Architectural Services Department

Provision of Cremators at Wo Hop Shek Crematorium

Project Profile

January 2006

Report no: 01256R0012

Hyder Consulting

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1 Basic Information

1.1 Project Title

The title of the proposed project is "Provision of Cremators at Wo Hop Shek Crematorium" (hereafter named as the Project).

1.2 Purpose and Nature of Project

The existing Wo Hop Shek Crematorium is a coffin crematorium with two twin cremators. A skeletal cremator building with a single cremator operates nearby for the cremation of skeletal remains from burial. The skeletal cremator and the coffin cremators were commissioned in the 1960's and 1991 respectively. As the five existing cremators are approaching the end of their serviceable life, replacement is required to up-grade the cremation facilities. The opportunity is also taken to provide two more cremators under the same project to meet the increasing demand for cremation service. Moreover, to allow flexibility for future expansion, space would be reserved in the same site for the provision of two more cremators.

The phasing and scope of the proposed project includes:

Phase I

- Demolition of the existing coffin crematorium building, transformer room and pump room including the existing coffin cremators;
- Provision of five new coffin cremators, one dual-purpose cremator for handling both coffins and skeleton cremations, one new skeletal cremator and one cremation plant room with sufficient space for housing nine single cremators (i.e. space for the seven new cremators to be installed under Phase I of the current project together with space for two additional new cremators to be provided for expansion in future). The new crematorium will provide seven cremators upon completion of Phase I with an estimated total installed capacity ranging from 890 kg/hr to 1,025 kg/hr; and
- Provision of a full range of ancillary facilities required for the operation of a crematorium including:
  - Multi-purpose Service Halls (3 nos.) for funeral ceremony each with ancillary facilities including clergyman room, waiting room and catafalques for transportation of coffins to the cremation plant room;
  - Space for future provision of an additional service hall;
  - One Mortuary;
  - One Bone Storage Room and one Pulverization Room with a bone cremulator and dust proof cabinets;

- Office accommodation with ancillary facilities such as staff toilets;
- Building services and E&M installations including (i) coffin transportation and insertion equipment, (ii) anti-burglary devices and anti-bumping devices, (iii) automatic pulverizing devices, (iv) CCTV and PA systems, (v) MVAC, (vi) fire fighting facilities, and (vii) emergency generator;
- Underground Fuel Tank(s);
- Ancillary service rooms including fork lift re-charging room(s), transformer and switch room(s), emergency generator room, fuel tanks and pump rooms, dangerous goods store(s), refuse storage chambers and store room(s) etc;
- Public Toilets for visitors;
- Landscaping;
- Joss Paper Burners;
- Vehicular access for coffin vans and coaches, etc. to the Crematorium; and
- Parking spaces.

▪ During the works period of the project, the existing four coffin cremators will be closed down due to the following reasons (the skeletal cremator which operates in a separate site will remain in service):

- there is no other available flat land with sufficient land space for the construction of the replacement crematorium and thus it has to be built in-situ at the current crematorium site;
- extensive site formation works would be required to enlarge the site area if the existing cremators are to remain operational during the construction period. Such site formation works are costly and will inflate the project cost and prolong the construction period;
- it is not advisable on site safety and management grounds to open a venue for public use when construction works are underway; and
- with the commissioning of new cremators at Kwai Chung Crematorium in 2003, Fu Shan Crematorium in 2004 and Diamond Hill Crematorium by 2006, service need at Wo Hop Shek Crematorium during the construction period will be temporarily met by adjusting the operating hours of these cremators as and when required.

Phase II

- Demolition of the existing skeletal cremator building after the satisfactory commissioning of the new replacement under Phase I and provision of landscaping for the site.

Future expansion phase

- Provision of two additional cremators and one additional service hall for future expansion. The estimated total installed capacity of the two new cremators will be approximately 360kg/hr.

Therefore, the present EIA Study will cover the demolition works in Phases I and II and the provision of the seven cremators in Phase I as well as the additional two cremators under the future expansion phase.

1.3 Name of Project Proponent

Food and Environmental Hygiene Department (FEHD) is the Project Proponent. Architectural Services Department (Arch SD), the works agent, is responsible for the management, design and implementation of the project.

1.4 Location and Scale of Project and History of Site

The project site is the site of the existing Wo Hop Shek Crematorium. It falls within Wo Hop Shek Cemetery area which has been allocated to FEHD under a Government Land Allocation No. DN 81. The site does not currently fall into any Outline Zoning Plan or any other relevant plan. As stated in the revised Technical Feasibility Study (TFS), the Government Property Agency (GPA) has no comment on the Project from the site utilization viewpoint.

Due to environmental concerns and general public resistance against presence of crematorium in their neighbourhood, it is extremely difficult to identify suitable land for crematorium development. It often takes a long lead-time to go through the public consultation process while at the same time the demand for cremation service is rising. As such, it is necessary to build in maximum flexibility for future expansion as far as practicable as and when we have identified suitable sites for building cremators.

As the Wo Hop Shek area is generally accepted by the public for burial/cremation operations, it is considered that we should ride on the replacement project of existing cremators to build additional cremators and to reserve suitable space in the same site for future expansion.

The location and boundary of the existing and new crematorium are shown in Figure 1-1. The existing and conceptual layouts of the proposed project are shown in Figures 1-2 and 1-3.

1.5 Number and Types of Designed Projects Covered by the Project Profile

The Project is classified as a Designated Project under Category N.4 – A crematorium of Part I in Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance.

1.6 Contact Person of Arch SD

Name: Mr S W Chow, Senior Project Manager 321 of Arch SD

Address: 37/F Queensway Government Offices, 66 Queensway, Hong Kong

Telephone: 2867 3716

2 Outline of Planning and Implementation Programme

2.1 Project Team

The FEHD is the project proponent and is responsible for the operation of the proposed crematorium. Arch SD is the works agent who oversees and manages the Project. Hyder Consulting Limited is appointed by Arch SD to undertake the EIA in accordance with the EIA Ordinance. Demolition and construction of the proposed crematorium will be carried out by contractor(s) to be appointed by Arch SD at a later stage.

2.2 Project Timetable

The exact time schedule and detailed design would not be available until all the requirements on environmental protection measures are determined. The following estimation on the overall time frame for the construction work may be taken as a reference:

Phase I: November 2007 to April 2010

Phase II: April 2010 to September 2010

Future Expansion Phase: for completion by around 2014

2.3 Interactions with Other Projects

There is no interaction with other projects.

3 Possible Impact on the Environment

3.1 Decommissioning and Construction Phase

3.1.1 Air Quality

Potential air quality impact during the demolition of the existing coffin crematorium building and the skeletal cremator, and the construction of the replacement crematorium is the fugitive emission of dust. Dust from demolished cremators and chimneys may contain dioxins.

Asbestos is commonly used for heat insulation before the 1980's. Therefore it is likely that the existing crematorium and skeletal cremators, especially the chimneys, contain asbestos.

3.1.2 Noise

Noise will be generated during the demolition and the construction activities. Major activities include breaking, transferring of construction and demolition (C&D) materials and truck movement. The operation of powered mechanical equipment (PME) is required. As the nearest noise sensitive receiver (NSR), Wo Hop Shek San Tsuen, is approximately 250 m from the existing crematorium and is shielded by natural terrain, noise impact will be minimal.

3.1.3 Water Quality

Wastewater generated from construction activities and surface runoff from the construction site during raining will contain high levels of suspended solids and may cause impact on the water body. Pollution may also be caused by other types of construction site wastewater such as sewage from site toilet. Reference will be made to the Practice Note ProPECC 1/94 Construction Site Drainage for proper collection of wastewater, water quality impact on the water sensitive receivers is unlikely.

3.1.4 Land Contamination

The existing crematorium and skeletal cremator are equipped with underground fuel tanks and fuel pipes. In addition, there is a transformer room which is located within the crematorium and will be demolished. Land contamination may exist if there has been fuel leakage, etc.

3.1.5 Waste Management

Excavated materials, general construction waste, chemical waste and general refuse will be generated from the demolition and construction

works. The amount of such waste arising from the construction works is anticipated to be small.

3.1.6 Landscape and Visual

During the demolition and construction period, some trees and shrubs will be removed from the site, tree survey will be carried out to identify the quantity, species and sizes of the affected trees and areas of shrubs.

Bare ground and the stockpiles of C&D materials will be screened by the site hoarding. The visual sensitive receivers (VSRs) are distant from the site and the natural terrain has blocked their line of sight to the site. This short-term impact is insignificant.

3.1.7 Ecology

Although the subject site is disturbed by human activities associated with the operation of the existing crematorium, it is surrounded by vegetated slopes which may contain areas of considerable ecological value (e.g. woodland). This project plans to clear part of the vegetated area, which might cause potential ecological impacts (e.g. habitat loss).

3.1.8 Cultural Heritage

There are no declared monuments or graded historical buildings in the area of Wo Hop Shek. However the Antiquities and Monuments Office (AMO) has recorded a few buildings in the area, including Wo Hop Shek San Tsuen, the heritage value of which remains to be fully ascertained. The impact of construction works on cultural heritage will require further detailed assessment in the statutory EIA stage. However archaeological impact is not anticipated.

3.2 Operational Phase

3.2.1 Air Quality

Air pollutants such as dioxins, organic compounds, etc and odour from the new crematorium may affect the nearby air sensitive receivers (ASRs). The new cremators are of advance design such that emissions from them will comply with statutory requirements. In addition, a flue gas filtering system will be installed to further reduce the air pollutants concentration from the cremators. All of these will ensure that the air pollution impact on the ASRs during the operational phase will be minimal.

The amount of joss paper burning is minimal. Administrative mitigation measures will be undertaken to reduce the nuisance due to emissions from joss paper burners and the impact is insignificant.

Kiu Tau Road is the major access road to the subject site. The number of vehicles accessing the area is limited during normal days. The road traffic condition will be very much similar to the existing condition when the new crematorium comes into operation.

There is no major industrial emission within 500m of the new crematorium. Any adverse air quality impact from industrial emissions on the new crematorium is not expected.

3.2.2 Noise

During the operation of the new crematorium, the traffic will be similar to the existing condition. The road traffic noise impact on the nearby NSRs is negligible.

As equipment and E&M installations will be properly housed with acoustic enclosure within the crematorium building, noise impact is not expected.

3.2.3 Water Quality

Sewage generated from sanitary facilities during daily operation of the new crematorium will be connected to nearby foul sewer and no adverse impact of water quality is expected.

3.2.4 Waste Management

Particulate matters and other non-combustible residues generated from cremation will be properly handled and disposed of in accordance with current practice. General refuse generated from office and visitors and remains from joss burning will be limited, and will be collected, handled and disposed of in public landfill site following the current practice.

3.2.5 Landscape and Visual

The landscaping and the building will be designed in such a way that a pleasant visual environment and a calm and comfortable perception will be delivered to the funeral participants. Soft landscaping will be provided to the existing skeletal cremator area after demolition. In view of the distant location of the VSR and the land profile, the impact of the development on VSRs will be minimal.

3.2.6 Hazard to Life

The schedule of accommodation for the new crematorium includes the provision of a Dangerous Goods (DG) store (Category 5 Dangerous Goods under the Dangerous Goods Ordinance, Cap. 295), an underground fuel tank of an estimated capacity of 50,000 L as the storage of light diesel fuel (DG Cat 5), a daily diesel fuel tank of 2,480 L capacity and a fuel pump for transferring the diesel fuel from the underground fuel tank to the daily fuel

tank. In addition, there will be a 2,480 L fuel tank for non-FSI emergency generators and a 1,000 L fuel tank for FSI emergency generators.

In accordance with the relevant statutory requirements, the diesel fuel will be properly handled so as to avoid leakage of fuel into nearby drains as well as to prevent fire hazard. It is therefore anticipated that the use and storage of diesel will not cause adverse environmental impacts and hazard concern.

3.2.7 Ecology

Ecological impact is not expected during the operational phase.

3.2.8 Cultural Heritage

The impact on cultural heritage is not expected during the operational phase.

4 Major Elements of the Surrounding Environment

The proposed site is surrounded by the Wo Hop Shek Cemetery with vegetated slopes. Air and noise sensitive receivers within 500 m from the site boundary would be included in the present EIA study. There is no significant stream in the vicinity of the site.

5 Environmental Protection Measures to be Incorporated in the Design and Any Further Environmental Implications

5.1 Air Quality

Before the demolition of the building, Asbestos Investigation Report (AIR) will be prepared. If asbestos is detected, Asbestos Abatement Plan (AAP) will be provided. Registered asbestos consultant and contractor will be employed for the supervision and the removal of asbestos works to ensure that asbestos containing material (ACM) removal is conducted as planned with no dispersion of asbestos during demolition.

During the demolition and construction stage, dust control measures will be implemented. Reference will be made to the Dust Control Requirements under Air Pollution Control (Construction Dust) Regulation.

The operation of the crematorium will comply with the emission limits according to the Guidance Note on the Best Practicable Means for

Incinerators (Crematoria), BPM 12/2 published by EPD in August 1998. The concentration limits specified in Table 5-1 below are currently applicable standards for cremation process and will be applied to the emissions from the development. All pollutant concentrations are expressed under reference condition of 0℃, 101.325kPA, 11% O_2 and dry conditions.

Parameters	Emission Limits
Particulate matter	100mg/m^3
Hydrogen chloride (excluding particulate matter)	100mg/m^3
Carbon monoxide	100 mg/m^3 (60 minute average)
Organic compounds (excluding particulate matter and expressed as total carbon)	20 mg/m^3
Dioxins	1 ng/m^3

Table 5-1 Emission Limits in the BPM 12/2 from EPD (August 1998)

The following control measures will be taken into account during the design and operation of the cremators:

- All cremators will be fitted with a secondary combustion zone to ensure complete combustion.
- The gases will be held at 850℃ for a minimum (at all times) of 2 seconds in the secondary combustion zone.
- 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 will not be introduced to the cremators unless the secondary combustion zone temperature exceeds 850℃.
- Chimneys including vents, structures and openings of any kind from or through which air pollutants may be emitted, will be located to provide sufficient dispersion of air pollutants.
- The efflux velocity of the exhaust gas stream emitted from a chimney will not be less than 7m/s at full load condition.
- The temperature of exhaust gas stream emitted from the chimney will not be less than the acid dew point.
- Odour control measures will be installed as necessary.
- The removal of ash and non-combustible residues will be undertaken carefully so as to prevent dust emissions. Cremated remains will be moved and stored in a covered container.

5.2 Noise

During the construction stage, the noise impact will be controlled in accordance with the Noise Control Ordinance and the following Practice Notes will be applicable:

- ProPECC PN1/93 Noise from Construction Activities – Statutory
- ProPECC PN2/93 Noise from Construction Activities – Non-statutory Controls

Noise control measures including the scheduling of works, the siting of facilities, the selection of quiet equipment and the use of acoustic panels and enclosures, will be implemented as far as applicable to ensure the compliance of the noise criteria.

Necessary Construction Noise Permit will be applied before conducting piling works, if any, or using powered mechanical equipment at designated time.

As the nearest NSRs are 250m away from the proposed site, adverse noise impact during both construction and operational stages is not anticipated.

5.3 Water Quality

Wastewater generated from construction activities and surface runoff from the construction site during raining are the major water pollution sources during the construction stage. The wastewater and surface runoff will be properly collected and treated. Sewage generated from construction workers will be collected and treated. Reference will be made to the Practice Note ProPECC 1/94. Discharges will comply with the conditions stipulated in the Effluent Discharge License. The reuse of wastewater will be implemented as far as possible.

5.4 Waste Management

Waste management will be planned prior to the commencement of demolition and construction works. The management will make reference to ETWB TC No. 33/2002 Management of Construction and Demolition Material Including Rock and ETWB TCW No. 15/2003 Waste Management on Construction Sites. Avoidance of waste generation, the reuse of materials, and quantity minimisation will be implemented as practicable. Disposal will be undertaken in compliance with statutory requirements.

General refuse will be generated during the operation of the new crematorium. It will be contained in bins with lids to avoid the emission of odour, windblown litter, vermin and visual impact. Chemical waste will be handled in accordance with the Waste Disposal (Chemical Waste) (General) Regulation and the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

5.5 Landscape and Visual

The design of the new crematorium will consider as far as practicable preserving and enhancing the greenery effect of the site by protecting the existing trees and planting new trees. Visual effects will also be considered in the landscape design of the new crematorium building taking into account the existing adjacent environment.

5.6 Land Contamination

Contamination Assessment Plan (CAP) will be prepared. Depending on the findings of the CAP, Contamination Assessment Report and Remediation Action Plan (CAR-RAP) will then be prepared if necessary. If contaminated land is found, the contaminated soil will be removed, handled and treated in accordance with the CAR-RAP. Impact on the surrounding environment is not expected.

The underground fuel tank for the new crematorium will be contained in a concrete chamber surrounded with sand to avoid direct contact of the fuel tank with soil.

5.7 Ecology

Should any species with conservation value be found at the site, appropriate mitigation measures such as transplanting or compensatory planting will be proposed.

5.8 Cultural Heritage

Should any sites of cultural heritage be identified at the site, appropriate mitigation measures will be proposed.

6 Use of Previously Approved EIA Reports

There is no previous EIA report applicable to this Project.

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The Locations of the Existing Crematorium and the New Crematorium

Figure No.: 1-1

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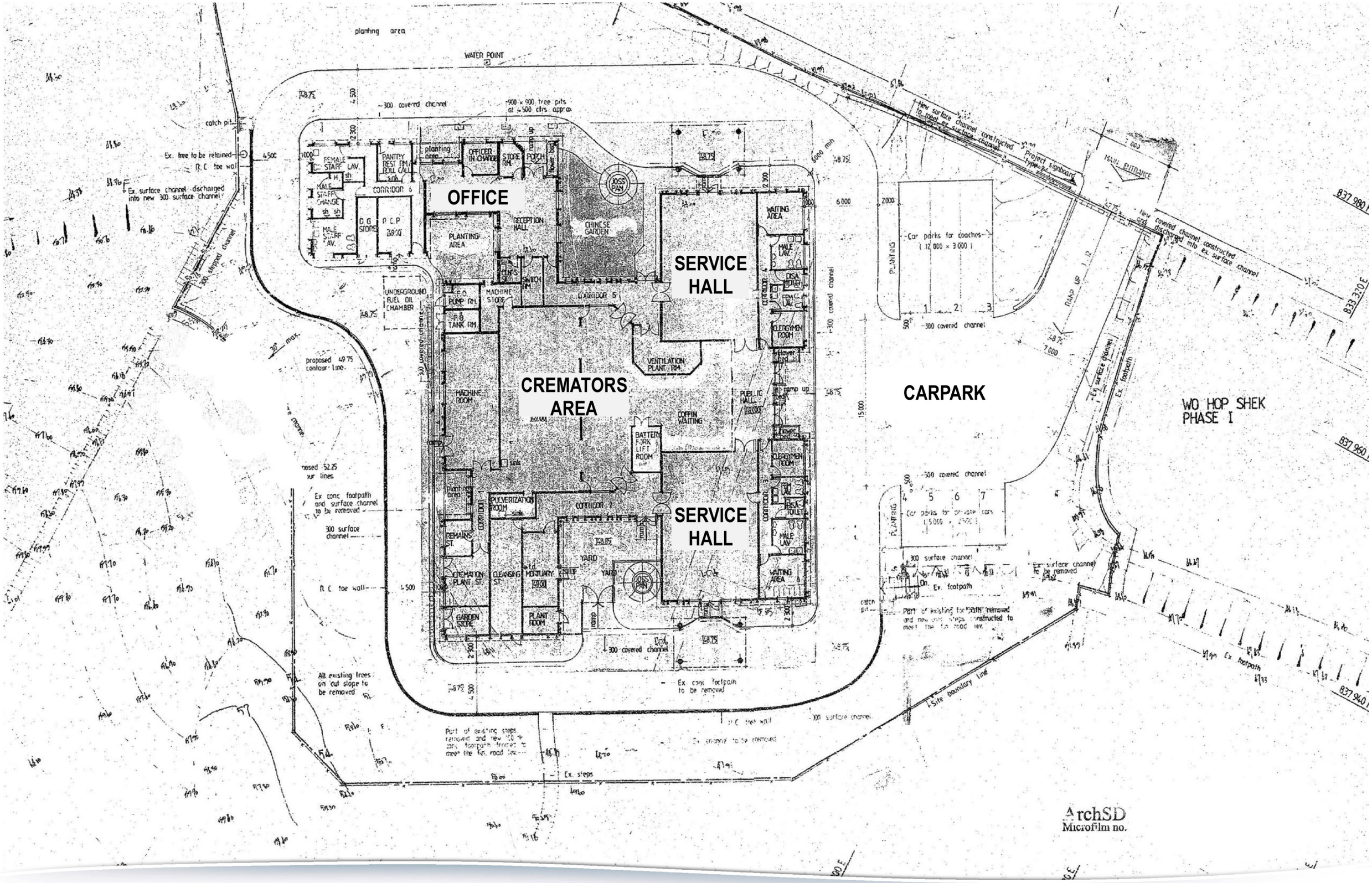

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The Layout Plan of the Existing Crematorium

Figure No.: 1-2

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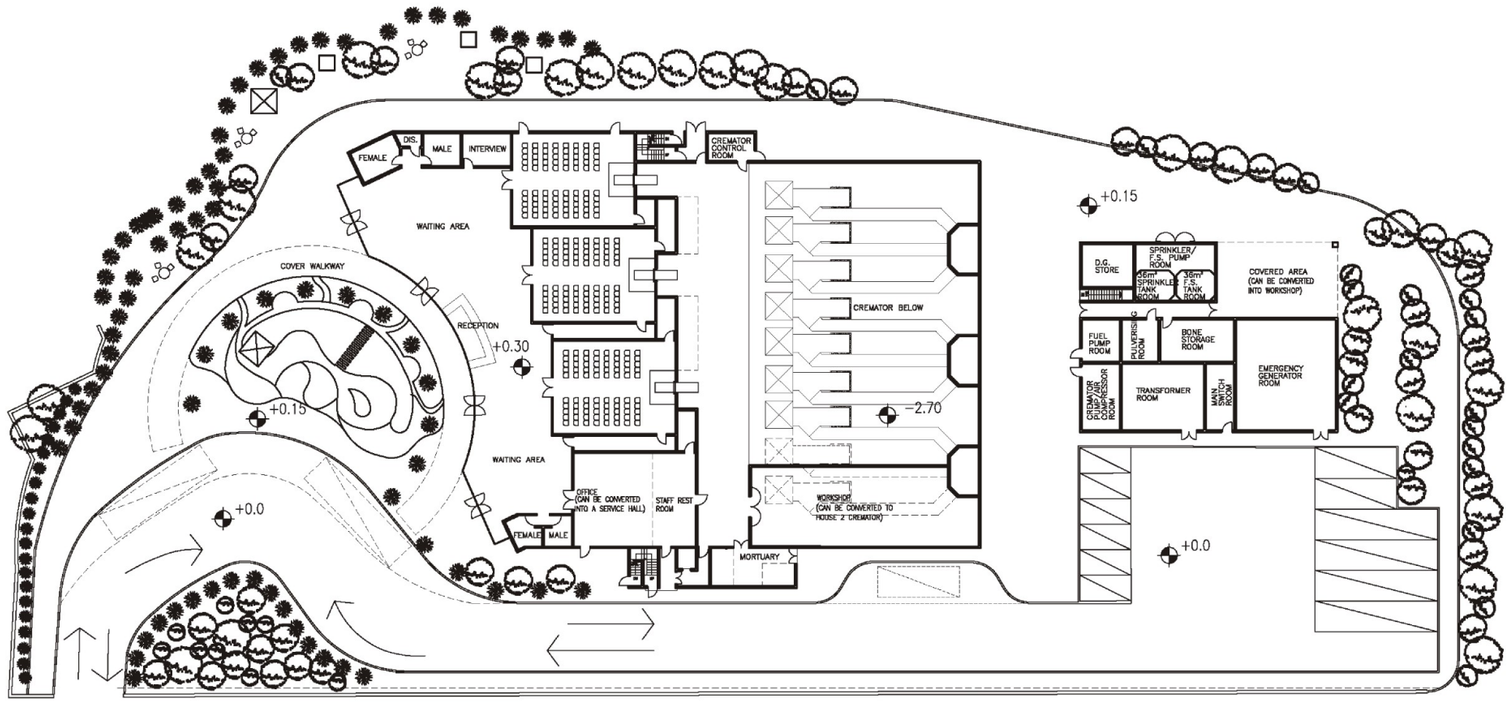
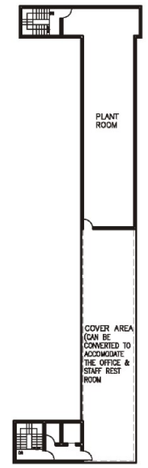
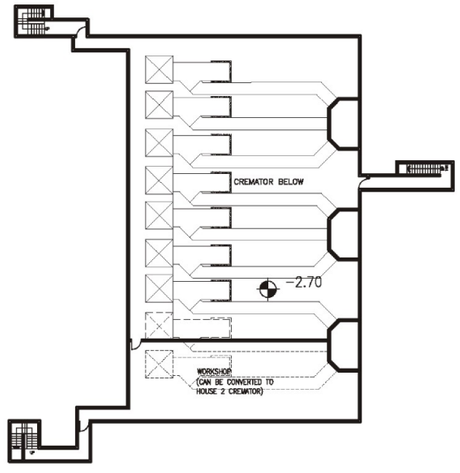


GROUND LEVEL 1:600



UPPER LEVEL PLAN
(STOREY ABOVE CREMATOR PLANT ROOM) 1 : 600



BASEMENT LEVEL PLAN
(LOWER FLOOR CREMATOR PLANT ROOM) 1 : 600