



**Architectural Services Department**

PWP No. 016NB

**Phased Re provisioning of Cape  
Collinson Crematorium**

**Executive Summary**

March 2009

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## **1 INTRODUCTION**

- 1.1 The existing Cape Collinson Crematorium has started operation since 1962. Cremator Nos. 1-10 were replaced in 1995 and Nos. 11-12 were commissioned in 2001.
- 1.2 The existing cremators are approaching the end of serviceable life and further restoration work is considered not cost-effective or sustainable. In order to cope with an increasing demand for cremation service, Food and Environmental Hygiene Department (FEHD) proposes to demolish the existing crematorium as well as to construct and operate a new crematorium in-situ as a replacement (hereinafter referred to as the Project). The Project will be developed in two phases.

## **2 PROJECT DESCRIPTION**

### **The Need and Justification for the Project**

- 2.1 The number of cremation sessions has been rising steadily in the past three decades and the existing cremators in the territory are operating at almost their full capacities. In 2008, out of the total number of deaths of 41,530 in Hong Kong, 36,410 (i.e. 88%) dead bodies were cremated. Although FEHD can meet the pledge of undertaking cremation within a maximum waiting time of 15 days after application, the present provision will not be sufficient to cope with the projected increase in demand for cremation service in the coming years.
- 2.2 The old cremators at Cape Collinson Crematorium should be replaced in the public interest and the capacity of the crematorium facilities should be expanded to meet the increasing demand.
- 2.3 The current Cape Collinson site is already established and the use of an existing site is a more sustainable approach than using a greenfield site. Owing to environmental concerns and general public's resistance against the presence of cremators in their neighbourhood, it is extremely difficult to identify suitable land for crematorium development. It usually takes long lead time to go through the public consultation process while at the same time the demand for cremation service is rising steadily.
- 2.4 If the existing cremators are not replaced and upgraded in time, or if sufficient numbers of cremators are not provided for commissioning by 2012 (Phase 1) and 2014 (Phase 2), a considerable number of applications for cremation sessions will unlikely be met within the present pledge of 15 days. Extended waiting time for the bereaved family will not be acceptable to the community. In addition, it is envisaged that the air quality in the vicinity of Cape Collinson Crematorium cannot be improved and the public concern on air emission cannot be addressed unless and until the new cremation facilities are in place.

### **Consideration of Alternative Options**

- 2.5 Apart from the redevelopment of the existing Cape Collinson Crematorium, the following alternative options have been considered for the new crematorium: new sites in more remote areas; alternative site in Tuen Mun Area 46; alternative extension at other existing crematorium sites; expansion of the existing Cape Collinson Crematorium; and alternative in-situ extension arrangements.
- 2.6 Taking into account the environmental benefits and dis-benefits of different possible options, the preferred scenario is redevelopment of the existing Cape Collinson Crematorium site by adjustment into its adjoining area so that the overall site area can accommodate 10 cremators and other ancillary facilities by 2014. It is selected for the following reasons:
- It is the most suitable option for early implementation to meet the rising demand for cremation service as soon as possible;

- Human disturbance already exist in the current site and its vicinity, therefore the environmental impact of the Project on the local environment is marginal compared with a new development on a greenfield site;
- In-situ redevelopment in the existing site has a much less significant environmental impact with regard to introducing a new source of air emission and visual impact of a new crematorium facility to a new site;
- The existing cremators can be upgraded using the latest cremation technology as soon as possible, thereby addressing the local concern and achieving the environmental benefit of improving the air quality.

### **Project Location**

- 2.7 The project site is the site of the existing Cape Collinson Crematorium at Cape Collinson Road, Eastern District. It is surrounded by Tai Tam Country Park and Shek O Country Park, and located close to Cape Collinson Buddhist Cemetery, Cape Collinson Muslim Cemetery and Sai Wan War Cemetery. King Tsui Court and Fung Wah Estate are located to the north of the project site. **Figure 2.1** shows the site location.

### **Construction and Demolition Programme**

- 2.8 The Project will be carried out in two phases as outlined below:

#### Phase 1 (July 2010 to March 2012)

- 2.9 Four new cremators, together with two multi-purpose service halls and other necessary ancillary facilities, will be provided at the adjoining site to the north of the existing crematorium. The total installed capacity of four new cremators under Phase 1 will be about 583 kg/hour.
- 2.10 As advised by FEHD, the existing crematorium will still be operating to serve the public during the testing and commissioning (T&C) of the four new cremators under Phase 1. However, special arrangement will be made to ensure that there will be no more than ten of both existing and new cremators in operation at any time (i.e. two new cremators and eight existing cremators) during T&C period to avoid additional loading of chimney emissions to the environment.

#### Phase 2 (March 2012 to December 2014)

- 2.11 After the satisfactory commissioning of the new cremators under Phase 1, the existing crematorium as well as the existing underground fuel tank will be demolished and removed. There will be no overlapping of construction/demolition works between Phase 1 and Phase 2. Six new cremators, together with one multi-purpose service hall and other necessary ancillary facilities, will be provided under Phase 2. The total installed capacity of six new cremators under Phase 2 will be about 943 kg/hour.

### **Benefits of the Project**

- 2.12 The proposed Project will have the following key environmental and social benefits:
- The Project will be able to address the increasing cremation demand without construction of additional cremators as the efficiency of the new cremators is much improved;
  - The existing cremators can be upgraded within the shortest possible time to address local concern on air emissions;

- Installation of new cremators of improved design and air pollution control technologies will improve the air quality in the vicinity of the Cape Collinson area;
- Instead of ultra low sulphur diesel, Towngas has been selected as burning fuel for the new cremators to further reduce emissions of air pollutants from fuel combustion, thereby to be more environmentally-friendly;
- The Project will be able to address the increasing cremation demand efficiently by avoiding the long lead time required to get a piece of vacant and earmarked land for adding a new crematorium in the relevant statutory plan;
- Food, Environment and Hygiene Committee (FEHC) under the Eastern District Council at its meeting in 2008 supported the reprovisioning plan by emphasizing the need for timely replacement of the crematorium to improve air emission quality.

### 3 KEY FINDINGS OF ENVIRONMENTAL IMPACT ASSESSMENT

#### Air Quality

- 3.1 The potential air quality impacts from the construction of the Project would mainly be related to construction dust from site clearance, ground excavation, cut and fill operations and construction of the new cremators and other ancillary facilities. The potential dust impact arising from the demolition and construction of the Project was assessed. Results showed that the predicted air quality at the air sensitive receivers (ASRs) would comply with and far below the respective criteria with the implementation of dust suppression measures as stipulated in the Air Pollution Control (Construction Dust) Regulation. The predicted highest hourly and daily TSP concentrations during Phase 1 construction are  $142 \mu\text{g}/\text{m}^3$  and  $112 \mu\text{g}/\text{m}^3$ . Whereas, the predicted highest hourly and daily TSP concentrations during Phase 2 construction are  $207 \mu\text{g}/\text{m}^3$  and  $146 \mu\text{g}/\text{m}^3$ .
- 3.2 During the operation of the Cape Collinson Crematorium, the potential sources of air quality impacts would be the air emissions from the stacks of incineration process. The assessment results indicated that the predicted air pollutant concentrations at all representative ASRs would comply with the respective criteria. The highest hourly  $\text{NO}_2$  concentrations of  $179 \mu\text{g}/\text{m}^3$  would occur at the staff quarters of Cape Collinson Crematorium, which is the nearest ASR to the emission source, would still comply with the relevant Air Quality Objective of  $300 \mu\text{g}/\text{m}^3$ .
- 3.3 Air pollution control and stack monitoring system will be installed for the Cape Collinson Crematorium to ensure that the emissions from the cremator stacks will meet the target emission limits equivalent to those stipulated in Hong Kong for crematorium.
- 3.4 With the implementation of practicable air pollution control, the Cape Collinson Crematorium will not cause adverse air quality impact at all representative ASRs during operation phase.

#### Waste Management

- 3.5 Waste likely to be generated during the construction phase of the Project includes excavated material, construction and demolition materials, contaminated materials, chemical waste and general refuse. Ash and non-combustible residues, chemical waste and general refuse are expected to be the major types of waste arising from the operation of the new crematorium.
- 3.6 With effective implementation of the good practices and mitigation measures, it is anticipated that the impacts on the environment and the potential impacts on the capacity of waste collection, transfer and disposal facilities will be insignificant during both construction and operation phase.
- 3.7 Prior to the demolition phase of the existing crematorium, further contamination investigation will be carried out to confirm quality and quantity of contaminated materials (including those

contaminated by asbestos and dioxins).

### **Land Contamination**

- 3.8 A land contamination assessment was undertaken and lead contamination in soil was found at the borehole BH-1 near the existing underground fuel tank at the depth of 1.5m to 1.95m. The quantity of contaminated soil was estimated to be 37m<sup>3</sup>. Solidification/stabilization technique is considered as the most practical and cost-effective method to treat such contaminated soil.
- 3.9 Further site investigation in areas that are currently in use and cannot be accessed will be undertaken after decommissioning and prior to the demolition of the existing crematorium. These areas include the trial pit for soil sampling underneath the pipeline and two cremation rooms.
- 3.10 As Towngas will be used as burning fuel instead of ultra low sulphur diesel in the new crematorium, leakage or spillage from the underground fuel tank and the pipeline system is eliminated. With the new design of cremators, aerial deposition of contaminants will be insignificant. Land contamination due to the operation of the new crematorium is unlikely.

### **Visual Impact**

- 3.11 Visual impact on R1 (King Tsui Court), R2 (Fung Wah Estate), GIC1 (Tai Tam Gap Correctional Institution) and OU1 (hikers and cemetery visitors) during construction phase will be substantial due to the close distance to the Project. With implementation of mitigation measures, there will still be some moderate adverse visual impact on these visual sensitive receivers (VSRs). However, such visual impact will be temporary and can be minimised by decorative hoarding.
- 3.12 The architectural appearance of proposed crematorium will be aesthetically designed to be compatible with adjacent landscape setting to enhance the overall outlook to minimise visual impact during operation phase. Roof greening will be adopted for the provision of landscape amenity and character of remembrance. Landscape roof garden will enhance and embrace the amenity space with the existing Garden of Remembrance to strengthen the overall visual characters of the site. Therefore, visual impact on VSRs R1, R2, GIC1 and OU1 will be slightly benefited from the new crematorium appearance.
- 3.13 Overall, the residual visual impacts of the proposed development are acceptable with mitigation measures during construction and operation phase.

### **Noise Impact**

- 3.14 The construction noise impacts of the Project during normal daytime working was assessed. The predicted unmitigated noise levels at representative NSRs would range from 60 to 79 dB(A) for Phase 1 and 61 to 81 dB(A) for Phase 2. With the use of quiet powered mechanical equipment for excavator/loader, soil nailing drilling machine, rock dowel drilling machine, bulldozer, dump truck and crawler mounted rock drill, the noise levels at all representative NSRs would comply with the construction noise limit of 75 dB(A).
- 3.15 The noise impact associated with the operation of the Project was assessed. The predicted unmitigated noise levels at all representative NSRs would exceed the night-time planning noise criteria by 1 to 6 dB(A). The potential noise impact at the NSRs will be mainly from the operation of the radiators on the roof of the crematorium building. To mitigate the noise impact at the affected NSRs, 2.5m high noise barriers have been proposed to surround the radiators. Besides, the noise barrier will be lined with sound absorbing material at the surface of the barrier facing the noise source to further enhance the noise reduction effectiveness. With such noise barriers in place, the predicted noise levels at all representative NSRs ranging from 43 to 49 dB(A) will comply with both the daytime and night-time planning noise criteria.
- 3.16 For the concurrent operation of existing fixed plant and new fixed plant during T&C stage of

Phase 1, the predicted cumulative noise levels at all representative NSRs will comply with the relevant daytime/evening Acceptable Noise Level of 65 dB(A) with the 2.5m high noise barriers for the radiators in place.

#### **Water Quality**

- 3.17 Water quality impacts from the land-based construction and demolition works can be controlled to acceptable levels by implementing the recommended mitigation measures. No unacceptable water quality impacts will be expected from the land-based construction and demolition activities. Site inspections should be undertaken routinely to inspect the works areas in order to ensure the recommended mitigation measures are properly implemented.
- 3.18 No effluent will be discharged from the Air Pollution Control equipment in the new crematorium as "dry" process will be adopted. Sewage generated by visitors and workers, as well as wastewater from cleaning activities will be connected to the sewerage system. Sewerage impact assessment has been conducted for the Project. Assessment results indicated that the additional wastewater / sewage generated from the Project would not cause any adverse impacts to the existing sewerage systems. Hence, adverse water quality impact during operation phase is not expected.

#### **Environmental Monitoring and Audit**

- 3.19 Environmental monitoring and audit (EM&A) requirement for the Project have been specified in an EM&A Manual. The EM&A Manual contains details of proposed baseline and compliance monitoring programme, implementation schedule of the environmental mitigation measures, EM&A reporting procedures and complaint handling procedures.

### **4 CONCLUSION**

- 4.1 The findings of this EIA have provided information on the nature and extent of environmental impacts arising from the construction and operation of the Project. The EIA has, where appropriate, identified mitigation measures to reduce the environmental impacts to acceptable levels.
- 4.2 In general, the environmental impacts arising from the Project are either considered minimal or can be mitigated to an extent where the impacts on the sensitive receivers are acceptable. No unacceptable residual impacts are anticipated, provided that the recommended mitigation measures are properly implemented. Monitoring and audit requirements have been specified in a stand-alone EM&A Manual to ensure proper implementation of the recommended mitigation measures.