

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 703 - BUILDINGS

Environmental Hygiene - Burial grounds, columbaria and crematoria 7NB – Reprovisioning of Diamond Hill Crematorium

Members are invited to recommend to Finance Committee the upgrading of **7NB** to Category A at an estimated cost of \$231.4 million in money-of-the-day prices for the reprovisioning of the Diamond Hill Crematorium.

PROBLEM

The six cremators at the Diamond Hill Crematorium (DHC) have been in use for over 20 years on average and are at the end of their serviceable life. Due to their deteriorating performance, frequent repairs are required, causing disruptions to the provision of cremation service to the public.

PROPOSAL

2. The Director of Architectural Services (D Arch S), with the support of the Secretary for Health, Welfare and Food, proposes to upgrade **7NB** to Category A at an estimated cost of \$231.4 million in money-of-the-day (MOD) prices to reprovision the DHC with six new cremators and a full range of ancillary facilities at the site of the existing crematorium as well as the adjacent sitting-out area and garden of remembrance.

/ PROJECT

PROJECT SCOPE AND NATURE

3. To avoid disruptions to the provision of cremation service at the DHC during the construction period, **7NB** will be implemented by two phases. The scope of **7NB** comprises -

(a) Phase I

- (i) construction of a cremation plant room with six new cremators which will be designed to meet all relevant environmental protection criteria, including the Guidance Notes on the Best Practicable Means for Incinerators (Crematoria)¹ (the Guidance Notes) issued by the Environmental Protection Department (EPD);
- (ii) construction of two service halls with ancillary facilities, including public toilets, clergy's rooms and storerooms;
- (iii) provision of an automatic coffin handling system to transfer coffins from the service halls to the cremation plant room;
- (iv) provision of a pulverising room, a mortuary, ancillary service rooms, transformer and switch rooms, a fire services pump room and an emergency generator room;
- (v) provision of four lifts and part of an underground service tunnel for coffin circulation;
- (vi) provision of a management office;
- (vii) installation of closed-circuit television (CCTV) system and anti-burglary devices at suitable locations;
- (viii) provision of four vehicular loading bays for vehicles including coffin vans and coaches;

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¹ This note was issued by the EPD to provide guidance for processes specified under Part IV of the Air Pollution Control Ordinance. The note sets out the basic requirement for the applicant to provide and maintain the best practicable means for the prevention of emission of air pollutants arising from crematoria.

- (ix) construction of two lily ponds and two gardens of remembrance with joss burners; and
 - (x) re-alignment of the existing emergency vehicular access; and
- (b) Phase II
- (i) demolition of the existing crematorium building;
 - (ii) in-situ construction of two service halls with ancillary facilities, two lifts and the remaining portion of the underground service tunnel for coffin circulation;
 - (iii) construction of two lily ponds and two gardens of remembrance with joss burners; and
 - (iv) reprovisioning of 12 car parking spaces and landscaped area displaced by the new cremation plant room.

4. A site plan is at Enclosure 1 and the view of the proposed crematorium (artist's impression) is at Enclosure 2. We plan to start the Phase I works in October 2004 for completion in June 2006. Upon satisfactory commissioning of the new cremators, we will begin the Phase II works in July 2006 for completion in April 2008.

JUSTIFICATION

5. The DHC had four cremators when it was commissioned in 1979 and two more cremators were added in 1985 to meet the increasing demand for cremation service. These cremators have been in use for about 18 to 24 years and are at the end of their serviceable life. The frequent repairs required in recent years have affected the provision of cremation service to the public.

6. Since the DHC cremators have been in operation for a long time, their performance is likely to deteriorate further and may possibly cause air pollution problems like dark smoke and odour if replacement cremators are not put in place in a timely manner.

7. The percentage of cremations to the total number of deaths has risen from 47% in 1979 to 83% in 2003. The number of cremations has been increasing

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steadily at about 1% per year in the last decade. There is a need for the Government to expand the cremation capacity by upgrading the existing cremators in order to meet the increasing public demand for cremation service. If DHC cremators were to cease operation, there would be a serious shortfall in cremation sessions by 2006 and the waiting time for cremation service would increase by about 20% as a result.

8. In view of the above, we propose to replace the existing cremators with new ones, which will adopt the latest cremation technology and will be designed to meet all relevant environmental protection criteria during their operation. They will be equipped with high temperature secondary combustion chambers to ensure complete combustion during the cremation process and a flue gas filtering system to filter away particles and waste gases in the emission from the cremators. These advanced features have been adopted in the replacement cremators at the Kwai Chung Crematorium commissioned in 2003 and have proven effective in preventing the emission of particles/waste gases and dark smoke and meeting the statutory environmental standards.

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the project to be \$231.4 million in MOD prices (see paragraph 10 below), made up as follows -

	\$ million
(a) Site works and demolition	8.5
(b) Geotechnical works	1.6
(c) Building	54.3
(d) Building services	28.2
(e) Drainage and external works	13.8
(f) Supply and installation of cremators, flue gas filtering system and supporting machinery	109.5
(g) Furniture and equipment ²	1.4

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² Based on the provision of furniture and equipment of existing crematoria and the market price of the items required.

	\$ million	
(h) Contingencies	21.7	
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Sub-total	239.0	(in September 2003 prices)
(i) Provision for price adjustment	(7.6)	
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Total	231.4	(in MOD prices)
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The construction floor area (CFA) of **7NB** is about 6 960 square metres (m²). The estimated construction unit cost, represented by the building and the building services costs, is \$11,853 per m² of CFA in September 2003 prices. D Arch S considers this unit cost comparable to that of other similar projects built by the Government.

10. Subject to approval, we will phase the expenditure as follows -

Year	\$ million (Sept 2003)	Price adjustment factor	\$ million (MOD)
2004 - 05	6.0	0.97150	5.8
2005 - 06	45.0	0.95450	43.0
2006 - 07	72.0	0.95450	68.7
2007 - 08	54.0	0.96643	52.2
2008 - 09	35.0	0.98455	34.5
2009 - 10	19.0	1.00203	19.0
2010 - 11	8.0	1.01906	8.2
	<hr/>		<hr/>
	239.0		231.4
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11. We have derived the MOD estimate on the basis of the Government's latest forecast of trend rate of change in the prices of public sector building and construction output for the period 2004 to 2011. We intend to award the contract on a fixed-price lump-sum basis because we can clearly define the

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scope of works in advance, leaving little room for uncertainty. The contract will provide for price adjustments because the contract period will exceed 21 months.

12. At present, the annual recurrent expenditure for the DHC is \$6.2 million. We estimate the annual recurrent expenditure upon completion of the project to be \$13.7 million.

PUBLIC CONSULTATION

13. The original scope of the project was to build 12 cremators (including six replacement cremators and six additional cremators) at the DHC site to meet increasing demand for cremation service. When we consulted the Environmental Committee of the former Wong Tai Sin Provisional District Board in November 1997, the Committee only supported the early replacement of the six existing cremators at the DHC but objected to the installation of six additional cremators due to concerns about possible additional air pollution they might bring to the area. The Food and Environmental Hygiene Department (FEHD) subsequently conducted a review and concluded that the increasing demand for cremation service could be met by the installation of new cremators with greater cremation capacity than that of the traditional cremators. We have therefore revised the scope of the project to include only the replacement of six cremators and reprovisioning of the full range of ancillary facilities.

14. In January 2003, in response to the requests from a group of parents of students studying in the school village near the DHC to expedite the reprovisioning project and make improvements to the existing cremators in the interim, a Legislative Council case conference was held and Members urged the Government to implement the reprovisioning project as soon as possible so as to improve the local environmental quality.

15. The Wong Tai Sin District Council (WTSDC) has been very concerned about the progress of the project. In March 2003, the WTSDC Chairman wrote to the FEHD to enquire about the progress of the project and urged for early replacement of the existing cremators.

16. We briefed the Legislative Council Panel on Food Safety and Environmental Hygiene on the project on 19 March 2004. Members supported the replacement of the existing cremators and requested early implementation of the project.

ENVIRONMENTAL IMPLICATIONS

17. This is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and an environmental permit is required for the construction and operation of the new crematorium and for the decommissioning of the existing crematorium. In conducting the EIA study for the project, we have assessed the possible impact of the project on both the existing and potential sensitive receivers in the vicinity of the project site. The study concluded that the environmental impact arising from the project could be controlled within the criteria under the EIA Ordinance and the Technical Memorandum on EIA Process. At the public inspection stage of the EIA process, there were views against in-situ re-provisioning of the DHC. Having considered all views received, the Advisory Council on the Environment endorsed the EIA report in March 2004. The EPD approved the EIA report for the project in March 2004 and issued the environmental permit in April 2004.

18. We will implement the mitigation measures and the environmental monitoring and audit programme for the construction and operation stages as required and recommended in the approved EIA report. The design of the new cremators will adopt the latest air pollution control technology. Air emission from the new cremators will meet all relevant criteria and the project will have no long-term adverse environmental impact. We will adopt a flue gas filtering system to control the quality of the gas emitted from the cremators. The outdoor areas will be landscaped, including planting trees on top of the new cremation plant room. FEHD will monitor the operating parameters (e.g. temperature, oxygen content) of the new cremators on a continuous basis and the stack emission from the new cremators on a regular basis throughout the operation life of the new crematorium. During construction, we will keep noise, dust and site runoff nuisances 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 the provision of wheel-washing facilities. We will clean up the soil contamination hotspots as identified in the approved EIA report. We will also conduct supplementary contamination assessment to confirm the presence of additional contaminated soil and materials, if any, and to carry out the necessary remedial works if contamination is identified. As required by the environmental permit, an environmental team will be established and an independent environmental checker will be employed for environmental monitoring and audit during the construction period. We estimate the cost of implementing the environmental mitigation measures to be \$4.3 million. We have included this cost in the overall project estimate.

19. At the planning and design stages, we have considered measures to reduce the generation of construction and demolition (C&D) materials. D Arch S has introduced more prefabricated building elements into project design to reduce

temporary formwork and construction waste. These include dry-wall partitioning and proprietary fittings and fixtures. We will use suitable excavated materials for filling within the project site to minimise off-site disposal. In addition, we will require the contractor to use metal site hoardings and signboards so that these materials can be recycled or reused in other projects.

20. D Arch S will require the contractor to submit a waste management plan (WMP) for approval. The WMP will include appropriate mitigation measures to avoid, reduce, reuse and recycle C&D materials. D Arch S will ensure that the day-to-day operations on site comply with the approved WMP. D Arch S will control the disposal of public fill and C&D waste to designated public filling facilities and landfills respectively through a trip-ticket system. The contractor will be required to separate public fill from C&D waste for disposal at appropriate facilities. We will record the disposal, reuse and recycling of C&D materials for monitoring purposes.

21. We estimate that the project will generate about 23 154 cubic metres (m³) of C&D materials. Of these, we will reuse about 14 183 m³ (61.3%) on site, 7 876 m³ (34.0%) as fill in public filling areas³, and dispose of 1 095 m³ (4.7%) at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$136,875 for this project (based on a notional unit cost⁴ of \$125/m³).

22. The operation of the new cremators requires a specified process licence under the Air Pollution Control Ordinance. FEHD will obtain the requisite process licence by satisfying the requirements in the Guidance Notes issued by EPD.

LAND ACQUISITION

23. The project does not require land acquisition.

/ **BACKGROUND**

³ 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.

⁴ 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/m³), 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.

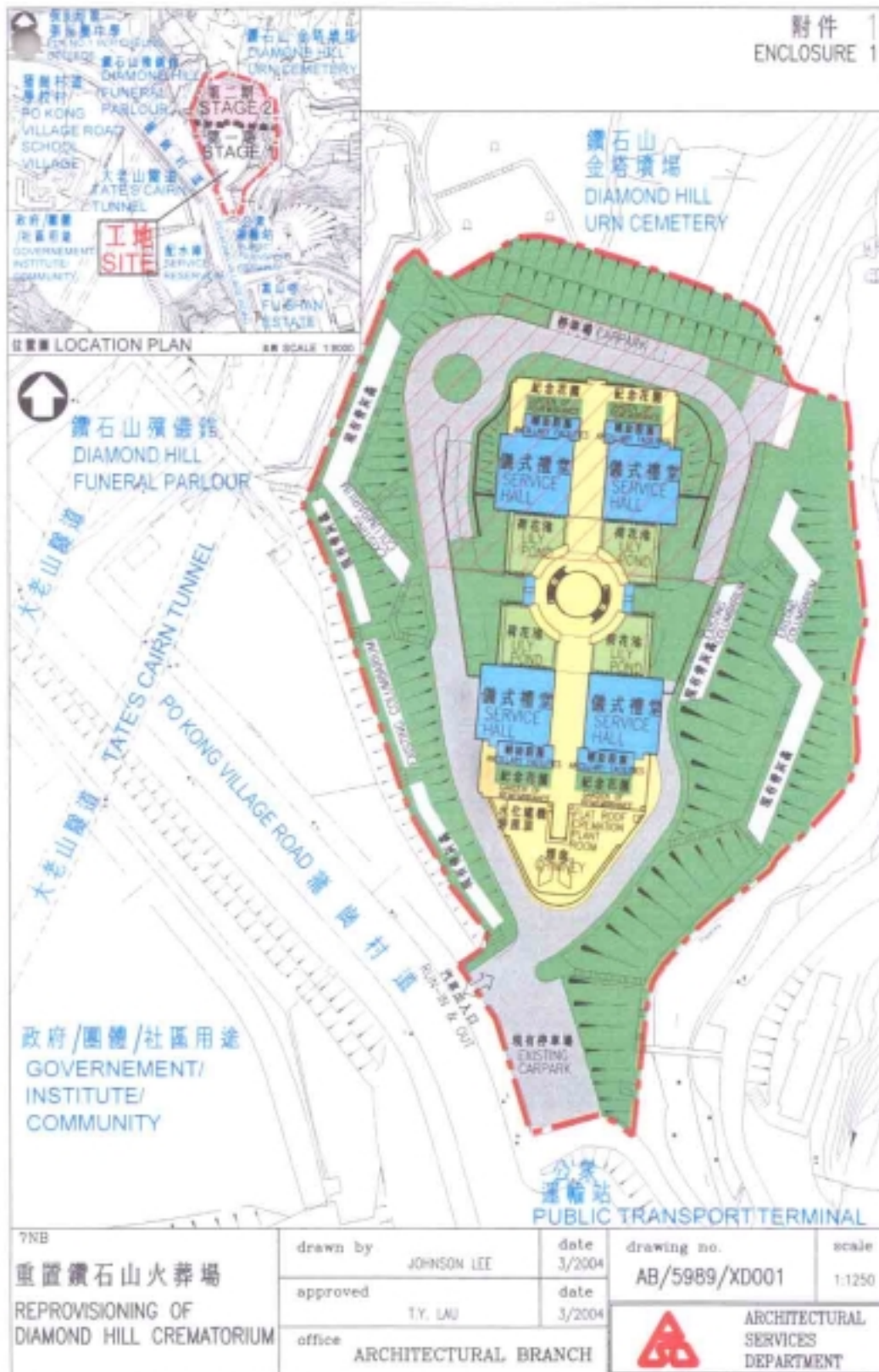
BACKGROUND INFORMATION

24. We upgraded **7NB** to Category B in September 2000. We have employed term contractors to carry out ground investigations and a topographical survey, and engaged consultants to carry out a Preliminary Environmental Review (PER), an EIA, an Air Pollution Control Plan (APCP) and drafting services for contract documentation for the project at a total cost of \$2.3 million. We have charged this amount to block allocation **Subhead 3100GX** "Project feasibility studies, minor investigations and consultants' fees for items in Category D of Public Works Programme". The term contractors and the consultants have completed the ground investigations, topographical survey, PER, EIA, APCP and drafting services for contract documentation. D Arch S has completed the detailed design of the project and is preparing the tender documents using in-house staff resources.

25. The proposed reprovisioning of the DHC will involve removal of 172 trees, including 34 trees to be felled, 107 trees to be transplanted elsewhere, and 31 trees to be replanted within the project site. Among these existing trees to be affected, 20 trees are deemed to be important trees by virtue of them being designated as protected species under the Forestry Regulation (Cap 96 sub leg). All these 20 important trees are to be replanted within the project site. A summary of these important trees is provided at Enclosure 3. We will incorporate planting proposals as part of the project, including estimated quantities of 262 trees, 4 800 shrubs and 3 000 groundcovers.

26. We estimate that the proposed works will create about 125 jobs (115 for labourers and another 10 for professional/technical staff) providing a total employment of 2 700 man-months.

Health, Welfare and Food Bureau
April 2004






從西面望向火葬場的構思圖

VIEW OF CREMATORIUM FROM WESTERN DIRECTION (ARTIST'S IMPRESSION)



從北面望向火葬場的構思圖

VIEW OF CREMATORIUM FROM NORTHERN DIRECTION (ARTIST'S IMPRESSION)

7NB 重置鑽石山火葬場 REPROVISIONING OF DIAMOND HILL CREMATORIUM	drawn by	JOHNSON LEE	date	3/2004	drawing no. AB/5989/XD002	scale	N.T.S.
	approved	T.Y. LAU	date	3/2004			
	office	ARCHITECTURAL BRANCH		 ARCHITECTURAL SERVICES DEPARTMENT			

**Summary of “Important Trees” Involved in
7NB - Re-provisioning of Diamond Hill Crematorium**

Tree ref. no. (and/or photo no.)	Tree species (Botanical name)	Tree size			Form (Good/Fair/ Poor)	Survival rate after transplanting (High/Med/Low)	Amenity value (High/Med/Low)
		Overall height (metres)	Trunk diameter (mm)	Average crown spread (metres)			
22	Ailanthus fordii (福氏臭椿)	8	344	4	Fair	Med	Med
23	Ailanthus fordii (福氏臭椿)	9	293	3	Fair	Med	Med
24	Ailanthus fordii (福氏臭椿)	10	293	3	Fair	Med	Med
25	Ailanthus fordii (福氏臭椿)	10	293	3	Fair	Med	Med
26	Ailanthus fordii (福氏臭椿)	10	430	4	Fair	Med	Med

Tree ref. no. (and/or photo no.)	Tree species (Botanical name)	Tree size			Form (Good/Fair/Poor)	Survival rate after transplanting (High/Med/Low)	Amenity value (High/Med/Low)
		Overall height (metres)	Trunk diameter (mm)	Average crown spread (metres)			
48a	Rhodoleia championi (吊鐘王)	4	102	3	Fair	Med	Med
48b	Rhodoleia championi (吊鐘王)	4	99	2	Fair	Med	Med
48c	Rhodoleia championi (吊鐘王)	2	89	2	Fair	Med	Med
48d	Rhodoleia championi (吊鐘王)	4	102	2	Good	Med	Med
66	Magnolia grandiflora (荷花玉蘭)	6	166	3	Fair	Med	Med
135	Michelia alba (白蘭)	5	108	3	Good	Med	Med
137	Michelia figo (含笑)	2.5	102	2.5	Fair	Med	Med
A	Michelia figo (含笑)	N/A	Bush	N/A	Fair	Med	Med
B	Michelia figo (含笑)	N/A	Bush	N/A	Fair	Med	Med

Tree ref. no. (and/or photo no.)	Tree species (Botanical name)	Tree size			Form (Good/Fair/Poor)	Survival rate after transplanting (High/Med/Low)	Amenity value (High/Med/Low)
		Overall height (metres)	Trunk diameter (mm)	Average crown spread (metres)			
C	Camellia japonica (山茶)	N/A	Bush	N/A	Fair	Med	Med
E	Camellia japonica (山茶)	N/A	Bush	N/A	Fair	Med	Med
F	Camellia japonica (山茶)	N/A	Bush	N/A	Fair	Med	Med
G	Camellia japonica (山茶)	N/A	Bush	N/A	Fair	Med	Med
H	Camellia japonica (山茶)	N/A	Bush	N/A	Fair	Med	Med
I	Michelia figo (含笑)	N/A	Bush	N/A	Fair	Med	Med