

**For discussion
on 12 June 1996**

PWSC(96-97)19

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 702 - PORT AND AIRPORT DEVELOPMENT

Support - Intra-governmental services

New item - Government Facilities for the Second Runway of the new airport at Chek Lap Kok

Members are invited to recommend to Finance Committee the inclusion of a new item in Category A of the Public Works Programme as "Government Facilities for the Second Runway of the New Airport at Chek Lap Kok" at an estimated cost of \$602 million in money-of-the-day prices.

PROBLEM

We need to provide additional special equipment and systems and construct additional Government facilities to support the operation of the second runway at the new airport.

PROPOSAL

2. The Director of Architectural Services, with the support of the Secretary for Works, proposes to include an item in Category A at an estimated cost of \$602 million in money-of-the-day (MOD) prices for the procurement of additional special equipment and systems and construction of additional government facilities at the new airport to support the operation of the second runway. A location plan for the proposed facilities is at Enclosure I.

PROJECT SCOPE AND NATURE

3. The Civil Aviation Department (CAD), the Royal Observatory (RO), the Customs and Excise Department (C&ED) and the Royal Hong Kong Police Force (RHKPF) need the following additional facilities and equipment and systems to support the operation of the second runway -

Air Traffic Control (ATC) Equipment and Systems for CAD

- (a) Two Instrument Landing Systems (ILS) are required for precise radio navigational guidance for aircraft approaching the second runway.
- (b) A Precision Runway Monitor (PRM) is required for monitoring of air traffic operating on parallel runways to guard against any aircraft deviation from their runway flight paths, so that the capacity of the two runways can be maximised within required safety standards.
- (c) Communications equipment is required to cater for aircraft using the second runway. Such equipment will include VHF/UHF transmitters and receivers, mobile/ portable receivers, cabling, data links and an uninterruptible power supply system and associated equipment.
- (d) Ancillary ATC equipment including a small automatic message switching system, speech processing system, microwave links, automatic terminal information system, meteorological information broadcast system for aircraft in flight, data and cabling network, uninterruptible power supply system and ancillary communications facilities is required. The ancillary ATC equipment will be used to perform certain essential ATC functions to enable continued operation of the airport in the event of an emergency affecting the normal operation of the ATC Tower and Complex constructed under the first phase of the new airport. It can also be used for staff training.

Meteorological Equipment for RO

- (e) An extension of the Aerodrome Meteorological Observation System (AMOS) for monitoring the meteorological conditions on the second runway will be required including anemometers, transmissiometers, masts, computer workstations and cables.
- (f) Ancillary meteorological equipment including computer workstations and accessories for the AMOS, geographic situation display for the terminal doppler weather radar, a small meteorological data processing system, associated communications facilities and cable network is required. The equipment will be used to support the ancillary ATC centre (see item 3(g) below) should the need for its operation arise. It will also be used for staff training.

Building and Airfield Facilities

- (g) A building cum tower known as the Precision Runway Monitor (PRM) Tower will be constructed to accommodate the PRM, an antenna farm for the communications equipment, and microwave links. This 56-metre high building cum tower will also function as the ancillary ATC tower and provide space for offices and equipment rooms for CAD and RO, observation/radio communication rooms for C&ED, and a radio equipment room with antenna for the RHKPF. The base of the building will be enlarged to function as the ancillary ATC centre and provide accommodation for the ancillary ATC and meteorological equipment (see items 3(d) and 3(f) above).
- (h) Airfield ATC and meteorological facilities to be constructed for the second runway will include equipment rooms, other antenna farms, building services facilities and a cable duct system.

- (i) Airfield Police facilities for the second runway will include observation posts constructed at strategic locations to maintain security of the new airport upon operation of the second runway. A cable duct system will be provided to link the observation posts with other airport police facilities.

JUSTIFICATION

4. In the light of higher forecasts of air traffic demand, and revised estimates of runway capacity at airport opening, the Airport Authority envisages that the first runway of the new airport at Chek Lap Kok will be unable to meet the full unconstrained peak hour demand for aircraft movements on airport opening, within desired operational service standards. It is estimated that with only one runway, the new airport may have to turn away up to four million passengers between 1998 and 2001. This could mean a loss of revenue not only to the Airport Authority and its business partners, but also to the Hong Kong economy as a whole. The loss of four million passengers equates to an estimated loss of nearly HK\$ 8 billion in visitor spending alone.

5. The Airport Authority has therefore concluded that there is a strong case on grounds of operational efficiency, maintenance of desired service standards and overall economic benefits to the community, for commissioning the second runway and associated facilities at the new airport as soon as practicable after airport opening. They have identified October 1998 as the earliest possible date for commissioning the second runway. At its meeting on 30 May 1996, the British and Chinese sides of the Airport Committee of the Sino-British Joint Liaison Group reached a common view that the Airport Authority may immediately proceed with the design and construction of the second runway of the new airport at Chek Lap Kok and associated facilities. According to the project implementation programme at Enclosure II, if we are to meet the target commissioning date of October 1998, we have to obtain the necessary funding now so that tendering for the additional facilities and equipment systems can start in accordance with the project implementation programme.

6. The second runway will require, as did the first, installation of an ILS at each runway direction. Additional communications equipment is needed for ATC when handling the second runway traffic. Ancillary ATC equipment is also required

to supplement and back up the ATC systems being provided for the first runway. Similarly, extension of the AMOS and ancillary meteorological equipment are required to cover the second runway and to support the ancillary ATC systems so that the essential ATC/meteorological functions can be maintained in case of any emergency affecting the normal operation of the ATC Tower and Complex constructed in the first phase of the new airport.

7. The PRM radar is required to monitor aircraft to guard against any deviations from their flight paths under independent operation (i.e. landings and departures on both runways), enabling full utilization of the capacity of the two runways. Without this PRM radar, the airport can only be operated under restricted segregated mode (i.e. one runway used exclusively for aircraft landings and the other used exclusively for aircraft departures but not at the same time, i.e. staggered use of the two runways will be necessary) and its capacity will be limited to 50 movements per hour which is expected to be exceeded by the forecast traffic demand around 2000/2001. The PRM must therefore be available before traffic demand exceeds runway capacity under restricted segregated mode. It will take about six months after the installation of the PRM for the development and evaluation of the operational procedures for using the PRM and for training of staff to use the equipment.

8. The PRM and the ancillary ATC/meteorological equipment will be ready for installation a few months after October 1998 because the 16-month construction period for the PRM Tower which will accommodate them can only start in June 1997 when the work site becomes available from the Airport Authority. This will not affect the opening of the second runway as the runway capacity will be increased in phases during the initial period of operation. However, it is necessary to have these facilities in place shortly thereafter to cater for the increasing air traffic demand.

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the works to be \$602 million in MOD prices (see paragraph 11 below), made up as follows -

	\$ million
(a) ATC Equipment and Systems	
(i) Instrument Landing System	56.5

(ii)	Precision Runway Monitor	90.1	
(iii)	Communications Equipment	10.5	
(iv)	Ancillary ATC Equipment	72.3	
(b)	Meteorological Equipment		
(i)	Extension of Aerodrome Meteorological Observation System	17.9	
(ii)	Ancillary Meteorological Equipment	17.0	
(c)	Building and Airfield Facilities		
(i)	PRM Tower	100.9	
(ii)	Airfield ATC and Meteorological Facilities	79.7	
(iii)	Airfield Police Facilities	12.3	
(d)	Contingency	22.8	
	Sub-total	<u>480.0</u>	(at March 1996 prices)
(e)	Inflation allowance	122.0	
	Total	<u>602.0</u>	(in MOD prices)

10. We intend to let all the contracts on a fixed-price lump sum basis so that Government can have greater certainty in its financial planning. Like the first phase of the new airport works, we intend to entrust some of the work on the airfield facilities (items 3(h) and (i) above) to the Airport Authority because of cost and programme benefits.

11. Subject to approval of the necessary funds, we will phase the expenditure as follows -

Year	\$ million (Mar 1996)	Price adjustment factor	\$ million (MOD)
1996 - 97	16.1	1.05	16.9
1997 - 98	116.0	1.16	134.0
1998 - 99	276.3	1.27	351.1
1999 - 2000	71.6	1.40	100.0
	<u>480.0</u>		<u>602.0</u>

12. We estimate the additional annually recurrent expenditure for operating the additional government facilities required for the second runway to be \$44 million at current prices.

ENVIRONMENTAL IMPLICATIONS

13. We anticipate that the operation of the proposed systems and equipment will not cause adverse environmental impact. During the construction stage, we will carry out normal mitigation measures through provisions in the relevant contracts to control dust, noise, site runoff and waste.

LAND ACQUISITION

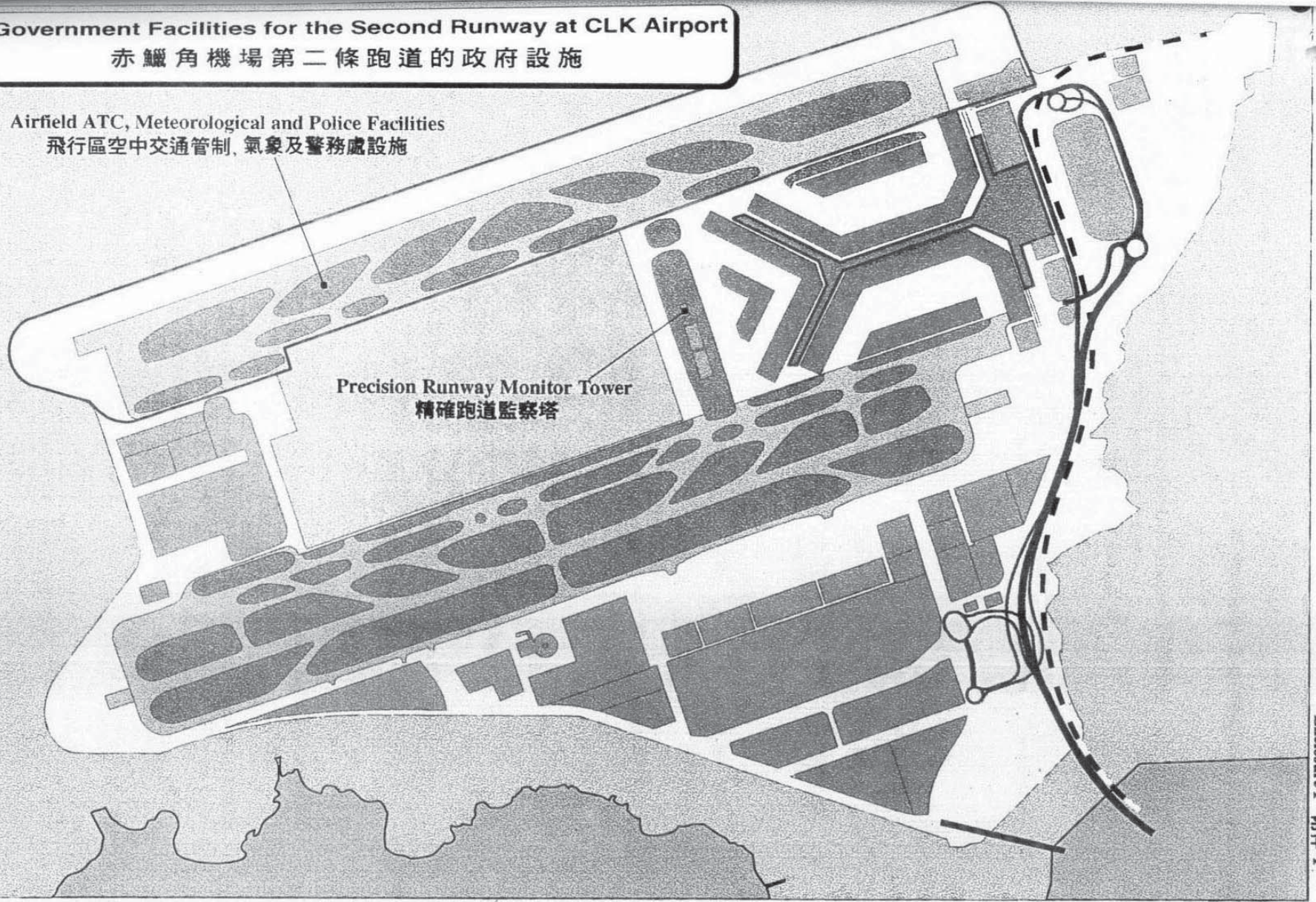
14. The project does not require any land acquisition.

Government Facilities for the Second Runway at CLK Airport

赤鱸角機場第二條跑道的政府設施

Airfield ATC, Meteorological and Police Facilities
飛行區空中交通管制、氣象及警務處設施

Precision Runway Monitor Tower
精確跑道監察塔



Enclosure I 附件 I

**Implementation Programme for Government Facilities
for the Second Runway
of the New Airport at Chek Lap Kok**

	Tender Invitation	Contract Award	Contract Completion	Contract Commissioning
(a) ATC Equipment and Systems				
(i) Instrument Landing System	Aug 96	Jan 97	Jun 98	Aug 98
(ii) Precision Runway Monitor	Jun 96	Apr 97	Mar 99	Sep 99 (Note 2)
(iii) Communications Equipment	Aug 96	Jan 97	Jul 98	Aug 98
(iv) Ancillary ATC Equipment	Jun 96 - Jan 97	Feb 97 - Aug 97	Feb 99	Mar 99 (Note 2)
(b) Meteorological Equipment				
(i) Extension of Aerodrome Meteorological Observation System	Feb 97	Sep 97	Aug 98	Oct 98
(ii) Ancillary Meteorological Equipment	Feb 97 - May 97	Sep 97 - Nov 97	Feb 99	Mar 99 (Note 2)
(c) Building and Airfield Facilities				
(i) PRM Tower	Mar 97	Jun 97	Oct 98	-
(ii) Airfield ATC and Meteorological Facilities	Note 1	Note 1	Note 1	-
(iii) Airfield Police Facilities	Note 1	Note 1	Note 1	-

Notes : (1) Programme to be developed in conjunction with the airfield civil works contract of Airport Authority.

(2) Although these facilities will not be fully completed when the second runway is commissioned, they will be required shortly thereafter to cater for growing air traffic demand.