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Figure 1.1	Locations of Existing Crematorium (Site A) and Replacement Crematorium (Site B)
Figure 4.1	Locations of Sensitive Receivers

## 1. BASIC INFORMATION

### Project Title

- 1.1 The title of the proposed project is “Extension of Kwai Chung Crematorium ” (the Project).

### Purpose and Nature of the Project

- 1.2 The purpose of this project is to design and construct a new extension of the Kwai Chung Crematorium. The scope of this project (the Project) includes:
- (a) Demolition of the existing crematorium (the Existing Crematorium);
  - (b) Construction of the new crematorium (the New Crematorium) with 4 single cremators and a full range of ancillary facilities including:
    - Two service halls;
    - Two joss paper burners;
    - Underground fuel tanks;
    - Transformer room, switch room and emergency generator room;
    - Automatic coffin delivery system;
    - Office accommodation;
    - Store rooms and dangerous goods store; and
    - Parking spaces for coaches.

### Name of Project Proponent

- 1.3 The Food and Environmental Hygiene Department (FEHD) is the Project Proponent and the Architectural Services Department (Arch SD) is the works agent implementing the project.

### Location and Scale of Project and History of Site

- 1.4 The Existing Crematorium was commissioned in 1980. It consists of two twin cremators, two service halls and the ancillary building facilities. Under this project, the Existing Crematorium will be demolished and the New Crematorium will be built at Site A. The New Crematorium will have four single cremators with a total installed capacity of 650 – 760 kg/hr.
- 1.5 Under an earlier project, namely “Replacement of Cremators at Kwai Chung Crematorium”, a Replacement Crematorium incorporating four single cremators as a replacement to the Existing Crematorium has been built on Site B. The Replacement Crematorium was commissioned and the Existing Crematorium closed down on 31 March 2003.
- 1.6 Locations of Existing Crematorium (Site A) and Replacement Crematorium (Site B) are shown in [Figure 1.1](#).

### Number and Types of Designated Projects Covered by the Project Profile

- 1.7 The Project involves the construction and operation of a crematorium. It is a Designated Project under item N.4 of Part I of Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499).

**Name and Telephone Number of Contact Person(s)**

1.8 All queries regarding the project can be addressed to:

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## **2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

### **General**

- 2.1 The Project is to design and construct the Extension of Kwai Chung Crematorium. The Existing Crematorium will be demolished and a New Crematorium with a total installed capacity of 650 – 760 kg/hr will be constructed.

### **Responsibilities of Parties**

- 2.2 FEHD is the Project Proponent and Arch SD is the works agent who oversees and manages the Project. Arch SD has commissioned an Environmental Consultant to conduct an Environmental Impact Assessment (EIA) in accordance with the Environmental Impact Assessment Ordinance (EIAO). The Project will be implemented by Contractor(s) to be appointed by Arch SD at the subsequent stages. FEHD is responsible for the operation of proposed crematorium.

### **Project Time Table**

- 2.3 Construction of the proposed works is scheduled to commence in November 2004, and construction will last for 24 months until November 2006.

### **Interactions with Other Projects**

- 2.4 The Project would have interaction with the following projects
- Project “The Replacement of Cremators at the Kwai Chung Crematorium”. Under the Environmental Permit (EP) (EP No. EP-082/2000), the total maximum loading of the Replacement Crematorium is 760 kg/ hour.
  - Project “Public Mortuary in Area 26E, Kwai Chung”.

### 3. POSSIBLE IMPACT ON THE ENVIRONMENT

#### General

- 3.1 The potential environmental impacts that may arise from the construction and operation of the Project are discussed below.

#### Noise

- 3.2 During the construction of the Project, construction noise will be mainly contributed by the use of powered mechanical equipment used in various construction activities. The major noisy construction activities will be the site formation, foundation and building works.
- 3.3 The operation of the proposed crematorium is mainly confined to daytime and the noisy equipment will be properly enclosed and acoustically shielded. Adverse noise impact on the surrounding sensitive receivers is unlikely.
- 3.4 The additional traffic generated by the crematorium during construction and operation would be minimal, and the operation of the proposed crematorium will not impose adverse noise impact on nearby noise sensitive receivers.

#### Air Quality

- 3.5 The likely air quality impacts associated with the construction activities of the Project would be dust nuisance and gaseous emissions from construction plant and vehicles. Major sources of dust on site are expected to arise from site clearance, excavation, materials handling and wind erosion.
- 3.6 Chimney emissions arising from the industrial activities in the vicinity of the proposed development may also result in air quality impact on the air sensitive receivers. Air quality impacts from both the New Crematorium and the Replacement Crematorium will be included in the assessment.
- 3.7 The air quality and odour are potential issues of concern due to the operation of the cremators (including ancillary facilities under S.1.2 (b)). Particulate matters, organic and inorganic gases would be generated and discharged into the atmosphere. The design of the crematorium will satisfy the requirements stipulated in the Environmental Protection Department's *BPM 12/2, A Guidance Note on the Best Practicable Means for Incinerators (Crematoria)*, to minimise air emission from the crematorium.

### **Water Quality**

- 3.8 During construction of the Project, construction site runoff and drainage, potential spillage of liquid (that is, lubricant oil, fuel oil, solvent, etc.), and sewage from the on-site construction workforce could result in water quality impacts on the environment. Silt from site runoff may cause blockage of sewers and drains, and increase suspended solids concentrations in receiving water.
- 3.9 Sewage from toilets and wastewater from the refuse room will arise during operation of the Project. The sewage effluent and wastewater from the toilets and refuse room will be discharged to the foul sewer. Given the small quantity of sewage to be generated on-site, adverse water quality impact is unlikely.
- 3.10 If there is effluent discharged from the air pollution control system that may contain pollutants, treatment may be needed before discharge into foul sewer, or disposed of as chemical wastes. The issues should be addressed when details of the air pollution control system and scrubbing system are available.

### **Waste**

- 3.11 Waste would be generated during the construction phase of the proposed development. Waste material would comprise excavated material and construction and demolition materials (C&DM) including asbestos, and general refuse. The handling and disposal of waste arising from the construction site may pose environmental impacts if not properly managed.
- 3.12 During the operation of the crematorium, ash and non-combustible residues will be produced. The handling and disposal of these wastes would cause environmental nuisance if not properly managed.
- 3.13 General refuse will arise from visitors and staff at the crematorium. The waste will be stored in lidded metal bins and will be disposed of at landfill. Given the small quantity of general waste to be handled and disposed of, it is not expected to cause any environmental concerns.

### **Visual Appearance**

- 3.14 During the construction phase, the presence of demolition equipment and stockpiled materials will be the potential sources of unsightly visual appearance. However, the visual impact is considered temporary and minimal.
- 3.15 The New Crematorium will replace an existing crematorium on the same site, the landscape character would not be markedly affected. The new crematorium design will ensure that the visual impact of the chimney on the surrounding environment would be minimized.

### **Land Contamination**

- 3.16 There is an underground fuel tank installed in the Existing Crematorium. The underground fuel tank will be removed before site formation works of the Project. Should there be any leakage from the underground fuel tank and associated pipelines in the past, the soil in the vicinity of the tank may be contaminated.

### **Other Impacts**

- 3.17 There will not be any impacts to local ecology, sites of cultural importance or listed buildings. There will be no other impact on natural resources including watercourses or groundwater.

#### 4. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

##### Sensitive Receivers

- 4.1 The Project site is located near the coast of Kwai Chung, overlooking Tsuen Wan Chinese Permanent Cemetery and Typhoon Shelter to the west, and Kwai Chung Park to the southeast. Industrial buildings are located to the northeast of site.
- 4.2 The existing sensitive receivers in the vicinity of the project site have been identified in accordance with the *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM) and are listed in Table 4.1. [Figure 4.1](#) shows the locations of sensitive receivers.

**Table 4.1 Sensitive Receivers**

<b>Sensitive Receivers</b>	<b>Horizontal Distance from the site boundary (m)</b>
Kwai Shing West Estate	560
Wing Kwong Industrial Building	120
Mei Kei Industrial Building	180
Kingsford Industrial Building	480
CNEC Lee I Yao Memorial Secondary School	460
Kwai Chung Park	200

## 5. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS

### Mitigation Measures

#### Noise

- 5.1 Construction noise impact would be alleviated by the use of quieter construction methods and equipment. The contractor should aim to meet the EIAO-TM noise criteria at the nearest noise sensitive receivers (NSRs) during normal working hours. Evening or night-time work is not expected.
- 5.2 In general, good site practice and noise management would considerably reduce the impact of the construction site activities on nearby NSRs. The following measures will be incorporated into the Contract Specifications.
- Only well maintained plant should be operated on-site and plant should be serviced regularly during the construction period.
  - Machines and plant used intermittently should be shut down between work periods or should be throttled down to a minimum.
  - Silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction period.
  - Material stockpiles and other structures should be effectively utilised as barriers, where possible, and be orientated so that the noise is directed away from the nearby NSRs.
  - Mobile plant should be sited as far away from NSRs as possible.
- 5.3 The nearest noise sensitive receiver is located at more than 300m away from the proposed development and screened by industrial buildings. Adverse construction noise impacts are not expected.

#### Air Quality

- 5.4 The mitigation measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* should be incorporated in the Contract Specification in order to minimise any potential dust nuisance arising from the construction activities of the Project and to keep dust levels within the acceptable levels.
- 5.5 The design and operation of the new crematorium will follow the measures set out in *BPM12/2*, which provides guidelines for the design of cremators as follows:
- The cremators should be designed to ensure complete combustion and should be fitted with a secondary combustion zone. As one of the means of achieving good combustion, the cremators should be designed so that there is adequate secondary air in the primary combustion zone to ensure good turbulence.
  - The gases should be held at 850 °C for a minimum (at all times) of 2 seconds in the secondary combustion zone. The residence time should be determined by direct measurement of the volume rate of the flue gases throughout the cremation cycle at the cremator exit with appropriate corrections made for changes in temperature and oxygen.
  - The concentration of oxygen at the outlet of the secondary combustion zone should not be less than 6% by volume, if measured on a wet basis, or an average of 6% by volume with a minimum of 3% by volume if measured dry.



- Coffins should not be introduced to the cremators unless the secondary combustion zone temperature exceeds 850 °C or other minimum temperature accepted by the Authority.

5.6 In addition, the *BPM 12/2* specifies the concentration limits of emissions from the cremation process as shown in Table 5.1 below. In order to ameliorate the potential air quality impact associated with the operation of the Project, the New Crematorium would be designed in compliance with *BPM 12/2*. Under high temperature and long residence time, odorous gas will be destroyed by the cremator.

**Table 5.1 Emission Limits of Air Pollutant**

Air Pollutants	Emission limit
Particulate matter	100 mg m <sup>-3</sup>
Hydrogen chloride (excluding particulate matter)	100 mg m <sup>-3</sup>
Carbon monoxide	100 mg m <sup>-3</sup> (60 minute average)
Organic compounds (excluding particulate matter and expressed as total carbon)	20 mg m <sup>-3</sup>
Dioxins	1 ng m <sup>-3</sup>

5.7 The New Crematorium would be operated in accordance with the *BPM 12/2*. The operation procedures would incorporate continual monitors and controls to ensure that the cremation process is being controlled properly. Chimney flue ductwork would be cleaned regularly to prevent accumulation of deposits. The removal of ash and non-combustible residues would be undertaken carefully so as to prevent dust emissions. Cremated remains would be moved and stored in a covered container.

#### Water Quality

5.8 As land based construction activities will be undertaken, water quality impact arising from the Project is expected to be minimal. To ensure that adverse environmental impacts will not arise, good practices outlined in *ProPECC PN 1/94, Construction Site Drainage* would be followed to control the site runoff and drainage.

5.9 To minimise the impacts on water quality from the operation of the proposed facility, the following mitigation measures are required:

- Proper connections to public sewers from the proposed development.
- All effluent shall comply with the appropriate effluent standards stipulated in the *Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (WPCO-TM)*.
- Effluent from the Flue Gas Cleaning Plant and any chemical wastes shall be treated before discharge into the foul sewer or, where appropriate, disposed off-site at licensed facilities.

Waste

- 5.10 Good waste management practices including avoiding, minimising, reusing and recycling will be adopted to reduce waste generation during construction phase. In addition, on site sorting of demolition debris will be carried out. Scrap metals or abandoned equipment will be recycled if practical.
- 5.11 General refuse generated from the operation of the Project will be collected from lidded bins and delivered to a central collection point and would be stored in enclosed containers to prevent odour, windblown litter, vermin, water pollution and visual impact. Chemical waste will be handled in accordance with *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*.

Visual Appearance

- 5.12 Proper landscape, building and chimney design will be incorporated in order to alleviate the potential visual impact.

Land Contamination

- 5.13 Potential land contamination will be identified for the Project. Should the land be contaminated, the contaminated soil will be removed and disposed in accordance with the TM-EIAO.

**Possible Severity, Distribution and Duration of Environmental Effects**

- 5.14 Potential environmental impacts identified to occur during the construction phase will only last at most for the duration of the construction period (tentatively 24 months). As such the effects are considered to be temporary and short term. With the implementation of appropriate mitigation measures, no insurmountable impacts are expected.
- 5.15 Pollutants emitted from the crematorium during the operation phase is a key area of concern for the Project. The design of the New Crematorium would satisfy the *BPM 12/2* limits and adverse air quality impact on the surroundings would not be expected.

**6. USE OF PREVIOUSLY APPROVED EIA REPORTS**

6.1 No previous EIA report has been approved or submitted for the subject development.