuel surcharges. Long haul destinations include those in North and South America, Europe, Middle East, Africa, Southwest Pacific and Indian Subcontinent. The rest are short haul destinations.

<sup>2</sup> Premium class passengers include first and business class passengers. Economy class (including premium economy) passengers are non-premium class passengers.

30. With the revenue generated under paragraph 24 (a) and (b) above, AAHK estimated that the total funding shortfall would be around \$69 billion to be met by third party debts. As a follow up to the overall financing arrangement for developing the 3RS announced by AAHK in 2015, AAHK will commission a consultancy study on the detailed debt and bank financing plan for the 3RS project. The consultancy will analyse different debt structures, identify different forms of financial instruments, including retail bonds, in both the bank loan market and capital market and make recommendations on instruments, timing, size and tenor, etc. in the best interest of the project. The consultancy, the appointment of which is being finalised, is expected to be completed by mid-2017.

### **Pearl River Delta (“PRD”) Airspace Management**

31. To maximise the airport handling capacity of the HKIA upon the implementation of 3RS, we have to ensure compatibility in airspace management with major adjacent airports in the Pearl River Delta (“PRD”) region.

32. We have witnessed phenomenal growth in air traffic volume within the PRD region in recent years. In order to enhance flight safety in the PRD airspace while supporting air traffic growth, the Civil Aviation Administration of China (“CAAC”), the Civil Aviation Department (“CAD”) of Hong Kong SAR and the Civil Aviation Authority of Macao SAR (“CAAM”) jointly established a Tripartite Working Group (“TWG”) in 2004 to formulate measures to harmonise air traffic management arrangements in the PRD region. The TWG drew up the “Pearl River Delta Region Air Traffic Management Planning and Implementation Plan (Version 2.0)” (“the 2007 Plan”) in 2007, the overarching objective of which is to optimise the utilisation and management of PRD airspace, in a safe and efficient manner, for the mutual benefits of the five major airports in the PRD region. Having taken into account the operational need for 3RS of HKIA, as well as the planned development of other key airports in the PRD region, the 2007 Plan recommended measures to improve air traffic management and planning of the PRD region, including a range of short, medium and long term measures to optimise the developmental opportunity and synergy of the PRD airports.

33. With the full support of the TWG members, a number of short-to-medium-term airspace enhancement measures in the 2007 Plan have been successfully implemented in a step-by-step, incremental manner. These included the following: (a) establishment of two additional handover points and corresponding air routes between Hong Kong and Guangzhou Flight



Information Regions (“FIRs”) to cater for flights overflying Hong Kong and landing in Guangzhou and Shenzhen; (b) establishment of new air routes for the eastern part of the Mainland and an additional handover point between Hong Kong and Guangzhou FIRs for flights operating between Hong Kong, Macao and the eastern part of the Mainland; and (c) adjustment of the Zhuhai airspace structure and establishment of peripheral flight paths in the PRD region. The three sides have been maintaining close liaison and will continue to deliberate on the work plans under the TWG platform.

#### Full support of the Central People’s Government (“CPG”) for 3RS

34. The 3RS development receives full support from the relevant Central Authorities at various levels. At ministerial level, the former Administrator of CAAC has repeatedly and publicly expressed his full support for the 3RS project during meetings with the Secretary for Transport and Housing and the Chairman of the AAHK in 2015. When the Director General of Civil Aviation met with the incumbent Administrator of CAAC in September 2016, he also gave his full support for the 3RS project.

35. At the State Council level, in the Guiding Opinion on Promoting Cooperation within the Pan-Pearl-River Delta region (《國務院關於深化泛珠三角區域合作的指導意見》) (“Guiding Opinion”) issued on 15 March 2016, it “supports the development of the 3RS at the HKIA to reinforce Hong Kong's position as an international aviation hub”. The CPG also encourages closer cooperation between the HKIA and airports in the nine provinces/regions of the Mainland.

#### Agreement on Liaison Mechanism to Enhance Co-operation and Exchange

36. To further enhance communication and synergy within the TWG, the Air Traffic Management Bureau of CAAC (which oversees Mainland airspace arrangement), CAD and CAAM signed an agreement in Hong Kong in May 2016 on establishing a strengthened liaison mechanism to enhance co-operation and regular exchange among the three sides on air traffic management planning and implementation in the PRD region. The top management of the three civil aviation authorities will host high-level meetings in the Mainland, Hong Kong and Macao on a rotational basis and/or tele-conferencing twice a year to proactively strengthen the close co-operation among the three sides. A press release on signing of the agreement was issued (at **Enclosure 8**).

37. The TWG will continue to conduct regular meetings and expert studies with a view to implementing enhancement measures of the 2007 Plan, including airspace management, in a progressive manner.

## **Advice Sought**

38. Members are invited to note the issues covered in this paper. Details concerning the environmental matters, financial arrangement plan and PRD airspace management will be discussed further in subsequent meetings.

**Transport and Housing Bureau  
Civil Aviation Department  
Airport Authority Hong Kong**

**December 2016**

**Expansion Projects at the Hong Kong International Airport (“HKIA”)**

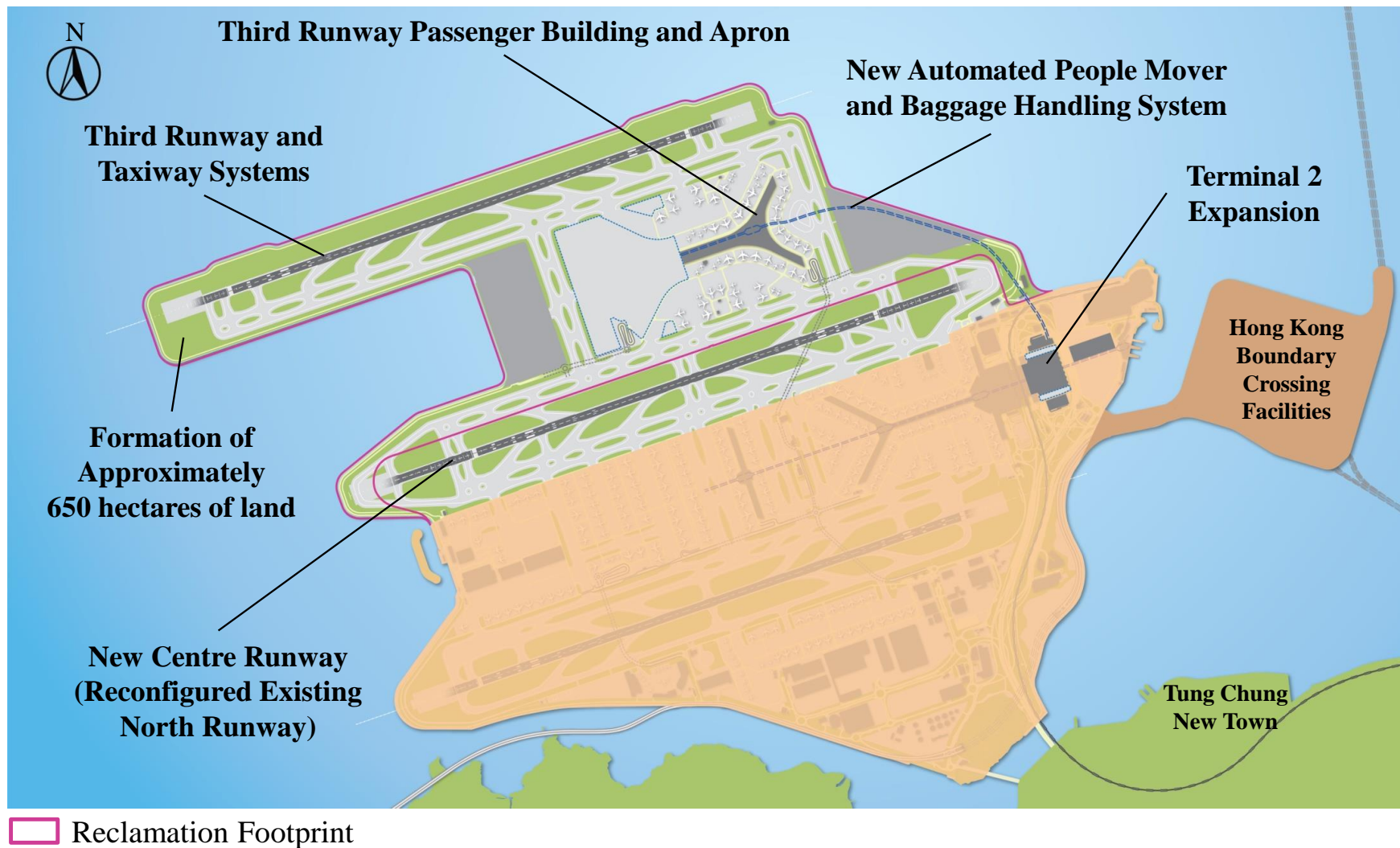
***West Apron Expansion***

The West Apron Expansion project, which cost over HK\$2.5 billion, was completed in the end of 2014 and commenced full operation in 2015. The project provides a total of 28 additional parking stands to increase the parking capacity of the maintenance and cargo aprons.

***Midfield Development***

Located west of Terminal 1 between the two existing runways of the HKIA, the Midfield has an area of 410,000 square metres. In late 2015, the Airport Authority Hong Kong completed the construction of the Midfield Concourse (“MFC”) and its ancillary facilities with 20 aircraft parking positions. With its full operation in March 2016, the MFC is now able to handle approximately 20% of HKIA’s daily flight, raising the airport capacity by at least 10 million passengers a year. Development of the remaining Midfield is scheduled to be completed in phases by 2020.

**Three-Runway System Project Layout Plan**



**For Discussion  
On 1 December 2015**

**Legislative Council Subcommittee  
to Follow Up Issues Relating to the  
Three-runway System at the Hong Kong International Airport**

**Three-Runway System Project at the Hong Kong International Airport:  
Project Scope and Cost**

**Introduction**

This paper sets out :

- (a) the scope and cost of the three-runway system (“3RS”) project, including 3RS reclamation design; and
- (b) the cost control for the 3RS project.

**Background**

2. At the meeting on 3 November 2015, Members were given an overview of the 3RS project, covering, inter alia, the project scope and cost as well as the latest progress (LC Paper No. CB(4)143/15-16(01)). Members asked for a further discussion of the project scope and cost.

3. The 3RS is the single largest development planned for the airport since its opening in 1998. The scale of the works is similar to the construction of the existing airport at Chek Lap Kok, except that the site is now within the operational environment of one of the world’s busiest airports. The scope of works and design details of the 3RS are being fine-tuned at the detailed design stage to ensure the final project design takes due consideration for economy, as well as safety and operational efficiency.

**Scope of the 3RS Project**

4. On the basis of the scope as set out in Airport Authority Hong Kong’s (“AAHK”) Master Plan 2030, the 3RS is planned to cater for an additional 30 million passengers per annum (“mppa”). Together with the

capacity of the existing Hong Kong International Airport (“HKIA”), the completed 3RS would have the capacity of handling around 100 mppa by the year 2030, with the potential for expanding further, if and when necessary. The major components of the project include:

- (a) formation of approximately 650 hectares (“ha”) of land north of the existing airport island by reclamation;
- (b) construction of the Third Runway, taxiways and apron;
- (c) construction of the Third Runway Concourse (“TRC”) with 57 parking positions upon 3RS commissioning;
- (d) modification/expansion of the existing Terminal 2 (“T2”) and construction of associated road network;
- (e) provision of a new Automated People Mover (“APM”) System and an integrated maintenance depot;
- (f) provision of a new high-speed Baggage Handling System (“BHS”) serving TRC and T2; and
- (g) construction of airport support infrastructure, utilities and facilities.

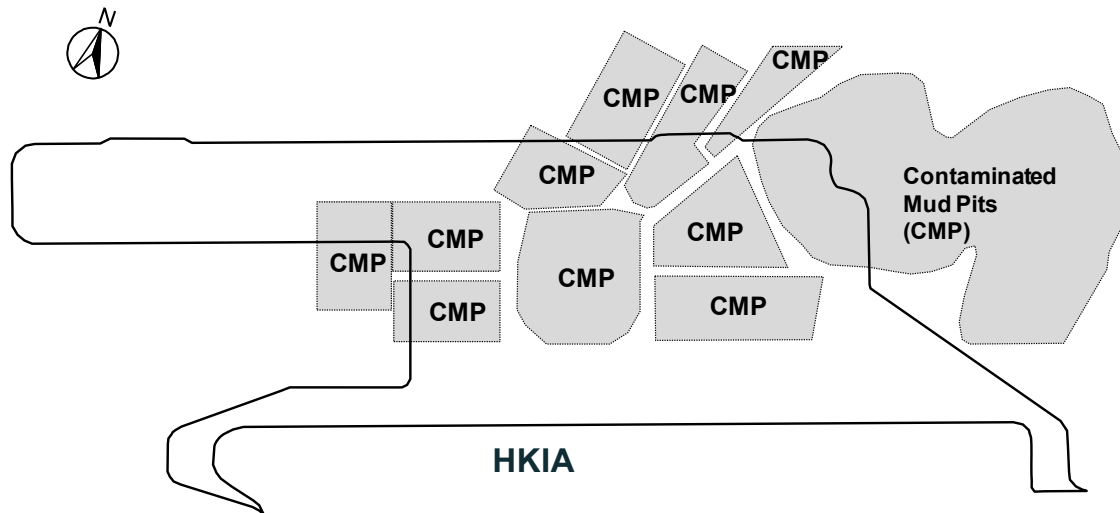
5. The layout plan for the 3RS project at **Appendix A** and details of the major works items are elaborated in the following paragraphs.

**(a) Formation of Land by Reclamation**

6. The 3RS project requires reclamation to create a platform of around 650 ha north of the existing airport to accommodate the new runway, all associated taxiways, a passenger concourse, aprons and other airport infrastructure.

7. In order to fully understand the existing ground conditions of the reclamation area, a comprehensive ground investigation study has been conducted (with over 650 ground investigation points). The study reveals that the general ground condition comprises a thick layer of soft marine mud of varying thickness (averaging 15m), underlain by a layer of stiffer alluvium of 15 to 20m. About 40% of the reclamation area is underlain by disused Contaminated Mud Pits (“CMPs”) within the layer of the marine mud, as shown in **Figure 1** below. The contaminated mud is generally highly disturbed and is softer than the surrounding mud.

**Figure 1 : Contaminated Mud Pits within the Reclamation Footprint**



8. The reclamation works comprises three main components : ground improvement, seawall formation and land formation. In view of the ground conditions and environmental considerations, a combination of meticulous techniques and procedures, which will comply with both the geotechnical as well as environmental requirements, will be adopted to strengthen the soft marine mud which will be left in place but, at the same time, strong enough to ensure the formation of a stable platform.

### Ground Improvement

9. In simple terms, land will be formed above the CMP areas and non-CMP areas. Having considered the possible impacts on the environment, a combination of non-dredged reclamation methods will be used. In the CMP areas, the use of Deep Cement Mixing (“DCM”) will be adopted. DCM involves the solidification of the marine mud by mixing it with cement, giving rise to clusters of improved ground in the form of closely spaced columns that are able to support the reclamation above. The merit of DCM is to contain contaminants from escaping in any water squeezed out. Whilst this technique has been widely used in Asia (principally Japan and Korea)<sup>1</sup> and Europe and America, to provide confidence in the constructability and the environmental acceptability of the method in Hong Kong, a series of trials has been conducted. The trials and the associated monitoring and testing have all been proven successful.

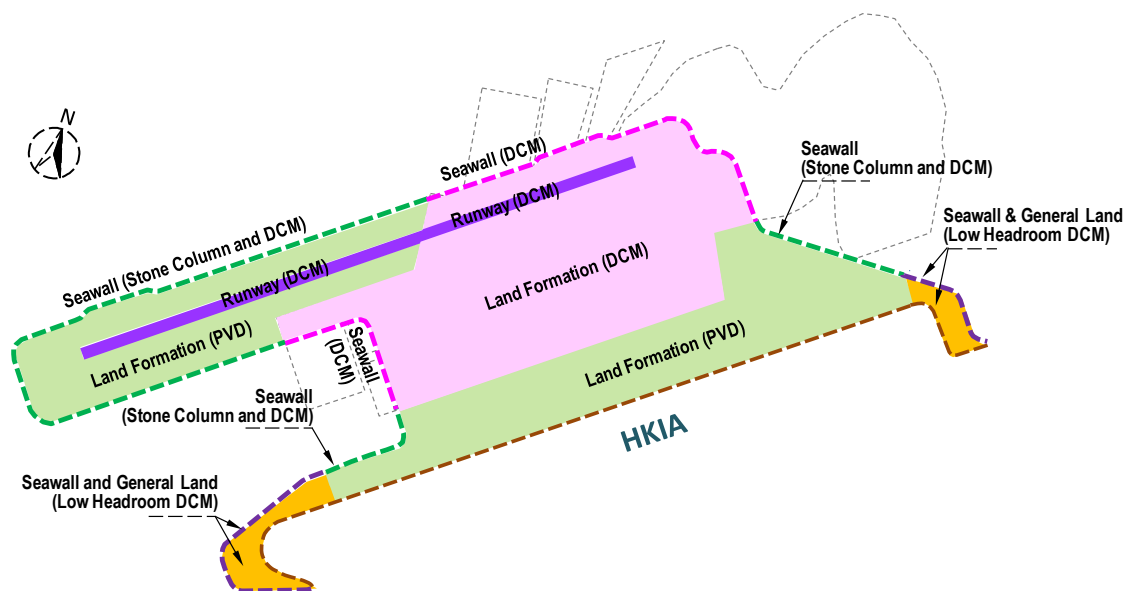
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<sup>1</sup> Examples of DCM used in other major airport developments include the Osaka Kansai Airport and the Tokyo Haneda Airport.

10. For the formation of land in the remaining non-CMP area, the traditional method of drained reclamation will be adopted by installing closely spaced Perforated Vertical Drains (“PVD”) within the thick marine mud layer to allow the water within the mud to escape during the filling operation, thereby accelerating consolidation of the marine mud. In addition, the land will be filled to several metres above the future formation level to provide a temporary additional load (called “surcharge”) to speed up the consolidation process. Upon the removal of the surcharge, the excessive settlement would have been removed and ready for the subsequent infrastructure and superstructure construction.

11. A simplified layout of the different ground improvement methods to be adopted, with their relative locations and areas within the land formation footprint, is illustrated in **Figure 2** below.

**Figure 2 : Layout of Ground Improvement Methods to be Adopted**



Seawall Formation

12. The reclamation area will be bounded by approximately 13.4 km of seawall. The seawall principally consists of a conventional sloping rubble mound seawall for protecting the fill materials in the reclamation. The seawall has been designed to withstand the action of currents and waves under operating and predicted extreme conditions (including typhoons) derived from the hydrodynamic modelling and studies. A 10% increase in the predicted future typhoon intensity was adopted in the model and the crest levels of the seawalls will also be raised to cater for effects based on the suggestion in the



Intergovernmental Panel on Climate Change<sup>2</sup> (IPCC 2014).

13. Ground improvement techniques will be adopted below the seawalls, including DCM wall panels, to provide lateral resistance under the seawall in the CMP. Outside the CMP, the marine mud will be improved by stone columns (another common type of ground improvement technique used in soft ground), together with DCM wall panels introduced to counter lateral loads.

### Land Formation

14. In summary, the land to be formed will be placed in layers. Initially, a 2m thick sand blanket will be placed over the seabed to avoid disturbance of the soft marine mud; then to be followed by the main body of the reclamation, predominately using sand placed to slightly above water level (approximately +2.5mPD). After this, the fill will be placed by land-based plant using different types of fill materials including sand and public fill. The final formation level of the general platform will be similar to that of the existing airport (+6.5mPD). The whole land formation process will be completed in phases, with an average completion time of four years.

15. To form the reclamation, it is estimated that about 100 Mm<sup>3</sup> of sand fill; about 5 Mm<sup>3</sup> of rock fill and rock armour (for the formation of seawall); and up to 28 Mm<sup>3</sup> of public fill will be required. Marine sand will be sourced from the Mainland. Based on the advice from the Civil Engineering and Development Department, public fill would be available from their fill banks and other concurrent infrastructure projects. Potential sources of rock fill and rock armour are nearby quarries in the southern part of Mainland China. In case of any shortfall, the use of precast units would be considered. Rock armour removed from the existing Airport Island north seawall will also be reused where possible. With the adoption of all these techniques, the land formed will be structurally strong while fulfilling the relevant environmental considerations.

### Management of Marine Construction Activities

16. In discussing LC Paper No. CB(4)143/15-16(01) at the meeting on 3 November 2015, a member requested AAHK to provide information on the measures to be adopted to safeguard the safety of fishermen and others at sea in

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<sup>2</sup> The Intergovernmental Panel on Climate Change, established by the United Nations Environment Programme and the World Meteorological Organization in 1988, is the leading international body for the assessment of climate change. It provides the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts.

the course of carrying out the reclamation works for the 3RS project. In this regard, members may wish to note that during the conceptualization of reclamation design, special considerations have been given to ensure proper management of marine construction activities. In addition to liaising closely with the Marine Department, a Marine Traffic Control Centre will be set up as part of the reclamation works contract to manage and coordinate the movement of working vessels in relation to the 3RS works so that the impact of working vessels on regular marine activities, including those of fishing vessels, are practically minimized. Furthermore, the reclamation works areas will be clearly delineated and patrolled to prevent unintentional entry of unauthorized vessels that may pose danger to themselves as well as to other working vessels.

**(b) Construction of the Third Runway, Taxiways and Apron**

17. The design of the airfield is guided primarily by two principles :
- (a) the standards set out by the International Civil Aviation Organisation<sup>3</sup> (“ICAO”), and standards and practices required by the Civil Aviation Department; and
  - (b) the need to accommodate the full range of aircraft up to the largest passenger aircraft i.e. the Airbus A380 (Code F).

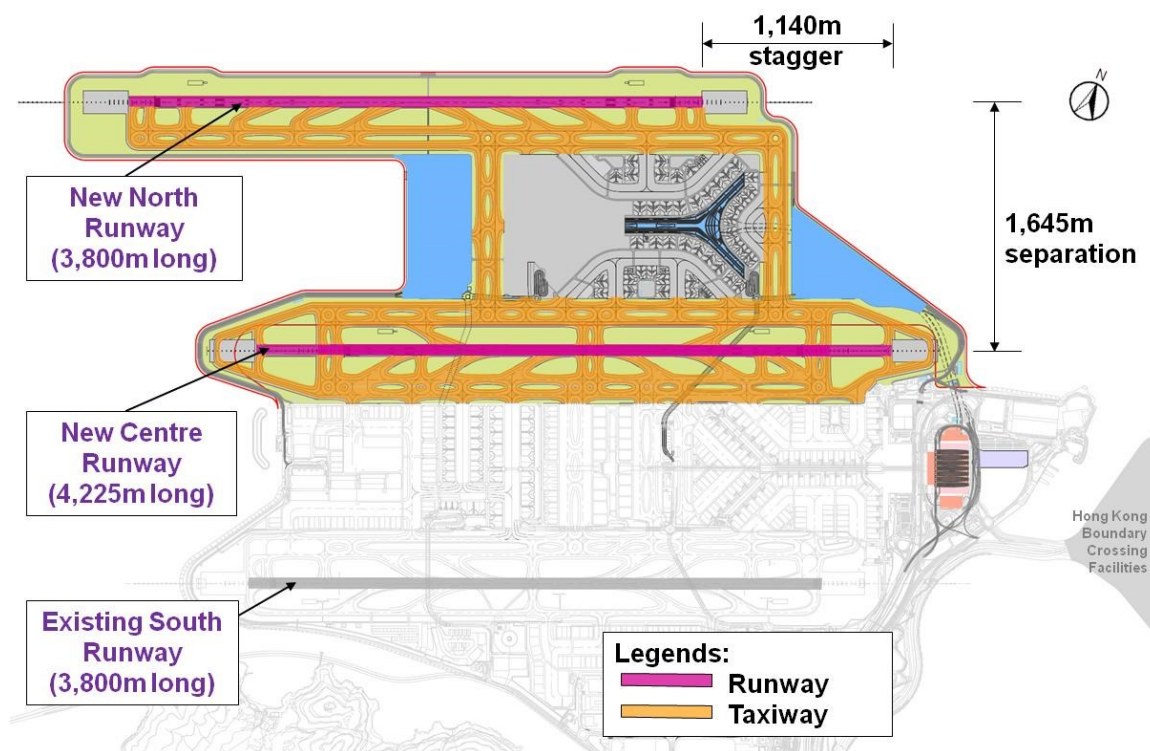
Runway and Taxiways

18. Construction of the new runway and taxiways will commence after completion of the land formation. The configuration of the runway and taxiways in the 3RS is illustrated in **Figure 3** below.

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<sup>3</sup> ICAO works with the Member States of the Convention on International Civil Aviation (Chicago Convention).and industry groups to reach consensus on international civil aviation Standards and Recommended Practices (SARPs) and policies in support of a safe, efficient, secure, economically sustainable and environmentally responsible civil aviation sector.

**Figure 3 : Three-Runway System Configuration**



19. A 3,800-metre-long and 60-metre wide<sup>4</sup> new runway, parallel to the existing two runways and to the north of the existing airport platform, will be built. Upon completion, the third runway will become the North Runway.

20. The third runway will be staggered 1,140m to the west of the existing North Runway. Technical studies had been conducted and the findings confirmed that to comply fully with the safety and air traffic control requirements, the alignment of the third runway will need to be staggered within the range of 700m and 1,400m to the west of the existing North Runway. After careful assessment, the 1,140m stagger has been confirmed to be the most optimum alignment that will not affect the busy Urmston Road channel to the east and leave a reasonably wide and adequate air-draft navigational channel to the west of the third runway. Such an alignment will also, on balance, achieve the highest efficiency in apron operation and minimize the reclamation overlap with the CMPs. In short, careful consideration has been given to establish the 1,140m stagger to optimize the performance of the 3RS in relation to the existing airport and surrounding topography.

<sup>4</sup> The configuration is the same as those of the existing two runways whereby all types of aircraft, including Airbus A380, can be accommodated.

21. Following the completion of the third runway, the existing North Runway will be closed for about two years to be modified into the Centre Runway. It will be extended, from its current length of 3,800 metres, by 425m to accommodate a Wrap-Around-Taxiway on either ends to avoid aircraft landing on the new North Runway having to taxi across the new Centre Runway to reach the Terminal 1 (“T1”) Aircraft Parking Apron. During the modification works, planes will take off and land from the Third Runway and the existing South Runway.

22. Two parallel taxiways and four crossfield taxiways are provided to the south of the new North Runway and, similarly, two new parallel taxiways are also provided to the north of the new Centre Runway.

### Aircraft Parking Apron

23. The following design considerations have been taken into account in the planning of the apron layout and aircraft parking positions:

- (a) airline terminal and concourse occupancy to minimize long transfer distances between airlines of the same alliance;
- (b) minimization of taxiway routing of aircraft between TRC apron and runways;
- (c) maximization of the number of contact parking positions served by Aircraft Loading Bridges (“ALB”); and
- (d) provision of apron road network to facilitate efficient ground service operations.

**Figure 4** shows the indicative apron configuration.

**Figure 4 : Indicative Apron Configuration**



24. Based on the traffic forecast of IATA Consulting<sup>5</sup> and the airlines allocation strategies, it is forecast that the TRC apron will require 57 parking positions, of which 34 will be contact positions with direct ALB connection to the concourse and 23 will be remote parking positions to meet the aircraft stand demand and the passenger handling capacity of 30 mppa.

**(c) Construction of TRC**

25. The concourse is the place where passengers will either congregate before boarding their departure flight, or first alight from aircraft as an arriving passenger. The prime consideration in the design of the TRC therefore is passenger experience. In terms of space provision, the TRC will have a floor area of about 280,000 square metres. The general layout will be largely on a par with that of T1 and the level of service standard of the TRC will also be on a par with most of the other international airports. Passengers will be provided with a good level of services, in terms of space allowance at critical areas such as transfer area, waiting / circulation area, security screening area, holding area and boarding gate loading area. All in all, passengers will enjoy an efficient, comfortable and pleasant environment at the TRC.

26. Similar to T1, the TRC will be a single concourse that allows passengers to access all gates by walking. Departing passengers enter the Departure Level at a single point set on the TRC, thus avoiding the duality of the north and south access points of T1, offering substantial improvement in the clarity of way finding. It also offers a piazza-like commercial hub which optimises exposure to retail facilities and direct sightlines to departure gates. A widened central concourse incorporating outdoor courtyards offers passenger access to and views of natural landscaped spaces while two sunken gardens will be built to enhance the experience of arriving passengers. The roof will adopt a single flowing form which is designed to express spatial continuity and enhance intuitive passenger orientation in the same way as in T1. **Figures 5 to 7** show the TRC artist impression; the piazza-like commercial hub; and the view of landscape courtyard at departure level respectively.

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<sup>5</sup> IATA Consulting, the commercial arm of International Air Transport Association (“IATA”), is a highly regarded organization in providing traffic forecast for aviation clients.

**Figure 5 : TRC Artist Impression**



**Figure 6 : View of Piazza-like Commercial Hub**



**Figure 7 : View of Landscape Courtyard at Departure Level**



#### **(d) Modification/Expansion of T2**

27. With the expansion of the HKIA into a 3RS, T2 will be expanded to provide full-fledged terminal services, serving departure, arrival and transfer operations. The need to modify and expand T2 has been examined in great detail and is considered absolutely necessary for the overall operational efficiency of the 3RS. Careful consideration has been given to retaining the existing structures and facilities. According to the latest design, the entire T2 foundation, substructures, and coach hall at Level 3, together with most of the building services facilities and airport system works, such as generators and transformers, chillers, lifts etc, will be retained. Other floor levels will also be retained as far as possible but with modifications necessary to suit the expanded T2 layout. Materials demolished from the T2 would be reused or recycled in the 3RS project wherever possible.

28. The design of the modified/expanded T2 will provide an airport terminal that facilitates a simple, direct and efficient flow for passengers and baggage handling. A “T1 Mirror” design concept will be adopted to provide a reflection of the world class standard and efficiency of T1. The Check-in Hall at Departure Level comprises check-in islands with a central Departure Portal above the new T2 Baggage Reclaim and Meeters and Greeters Arrival Level. Furthermore, the North and South Annex Buildings will be constructed on both sides of T2 to house several key land transportation and building facilities including coach staging area, arrival pick up, loading / unloading bays, limousine lounge and staging area and public car parking. An APM Interchange Station (“AIS”) will be provided at the basement of T2 to serve as the central transfer between T1, T2, TRC and SkyPier. In short, the design of T2 will allow for maximum flexibility in terms of internal space utilization and possible future changes in the functional requirements and expansion. Construction works will be implemented in phases to minimize disruption of existing airport operations.

#### **(e) Provision of a new APM System**

29. The 3RS APM system consists of a new underground APM line of 2.6 km long, connecting the AIS and TRC. It will be a three-guideway (track) system with a single pinched loop<sup>6</sup>, catering for four x 6-car trains at 2.5 minutes headway, with a maximum train speed at about 80 km per hour. The travelling time from T2 to the TRC will be about 2.7 minutes. Up to 10,800 passengers can be transported per hour.

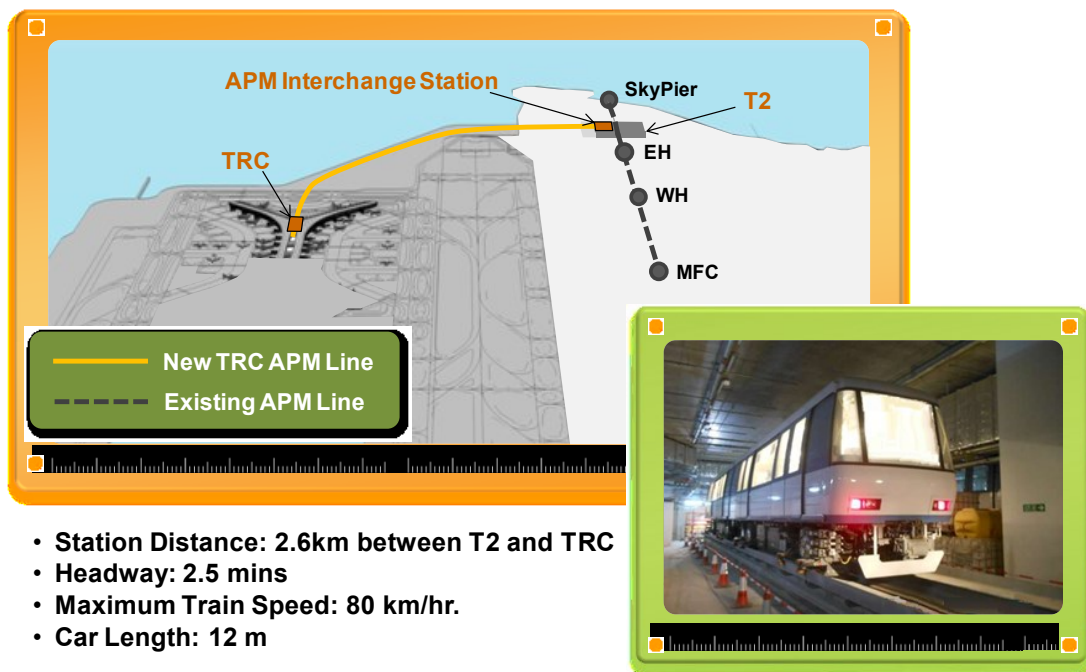
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<sup>6</sup> A pinched loop consists of a dual guideway configuration whereby trains travel in a loop by reversing direction and changing lanes at the end stations.

30. In view of the relatively long distance between T2 and the TRC which is beyond walking distance, a high level of operational redundancy is required for the APM system. In the event of failure of either one of the normal tracks, the backup track (hence a three guideway system) can substitute the failed track and maintain the pinched loop operation, thus providing a high level of operational redundancy. Furthermore, the APM system is designed with the provision of dual feed power supply system, redundant signalling system and redundant communications system to ensure 100% overall system redundancy.

31. In anticipation of further passenger demand, a fourth APM tunnel will be built but without fit-out to provide for possible expansion of the APM system to a four-guideway double pinched loop operation. This is prudent planning as it is highly difficult, if not impossible, to carry out the necessary tunnelling work after completion of the APM system. **Figure 8** shows the layout for the 3RS APM System.

**Figure 8 : 3RS APM System Layout**



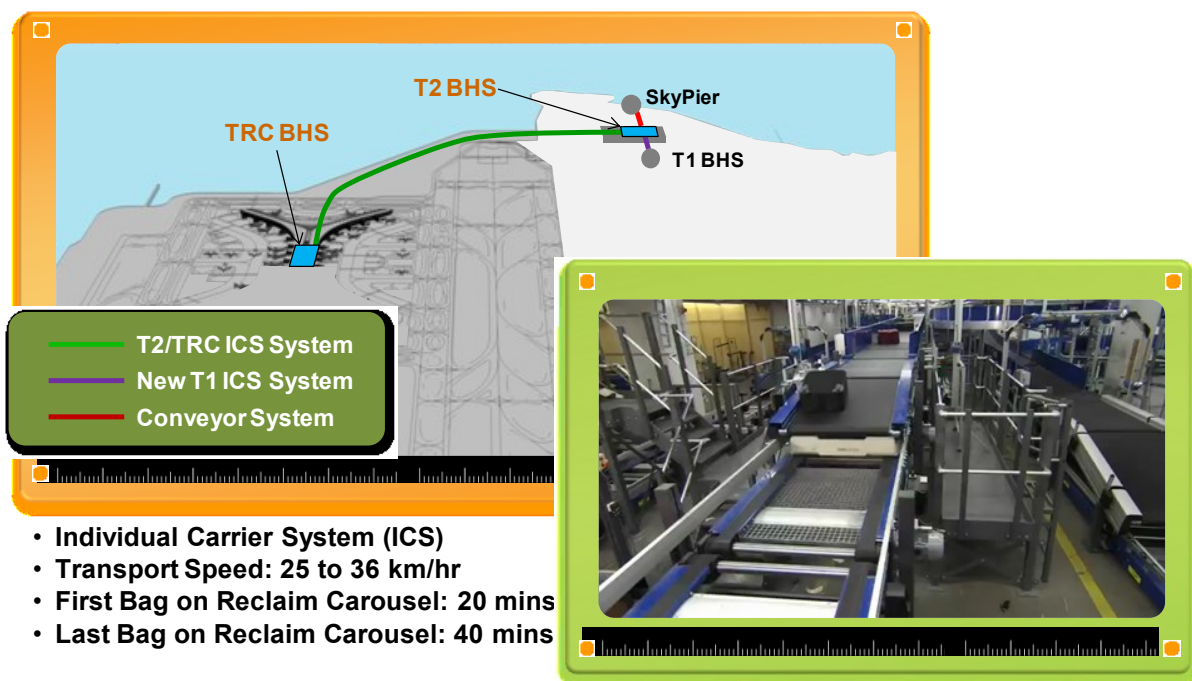
32. In addition, a new underground APM depot, situated adjacent to the AIS, will be constructed to serve both the planned TRC and existing APM fleets. The primary functions of the depot include the support of vehicle maintenance, vehicle stabling, and APM operation with the central control facility for all existing and new APM lines.



**(f) BHS**

33. Currently, baggage to and from the T1 baggage hall is transported by a manual “tug-and-dolly” system. Given the long distance between the TRC and the baggage hall at the expanded T2, a high speed and fully automated BHS will be built to ensure a high level of baggage delivery service. The BHS will connect the TRC with T2 and provide baggage security screening and early bag store facilities. A high speed Individual Carrier System (“ICS”) is adopted for the TRC BHS design. This ICS is capable of working up to 10 m/sec in BHS tunnel section, as compared to the speed of the existing conveyor based T1 BHS system at 2 m/sec. This will ensure the first arrival bag is delivered within 20 minutes.

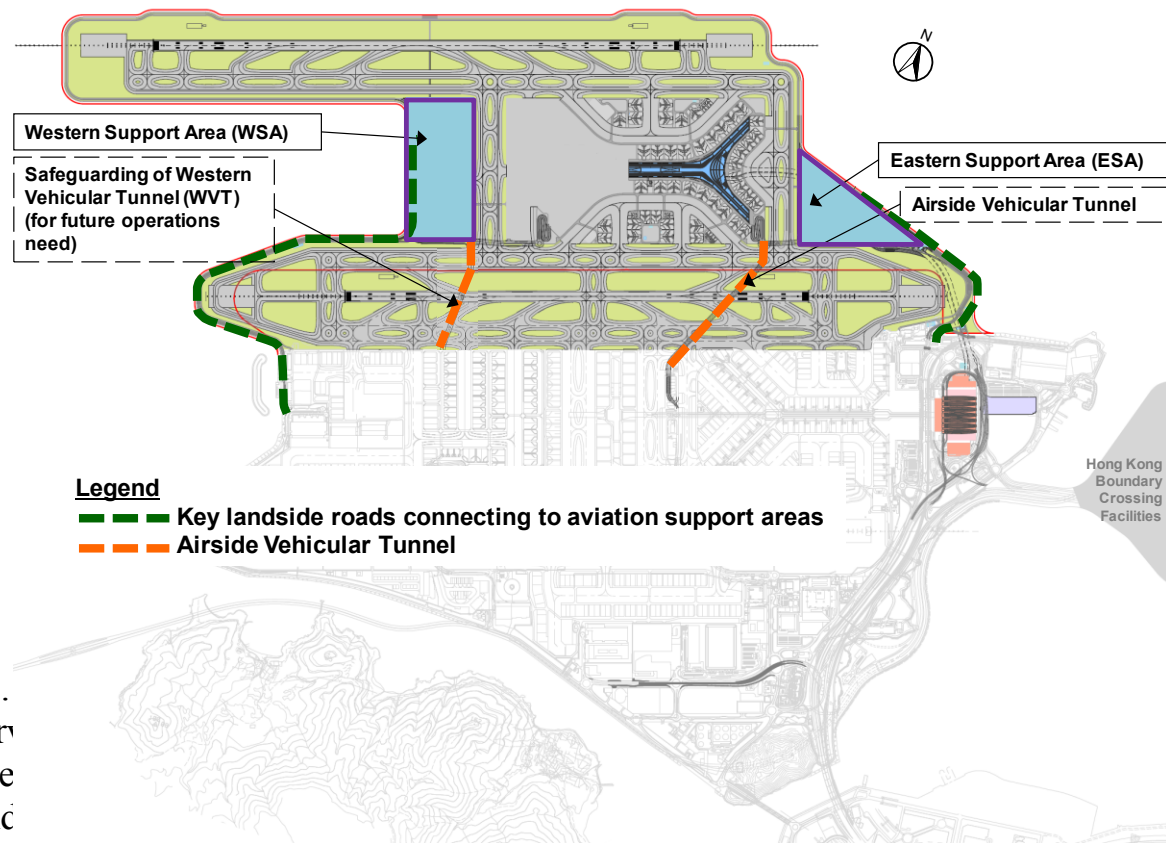
**Figure 9 : Airport-Wide Baggage Handling Strategy**



**(g) Construction of Airport Support Infrastructure, Utilities and Facilities**

34. Apart from the major works components for the 3RS project described above, other ancillary facilities are necessary to support the daily operations of the future 3RS. These ancillary facilities are planned to be located in the Eastern Support Area (“ESA”) and Western Support Area (“WSA”), the locations of which are shown in **Figure 10** below.

**Figure 10 : New Airside Vehicular Tunnel and Landside Road Connection**



35. ser fire unc facilities.

36. The WSA to the west of TRC will mainly accommodate aviation-related maintenance and servicing facilities to support the operational needs of 3RS. These mainly include aircraft maintenance facilities (i.e. maintenance hangars and aprons, engine run-up facilities, and aircraft recovery equipment facilities), GSE and other supporting facilities, air cargo staging area, Government facilities as well as utilities.

37. Among the various facilities in the support areas, there will be a total of three fire stations – two in the ESA (one airside and one landside) and one airside station in the WSA. The provision of fire stations at the airside is particularly critical to ensuring fire safety requirements stipulated by the ICAO.

38. The 3RS development will also require the extension and improvement of some existing landside roads on the airport island, and the provision of a new airside vehicular tunnel connecting the existing facilities to the future development areas to ensure operational continuity.

39. The airside vehicular tunnel will provide connectivity for GSE and cargo movements across the new Centre Runway. Journey time analysis has

shown that the provision of airfield new airside vehicular tunnel considerably shortens connection time and distance in comparison to at-grade routes around the new Centre Runway. This will also reduce emissions and fuel consumption of the cargo and GSE operators. An empty Western Vehicular Tunnel box structure underneath the new Centre Runway will also be constructed to meet future operation needs as construction of the tunnel box in future underneath an operating new Centre Runway is impractical, highly disruptive and unacceptable.

40. Extension of existing utility services will be provided to support future 3RS operations, which include aviation fuel supply system, power supply system, potable water and fire fighting system, seawater supply system, stormwater drainage and oil separation system, sewerage system and the associated airport systems.

### **Green and Sustainable Design Features**

41. The 3RS scheme design embodies an extensive range of sustainability, constructability and environmental initiatives that will take full advantage of contemporary technologies. At the detailed design stage, further flexibility to accommodate the rapid airport industry development environment will also be explored. In the light of AAHK's commitment in making HKIA the world's greenest airport and the recommendation from the Advisory Council on the Environment, the 3RS project is targeted for the BEAM Plus Platinum certification<sup>7</sup> where practicable.

### **Project Cost Estimate**

42. The scale of the 3RS project is almost as big as building a new airport next to the existing one. The total estimated construction cost is HK\$141.5 billion in money-of-the-day ("MOD") prices with breakdown at **Appendix B**.

43. The MOD estimate is derived on the basis of the Government's price adjustment factors as set out in PWSCI(2013-14)<sup>15</sup> issued in March 2014. The prices of public sector building and construction output were assumed to increase by 6% per annum from 2014 to 2018; 5% per annum from 2019 to 2021 and 4.5% per annum from 2022 to 2024. The estimate has also taken into account the assumption that the construction works for the 3RS will start in 2016 and last for 8 years.

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<sup>7</sup> BEAM Plus is a comprehensive environmental assessment scheme for buildings recognized by the Hong Kong Green Building Council Limited ("HKGBC").

44. The project estimate was developed in conjunction with scheme design consultants and a professional independent quantity surveying (“QS”) consultant and was reviewed by AAHK’s management team. In coming up the estimated cost, reference has been made to the appropriate market rates; supported by benchmarking and AAHK’s historical cost data for similar construction works. The whole process of cost estimation was highly vigorous which enables a high degree of confidence in the sufficiency and accuracy of the estimate.

### **Project Management/Cost Control**

45. Operating along prudent commercial principles and having committed to self-financing the 3RS project, AAHK will do its best to deliver the project within time and budget. Cost control is vitally important with the objectives of delivering the project within budget, achieving value for money, securing early certainty of the out-turn cost and obtaining competitive prices through healthy competition.

46. Project cost control is not an isolated project management issue but will be integrated with other key planning, design, procurement and construction management activities of the Project. Accordingly, in achieving the cost control objectives, it will be imperative to have effective organisation/leadership, robust planning and strong project control and execution, each of these aspects is described in the ensuing paragraphs.

#### **(a) Organisation/Leadership**

47. Airport construction is highly specialized and requires in-depth design and construction knowledge of the full range of airport infrastructure works; specialised systems; their relationship with the existing airport facilities; and an appreciation of the logistic and construction constraints imposed by the existing airport operations. The Third Runway Division (“TRD”) within AAHK, which is responsible for managing the 3RS project, has over 20 years of experience in project management construction at HKIA since the commencement of the original airport construction in the early 1990s. The TRD, comprising a compact structure of key in-house professionals, will expand its in-house project management team to cope with the challenging tasks ahead. External augmentation will be engaged to provide additional professionals, specialists and experts required for the 3RS project as and when necessary.

48. The proposed project management approach is based on that used in the implementation of the original airport expansion, but adapted to take on lessons learnt from subsequent works at the airport, together with other major projects in Hong Kong and international benchmarks. The organisation comprises a Project Management Office (“PMO”) that provides a centralized functional leadership role and the Project Delivery Team (“PDT”) which focuses on managing the construction delivery.

49. The central PMO will set a clear governance structure and provide embedded resources through a matrix organization into the PDT to ensure accountability for the overall project programme and budget with a “single-source of truth” and prevents project management “optimism bias” from the PDT. The key roles of PMO are as follows:

- (a) **Programme Control** – The central PMO develops the integrated master programme, sets the programme management strategy and maintains a fully integrated suite of updated programmes.
- (b) **Risk management** – this is a key discipline within the central programme office that drives risk management capability across the sub-projects. It regularly performs schedule analysis, risk analysis, “what-if” scenarios and contingency planning.
- (c) **Cost Control** – The PMO establishes the full suite of cost, programme, risk, change and reporting tools and require these to be utilized by all sub-projects and interfaced to contractors’ performance data.
- (d) **Coordination and Reporting** – The central PMO establishes a clear set of performance measures, baselines to report performance against and quantitative reporting to show performance, trends and forecasts.
- (e) **Peer Review** –The PMO provides the capability to establish a small team of highly experienced, independent design, construction, programme and project management professionals that are able to provide a peer review/assurance function at key project milestones and gateways.

## (b) Planning

50. Robust project planning provides a sound basis for effective cost control which must be integrated with programme and risk management.

51. AAHK has completed comprehensive **Scheme Designs** with extensive site investigations to establish the basis for the project budget estimate. These scheme designs were prepared by experienced local and

international design and specialist system consultants, providing a robust basis for establishing the project definition and scope agreed with the internal “clients” including operations, maintenance, commercial, etc.

52. An independent consultant was appointed to further develop a detailed **Project Master Programme, Project Procurement Strategy and Project Risk Management Plan** with a view to providing a robust basis for taking the project forward with programme and cost certainty.

### **(c) Controlling**

53. A high performance project team that executes effective cost control requires strong leadership, both at the board, management and working levels. One crucial aspect of project management is the capacity to make sound and timely decisions throughout the project cycle, with appropriate levels of delegated authority.

54. While the PMO is responsible for making decisions at working levels, it is supported and overseen by the AAHK Board and its committees. To give due attention to the 3RS project, special committees have been set up, including a Steering Committee chaired by the AAHK Chairman; and the 3RS Coordination Committee led by CEO/AAHK, supported by other AAHK executive directors. This organizational setup facilitates development of close working relationship between the AAHK senior management and the PMO and enables regular consultation with and direction from the AAHK Board and its committees on key issues. Regular progress and budget updates are given to the AAHK Board with a high level of transparency.

### **(d) Execution**

55. AAHK has an established cost control system to manage its capital works project, comprising the following key tasks.

56. **Establishment of Project Budget:** The project budget estimate has been established based on comprehensive scheme designs through a robust process, providing a high level of confidence in the sufficiency and accuracy of the estimated project out-turn cost.

57. **Design Phase Cost Control:** Continuous engineering analyses will be carried out during the detailed design stage to freeze the design scope and achieve cost-effectiveness and operational needs of the 3RS to ensure that the design will be fit-for-purpose and value-for-money, avoiding extravagant or unnecessary design or architectural features. Regular cost checks on the

detailed designs will be carried out by independent professional QS consultants to ensure that the project cost based on the final design will not exceed the project budget estimate established in the scheme design phase.

58. **Development of Procurement Strategy:** The Project Procurement Strategy, supported by global benchmarking and market sounding, will enhance competitiveness of tenders e.g. use of appropriate contract packaging strategies to promote competition and reduce interfaces.

59. **Commitment Control (Change Management):** Each contract will be awarded with a contract budget which will become the basis of cost control for the works covered in the contract. In the event that adjustments to the contract sum are necessitated by genuine needs, a detailed assessment of the need, justification, cost and programme implications of the proposed change will be carried out to ensure vigorous cost control.

60. **Continuing Risk Management:** AAHK will carry out proactive risk management in accordance with the Project Risk Management Plan as described above to identify risks for early mitigation, thereby minimizing the probability of cost overrun.

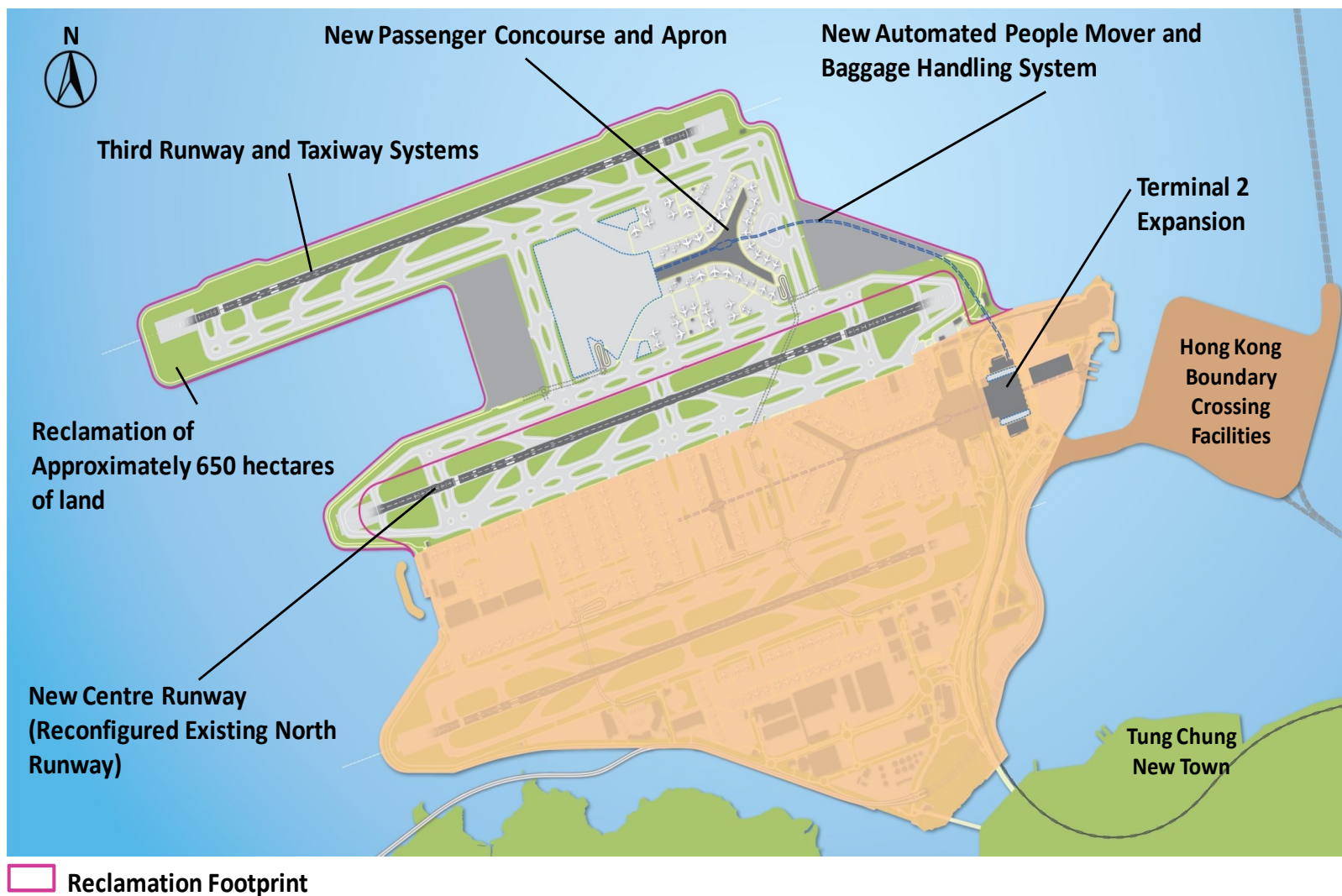
61. **Project Cost Monitoring and Reporting:** Regular cost reports will be prepared by the PMO for submission to Senior Management and Board and its committees, detailing the project budget status.

62. With the above robust systems and stringent measures in place, AAHK will be making its best endeavours for programme and budget control for the delivery of the 3RS project.

### **Advice Sought**

63. Members are invited to note and comment on the issues covered in this paper.

Three-Runway System Project Layout Plan





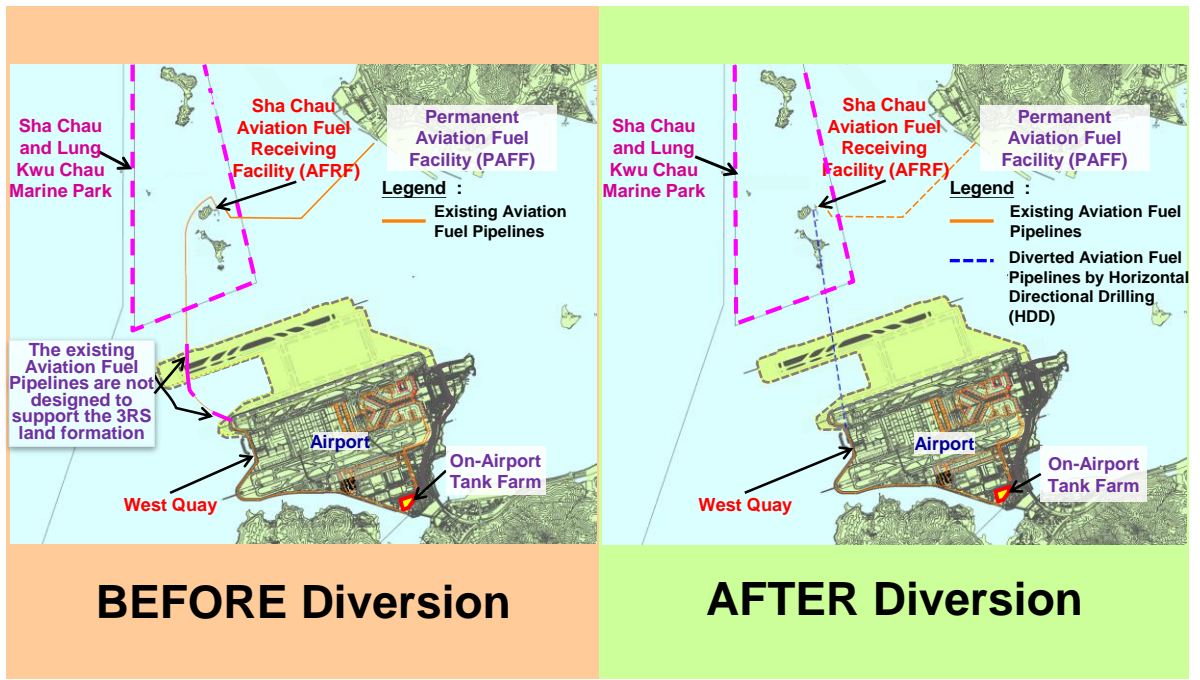
**Appendix B**

**Breakdown of the Total Estimated Construction Cost for the 3RS Project**

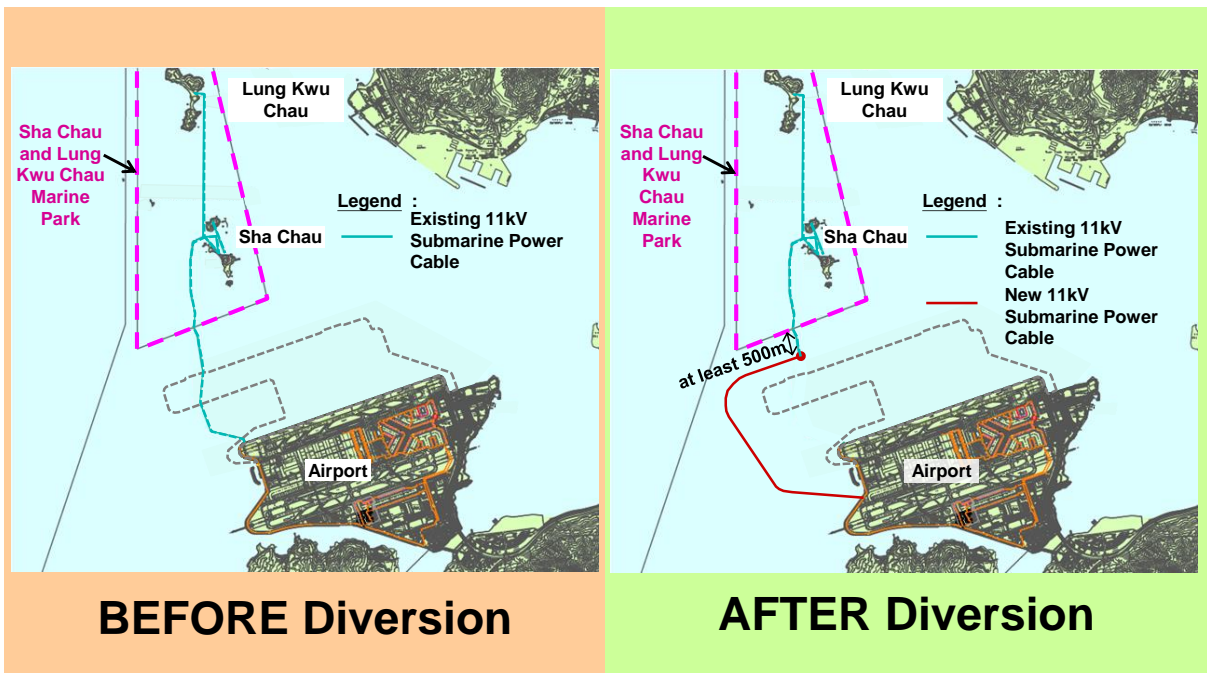
Scope of Works		4Q2010		MOD (Mar 2014)	
		Sub-total (HK\$B)	Total (HK\$B)	Sub-total (HK\$B)	Total (HK\$B)
<b>1.</b>	<b>Land Formation and Marine Works</b>		<b>36.8</b>		<b>56.2</b>
	- Ground Improvement	18.8		28.8	
	- Fill Management	17.0		25.9	
	- Utilities Diversion	1.0		1.5	
<b>2.</b>	<b>Airfield Facilities</b>		<b>6.5</b>		<b>11.5</b>
	- Runway, Taxiway & Taxilane	2.9		5.2	
	- Airfield Support Area	1.0		1.7	
	- Airside Road Network	2.6		4.6	
<b>3.</b>	<b>Apron Works</b>		<b>2.7</b>		<b>5.0</b>
<b>4.</b>	<b>Terminal 2 Modification/Expansion</b>		<b>9.5</b>		<b>16.5</b>
	- Foundation, Basement and Structure	3.3		5.7	
	- Architectural Works	2.4		4.2	
	- E&M and Airport Systems Works	3.8		6.6	
<b>5.</b>	<b>Third Runway Concourse</b>		<b>14.1</b>		<b>26.3</b>
	- Foundation, Structure and FLB & ALB	6.6		12.3	
	- Architectural Works	2.4		4.5	
	- E&M and Airport Systems Works	5.1		9.5	
<b>6.</b>	<b>APM System</b>		<b>6.1</b>		<b>10.9</b>
<b>7.</b>	<b>Baggage Handling Systems</b>		<b>4.5</b>		<b>7.8</b>
<b>8.</b>	<b>Airport Support Facilities and Utilities</b>		<b>4.3</b>		<b>7.3</b>
	<b>TOTAL</b>		<b>84.5</b>		<b>141.5</b>

**Diversion of Existing Facilities Location Plan**

A. Diversion of Aviation Fuel Pipelines



B. Diversion of Existing 11 kV Undersea Power Cables



**For Discussion  
on 16 February 2016**

**Legislative Council Subcommittee  
to Follow Up Issues Relating to the  
Three-runway System at the Hong Kong International Airport  
Mitigation and Enhancement Measures in connection with the  
Conservation of Marine Ecology and Chinese White Dolphins**

**Introduction**

This paper sets out :

- (a) an overview of the proposed mitigation and enhancement measures in connection with the conservation of marine ecology and Chinese White Dolphins (“CWD”); and
- (b) the latest progress on the implementation of these measures.

**Background**

2. At the meeting on 3 November 2015, Members were briefed on an overview of the Three-Runway System (“3RS”), covering, among others, the latest progress on the statutory Environmental Impact Assessment (“EIA”) process. Members noted that the Airport Authority Hong Kong (“AAHK”) aims to achieve “development alongside environmental conservation” in the implementation of the 3RS project. Members also noted the granting of the Environmental Permit (“EP”) by the Director of Environmental Protection (“DEP”) to AAHK in November 2014, and AAHK’s efforts in fulfilling the requirements of the EP, including stakeholder engagement activities. Upon Members’ request, AAHK undertook to provide :

- (a) membership and background of the Professional Liaison Group (“PLG”) and measures adopted by AAHK to engage those environmental groups which refused to join the PLG; and

- (b) measures that would be adopted by AAHK to comply with/fulfill the 56 conditions set out in the EP for the 3RS project. This paper focuses on the relevant progress on the implementation of mitigation and enhancement measures for the conservation of marine ecology and CWD. Progress of the remaining measures will be provided in due course.

### **Granting of EP and Measures Adopted by AAHK to comply with the Conditions Set out in the EP**

3. On 7 November 2014, DEP granted to AAHK the EP for the 3RS project. The EP sets out a number of conditions, covering proposed environmental mitigation measures, monitoring, and submission requirements during different stages of the project.

4. Further to the granting of the EP, AAHK has worked out a detailed work plan to comply with the EP requirements. Three external consultants have been engaged to ensure AAHK's delivery of the EP requirements and EIA commitments. A full time on-site Environmental Team ("ET") has been commissioned to carry out comprehensive environmental monitoring and audit ("EM&A") in connection with CWD, ecology, air, noise, water etc. Furthermore, a full time on-site Independent Environmental Checker ("IEC") is appointed to audit, review, and verify all EM&A data and EP submissions. Both the ET and the IEC are directly employed and managed by AAHK to ensure that they are properly empowered to monitor and audit the construction contractors' works in connection with environmental compliance. Besides, AAHK has appointed an experienced specialist environmental consultant to support AAHK in the delivery of marine ecology and fisheries related EP requirements, including preparatory work for the proposed marine park designation and the implementation of marine ecology and fisheries mitigation and enhancement measures.

### **Dolphin Survey and Impact of the 3RS Project on the CWD**

5. As part of the EIA study, AAHK invited two well respected and highly qualified international marine mammal biologists Dr Bernd Würsig and Dr Thomas Jefferson to lead the impact assessment on CWD. The two experts have been working extensively in Southeast Asia, with a primary research focus on the conservation biology of CWD population in Hong Kong since 1995. Dr Thomas Jefferson also developed the dolphin survey technique that has been adopted by the Agriculture, Fisheries and Conservation Department ("AFCD")

and other researchers in Hong Kong in the past 20 years.

6. During the course of the 3RS EIA study, a combination of dolphin survey techniques was employed to collect 12-14 months of project specific data on CWD. The data provided information on CWD density and abundance; ranging patterns of individual dolphins; swimming and movement patterns of dolphin groups; CWD responses to vessels; as well as daytime and night-time information on dolphin presence and vocal activity. The data collected facilitated a thorough analysis of how CWD are utilizing the affected habitat. The assessment has also taken into account the historic long-term CWD monitoring dataset collected by AFCD.

7. The EIA concluded that the 3RS project will result in some impact on the CWD population in Hong Kong waters, mostly related to the loss of CWD habitat; the reduction of the size of CWD travelling areas between the east and west of the airport; and the associated impact on habitat fragmentation and carrying capacity, largely as a result of the new land formation, as well as impact from the SkyPier high speed ferries (“HSFs”) traffic.

8. A range of measures has been proposed in the EIA to minimize, mitigate and compensate for the potential impact on CWD and marine ecology during the construction and operational phases of the project. A Marine Ecology and Fisheries Enhancement Strategy is also recommended in the EIA for the purpose of enhancing the marine environment for the benefit of marine ecology (including CWD) and fisheries resources. Details of these measures are set out in paragraphs 9 to 28 below.

### **Proposed Marine Park**

9. The establishment of a new marine park (see map at [Annex A](#) on the preliminary boundary) is a key mitigation measure for the identified impact on CWD. It is generally recognized from international experience that marine parks are most effective when they are large in relation to the ranges of the protected animals, and when they can provide linkages between areas of core habitat for important life functions. This experience has been utilized in the development of the proposed marine park mitigation for local CWD population.

10. With a size of about 2,400 hectares, the proposed marine park is nearly four times that of the proposed 3RS reclamation area and about the same as the total aggregated area of all existing marine parks in Hong Kong. The

proposed marine park will connect the Hong Kong International Airport Approach Areas (“HKIAAA”)<sup>1</sup> with the existing Sha Chau and Lung Kwu Chau Marine Park (“SCLKCMF”) to its north and with the committed marine park in the Brothers Islands to the east (to be designated under the Hong Kong–Zhuhai–Macao Bridge Hong Kong Boundary Crossing Facilities project), forming a huge continuous stretch of marine protected area of about 5,200 hectares. The synergy thus gained would contribute significantly to the long-term conservation of CWDs, and provide a protected habitat for other marine ecology. In particular, the CWD will benefit from significant protection from high-speed vessel traffic; certain fishing activities; and other human based threats. The proposed marine park is also expected to be beneficial in protecting important travelling areas for CWD between the recognized CWD “hotspots” of Sha Chau and Lung Kwu Chau (“SCLKC”), and around the Brothers Islands. The proposed marine park will be contiguous with the Pearl River Estuary (“PRE”) CWD National Nature Reserve established by the Mainland, thereby linking the protected habitat between Hong Kong and the Mainland.

11. Early establishment of the proposed marine park has been considered. Nevertheless, it was found to be impracticable to seek to designate the new marine park while construction activities for the 3RS project are ongoing. The restrictions of a marine park would preclude planned construction activities. That said, AAHK will carry out a detailed study on the preparatory work for marine park designation and lead the associated stakeholder consultation activities, with the support and participation from AFCD throughout the detailed study. As the authority under the Marine Parks Ordinance, AFCD will be responsible for the designation, management and operation of the proposed marine park<sup>2</sup>. A liaison group involving AAHK and AFCD is proposed to be set up to facilitate direct and ongoing liaison with AFCD with a view to strengthening the management of the proposed marine park after its establishment.

12. Separately, under the EM&A programme of the 3RS Project, AAHK will conduct CWD monitoring to assess the effectiveness of the proposed marine park as a mitigation measure for the Project after the marine park has been designated. Data collected will be shared with AFCD.

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<sup>1</sup> Hong Kong International Airport Approach Area (“HKIAAA”) is an area established in the vicinity of the airport island to safeguard the operation of aircraft and radio navigational aids whereby entrance of vessels into the area is restricted. As a result of the restricted access by vessels, it will benefit the conservation of marine ecology.

<sup>2</sup> AAHK will seek to assist in completing the designation of the proposed marine park before the operation of the 3RS project.

## Mitigation Measures for Potential Disturbance of Marine Traffic on CWD

13. The potential impact on CWD due to the construction and operational phase marine traffic has been examined as part of the EIA study. Mitigation measures in relation to marine traffic are formulated to reduce the acoustic disturbance, risk of injury or mortality and changes to abundance and patterns of habitat use of CWD.

14. A key mitigation measure focuses on the SkyPier HSFs traffic. In order to reduce the physical threat and the high noise levels generated by the HSFs travelling at speeds of over 30 knots across the narrow waters between the airport island and the SCLKCMP during the construction of the project, the SkyPier HSFs travelling to/from Zhuhai and Macau would be diverted to the north of SCLKCMP with their speed restricted to 15 knots across areas with high CWD abundance (see **Annex B**). In doing so, the disturbance to CWD habitat due to HSF traffic in the core zone of the PRE CWD National Nature Reserve could be minimized. In addition, AAHK has committed to capping the SkyPier HSFs traffic movement at an annual average daily level of 99 prior to the successful designation of the proposed marine park described above.

15. Workshops were held to enhance the understanding of HSF captains on the threats and disturbance to CWD due to HSFs, as well as details on the required diversion and speed restriction. Implementation of the SkyPier HSFs diversion and speed restriction has commenced on 28 December 2015. All the concerned SkyPier HSFs are required to be equipped with Automatic Identification System transponders to facilitate route and speed tracking for proper monitoring.

16. Regarding construction vessels, although they normally travel at low speeds and are therefore not expected to be a significant threat to CWD, a range of mitigation measures are nevertheless initiated. These measures cover the use of predefined and regular routes to reduce disturbance from vessel activities on CWD; a speed limit of 10 knots within CWD hotspots and within 3RS works areas (which is de facto equivalent to the speed limit imposed inside a marine park); measures to keep the number of working or stationary vessels present on-site to a practical minimum; and skippers training for safe construction vessel operation in the presence of CWD.

## **Other Construction Phase Mitigation Measures for CWD**

17. In addition to the above, the following measures will be put in place during the construction of the project in connection with the protection of CWD:

- (a) adoption of advanced designs and specific construction methods (such as using non-dredge methods to carry out reclamation during land formation, deep cement mixing over existing contaminated mud pits, and horizontal directional drilling for submarine pipeline diversion) that minimize environmental impact;
- (b) complete avoidance of marine percussive piling and avoidance of bored piling during the peak calving season for CWD;
- (c) acoustic decoupling of construction equipment mounted on construction barges to minimize acoustic disturbance to CWD;
- (d) establishment of dolphin exclusion zones for intensive and noisy marine construction activities to reduce the risk of potential disturbance to CWD; and
- (e) implementation of spill response plan as precautionary measure for protection of marine water quality.

## **Marine Ecology and Fisheries Enhancement Strategy**

18. As part of the EIA study, AAHK has committed to formulating and implementing a Marine Ecology and Fisheries Enhancement Strategy (“MEFES”) for the 3RS project. The MEFES would be set up for the purpose of enhancing the marine environment for the benefit of marine ecology (including CWD) and fisheries resources in the vicinity of the project area, in Hong Kong western waters and further afield into the PRE. The MEFES also provides support and assistance to affected fishermen to promote more sustainable fishing operations. In accordance with the EP conditions, AAHK shall, inter alia,:

- (a) establish a Marine Ecology Enhancement Fund (“MEEF”) and submit a Marine Ecology Conservation Plan (“MECP”); and
- (b) establish a Fisheries Enhancement Fund (“FEF”) and submit a Fisheries Management Plan (“FMP”)



19. As stipulated in the EP, the MECP should be formulated for the conservation of marine life, particularly the CWD, within the Hong Kong and the PRE waters. The MECP shall cover:

- (a) the relevant marine parks and other important marine habitats in Hong Kong to enhance their carrying capacity;
- (b) “dolphin friendly” activities;
- (c) the recovery of fisheries resources; and
- (d) scientific research for the overall benefits of marine mammals, particularly CWD, in the PRE during the construction and operation of the project.

20. The EP specifies that the FMP should support the fishing industry and enhancing fisheries resources in the western Hong Kong waters, especially the Lantau waters.

21. The MECP and the FMP outline the proposed mechanisms for implementation of the MEFES, including funding arrangements, and the establishment of management committees for the MEEF and the FEF. Some potential examples of enhancement initiatives were also included in the Plans to provide guidance to the management committees on a range of potentially suitable initiatives for MECP and FMP support.

22. AAHK will ensure that both the MECP and the FMP are implemented in compliance of the EP requirements. To meet the objectives of the two Plans, substantial resources, both financial and manpower support, are essential. MEEF and FEF, managed by two separate management committees, will be established to ensure effective implementation of the two Plans.

23. A total funding amount of HK\$150 million will be put under an endowment arrangement to generate a targeted annual budget income of about HK\$6 million to support the MEEF initiatives. The investment income from the endowment will be made available to support relevant conservation initiatives. To ensure stable funding support, any shortfall on the targeted annual return of HK\$6 million (due to possible fluctuations in investment income) will be topped up by an additional HK\$100 million “top-up” fund established for both the FEF and the MEEF.

24. Consultation with the fishery sector has been undertaken to better understand their specific support needs under FEF. As the key objectives of FEF are to support the fishing industry and to enhance fisheries resources in the western Hong Kong waters consequent to 3RS construction, with a particular focus on supporting measures that help to achieve sustainable management and enhancement of fisheries resources, it is expected that a significant portion of the funding support is likely to be needed in the initial years, particularly during the marine construction stage of the project. It is therefore proposed to allocate HK\$50 million (out of the proposed HK\$150 million) at the onset to support relevant initiatives. The remaining HK\$100 million would be put under an endowment arrangement to generate a targeted annual income of about HK\$4 million to support long-term and sustainable fisheries enhancement efforts. Similar to the arrangement for MEEF, any shortfall to the annual investment income will be topped up from the HK\$100 million “top-up” fund described above.

25. Two separate management committees will be responsible for the management and operation of the two Funds to ensure effective selection and implementation of relevant initiatives, including approval of qualifying funding applications within the budgeted annual funding support of the respective funds. The management committee of MEEF would include relevant academics, dolphin experts, green groups, relevant stakeholders and AAHK members; whereas the management committee of FEF would include fishermen’s association representatives, fisheries experts, relevant stakeholders and AAHK members. Community leaders as well as individuals having expertise/experience in managing similar funds would also be considered for appointment into the management committees.

26. In addition to the two management committees, it is proposed to establish a Steering Committee to provide overall directional guidance and policies for the two Funds to ensure that sufficient resources will remain available for the two Funds to meet their objectives in a long-term and sustainable manner. If the total funding amount of the applications recommended by the two management committees exceeds the anticipated annual funding support in any particular year, the Steering Committee may exercise discretion by using the “top-up” fund to meet the shortfall.

27. The Steering Committee will be chaired by AAHK. Membership will include the chairpersons of the two management committees, and other individuals who have relevant professional expertise/experience.

28. A MECP and a FMP, including details on the proposed arrangements for the two Funds, have been prepared in consultation with AFCD and presented to ACE on 7 December 2015 for their comment. It is anticipated that the Management Committees of the two Funds will be established by the second quarter of 2016 with fund applications invited and received in the third quarter of 2016, subject to the final approval by DEP.

## **Stakeholder Engagement**

29. To enhance transparency and communication with the community in a proactive way, AAHK set up five Community Liaison Groups (“CLGs”) in 2012 in the neighbouring districts of HKIA, namely Islands, Kwai Tsing, Shatin, Tsuen Wan and Tuen Mun. The CLGs have a total of about 160 members, including district councillors and community leaders. AAHK leverages on the CLGs to exchange views with the community on the latest airport developments. In addition, the CLGs also provide the platforms for AAHK to update the community leaders and listen to their views on various topics related to HKIA and the 3RS project, including the environmental issues. CLG members were updated on the latest progress of the 3RS project, the EP requirements and the EM&A organization structure at the meetings in July 2015.

30. In September 2015, AAHK also set up the Professional Liaison Group (“PLG”) comprising 22 relevant professional/experts in different relevant environmental fields to facilitate communications, enquiries and complaints handling on all environmental issues related to the 3RS project. The membership list is shown in **Annex C**. The first meeting of the PLG was held on 15 October 2015.

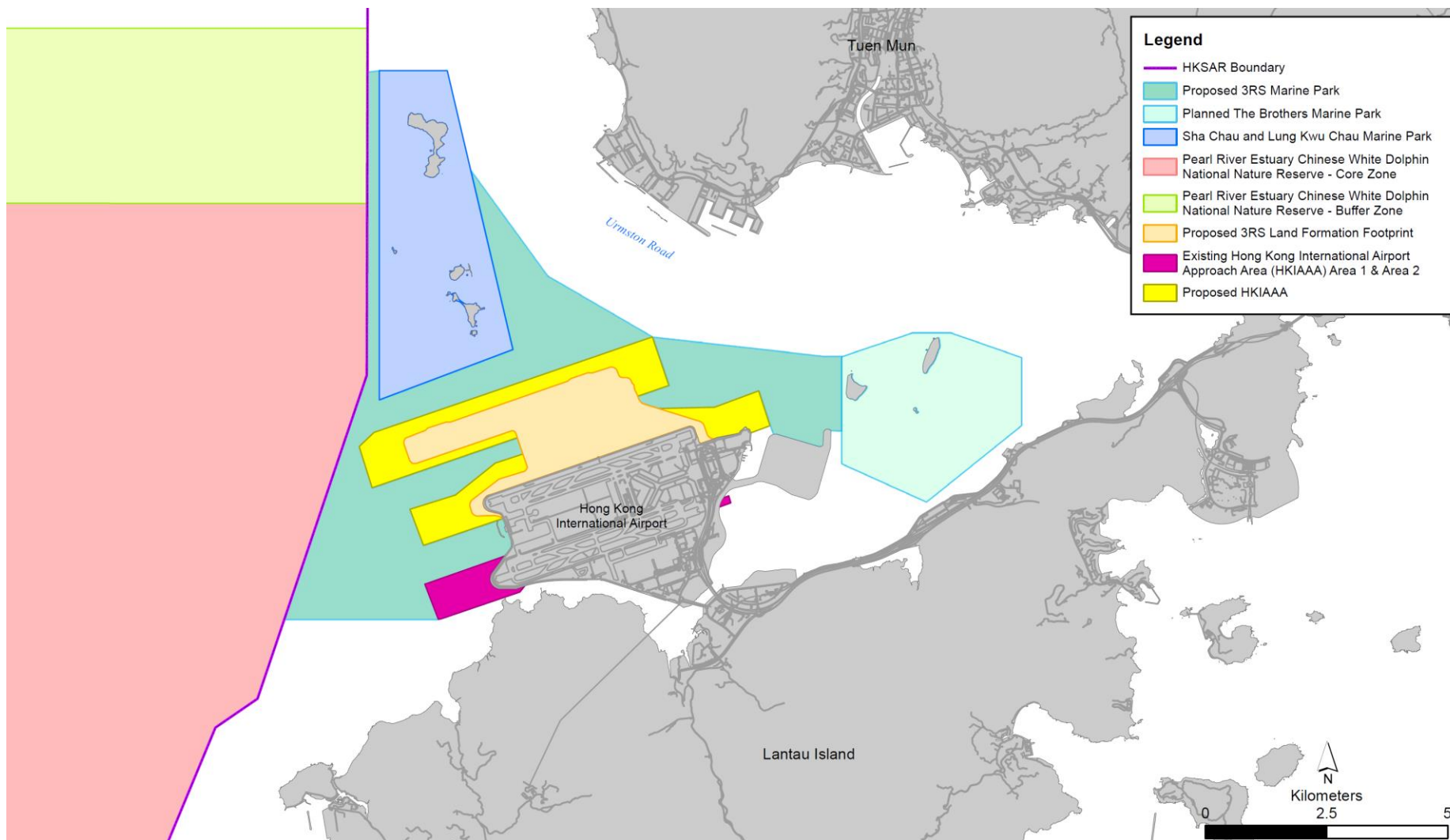
31. In setting up the PLG, AAHK had issued invitation letters to 18 green groups in June 2015. Despite AAHK’s efforts and goodwill, some of the green groups refused to join the PLG. That said, AAHK will spare no effort in continuing its efforts in engaging various green groups on the 3RS issues. A green NGOs roundtable was held recently in early January 2016 to update the green groups on the latest progress of the 3RS project, including the MECP and FMP, as well as Marine Travel Routes and Management Plan for HSFs of SkyPier. AAHK is highly transparent in its work concerning the CLGs and the PLG; the TORs of these Groups, their membership and meeting material have all been uploaded onto a dedicated website at <http://env.threerunwaysystem.com/en/index.html>.

## **Advice Sought**

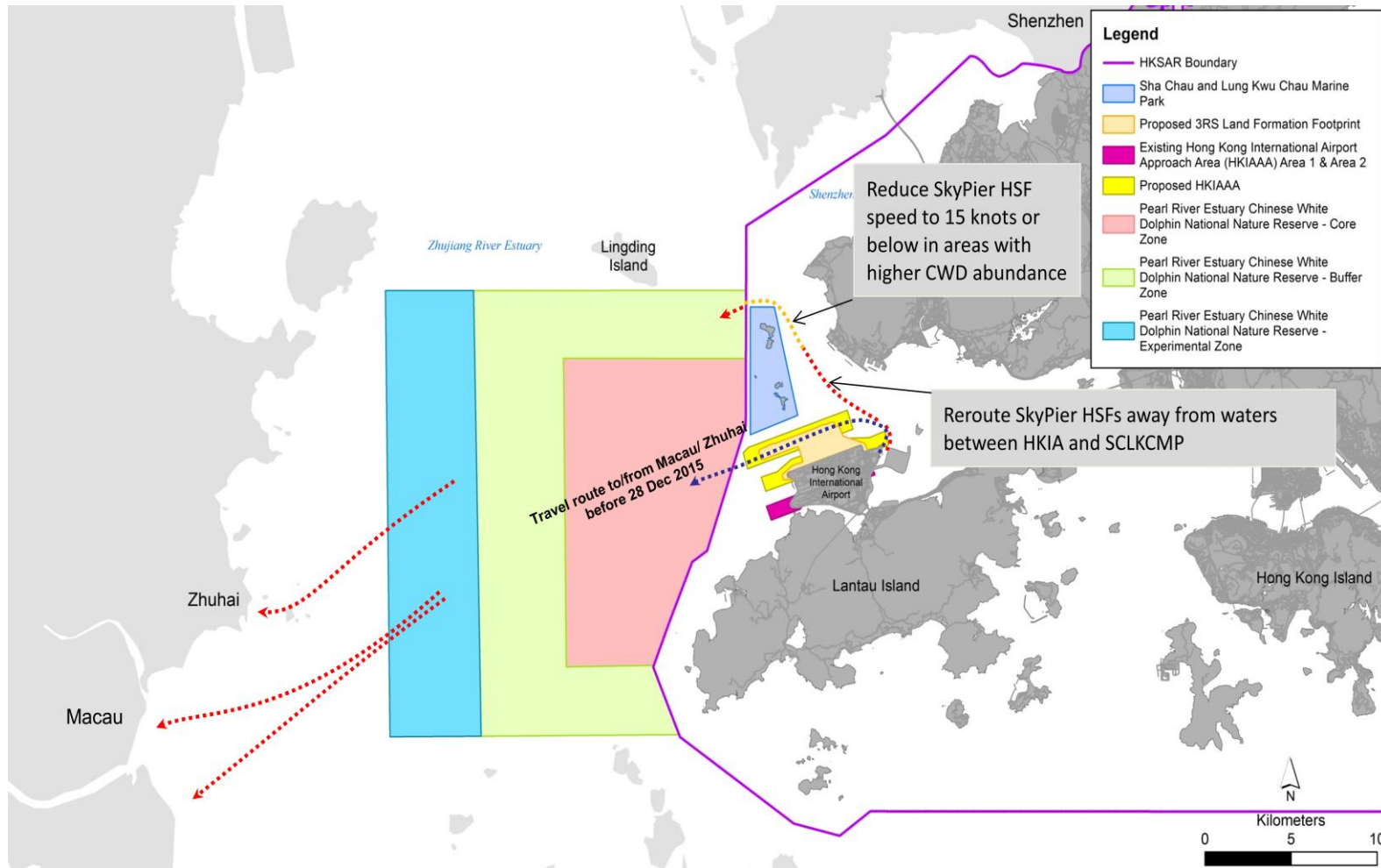
32. Members are invited to note and comment on the issues covered in this paper.

**Airport Authority Hong Kong  
February 2016**

**Preliminary Boundary of the Proposed 3RS Marine Park**



**Diverted Travel Routes of SkyPier HSFs operating to/from Zhuhai and Macau and the Pearl River Estuary CWD National Nature Reserve**



**Professional Liaison Group Membership**

<b><u>Name</u></b>	<b><u>Organization</u></b>
1. Mr. Grant Abel	Ocean Park Hong Kong
2. Ms. Evelyn Chan	International Air Transport Association
3. Prof. Li Cheng	Department of Mechanical Engineering, The Hong Kong Polytechnic University
4. Mr. Ken Ching	Eco-Education and Resources Centre
5. Dr. Helen Chiu	American Chamber of Commerce in Hong Kong
6. Ir. Gordon Cho	Dashun Policy Research Centre
7. Mr. Dee Hwa Chong	Ichthyological Society of Hong Kong
8. Prof. Chu Ka-hou	School of Life Sciences, The Chinese University of Hong Kong
9. Ms. Helen Cochrane	Environment & Energy Committee, The British Chamber of Commerce in Hong Kong
10. Ms. Suzanne Gendron	Ocean Park Conservation Foundation Hong Kong
11. Prof. Jackson Ho	Hong Kong Airline Service Providers Association
12. Ms. Yvonne Ho	International Air Transport Association
13. Dr. Brian C W Kot	Department of Applied Biology and Chemical Technology, The Hong Kong Polytechnic University
14. Prof. Alexis Lau	Division of Environment, Hong Kong University of Science and Technology
15. Mr. Ken Lau	Airports Council International, Asia-Pacific Region
16. Ir. Lee Ping Kuen	The Hong Kong Institution of Engineers
17. Dr. Lui Sun Wing	The Hong Kong Association for the Advancement of Science and Technology
18. Mr. Simon Ng	Civic Exchange
19. Ms. Shadow Sin	Ocean Park Conservation Foundation Hong Kong
20. Ir. Kenny Wong Siu Wai	The Hong Kong Institution of Engineers
21. Ir. Prof Steve Wong	The Environment & Sustainability Committee, The Hong Kong General Chamber of Commerce
22. Dr. Cynthia Yau	Marine And Fisheries Ecologist

**For Discussion  
On 5 January 2016**

**Legislative Council Subcommittee  
To Follow up Issues Relating to the  
Three-Runway System at the Hong Kong International Airport**

**Three Runway System Project at the Hong Kong International Airport:  
Financial Arrangement Plan of the  
Three-Runway System Project**

**Introduction**

1. This paper sets out the financial arrangement plan Airport Authority Hong Kong (“AAHK”) proposes for the Three-runway System (“3RS”) project.

**Background**

2. As part of its Master Plan 2030 (“MP2030”), AAHK commissioned an external financial advisor to conduct a financial feasibility assessment study which was completed in 2011. In the light of the Executive Council’s (“ExCo’s”) in-principle approval in March 2012 for AAHK to proceed with the planning work, including the financial arrangement plan relating to the development of the 3RS, AAHK has appointed The Hongkong and Shanghai Banking Corporation Limited (“HSBC”) as its financial advisor to conduct a study on the possible financial arrangement plan for implementing the 3RS project. The study has thoroughly considered and assessed issues/scenarios such as reviewing the assumptions adopted by AAHK in formulating the revenue projections, assessing the initial debt funding requirement and possible funding options, performing risk analysis and running sensitivities to test the financial robustness and prudence of the 3RS financial arrangement plan, etc. Key differences between MP2030 financial feasibility study and 3RS financial arrangement plan are set out in **Annex A**.

3. Having critically reviewed the scope of the 3RS project and on completion of the scheme design, AAHK estimated the capital cost of the 3RS to be approximately \$141.5 billion in money-of-the-day (“MOD”) prices, i.e. after taking into account expected price inflation over the period up to expected completion of 3RS in 2023/24, assuming a 8-year



construction period commencing in 2016/17. On this basis, AAHK and its financial advisor have come up with recommendations on a financial arrangement plan which was submitted to the Government in January 2015. In March 2015, the Government affirmed the need for the 3RS project and asked AAHK to review the charging regime of the proposed Airport Construction Fee (“ACF”) so as to reduce the burden on passengers. Accordingly, AAHK revised the ACF proposal and made consequential changes to the overall financial arrangement plan.

4. At the Subcommittee’s meeting on 3 November 2015, Members were briefed on the overview of the 3RS project, covering, inter alia, the financial arrangement plan (LC Paper No. CB(4)143/15-16(01)). At the meeting on 1 December 2015, Members requested AAHK to provide the latest report of the study on the financial arrangements for the 3RS conducted by HSBC. The report has been uploaded onto AAHK’s website for public reference ([http://info.threerunwaysystem.com/pdf/en/3RS\\_financial\\_arrangements\\_report.pdf](http://info.threerunwaysystem.com/pdf/en/3RS_financial_arrangements_report.pdf)). The main findings of the above study are summarised in this paper.

### **The 3RS Financial Arrangements Consultancy Study**

5. In conducting the financial arrangement study, a set of key working case assumptions on AAHK’s revenue and expenditure were adopted. These assumptions are set out in **Annex B**.

6. When devising the financial arrangements, AAHK has adopted the “joint contribution” principle, i.e. users of Hong Kong International Airport (“HKIA”), including passengers, airlines and operators at HKIA should contribute to the project cost. AAHK has proposed to fund the 3RS through the following three sources :-

- (a) retaining AAHK’s operating surplus including, inter alia, reviewing and optimizing existing fees and charges;
- (b) introducing a new ACF; and
- (c) raising third party debts from the market leveraging on AAHK’s financial capability and excellent credit rating.

(a) **Retain Operating Surplus**

7. Having regard to AAHK's robust revenue performance in the past and the continued growth in revenue projected for future years in the light of steadily rising air traffic demand at HKIA, AAHK is committed to exhausting all possible means to finance the project by itself.

8. AAHK intends to optimise all its revenue sources, including the airport charges which would be brought back to the level of 15 years ago (when the charges were reduced in January 2000<sup>1</sup> due to the Asian Financial Crisis), with subsequent increases to be introduced in line with inflation. According to a survey conducted by the consultancy firm LeighFisher in 2015, HKIA's overall airport charges ranks 55th among the 56 international airports studied, indicating such charges are low by international standard. The information provided by the International Civil Aviation Organization ("ICAO") further indicates that airport charges account for only around 4%<sup>2</sup> of the surveyed global airlines' operating expenses. The proposed increase therefore should not result in any material impact on airlines and affect HKIA's competitiveness. AAHK is currently discussing the proposal with airlines and the increase in airport charges is targeted to be implemented in FY2016/17. AAHK will also regularly review and optimise the levels of all other revenue sources in accordance with market conditions.

9. AAHK plans to retain all distributable profits from FY2014/15 onwards until the commissioning of the 3RS (assuming a project construction period of 8 years which commences in FY2016/17).

10. AAHK estimates that about \$47 billion (or 33%) of the required capital funding for the 3RS project would be raised through optimising revenues and retaining distributable profits.

(b) **Introduction of an ACF**

11. Members were briefed on the ACF regime at the meeting on 3 November 2015 (LC Paper No. CB(4)143/15-16(01)). In short, the ACF regime differentiates charging levels for short haul/long haul passengers, first or business class/ economy class passengers, and origination and destination ("OD")/ transfer and transit ("TT") passengers, as set out in **Annex C**.

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<sup>1</sup> The airport charges were reduced by 15% in 2000.

<sup>2</sup> ICAO Financial Situation of Airports and Air Navigation Services Providers Report 2007 (Chapter 3), ICAO Financial Situation of Airports and Air Navigation Services Providers Information Paper 2013, ICAO Data+; Include security related charges

12. AAHK estimates that about \$26 billion (or 18%) (net of tax) of the capital funding requirement of the 3RS project would be raised through the implementation of the ACF. AAHK plans to begin levying the fee once all the statutory procedures for the 3RS project under the Town Planning Ordinance (Cap. 131) and the Foreshore and Seabed (Reclamations) Ordinance (Cap. 127) are completed. It will remain in effect until all the 3RS-related borrowings have been repaid. Currently, it is AAHK's intention to maintain the charging levels of ACF throughout the collection period. Meanwhile, AAHK will work out with airlines and the travel industry the logistics arrangement for collecting ACF via air tickets.

(c) **Raising Funds from the Market**

13. Taking account of the funding sources outlined in paragraphs 7 to 12 above, there remains a funding shortfall of \$52 billion. To fill this funding gap, AAHK needs to resort to borrowing/raising funds from the market. Together with the estimated borrowing cost of \$17 billion, the total incremental borrowings will be \$69 billion which will be raised from the market by phases subject to the 3RS capex phasing. AAHK's reputation, its financial capability, its 100% ownership by the Government and its excellent credit rating (AAA) would enable AAHK to raise sufficient funds on competitive terms from the market.

14. Currently, AAHK is working on the detailed plan and strategy for raising fund from the market. AAHK has established the following general guiding principles in developing the plan and strategy:-

- (a) Raise debt from sources and on terms which will result in :-
  - (i) debt tenors consistent with AAHK's investment plans and funding needs;
  - (ii) cost-effective financing;
  - (iii) flexible terms which reflect the uncertainties that a project of 3RS' scale and complexity entails; and
  - (iv) opportunities for a broad range of stakeholders to participate in the financing of AAHK/3RS.
- (b) Retain flexibility on the timing of approach to market including:-

- (i) adapt to changing market conditions, unexpected events and the need to raise additional funding if required (e.g. by ensuring sufficient headroom under the debt capacity of the AAHK);
  - (ii) retain sufficient committed but undrawn facilities; and
  - (iii) ensure that the current multi-currency Medium Term Notes programme is in place to facilitate swift issuance of bonds.
- (c) Examine all potential sources and forms of financing, including institutional bonds, retail bonds, Islamic bond, bank loans, export credit agency backed financing and alternative funding source across a range of currencies and tenors. The financing plan will also be formulated to take into account the possibility of allowing public participation and sharing the financial success of the 3RS.
- (d) Actively manage relationship with relevant rating agencies, investors and banks to ensure that the strength of AAHK's operation is well understood in order to obtain funding from the market on competitive terms.

15. AAHK has assessed its borrowing capability taking into account potential impact to AAHK's credit rating and ensuring compliance with the Airport Authority Ordinance ("AAO"). It has come to the view that it would be viable to increase borrowing incrementally to \$69 billion, which would bring its maximum debt level to \$77 billion in FY2023/24 or around 4.5 times EBITDA in FY2022/23. AAHK has access to a wide range of funding options, including bank and bond markets. These markets have sufficient liquidity to fund the \$69 billion incremental debt required by AAHK. The following financial instruments will be considered:-

**(a) Long tenor bonds**

AAHK has a strong track record of tapping the HKD and USD bond markets and local and international investors will likely have a keen interest in AAHK's bonds. Therefore, institutional bonds will be an attractive financing option for the AAHK's core debt. Such funding is of minimal risk because of its long tenor (reducing refinancing risk) and fixed interest rates. Long

tenor bonds are most appropriate for long life infrastructure projects such as 3RS. As such, they will likely form a core part of AAHK's whole financing plan for 3RS. While market capacity in HKD bonds is limited, the USD markets provide substantial liquidity, provided that the credit and pricing are appropriate. Foreign exchange risk will need to be considered and managed for non-HKD bond issuance.

**(b) Retail bonds**

A portion of the incremental borrowings will likely be in the form of retail bonds to increase public participation and engagement in the 3RS project. This will be perceived positively since the bonds would allow the participation of the general public in the 3RS and enable them to take home financial benefits arising from investment in the project. However, the tenor of retail bonds is likely to be short when compared to the long term nature of the 3RS investment and the pricing may be less competitive when compared to other sources. Hence, the quantum and terms of retail bond issuance will require further study.

**(c) Islamic Bond/Sukuk**

Sukuk will also be considered. The Government issued two Islamic bonds in 2014 and 2015. The bonds were issued to increase the profile of Hong Kong as a centre for Islamic finance and as a template for other issuers to utilize Hong Kong to issue their Islamic bonds. Islamic bonds are more complex than conventional financing and in the short term are unlikely to offer a pricing advantage. However, there may be a strategic benefit in diversifying the investor base supporting AAHK to include investors in various parts of the world seeking Islamic compliant structures. If AAHK were to issue Islamic bonds, it would likely represent a small portion of the overall financing.

**(d) Commercial bank loans**

AAHK has established good relationship with major regional and international banks and has been an active participant in the Hong Kong syndication bank loan market. There is currently good market liquidity with appetite to lend up to 5 to 7 years at

competitive costs. Longer term commercial bank loans could be available with the support of export credit agencies for certain imported components of the 3RS project. Strong appetite to lend to AAHK is therefore anticipated. The tenor of bank loans could be complementary to the long dated bond. The bank loan market could provide an important funding source for AAHK.

(e) **Revolving Credit Facilities**

AAHK has maintained revolving credit facilities and this is considered important for 3RS to provide new financing and a flexible buffer in case capital expenditure is faster than expected or if the capital markets are closed or unattractive for a period of time. In early December 2015, AAHK signed a five-year \$5 billion revolving credit facility with 21 local and international banks. AAHK received overwhelming responses with an oversubscription of 3.4 times at an initial commitment of \$17.01 billion. The tight pricing also represented the lowest among club or syndicated bank loan deals in Hong Kong market with the same tenor over the past 48 months.

16. AAHK will monitor the market conditions closely and determine the detailed financing plan as the market allows, and execute it based on established guiding principles in paragraph 14 above.

17. A diagram summarising the overall 3RS funding plan is at **Annex D**.

## **Financial Return**

18. The 3RS project, based on the latest key assumptions, would generate a financial internal rate of return (“IRR”) of about 8% on standalone basis<sup>3</sup>. This IRR is calculated based on incremental cash flows (revenues, operating expenses and capital expenditure) generated by the 3RS project relative to a two-runway system baseline case. The IRR estimated by AAHK’s financial advisor under the 3RS financial arrangement study is substantially higher than that in the financial feasibility study completed in

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<sup>3</sup> Calculated based on incremental cashflows (revenues, operating expenses and capex) generated by the 3RS project relative to a 2-runway scenario (traffic capped at 77mppa, 420,000 ATM p.a.) up to FY2046/2047, after taking into account incremental tax. For reference, AAHK’s latest weighted average cost of capital (“WACC”) is approximately 8% based on internal assessment.

2011, mainly because of the incremental revenue from ACF and changes in other operating assumptions. In any case, the IRR does not take into account any economic benefits and it should not be confused with economic benefits contributed by the 3RS project, mainly in terms of the contribution to the wider Hong Kong economy as a whole. Compared with Two-Runway System (“2RS”), the 3RS will bring additional economic benefits of \$455 billion (2012 dollars) over the 50-year period and additional employment opportunities of 80,000 direct and indirect/induced jobs, which represent substantial incremental economic contribution to Hong Kong in the long term.

### **AAHK’s Statutory Power under the Airport Authority Ordinance**

19. At the Subcommittee’s meeting on 3 November 2015, AAHK was asked to provide information about the legal basis for charging the ACF and retain operating surplus. AAHK’s response is set out below.

#### **(a) Levying of Airport Construction Fee**

20. Section 5(1)(a) of the AAO states that AAHK “shall, in accordance with this Ordinance and also in accordance with the objective of maintaining Hong Kong’s status as a centre of international and regional aviation, provide, operate..., develop and maintain, at...Chek Lap Kok, an airport for civil aviation.”

21. Section 7(1) of AAO states that AAHK “shall have the power to do anything which is requisite or expedient, or is calculated to facilitate, or is conducive or incidental to, the performance of any of its functions and which is not inconsistent with any other provision of this Ordinance...”

22. Section 7(2) of AAO states that without affecting the generality of section 7(1) of AAO, the AAHK “may...subject to section 34 where applicable, determine the amount of charges and fees.”

23. Section 34 of AAO does not apply to ACF because Section 34 of AAO only concerns “airport charges” which are specially defined in Section 2 of AAO.

24. As made clear in Section 2 of AAO, the definition of “airport charges” ONLY “means charges payable in connection with the landing, parking or taking off of aircraft at the Airport”.

#### **(b) Retention of Operating Surplus**

25. Section 26 of AAO states that AAHK “may” declare and pay dividends to the Government. It is for the AAHK Board to decide whether to declare dividend, and the amount of such dividend, if any. The proposal of not declaring dividend for the purpose of financing the 3RS project was duly considered and approved by AAHK Board.

26. In short, according to legal advice it has obtained, AAHK is empowered to charge ACF and retain operating surplus. AAHK has also been advised that for as long as there are ongoing legal proceedings such as judicial reviews, AAHK cannot provide more information.

### **Financial Advisor’s Opinion on the 3RS Financial Arrangement Plan**

27. HSBC’s opinion is that, based on AAHK’s strong credit profile, AAHK will be able to raise the incremental debt of \$69 billion as set out in the financial arrangement plan.

28. HSBC has undertaken “what-if” analysis to test the financial robustness and prudence of the 3RS financial arrangement plan by assessing the impact of potential downside scenarios on the financial position of AAHK, including:-

- (a) Decline in all revenues of up to 15%;
- (b) Overspend on capital cost of up to 20%;
- (c) Overspend on capital cost of up to 50%;
- (d) Single adverse event e.g. similar to the SARS outbreak in 2003;  
or
- (e) Up to a 2% increase in the cost of borrowing.

These scenarios are for sensitivity testing purpose and do not reflect HSBC’s expectation of possible outcomes. HSBC concludes that in the event that these downside scenarios were to occur, AAHK would still be able to raise further debt to fund the consequential funding shortfall.

29. HSBC considers that the incremental debt of \$69 billion to be near or at the estimation of the maximum level of debt that AAHK should include in the working case financial arrangement plan for 3RS in order to leave AAHK with the capacity to raise additional funding from debt to meet shortfalls in downside scenarios (if they arise) whilst complying with a reasonable interpretation of the principles of financial prudence and



management standards set out in the AAO.

30. In case of downside situations which have a more severe financial impact than those considered in paragraph 28 above, and AAHK reasonably projects that a funding shortfall is likely to arise which cannot prudently be met with additional indebtedness, AAHK is recommended to revisit its financial plan. AAHK may look to develop other revenue streams or access alternative forms of financing other than senior debt.

### **The Way Forward**

31. AAHK will update and seek guidance from the Government in relation to the execution of the detailed financing plan.

### **Advice Sought**

32. Members are invited to note the issues raised in this paper.

**Airport Authority Hong Kong**  
**December 2015**

## Annex A

### Key differences between the MP2030 financial feasibility study and 3RS financial arrangement plan

	MP2030 financial feasibility study	3RS financial arrangement study
Report date	2011	2015
Study purpose	Financial feasibility assessment for both 2RS and 3RS as development option	Financial arrangement plan for 3RS
Study scope	<p>Assess the financial viability for both 2RS and 3RS such as IRR, net present value (“NPV”), WACC assessments, etc.</p> <p>Determine the size of funding gap (but not the source of funding).</p>	<p>Determine the size of funding gap and study the detailed source of funding</p> <p>(include updating IRR)</p>
Conclusion	<p>Size of funding gap was calculated.</p> <p>Source of funding was yet to be concluded.</p> <p>Incremental external borrowing could be one of the funding sources.</p>	<p>Source of funding includes retaining operating surplus, levying of ACF and external borrowing.</p> <p>In the event of downside scenarios tested by AAHK’s financial advisor, AAHK can raise additional debt to meet the funding shortfall if such arises.</p>

## Annex B

### Summary of Key Working Case Assumptions for the 3RS Project Financial Projects

<u>Parameters</u>	<u>Assumptions</u>
Airport Charges	To be brought back to the level in year 2000 starting FY2016/17 and subsequent increases in line with inflation. AAHK shall propose the actual adjustment mechanism after consulting with the stakeholders.
Surplus Funds	AAHK will retain surplus funds from operations and apply these to meet the costs of 3RS until completion of 3RS.
Airport Construction Fee	Fee charged per departing passenger, the level of which is dependent on the class (first/business or economy), distance (long haul or short haul) and type of travel (origination/destination or transfer/transit), applied from FY2016/17 until repayment of the 3RS project debt projected to be in FY2030/31.
Retail Revenue	As per AAHK's 5-year business plan*, grow in line with passenger growth and CPI thereafter.
Consumer Price Index	As per AAHK's 5-year business plan*, 3% per annum thereafter.
Traffic Growth	As per AAHK's 5-year business plan*, period thereafter is in line with IATA Consulting's base case traffic forecast used in the Environmental Impact Assessment report which has incorporated the 2-runway system capacity constraint before 3RS commences operations.
Capex	HKD141.5bn (MOD prices) per estimates from AAHK and their external consultants.
Routine Replacement of Fixed Assets	AAHK will continue to invest in committed capital projects, such as Midfield development and the routine replacement of fixed assets.
Cost of Borrowing	5.0% per annum over the projection period

**Note:**

\* The 5-year business plan refers to the 2014-2019 5-year plan prepared by AAHK

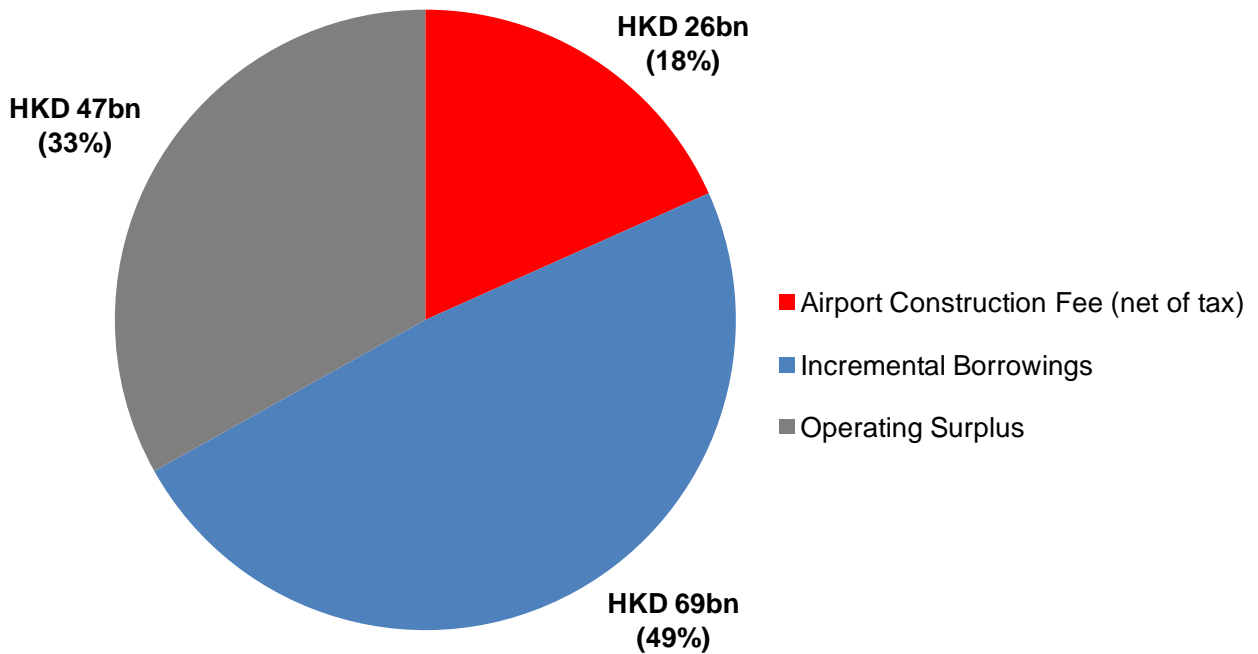
Source: AAHK, 3RS Consultancy Study: Financial Arrangement for Three-runway System (3RS) at HKIA – Financial Advisor Report, HSBC (2015)

**Charging Mechanism of the Revised ACF Regime**

<b>ACF (\$ per departing passenger)</b>		<b>First/ Business Class</b>	<b>Economy</b>
	Long haul	\$180	\$160
	Short haul	\$160	<b>\$90*</b>

\* To maintain the competitiveness of HKIA's hub status, ACF for short haul economy TT passengers is set at \$70.

**3RS Funding Plan**

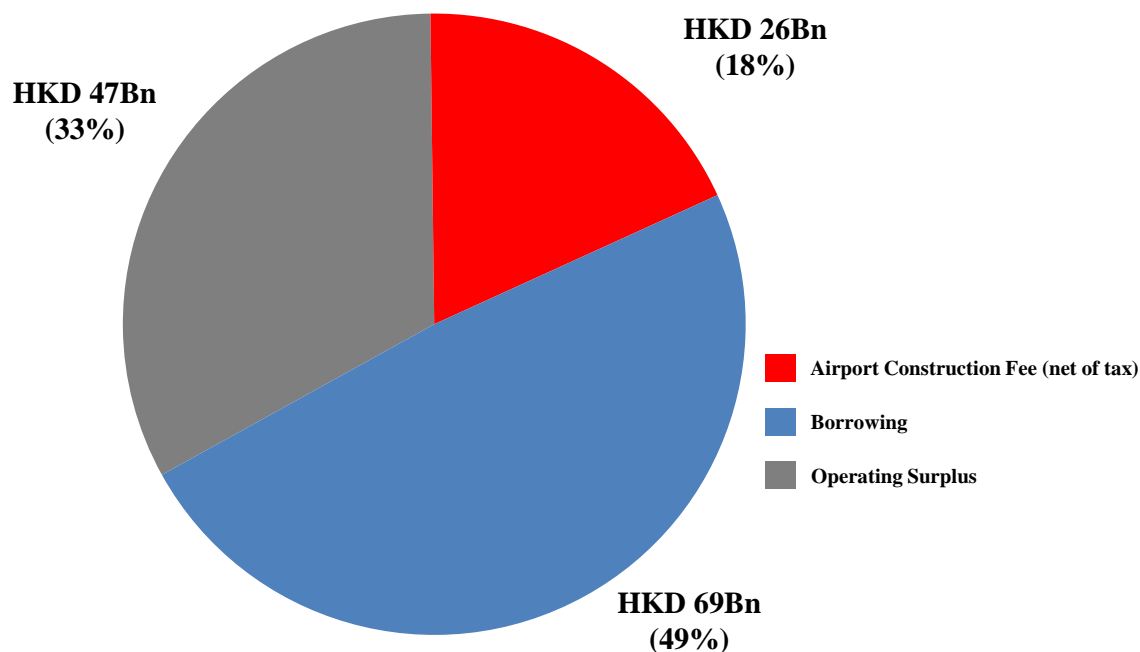


Notes: (1) The numbers above are subject to rounding.

(2) The operating surplus has incorporated revenue from Airport Charges

Source: AAHK, 3RS Consultancy Study: Financial Arrangement for Three-runway System (3RS) at HKIA – Financial Advisor Report, HSBC (2015)

**3RS Financial Arrangement Plan**



Notes : (1) The numbers above are subject to rounding.  
(2) The operating surplus has incorporated revenue from Airport Charges.

Source : AAHK, 3RS Consultancy Study : Financial Arrangement for Three-runway System (3RS) at HKIA – Financial Advisor Report, HSBC (2015)

## Press Releases

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CAAC, CAD and AACM sign agreement on liaison mechanism to enhance co-operation and exchange (with photos)

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The Air Traffic Management Bureau (ATMB) of the Civil Aviation Administration of China (CAAC), the Civil Aviation Department and the Civil Aviation Authority of the Macau Special Administrative Region (AACM) signed an agreement in Hong Kong today (May 9) on establishing a strengthened liaison mechanism to enhance co-operation and exchange among the civil aviation authorities in the Mainland, Hong Kong and Macau on air traffic management planning and implementation in the Pearl River Delta (PRD) region.

Witnessed by the Deputy Administrator of the CAAC, Mr Wang Zhiqing, and the Secretary for Transport and Housing, Professor Anthony Cheung Bing-leung, the agreement was signed by the Director General of the ATMB of the CAAC, Mr Che Jinjun; the Director-General of Civil Aviation, Mr Norman Lo and the President of the AACM, Mr Chan Weng-hong.

Specific contents of the agreement on the strengthened liaison mechanism to enhance tripartite co-operation and exchange include:

(1) The top management of the three civil aviation authorities will host high-level meetings in the Mainland, Hong Kong and Macau on a rotational basis and/or tele-conferencing twice a year to proactively strengthen the close co-operation among the three sides on the planning and implementation of air traffic management in the PRD region, enhance communication at the top management level, and synergy in overall planning, and foster co-operation in the PRD region; and



(2) Air traffic control technical personnel of the three sides will have more interaction and communications where necessary, share experience with each other, and conduct more meetings and exchanges at the technical level, with no limitation on the scale and number of meetings to be held.

Professor Cheung said at the signing ceremony that the agreement on the strengthened liaison mechanism to enhance co-operation and exchange helped to take forward the PRD Region Air Traffic Management Planning and Implementation Plan progressively and was also one of the means to implement the Guiding Opinions of the State Council on Deepening the Cooperation within the Pan-PRD Region. The signing of the agreement marked an enhanced partnership among the Mainland, Hong Kong and Macau in the planning of airspace resources in the PRD region which helped strengthen synergies, ensure efficient use of the airspace, and bring mutual benefits, thus achieving a win-win situation. Together, a world-class airport cluster in the PRD region would be built and the unique strengths of the region would be given full play.

Mr Wang noted that over the years, the Mainland, Hong Kong and Macau have all along been maintaining close working relationships and have established a good rapport in the field of civil aviation. The signing of the agreement on the strengthened liaison mechanism to enhance co-operation and exchange among the civil aviation authorities in the Mainland, Hong Kong and Macau on air traffic management is a good example. In line with the concept of "Innovation, Co-ordination, Integration and Mutual Benefits", the CAAC will work with the civil aviation authorities in Hong Kong and Macau to create a safer, smoother and healthier environment for sustainable development of the civil aviation industry in the PRD region through the approach of collaborative decision making, coordinated operations and development.

Professor Cheung also held a meeting today with Mr Wang to exchange views on various issues, including enhancement

of flight procedures and airspace structure of the PRD region, optimising the airspace utilisation in the region, and the three-runway system (3RS) project at the Hong Kong International Airport. Mr Wang said that, under the national directive of supporting the development of the 3RS project, the CAAC will provide full support with the aim of enabling the 3RS to maximise its potential and achieve the target runway capacity of 102 air traffic movements per hour in the long run.

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