

## ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

### HEAD 708 – CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT

#### Medical Subventions

**56MM – Enhancement of infection control facilities in the public hospital system (Batch A)**

**57MM – Enhancement of infection control facilities in the public hospital system (Batch B)**

Members are invited to recommend to Finance Committee –

- (a) the upgrading of **56MM** to Category A at an estimated cost of \$287.2 million in money-of-the-day prices for the enhancement of the infection control facilities to be carried out by the Architectural Services Department in the Pamela Youde Nethersole Eastern Hospital (PYNEH), Prince of Wales Hospital (PWH), Princess Margaret Hospital (PMH), Queen Elizabeth Hospital (QEH), Queen Mary Hospital (QMH) and Tuen Mun Hospital (TMH); and

/(b) .....

- (b) the upgrading of **57MM** to Category A at an estimated cost of \$122.4 million in money-of-the-day prices for the enhancement of the infection control facilities to be carried out by the Hospital Authority in the Alice Ho Miu Ling Nethersole Hospital (AHNH), Kwong Wah Hospital (KWH) and United Christian Hospital (UCH).

## **PROBLEM**

The isolation facilities in public hospitals are inadequate for handling major outbreaks of infectious diseases, including the Severe Acute Respiratory Syndrome (SARS).

## **PROPOSAL**

2. The Director of Architectural Services (D Arch S), with the support of the Secretary for Health, Welfare and Food, proposes to upgrade **56MM** and **57MM** to Category A at an estimated cost of \$287.2 million and \$122.4 million respectively in money-of-the-day (MOD) prices to enhance the infection control facilities in nine public hospitals, namely, PYNEH, PWH, PMH, QEH, QMH, TMH, AHNH, KWH and UCH for handling patients with infectious disease, including SARS patients.

## **PROJECT SCOPE AND NATURE**

3. **56MM** and **57MM** involve alteration and addition works in the nine public hospitals to improve their “fever” ward (for suspected SARS patients) and SARS ward facilities for handling future outbreaks of infectious diseases, including SARS. The scope of works comprises modifications of 67 wards in the nine hospitals to provide the standard facilities required for isolation rooms, where such facilities are not previously provided, by -

- (a) creation of negative pressure gradient with air flowing from “clean” zones (e.g. ward corridors) to “dirty” zones (e.g. patient rooms);

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- (b) provision of 100% fresh air supply at no less than 12 air changes per hour;
- (c) installation of low level exhaust for better air flow pattern;
- (d) installation of high efficiency particulate air (HEPA) filter for filtering out droplets and aerosols;
- (e) air-tight construction for patient rooms to prevent cross contamination;
- (f) addition of doors to close off existing open cubicles;
- (g) provision of en-suite toilet / shower facilities in ward cubicles where existing building structure and building services installations permit; and
- (h) provision of infection control facilities for hospital staff, such as gowning / de-gowning areas, changing rooms, shower facilities and clinical wash-hand basins.

We shall also conduct alteration works for existing treatment facilities, such as operating theatres, intensive care units and accident and emergency departments in eight of the nine hospitals to provide infection control / isolation facilities for handling infectious diseases, including SARS. Upon completion of the works, there would be a total of 536 rooms with 1 281 beds for isolation purposes in the nine hospitals.

4. The scope of works for the six public hospitals under **56MM** and the three public hospitals under **57MM** is set out at Enclosure 1. We plan to commence construction works in July 2003 for completion in October 2003.

## **JUSTIFICATION**

5. The recent SARS outbreak revealed the need to enhance and expand the infection control facilities in the public hospital system. At present, there is only a limited number of wards with negative pressure rooms, with or without en-suite toilet / shower, in our public hospitals. There are only 177 wards with

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negative pressure rooms, which are normally in the form of a pair of isolation rooms in a standard ward. These isolation rooms were originally designed for handling episodic cases of infectious diseases or hospital-acquired infections in wards designated for different specialties. There are however considerable difficulties in mobilising these isolation rooms which are scattered all over a hospital in the event of a major outbreak of infectious disease.

6. During the SARS outbreak, public hospitals have made make-shift arrangements by spacing out patients and installing exhaust fans in SARS wards with a view to reducing cross-infection. While the installation of exhaust fans can create negative pressure in SARS wards and improve the air dilution effect thus reducing the bioload, this contingency measure has significantly hampered the cooling efficiency of the hospital air-conditioning system and raised the temperature of the wards which leads to a deterioration in the working environment for health care workers as summer approaches. Besides, all these make-shift arrangements cannot provide proper isolation within the ward itself. In the case of SARS which is principally spread by droplets and aerosols, the isolation set-up should desirably comprise negative pressure rooms with independent toilet / shower facilities.

7. Building specially designed infection control facilities takes time. It takes about six years to build an infectious disease hospital and three years to build an infectious disease block attached to an acute hospital. In order to prepare Hong Kong for the possible resurgence of SARS outbreak later in the year, we need to enhance the “fever” ward (for suspected SARS patients) and SARS ward facilities of our public hospitals as an interim measure. Having reviewed local and international experiences in handling SARS in the past months, the Hospital Authority (HA) proposes that the handling of future SARS patients should be shared among its acute hospitals using a strategy for cohorting patients based on the following principles –

- (a) a staged approach is adopted in the mobilisation of hospitals in handling SARS;
- (b) the number of confirmed SARS patients in any hospital should be limited initially to 50 to avoid major disruption to existing services. The number could be increased to 100 in the case of a major outbreak. No hospital should take care of more than 100 patients at any one time;

/(c) .....

- (c) the number of suspected SARS cases could exceed the number of confirmed SARS cases;
- (d) priority will be given to suspected SARS cases for the use of isolation facilities to minimise the risk of cross-infection;
- (e) “probable” SARS patients may be cohorted in open wards with improved ventilation as risk of cross-infection among patients is lower; and
- (f) the cohorting of the suspected SARS patients should desirably be located in the acute hospitals backed up by intensive care facilities in view of the high level of medical and nursing dependency of the patients.

8. HA has identified nine major acute hospitals, namely, PYNEH, PWH, PMH, QEH, QMH, TMH, AHNH, KWH and UCH, which require substantial improvement works to enhance their “fever” ward (for suspected SARS cases) and SARS ward facilities to prepare the territory for another possible round of SARS attack later in the year. The proposed improvement works aim to exercise environment control against the spread of infectious diseases, including SARS. These include the creation of isolation effect with patients’ rooms or cubicles in negative pressure in relation to surrounding areas; dilution of bioload by having air flowing from lower to higher risk areas in sufficient air change rates; installation of HEPA filters for air purification; and prevention of cross-contamination by minimising air turbulences and setting up barriers. The works will also facilitate good infection control practices for health care workers by providing ample gowning / de-gowning areas for proper fitting and appropriate removal of personal protective equipment; hand-washing facilities for promoting hand hygiene to guard against transmission of the disease by contact; as well as shower facilities for washing off respiratory secretions, body fluids or excreta of patients. HA has drawn up the improvement plans for the nine acute hospitals having regard to the need to meet the cohorting strategy, the constraint of ongoing service requirements and the limitations of the physical layout of the hospitals concerned.

9. According to the guidelines published by the World Health Organization (WHO) on the management of SARS, suspected or probable SARS

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cases should be hospitalised under isolation or, if individual isolation is not possible, cohort with other suspected or probable SARS cases. Accordingly, the proposed improvement works will provide separate wards for confirmed and suspected SARS patients. HA will place patients in the one-bed, two-bed or four-bed rooms as clinically appropriate. HA will also individually isolate suspected SARS cases whenever practicable, or cohort patients with similar conditions. In general, confirmed SARS cases can be cohorted, although patients in more critical conditions may be placed in one-bed rooms for higher level of medical care.

10. Taking reference from the recent SARS outbreak, HA considers the surge capacity required for handling future outbreaks to be around 1 000 beds for confirmed SARS cases and 1 000 beds for suspected SARS cases. However, with lessons learnt from the recent outbreak and the comprehensive public health measures that have been put in place for early detection, swift contact tracing, prompt isolation and quarantine as well as effective containment, HA's assessment is that there is a good chance for future SARS outbreaks to be brought under control before triggering the surge capacity. Upon completion of the proposed improvement works, there would be some 1 300 beds for handling SARS cases, comprising 167 isolation rooms with a total of 492 beds for confirmed SARS patients and 369 isolation rooms with a total of 789 beds for suspected SARS patients as detailed at Enclosure 2. HA will put in place contingency plans for the timely provision of additional isolation facilities, which will be triggered into action when the first sign of an extensive outbreak develops.

11. The proposed improvement works under **56MM** and **57MM** will result in a reduction in the bed capacity of the nine hospitals by a total of around 450 beds, which can be accounted for as part of HA's planned reduction of 1 200 general beds in 2003-04 in the context of rationalisation of its service provision. In this connection, the planned reduction in in-patient beds has been made possible by advances in medical technologies, strengthened ambulatory and community care services as well as service re-engineering and consolidation, which help shorten the duration of hospitalisation and facilitate early discharge of patients. Separately, HA is currently reviewing its service rationalisation programme based on the lessons learnt during the recent SARS outbreak.

## FINANCIAL IMPLICATIONS

12. We estimate the costs of the proposed works under **56MM** and **57MM** to be \$287.2 million and \$122.4 million respectively in MOD prices, made up as follows -

/ \$ million .....

	<b>\$ million</b>		
	<b>56MM</b>	<b>57MM</b>	
(a) Building	166.4	48.5	
(b) Building services	110.9	69.7	
(c) Contingencies	27.7	11.8	
	<hr/>		
Sub-total	305.0	130.0	(in September 2002 prices)
(d) Provision for price adjustment	(17.8)	(7.6)	
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Total	287.2	122.4	(in MOD prices)
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Given the extremely tight time frame for completion of the works required in the event of a resurgence of SARS later in the year, we have accepted HA's preliminary cost estimates for the works involved in the nine hospitals as the control figures for the two projects. In tandem with the process of seeking funding approval from the Finance Committee, D Arch S, as the works agent for **56MM** involving six public hospitals which are formerly Government hospitals, will deploy in-house staff resources to develop the detailed user requirements and detailed cost estimates to satisfy himself the extent to which HA's preliminary estimates are correct. D Arch S, as technical advisor to the Government for **57MM**, would also satisfy himself that the detailed design and costing to be developed by HA's term consultants would be in order. Whilst we have not been able to adhere to the usual sequential approach with the Controlling Officer (i.e. D Arch S for both **56MM** and **57MM**) having vetted the preliminary estimates before seeking funding approval from the Finance Committee, we are satisfied that concurrent processing is the only way forward to achieve the target project delivery dates and that a mechanism exists for detailed design and costs to be vetted before works orders are placed.

13. Subject to Members' approval, we will phase the expenditure as follows –

/Year .....

Year	\$ million (Sept 2002)		Price adjustment factor	\$ million (MOD)	
	56MM	57MM		56MM	57MM
2003 – 2004	275.0	117.5	0.94300	259.3	110.8
2004 – 2005	30.0	12.5	0.93003	27.9	11.6
Total	305.0	130.0		287.2	122.4

14. We have derived the MOD estimates of **56MM** and **57MM** on the basis of the Government's latest forecasts of trend labour and construction prices for the period 2003 to 2005. The total construction floor areas (CFA) covered by the proposed improvement works under **56MM** and **57MM** are around 28 200 square metres (m<sup>2</sup>) and 12 000 m<sup>2</sup> respectively. The estimated construction unit costs of **56MM** and **57MM**, represented by the building and building services costs, are around \$9,833 / m<sup>2</sup> and \$9,850 / m<sup>2</sup> of CFA respectively in September 2002 prices and are comparable to that of other projects of similar nature.

15. To ensure that works can commence as promptly as practicable to meet the very tight time schedule, D Arch S and HA will carry out the works using their own term contractors selected through competitive bidding processes. To do so otherwise, say, through a tendering exercise, would defer the completion of the projects by up to six months.

16. HA cannot quantify the annual recurrent expenditure arising from the project at this stage, but does not expect it to be significant. With the implementation of the population-based funding mechanism, the provision of recurrent funding will no longer be facility-based. No separate resources will therefore be provided to HA to cover the recurrent consequences, if any, arising from both projects.

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## **PUBLIC CONSULTATION**

17. We consulted the Legislative Council Panel on Health Services on 25 June 2003. Members did not object to the proposed works.

## **ENVIRONMENTAL IMPLICATIONS**

18. **56MM** and **57MM** are non-designated projects under the Environmental Impact Assessment Ordinance, and will not cause long-term adverse environmental impact. During construction, D Arch S and HA will control noise, dust and site run-off nuisances to within established standards and guidelines through the implementation of mitigation measures in the relevant contracts. These include the use of silencers, mufflers, acoustic lining or shields for noisy construction activities, frequent cleaning and watering of the site and, where applicable, the provision of wheel-washing facilities.

19. At the planning and design stages, D Arch S and HA have considered measures to reduce the generation of construction and demolition (C&D) materials. D Arch S and HA will encourage the contractors to use non-timber formwork and recyclable materials for temporary works to minimize the generation of C&D materials. In addition, D Arch S and HA will require the contractors to use metal site hoardings and signboards so that these materials can be recycled or reused in other projects.

20. D Arch S and HA will require the contractors to submit waste management plans (WMPs) for approval. The WMPs will include appropriate mitigation measures to avoid, reduce, reuse and recycle C&D materials. D Arch S and HA will ensure that the day-to-day operations on site comply with the approved WMPs. D Arch S and HA will require the contractors to control the disposal of public fill and C&D waste to designated public filling facilities and landfills respectively through a trip-ticket system. D Arch S and HA will require the contractors to separate public fill from C&D waste for disposal at appropriate facilities. D Arch S and HA will record the disposal, reuse and recycling of C&D materials for monitoring purposes. D Arch S and HA estimate that the volume of C&D materials to be generated by the two projects is as follows -

**/Project .....**

Project	Total C&D materials generated m <sup>3</sup>	C&D materials to be reused / recycled at site		C&D materials to public filling areas <sup>1</sup>		C&D materials to landfills	
		m <sup>3</sup>	%	m <sup>3</sup>	%	m <sup>3</sup>	%
<b>56MM</b>	4 230	148	3.5	3 405	80.5	677	16.0
<b>57MM</b>	4 140	195	4.7	3 360	81.2	585	14.1
<b>Total</b>	8 370	343	4.1	6 765	80.8	1 262	15.1

The notional costs of accommodating C&D waste at landfill sites are estimated to be \$84,625 and \$73,125 respectively for **56MM** and **57MM** (based on a notional unit cost<sup>2</sup> of \$125/m<sup>3</sup>).

## LAND ACQUISITION

21. The proposed projects do not require land acquisition.

## BACKGROUND INFORMATION

22. SARS is a new respiratory illness caused by a member of the coronavirus family that has never been seen in humans. The recent SARS outbreak has turned out to be one of the worst outbreaks of infectious diseases ever experienced by Hong Kong for decades. As at 28 June 2003, a total of 1 755 persons have been confirmed to have contracted SARS, including 386 health care workers. Of these 1 755 patients, 1 428 have recovered, 29 are still in hospital and 298 have died. The number of patients hospitalised for SARS reached a peak of 960 on 17 April 2003.

23. We upgraded **56MM** and **57MM** to Category B on 26 June 2003.

/24. ....

<sup>1</sup> A public filling area is a designated part of a development project that accepts public fill for reclamation purposes. Disposal of public fill in a public filling area requires a licence issued by the Director of Civil Engineering.

<sup>2</sup> This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90 per m<sup>3</sup>), nor the cost to provide new landfills (which are likely to be more expensive) when the existing ones are filled. The notional cost estimate is for reference only and does not form part of this project estimate.

24. During the recent SARS outbreak, HA has, as a make-shift arrangement, installed exhaust fans to maximise fresh air intake and create negative pressure in the ward environment of a total of 228 wards in its hospitals.

25. We estimate that the proposed works will create the following job opportunities during the construction period -

<b>Project</b>	<b>Professional/ technical staff</b>	<b>Labourers</b>	<b>Total number of jobs</b>	<b>Total man-months</b>
<b>56MM</b>	95	575	670	2 650
<b>57MM</b>	45	405	450	1 860
<b>Total</b>	140	980	1 120	4 510

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Health, Welfare and Food Bureau  
July 2003

**56MM** – Enhancement of infection control facilities in the public hospital system (Batch A)

<b>Hospital</b>	<b>Scope of works</b>
PYNEH	Alteration and addition (A&A) works in five wards and the Accident & Emergency (A&E) Department, covering a total Construction Floor Area (CFA) of around 4 500 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 50 beds for confirmed SARS patients</li><li>• 72 beds for suspected SARS patients</li><li>• infection control / isolation facilities in A&amp;E Department</li></ul>
PWH	Conversion / A&A works in six wards, covering a CFA of around 3 500 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 48 beds for confirmed SARS patients</li><li>• 60 beds for suspected SARS patients</li></ul>
PMH	Conversion of 12 wards covering a CFA of around 5 500 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 108 beds for confirmed SARS patients</li><li>• 84 beds for suspected SARS patients</li><li>• nine Intensive Care Unit (ICU) beds</li></ul>
QEH	Conversion / A&A works in 11 wards, covering a CFA of around 5 500 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 36 beds for confirmed SARS patients</li><li>• 124 beds for suspected SARS patients</li><li>• infection control / isolation facilities in ICU</li></ul>
QMH	Conversion / A&A works in six wards and Operating Theatre (OT) suite, covering a total CFA of around 3 200 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 54 beds for confirmed SARS patients</li><li>• 46 beds for suspected SARS patients</li><li>• 10 ICU beds</li><li>• one negative-pressure OT</li></ul>
TMH	A&A works in ten wards and the A&E Department, covering a total CFA of around 6 000 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 48 beds for confirmed SARS patients</li><li>• 141 beds for suspected SARS patients</li><li>• infection control / isolation facilities in emergency observation and pre-admission ward, the A&amp;E Department, ICU and High Dependency Unit (HDU)</li></ul>

**57MM** – Enhancement of infection control facilities in the public hospital system (Batch B)

**Hospital****Scope of works**

- |             |   |
|-------------|---|
| <b>AHNH</b> | A&A works in six wards, ICU / Coronary Care Unit (CCU) and OT suite, covering a total CFA of around 4 500 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 46 beds for confirmed SARS patients</li><li>• 76 beds for suspected SARS patients</li><li>• one negative-pressure OT</li><li>• infection control / isolation facilities in ICU / CCU</li></ul>                                  |
| <b>KWH</b>  | A&A works in seven wards, OT suite and the A&E Department, covering a total CFA of around 4 000 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 50 beds for confirmed SARS patients</li><li>• 134 beds for suspected SARS patients</li><li>• one negative-pressure OT</li><li>• infection control / isolation facilities in ICU, HDU and observation ward of A&amp;E Department</li></ul> |
| <b>UCH</b>  | A&A works in four wards, HDU and OT suite, covering a total CFA of around 3 500 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 52 beds for confirmed SARS patients</li><li>• 52 beds for suspected SARS patients</li><li>• one negative-pressure OT</li><li>• infection control / isolation facilities in HDU</li></ul>  |

56MM - Enhancement of infection control facilities in the public hospital system (Batch A)

57MM - Enhancement of infection control facilities in the public hospital system (Batch B)

**Number of beds to be provided in the nine public hospitals  
for handling confirmed SARS patients and suspected SARS patients**

	Rooms for Confirmed SARS Patients				Rooms for Suspected SARS Patients				Total Bed Provision for Hospital
	No. of Beds in Room			Bed Provision Sub-total	No. of Beds in Room			Bed Provision Sub-total	
	1	2	4		1	2	4		
<b>PYNEH</b>	4	5	9	50	20	2	12	72	122
<b>PWH</b>	0	8	8	48	12	24	0	60	108
<b>PMH</b>	12	0	24	108	4	16	12	84	192
<b>QEH</b>	4	16	0	36	12	36	10	124	160
<b>QMH</b>	0	11	8	54	2	0	11	46	100
<b>TMH</b>	0	0	12	48	25	30	14	141	189
<b>AHNH</b>	2	6	8	46	42	3	7	76	122
<b>KWH</b>	2	0	12	50	14	6	27	134	184
<b>UCH</b>	4	0	12	52	4	24	0	52	104
<b>Total No. of Rooms</b>	28	46	93	167 rooms	135	141	93	369 rooms	536 rooms
<b>Total No. of Beds</b>	-----			492 beds	-----			789 beds	1 281 beds