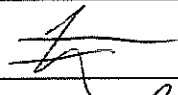



Architectural Services Department

**Asbestos Consultancy for
Phased Reprovisioning of
Cape Collinson Crematorium**

**Asbestos Investigation Report &
Asbestos Abatement Plan**

May 2008

	Name	Signature
Reviewed & Checked:	Michael To	
Approved:	Jackel Law	

Report Version:	<u>Final (rev 1)</u>	Date of Submission:	<u>23 May 2008</u>
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The information contained in this report is, to the best of our knowledge, correct at the time of printing. The interpretation and recommendations in the report are based on our experience, using reasonable professional skill and judgment, and based upon the information that was available to us. These interpretations and recommendations are not necessarily relevant to any aspect outside the restricted requirements of our brief. This report has been prepared for the sole and specific use of our client and ENSR Asia (HK) Ltd. accepts no responsibility for its use by others.

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PART I ASBESTOS INVESTIGATION REPORT**1 INTRODUCTION*****Background***

- 1.1 In February 2008, ENSR Asia (HK) Ltd. was commissioned by Architectural Services Department (ArchSD) to conduct an asbestos survey for Cape Collinson Crematorium in accordance with EIA Study Brief No. ESB-177/2008. The existing Cape Collinson Crematorium (The Existing Crematorium) consists of four service halls with twelve cremators. The Existing Crematorium was first in use in 1962 and had several cremators upgraded in 1995 and 2001. The aim of the survey is to identify the extent of the Asbestos Containing Material (ACM) existing in the building before any further renovation or demolition work to be commenced. The crematorium was in full operation during the survey period.
- 1.2 The asbestos survey and sampling were carried out on 20 February 2008 & 13 March 2008. Part I of this report presents the identified suspected asbestos-containing material (ACM) in the building, based on the field inspections carried out by ENSR's survey team and the asbestos sampling and analysis conducted by a Registered Asbestos Laboratory. Part II of this report is the asbestos abatement plan providing details and specifications of the asbestos removal procedures to control and minimise the release of asbestos fibres from identified ACM.

Scope of Work

- 1.3 The objectives of the survey are as follows.
- (a) To conduct a field inspection for the suspected asbestos-containing material inside the investigation area;
 - (b) To supervise the registered asbestos laboratory to collect bulk samples on suspected materials for confirmatory analysis;
 - (c) To prepare an asbestos investigation report (AIR) giving an inventory of identified ACMs and the respective qualitative hazard assessment; and
 - (d) To prepare an asbestos abatement plan (AAP) if asbestos-containing materials was found.

Details of Parties Concerned

- 1.4 The following parties have been involved in the asbestos survey.

Owner of the Premises	Food and Environmental Hygiene Department
Contact person	Mr. Shum Nam Lung
Tel	3101 6567
Fax	3101 0450
Registered Asbestos Consultant	Mr. To Chak Yan, Michael
Registration No.	1069
Address	ENSR Asia (HK) Ltd. 11/F., Grand Central Plaza, Tower 2 138 Shatin Rural Committee Road, Shatin, N.T.
Tel	3105 8524
Fax	2891 0305
Registered Asbestos Laboratory	ETS – Testconsult Limited
Registration No.	4003
Contact person	Mr. Dennis F.S. Fan
Address	8/F, Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Hong Kong
Tel	2695 8318
Fax	2695 3944
Registered Asbestos Contractor	To be appointed

Site Description

- 1.5 Cape Collinson Crematorium site consists of a main building & carpark area. Main building is a three storey building which included four service hall (Multi-purpose, Christian, Chinese & Hindu), cremator room, staff office, mortuary, and plant room. There are total 12 set of cremators in the crematorium. Eleven set of cremators were located inside the cremator room, which was all in operation during the survey. A separated cremator was located in the Hindu service hall, which was not in operation and was available for inspection. Exhaust from the cremators were centralized and connected to the chimney stack at the main building. Figure 1.1 illustrated the site location and investigation area.

2 THE INVESTIGATION**Field Inspection**

- 2.1 The field inspection & bulk sampling were conducted on 20 February 2008 & 13 March 2008.
- 2.2 External structure of the crematorium main building and cremator at Hindu Service Hall were inspected by the survey team. However, all the consealed pipelines inside the wall were not available for inspection to the survey team. Moreover, most of the flange connection was covered by metal cover, which was not available for inspection. Interior lining of the chimney stack and cremators No. 1-11 were not inspected as well since the crematorium was still in operation. Re-inspection of the in-accessible area by Registered Asbestos Consultant was necessary to confirm the presence of ACM. Table 2-1 illustrated the locations of the in-accessible area

Table 2-1 List of In-accessible Area

Location	Photo No.
Gasket at flange of all flue exhaust at roof	8, 12, 18, 19, 24
Insulation material underneath the metal cover of exhaust flue	8, 12, 18, 19, 24
Interior lining of chimney stack	26
Connection between chimney stack and exhaust flue	29
Pipelines consealed in wall	12, 24
Cremator No. 1-11	11

- 2.3 The survey team examined those materials that are commonly found and likely contain asbestos based on past experience. Materials were grouped and individually examined according to their type and homogeneity. Photographs of the materials inspected are given in Appendix A.
- 2.4 Non-ACMs were firstly sorted out by visual examination while the suspected materials were sampled for laboratory identification. Their locations and estimated quantities were also recorded.

Table 2-1 List of Inspected Materials

Material	Location	Likelihood of Asbestos Containing (Nature)	Photo No.
Roof tile	Roof	Non-ACM (cement)	17
Pipe lagging	Various locations	Non-ACM (PVC)	--
Flue gasket (Type 1)	Cremator No. 12 at Hindu Service Hall	Suspected ACM	6, 7
Flue gasket (woven) (Type 2)	Flat Roof outside Cremator No. 11	Suspected ACM	23
Fire pump gasket	Fire Pump Room	Non-ACM (rubber)	--
Insulation brick inside cremator	Cremator No. 1-12	Suspected ACM	9
Air duct insulation material	Roof of Chinese Service Hall	Suspected ACM	27

Insulation sheet	Outside Cremation Room	Suspected ACM	13
Switch / Fuse box	Various Locations	Non-ACM (MCB Type)	14, 16
Flexible joint	Various Locations	Non-ACM (rubber)	15
Door seal for cremator	Cremator No. 1-12	Suspected ACM	10
Grille panel	Various Locations	Suspected ACM	4
Floor tile with mastic	General Office	Suspected ACM	28

3 SAMPLE COLLECTION AND ANALYSIS

3.1 Bulk samples were collected from the suspected asbestos-containing material by the registered asbestos laboratory – ETS-Testconsult Ltd. and the sampling locations were drawn in Figures 3.1 & 3.2. The sampling criteria were summarized in Table 3-1. The collected samples were subsequently put in double zip-bags and numbered. All numbered samples were transferred to laboratory for analysis of the presence, type and composition of asbestos using the Polarising Microscope and Dispersion Staining Technique.

Table 3-1 Summary of Bulk Sampling Strategy

	Surface Material		Thermal Material	Miscellaneous Material
	Friable*	Non-friable**	Friable / Non-friable*	Friable / Non-friable**
No. of Sample required to prove ACM <u>absence</u>	At least 3 from each homogeneous area of <100m ² 5 for area of 100 to 500m ² 7 for area >500m ²	As determined by the Registered Asbestos Consultant	At least 3 from any homogeneous run of pipe 2 from each pipe elbow, valve & flange 2 from any patched insulation of <2m in length	As determined by the Registered Asbestos Consultant
No. of sample required to prove ACM <u>presence</u>	1	1	1	1

* Sampling based on "Code of Practice on Asbestos Control – Preparation of Asbestos Investigation Report, Asbestos Management Plan and Asbestos Abatement Plan" issued by the Planning, Environment and Lands Bureau, Hong Kong.

** Sampling based on "US Code of Federal Regulations, Title 40 Part 763 (asbestos), section 86 (sampling), 40CFR763.86".

3.2 The analytical results of the bulk samples was reported on 18 March 2008 and summarized in Table 3-2. Laboratory test results are enclosed in Appendix B.

Table 3-2 Results of Sample Analysis

Sample Nature	Sample No.	Sampling Location	Figure No.	Photo No.	Type of Asbestos	Classified as ACM (Y/N)
Cremator door seal	B/114/08/1	Hindu Service Hall	3.1	10	Asbestos not detected	N
Cremator door seal	B/114/08/2	Hindu Service Hall	3.1	10	Asbestos not detected	N
Gasket (Type 1)	B/114/08/3	Control Room inside Hindu Service Hall	3.1	6	Asbestos not detected	N
Insulation brick inside cremator No. 12	B/114/08/4	Hindu Service Hall	3.1	9	Asbestos not detected	N
Insulation brick inside cremator No. 8	B/114/08/5	Cremator No. 8, Cremation Room	3.1	9	Asbestos not detected	N
Insulation sheet	B/114/08/6	Outside Cremation Room	3.1	13	80% Chrysotile	Y
Gasket (Type 1)	B/114/08/7	Roof above cremation room	3.1	6	Asbestos not detected	N
Flue gasket (Type 2)	B/114/08/8	Cremator No. 11 at Roof	3.1	23	80% Chrysotile	Y
Flue gasket (Type 2)	B/114/08/9	Cremator No. 11 at Roof	3.1	23	80% Chrysotile	Y
Grille panel	B/114/08/10	Roof of Cremation Room	3.2	4	Asbestos not detected	N
Air duct insulation	B/114/08/11	Roof of Chinese Service Hall	3.1	27	Asbestos not detected	N
Air duct insulation	B/114/08/12	Roof of Chinese Service Hall	3.1	27	Asbestos not detected	N
Grille panel	B/114/08/13	Roof of Chinese Service Hall	3.1	4	Asbestos not detected	N
PVC floor tile with mastic (12" grey)	B/114/08/14	General Office	3.2	28	Asbestos not detected	N
PVC floor tile with mastic (12" grey)	B/114/08/15	General Office	3.2	28	Asbestos not detected	N

4 INVESTIGATION RESULTS

4.1 Table 4-1 provide lists of ACMs based on the field inspection and the bulk sample analysis results. Locations of the ACMs are depicted in Figure 4.1 and photographs of these materials were shown in Appendix A.

Table 4-1 List of Identified Asbestos-Containing Materials

Item	Description	Location	Estimated Quantity	Sample ID	Physical Condition	Photo	Figure	Type of Asbestos
CC-01	Flue gasket (Type 2)	Cremator No. 11 at Roof	1 no.	B/114/08/8 B/114/08/9	Good	23	4.1	80% Chrysotile
CC-02	Insulation sheet	Outside Cremation Room	1 sheet	B/114/08/6	Good	13	4.1	80% Chrysotile

5 HAZARD ASSESSMENT

- 5.1 Health risks of the ACM were assessed on the basis of their physical condition/ integrity, asbestos type and potential for disturbance by any means. The friability of the ACM contributes also to the health risk where the friable ACM presents a higher chance for deterioration thus releasing asbestos fibres. A summary of health hazard assessment of the identified ACM is shown in Table 5-1.

Table 5-1 Health Hazard Assessment of Identified ACM

ACM	Friability	ACM Condition	Factor of ACM Disturbance				Hazard Rank *
			Potential for Physical Contact	Potential for Air Erosion	Potential for Vibration	Overall Potential	
Flue gasket (Type 2)	Low	Good	Low	Low	Low	Low	1
Insulation sheet	Low	Good	Low	Low	Low	Low	1

Note * The rankings of potential hazard range from 7 (most hazardous), to 1 (least hazardous).

6 CONCLUSIONS

- 6.1 The asbestos survey at Cape Collinson Crematorium revealed the presence of asbestos-containing material. Asbestos gasket (woven) and insulation sheet were identified during the survey.
- 6.2 ACM was not found in the six columbarium blocks & carpark area.
- 6.3 External structure of the crematorium main building and cremator at Hindu Service Hall were inspected by the survey team. However, all the pipeline concealed inside the wall was not available for inspection. Moreover, most of the flange connection was covered by metal cover, which was also inaccessible to the survey team. Interior lining of the chimney stack and cremators No. 1-11 were not available to inspect, since the crematorium was still in operation. Re-inspection of the in-accessible area was necessary after the cremators are switched off or decommissioned to confirm the presence of ACM.
- 6.4 Due to the low friability nature and good condition of the ACM found, health hazard was relatively low, which would not impose health hazard to the occupier.

7 RECOMMENDATIONS

- 7.1 Owner of the premises / occupier was recommended to avoid further disturbances to ACM that would cause release of notorious asbestos fibres.
- 7.2 Access to the ACM should be cordoned off immediately & restricted to the asbestos professionals to avoid unintentional disturbance to the ACM.
- 7.3 Woven gasket found at cremator No. 11 is a non-exempted item under the APCO (Cap 311), therefore Registered Asbestos Contractors are required for the removal of the asbestos woven gasket. Whereas the insulation sheet outside the cremator room should be collected by Registered Asbestos Collector.
- 7.4 Before commencement of any asbestos abatement work, relevant authorities, such as the Environmental Protection Department (EPD) and Labour Department (LD) shall be notified by no less than 28 days in advance. The Registered Asbestos Contractor and the licensed collector shall observe the provisions under the Waste Disposal Ordinance for the dumping of asbestos waste at the Government designated disposal site.
- 7.5 Re-inspection to the in-accessible area (refer to section 2.2) by Registered Asbestos Consultant is necessary before any re-provisioning works to be carried out. A supplementary report to the accessible area shall be submitted to EPD for endorsement before any demolition work carry out.

- 7.6 Since the site was still in operation, it is not possible to carry out contaminated material investigation inside the cremation rooms or chimney. Therefore further site inspection for dioxin contaminated material (DCM) is required after the cremators are shut down. Registered Asbestos Consultant shall submit supplementary information and revised AIR / AAP to the Authority if the ACM found was contaminated by dioxin material. Dioxin contaminated ACM shall be removed as dioxin contaminated material in accordance with the Contaminated Material Investigation Report (CMIR).
- 7.7 To avoid inhalation of dioxin material by the asbestos supervisors / workers, the Registered Asbestos Consultant recommends the dioxin contaminated material (if any) should be removed prior to any asbestos abatement work process. The owner of the premises / main contractor shall submit a letter to EPD, Registered Asbestos Consultant / Contractor to report the completion of dioxin removal work on site.

PART II ASBESTOS ABATEMENT PLAN**8 SELECTION OF ABATEMENT METHOD**

- 8.1 The abatement method for the asbestos-containing material (ACM) should be specific such that due regards are given to the prevalent statutory requirements, health hazards and the particular site constraints. It is legally required that the identified ACM shall be abated/ removed by a Registered Asbestos Contractor.
- 8.2 Due to the low friability of the ACM found, the removal of woven gasket could be conducted under proper segregation.

9 RELEVANT LEGISLATION AND GUIDELINES

- 9.1 Full compliance with the relevant legislation and guidelines as mentioned in the Appendix A is required for the conducting of asbestos removal work. The primary, but not limiting requirements as follows shall be observed.
- (1) A Registered Asbestos Contractor shall be employed to carry out the removal and disposal works for the identified ACM.
 - (2) A licensed asbestos waste collector shall be appointed to collect and dispose of the asbestos waste.
 - (3) A Registered Asbestos Laboratory shall be engaged to conduct air monitoring in the course of asbestos abatement work.
 - (4) An on-site Registered Asbestos Supervisor shall be present during the carrying out of abatement work to provide proper control of excessive asbestos fibre release and to oversee all safety precautions in the work area. The Registered Asbestos Supervisor shall verify that all asbestos workers wear proper respirators and coveralls, and shall maintain a daily project log on site for inspection by the Authorities.
 - (5) Before commencement of any asbestos abatement work, relevant authorities, such as the Environmental Protection Department (EPD) and Labour Department (LD) shall be notified by no less than 28 days in advance. The Registered Asbestos Contractor and the licensed collector shall observe the provisions under the Waste Disposal Ordinance for the dumping of asbestos waste at the Government designated disposal site.
 - (6) All High Efficiency Particulate Air Filter Appliances (HEPA) such as the vacuum cleaner shall have a valid certificate of performance for inspection by the authority.
 - (7) All workers deployed to the abatement work must have valid medical certificates certifying their fitness to work on asbestos. The Registered Asbestos Contractor shall make X-ray films available for inspection.
- 9.2 Duties of the Owner / Main Contractor are as follows:
- (1) All the identified ACM should be removed and disposed prior to the demolition work. Registered Asbestos Specialist (Registered Asbestos Contractor, Registered Asbestos Waste Collector & Registered Asbestos Laboratory) shall be employed to carry out the removal and disposal works for the identified ACM.
 - (2) Notification of the presence of ACM to third party who has possession of the site for construction work to avoid accidental disturbance to the ACM before abatement work.
 - (3) Before commencement of any asbestos abatement work, relevant authorities, such as the Environmental Protection Department (EPD) and Labour Department (LD) shall be notified by no less than 28 days in advance.

9.3 Duties of the Registered Asbestos Contractor are as follows:

- (1) Give continuous supervision through registered asbestos supervisors stationed continuously at the asbestos abatement area to supervise the carrying out of the work.
- (2) Provide specialised control equipment, materials and trained workers to carry out the work.
- (3) Supervise the carrying out of the work specified in the asbestos abatement plan.

10 SITE PREPARATION AND MANAGEMENT

Segregation of the Site

10.1 To facilitate the effective control of asbestos works, work area shall be vacated prior to any site preparation work and shall be fenced off to prevent entry of personnel who are not involved in the work and/ or not properly protected from asbestos fibres.

10.2 A single entrance decontamination unit as described in the proceeding paragraphs shall be provided for workers' decontamination at the entrance. The layout plan for the abatement work was shown in Figures 10.1a & 10.1b.

Materials and Equipment

10.3 All the materials and equipment to be used in the asbestos removal works shall comply with the following specifications where appropriate.

- For construction of the decontamination unit, transparent plastic sheeting of 0.15 mm thickness manufactured from extruded low-density polythene to B.S. 4932:1973 or equivalent, shall be used.
- All polythene sheeting, transparent or colour-coded bags and containers used for packing of asbestos waste shall meet the specifications given in the "Code of Practice on the Handling, Transport and Disposal of Asbestos Wastes" by EPD.
- Duct tape, foam agent and spray adhesive shall be capable of sealing joints of adjacent sheets of polythene, facilitating attachment of polythene sheets to finished and unfinished surfaces, and of adhering under both wet and dry conditions, including during the use of amended water.
- Wetting agent for preparing amended water to enhance penetrating shall be 50% polyoxyethylene ester and 50% polyoxyethylene ether or equivalent, diluted to a specific concentration in accordance with the manufacturer's instructions.
- Water-based polyvinyl acetate (PVA) adhesives used during final clean-up of work area to encapsulate all exposed surfaces shall be dyed to indicate where and whether they have been applied to facilitate crosschecking at a later stage.
- HEPA vacuum cleaners shall be fitted with a high efficiency particulate air filter capable of trapping and retaining 99.97% of particles (asbestos fibres) greater than 0.3 micron mass median aerodynamic equivalent diameter.

Protective Clothing and Respirators

10.4 All asbestos workers, supervisors and visitors upon entering the abatement area shall wear approved respirators and protective clothing, such as the following:

- Martindale Full Face Positive Pressure Respirators
- Protector Safety Full Face Positive Pressure Respirators
- Racal Power Flow Full Face Positive Pressure Respirators
- Sekur Full-face Respirators
- 3M 8810 Disposable Respirators
- Tyvak Disposable Coverall and Overboots

- 10.5 The protective clothing shall be impervious to asbestos dust and shall consist of approved full body coveralls with headcover, overboot, rubber gloves and respirators. The respiratory protective equipment (RPE) of protection factor at least 10 (equivalently a half-face particulate filter) shall be required for decontamination process. The RPE shall be of approval type by the Labour Department.

Decontamination Unit

- 10.6 The registered asbestos contractor shall maintain a single entrance with a decontamination unit and shall ensure asbestos personnel's using for site entry and exit.
- 10.7 A central 3-chamber airlock decontamination hygiene unit comprising dirty, shower and clean rooms shall be constructed in the entrance of working zone for workers' decontamination.
- 10.8 Each compartment shall have a minimum size of 2m (height) x 1m (width) x 1m (length) and shall be constructed of 1½" strutwork at 4' centres, fixed to 3" x 3" main posts, and ¼" plywood fixed to strutwork forming top, floor and sides. Three layers of 0.15mm thick and opaque polythene sheeting shall be fixed to internal surfaces. All joints shall be sealed with tape or spray adhesive.
- 10.9 Each compartment is separated by a curtained doorway consisting of a polythene sheet with an I-shaped slit opening covered by a plastic flap that hangs and lifts in the direction of access. The plastic flap shall have an overlap of at least 100mm on each side of the slit opening and weighted at the bottom.
- 10.10 The shower room shall be no water leakage and fitted with a tray of adequate size to collect wastewater. Hot and cold water adjustable at the showerhead shall be provided at a minimum of one showerhead per 6 workers calculated on the basis of the largest shift. All wastewater shall be sump pumped to an aquarium type filter unit to remove suspended particles down to 5µm before being discharged and drained.
- 10.11 The shower room shall be wet cleaned and HEPA vacuumed after each shift change and meal break.
- 10.12 The dirty room shall be equipped with a HEPA vacuum cleaner for the worker to vacuum-clean the coverall and the respirator prior to being taken off.

Use of the Decontamination Facility

- 10.13 Work personnel shall enter the clean room and remove street clothing, and put on clean coveralls, foot coverings and respirator before entering the site through dirty room.
- 10.14 Before leaving the work area, work personnel shall remove the dust from the coveralls and respirators using a HEPA type vacuum cleaner. All clothing, including coveralls, overboots shall be removed and disposed of except the respirators in the dirty room. Workers then proceed to the shower room where their respirators are washed and filters soaked (without removed). When filters are soaked, respirators can be taken off and washed with soap & water. Disposable underpants and used filters shall be double-bagged with 0.15mm polythene bags and disposed of as asbestos waste. Workers shall wash thoroughly the bodies and hairs. Proceeding the clean room, workers dry off their bodies and dress in street clothing prior to exiting.

Warning Notices and Signs

- 10.15 Warning notices and signs worded in English and Chinese characters shall be displayed around the working zone, on the temporary partitions, at entrances of decontamination units and in areas for asbestos waste storage. Warning notices to be posted shall comply with the requirements as specified in the "Code of Practice on Asbestos Control" prepared by EPD. Segregation and warnings shall remain throughout the abatement work.

Viewing Panels

- 10.16 Sufficient number of clear viewing panels (300mm x 450mm with the lower edge no more than 1.2 above floor level) should be provided at strategic locations and be completed with proper means of access to facilitate observation of the asbestos abatement work from outside. The panel should

comprise one 2mm thick clear acrylic sheet, have at least 50mm overlap with the polythene sheet at the edge, and be securely fixed with 50 mm wide duct tape.

Temporary Storage Area

- 10.17 The registered asbestos contractor shall remove the asbestos waste off-site as soon as it is generated. Where immediate collection and disposal are not possible, the asbestos waste shall be temporarily stored in a secure area designated by the registered asbestos contractor within each Work Zone. The temporary storage of the chemical waste shall comply with the Code of Practice on the Packaging, Labelling and Storage of Chemical wastes published by the Environmental and Food Bureau (EFB). In particular, type 1/2 waste shall not be mixed with type 3 waste which requires a different colour-code packaging. No person shall be allowed to eat, drink or smoke in the chemical waste storage area. As a minimum requirement, the storage area shall:
- bear warning notices outside;
 - be water resistant and rigid;
 - be isolated from the rest of the work area;
 - be kept clean and free from obstruction; and
 - be lockable and restricted to the access of authorized persons which are directly involved in the asbestos abatement work and properly protected from asbestos fibres including the registered asbestos contractor and licensed waste collector.
- 10.18 After asbestos abatement, all asbestos waste will be immediately collected by registered asbestos collector for proper disposal.
- 10.19 All asbestos wastes in the storage area shall be packed in colour-coded bags/containers and labeled according to the asbestos waste type. Bags shall not be stacked over 3 bags high.

11 METHOD OF ABATEMENT WORK

Removal Procedure for Woven gasket

- 11.1 Work area shall be fenced off to prevent entry of personnel who are not involved in the work and/or not properly protected from asbestos fibres.
- a. The exhaust flue with gasket to be removed should be confirmed not in operation and safe to access by the worker before commencement of the removal process.
 - b. Clear up as asbestos removal work proceeds. Prevent debris accumulating on the floor or ground and causing fibre release.
 - c. Abatement area should be segregated by tarpaulin sheet and 2 layers of polythene sheet with 500mm high skirting should be placed on the floor to prevent any debris falling on the ground during the abatement process.
 - d. During the asbestos removal operation continuously spray with amended water to keep them wet all the time.
 - e. To minimize the disturbance to the ACM, the exhaust flue should be disconnected and cut as illustrated in Figures 10.1a & 10.1b. The flange with asbestos gasket should be isolated and wrapped in 2 layers of 0.15 mm thick polythene and label as asbestos waste.
 - f. Bagged all removed ACM & waste in 2 layers of 0.15 mm thick polythene sheet and label as asbestos waste. Collect the debris into the labelled asbestos waste bags and seal securely with PVC tape.

Site Clean-up and Acceptance of Work

- 11.2 All plastic sheets inside the work area shall be sprayed with PVA solution and allowed to dry. The plastic sheet shall be placed in approval bags. All surfaces in the work area shall be HEPA vacuumed and wet-wiped to remove any visible debris. All used HEPA filters and wiping rags shall be disposed of as asbestos waste.

- 11.3 The registered asbestos contractor should then perform a thorough visual inspection to ensure that any debris in the form of contaminated items, dust, chips or untreated effluent had been cleaned from the work area. A registered asbestos laboratory should carry out reassurance air test.

Air Monitoring

- 11.4 A Registered Asbestos Laboratory shall perform air monitoring that the results of the analysis shall be available within 24 hours of sampling.
- 11.5 Five (5) background air samples shall be taken prior to commencement of the abatement work.
- 11.6 Personal air sample at a rate of 1 per 4 workers per workday shall be taken to monitor the fibre exposure to the asbestos workers throughout the removal process.
- 11.7 After the site clean-up work, two (2) reassurance air tests shall be conducted to confirm the site cleanliness where the fibre count shall not exceed 0.01 fibre/ ml.
- 11.8 Four (4) environmental air samples at daily intervals should be taken at the perimeter of location being abated to monitor the fibre release.
- 11.9 A Registered Asbestos Laboratory that the results of the analysis shall be made available within 24 hours of sampling shall perform air monitoring.

12 DISPOSAL OF ASBESTOS WASTE

- 12.1 Asbestos wastes shall be disposed of in accordance with the "Code of Practice on the Handling, Transport and Disposal of Asbestos Waste" issued by the Environmental Protection Department and only at the appointed disposal site designated by the Environmental Protection Department.
- 12.2 The Registered Asbestos Contractor shall obtain the necessary permit and arrange a licensed collector for the dumping of the asbestos waste to the Government appointed disposal site.
- 12.3 The estimated quantities of asbestos waste generated are given in Table 7-1.

Table 7-1 Estimated Quantity of Asbestos Waste

ACM	Waste Category	Estimated Quantity
Woven gasket	1	1 no.

13 WORK PROGRAMME

- 13.1 The estimated duration of asbestos removal work is given in Table 8-1.

Table 8-1 Estimated Duration of Asbestos Removal Work for Work Zone

Work	Estimated Duration (Site Preparation + Asbestos Removal)
Woven gasket	1 day

14 EMERGENCY PROCEDURES

Procedures in the Case of Spillage of Asbestos Debris

- 14.1 The Registered Asbestos Contractor shall stop the processes being carried out which would produce more asbestos spillage.
- 14.2 The On-site Registered Asbestos Supervisor shall inform the Environmental Protection Officer of Environmental Protection Department for record.

- 14.3 The affected area and debris shall be immediately sprayed with a fine mist of amended water from airless type water sprayer.
- 14.4 While still wet, the debris shall be collected in plastic bags, doubled bagged and labelled as asbestos waste for disposal. Asbestos wastes packaging shall be colour coded and labelled according to the asbestos waste type and procedures illustrated in the "Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste".
- 14.5 The affected area shall be wet wiped and vacuum cleaned. The area shall be declared clean for other general work only after a satisfactory visual inspection by the Registered Asbestos Supervisor.

Procedures in the Case of a Fire

- 14.6 The Registered Asbestos Contractor shall immediately stop the abatement work and evacuate off the scene.
- 14.7 The On-site Registered Asbestos Supervisor shall inform the Environmental Protection Officer of Environmental Protection Department for record.
- 14.8 Once the fire has been put out and the site is safe for re-entry, all surfaces and the debris shall be sprayed with a fine mist of amended water.
- 14.9 The debris shall be collected in plastic bags, doubled bagged and labelled as asbestos waste for disposal. Asbestos wastes packaging shall be colour coded and labelled according to the asbestos waste type and procedures illustrated in the "Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste".
- 14.10 The affected area shall be wet wiped and vacuum cleaned. The area shall be declared clean for other general work only after a satisfactory visual inspection by the Registered Asbestos Supervisor and a reassurance air sample has been conducted.
- 14.11 If the air sample shows fibre counts in excess of 0.01 fibres/ml, the area shall be re-cleaned until the specified fibres level in air is attained.

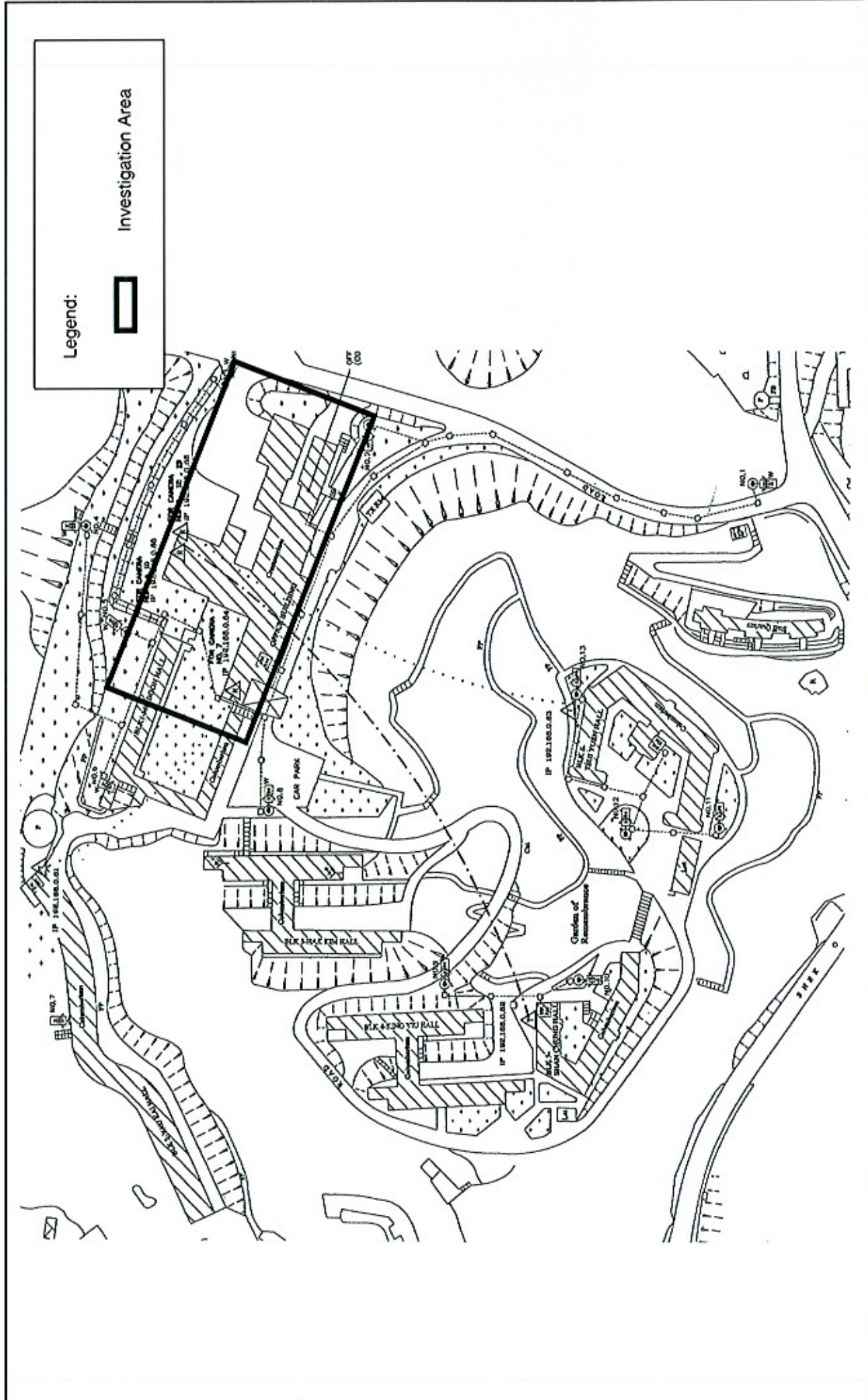
Procedures in the Case of an Accident

- 14.12 The Registered Asbestos Contractor shall stop all the works and take the worker(s) to a safety place.
- 14.13 If the worker collapses, his respirator shall be removed; otherwise, the respirator shall be left in place. Personal decontamination shall be carried out whenever possible. In a life-threatening case, the worker shall be taken to hospital immediately without carrying out personal decontamination.
- 14.14 The affected area during emergency shall be cleaned with HEPA vacuum cleaner.
- 14.15 The registered asbestos supervisor shall inspect the area and arrange air testing.
- 14.16 Should the air test showing a fibre level less than 0.01 fibre/ ml, the asbestos abatement work can be re-commenced.

Procedures in the Case of a Black Rainstorm Warning or Typhoon with a Signal of Number Three or Above

- 14.17 The Registered Asbestos Contractor shall stop all the processes that would produce more asbestos debris.
- 14.18 The Registered Asbestos Contractor shall place all loose asbestos debris into suitably labelled containers and transport to the secure storage area.
- 14.19 The contaminated area shall be thoroughly HEPA vacuum cleaned and all equipment shall be secure in place against the damage from the rainstorm or typhoon.

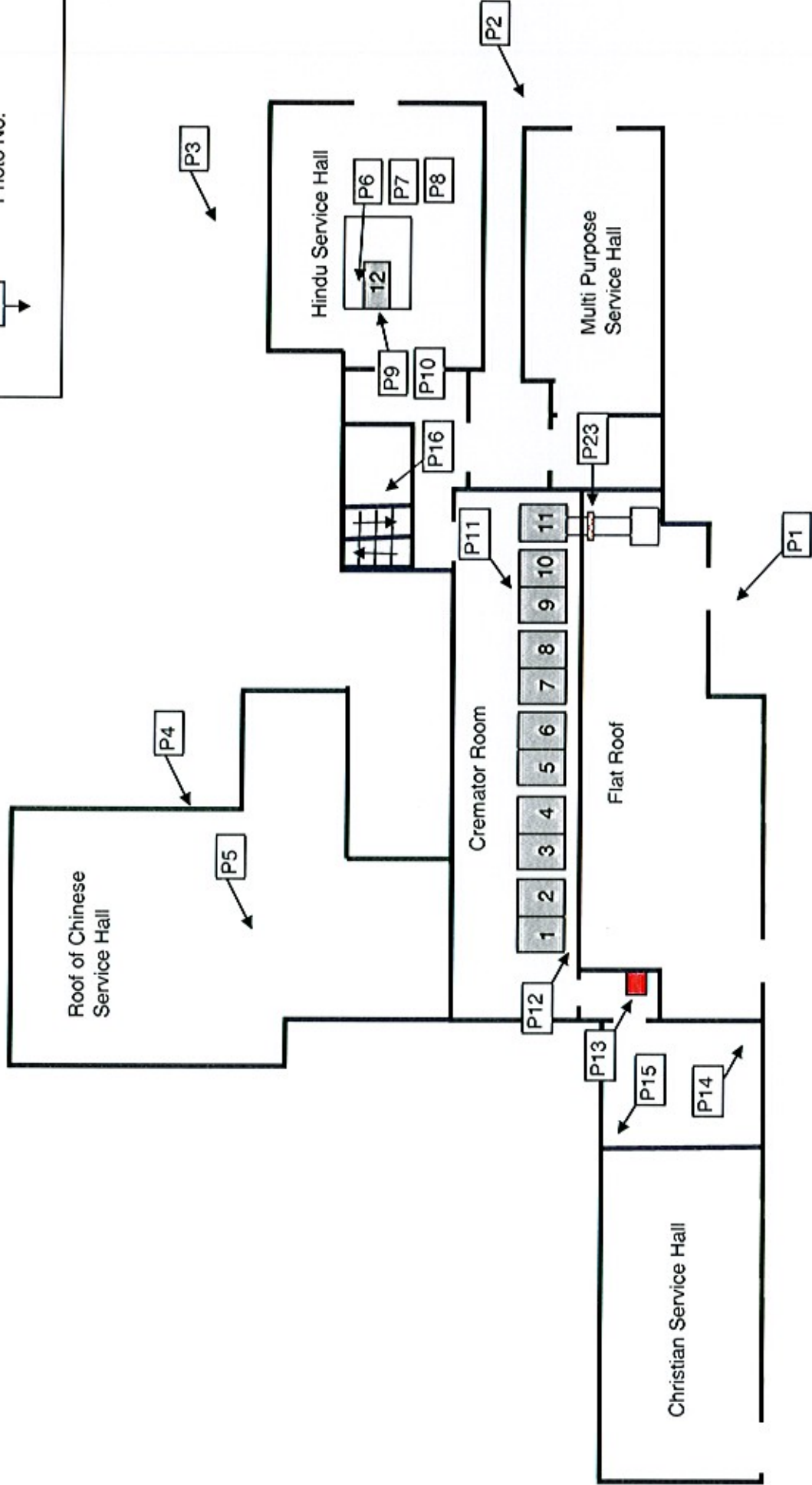
- 14.20 All electricity and water shall be cut off.
- 14.21 The registered asbestos supervisor shall verify the compliance of the above measures, before workers are allowed to leave the site.
- 14.22 The abatement works shall be resumed after the rain-storm or after the Number Three Typhoon Signal has been lowered and provided that satisfactory site clean-up has been completed.



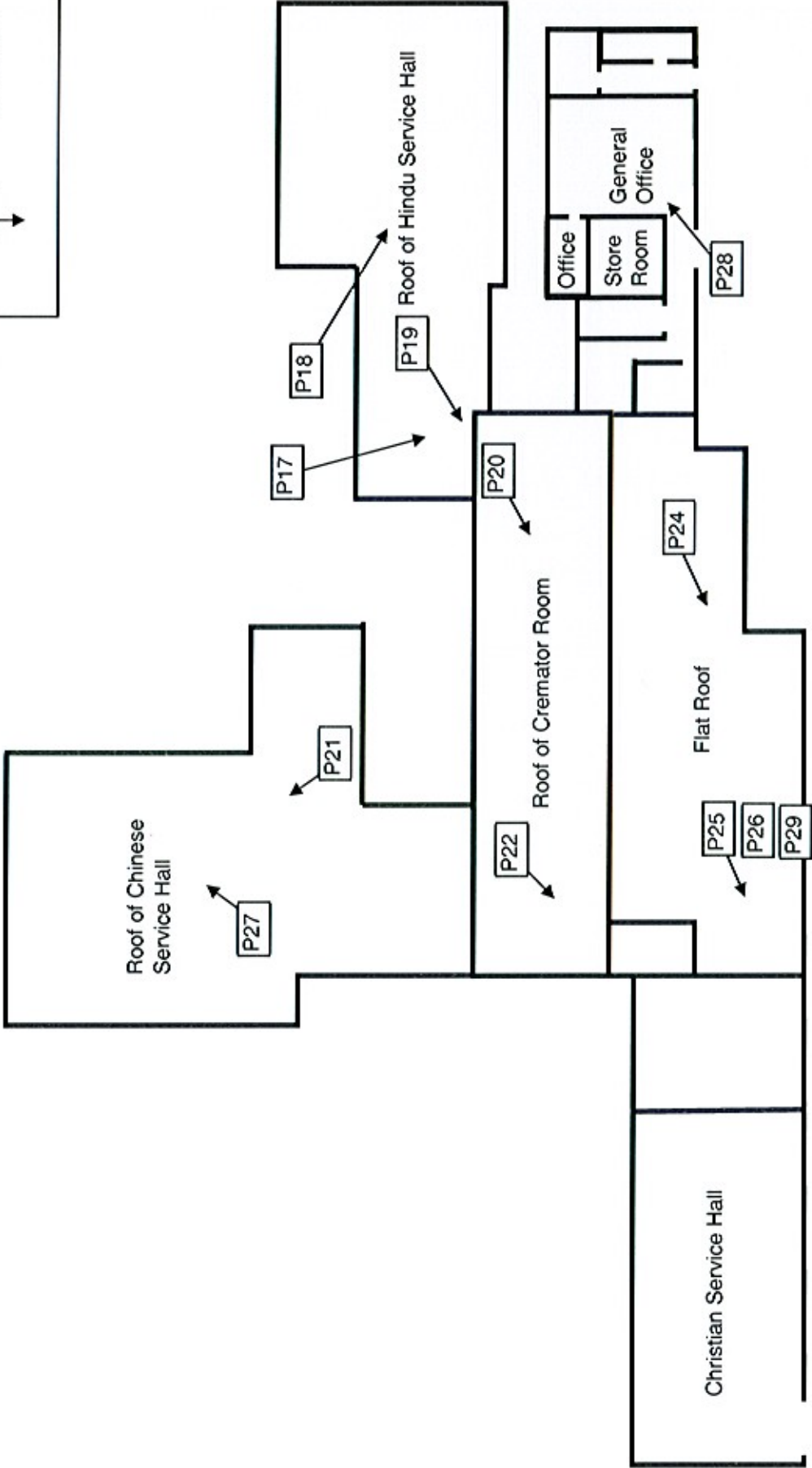
Legend: Investigation Area

ENSR AECOM	Asbestos Consultancy for Re-provisioning of Cape Collinson Crematorium Site Location Plan		SCALE	N.T.S.	DATE	Apr-08	
	CHECK	JOB NO.	60028568	DRAWN	DRAWING NO.	MCYT	
						Rev	-
						1.1	-

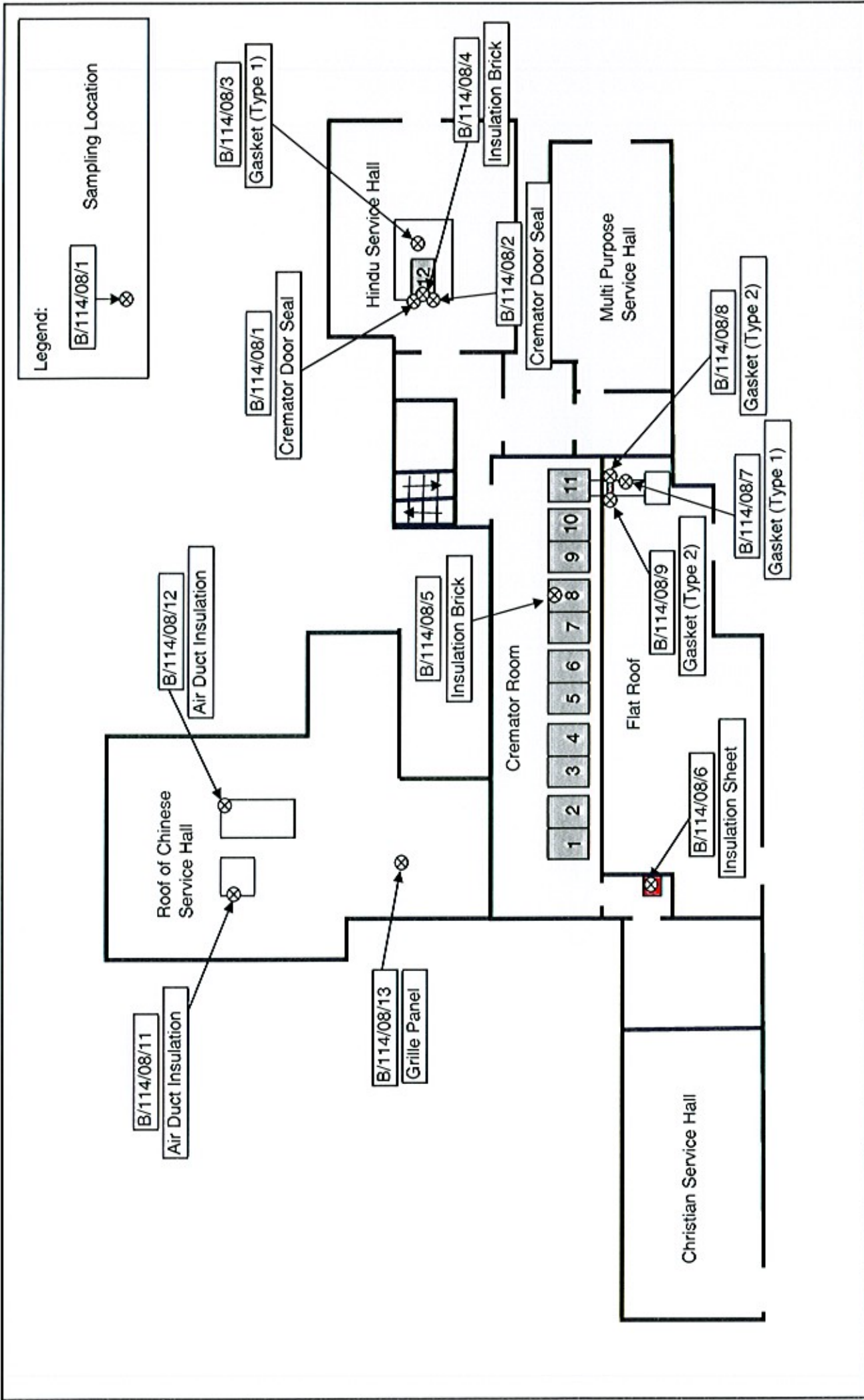
Legend:  Photo No.



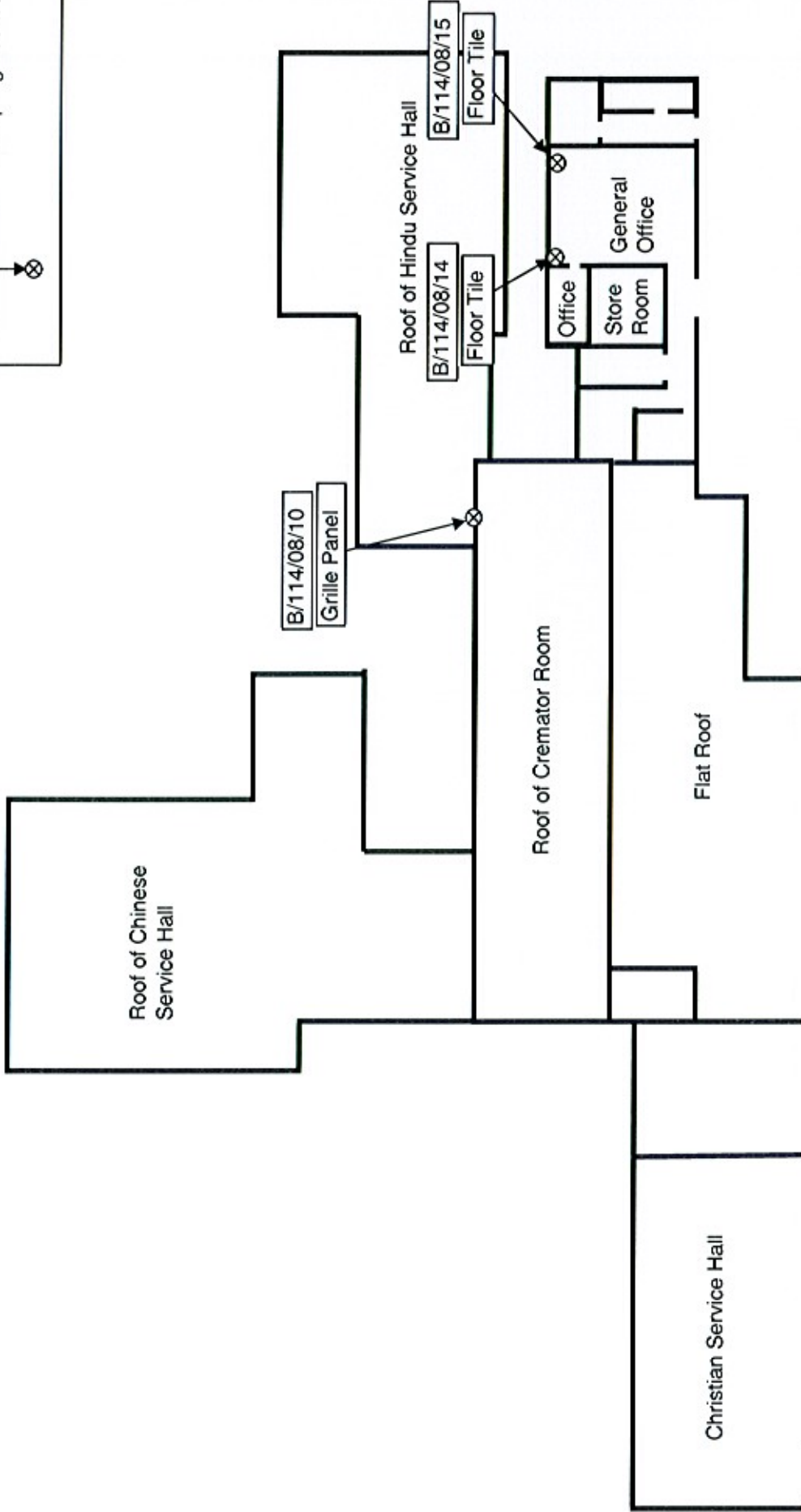
	Asbestos Consultancy for Reprovisioning of Cape Collinson Crematorium			SCALE N.T.S.	DATE Apr-08
	Photo Reference Location Plan, G/F			CHECK M.C.Y.T.	DRAWN M.C.Y.T.
				JOB NO. 60028568	DRAWING NO. 1.2



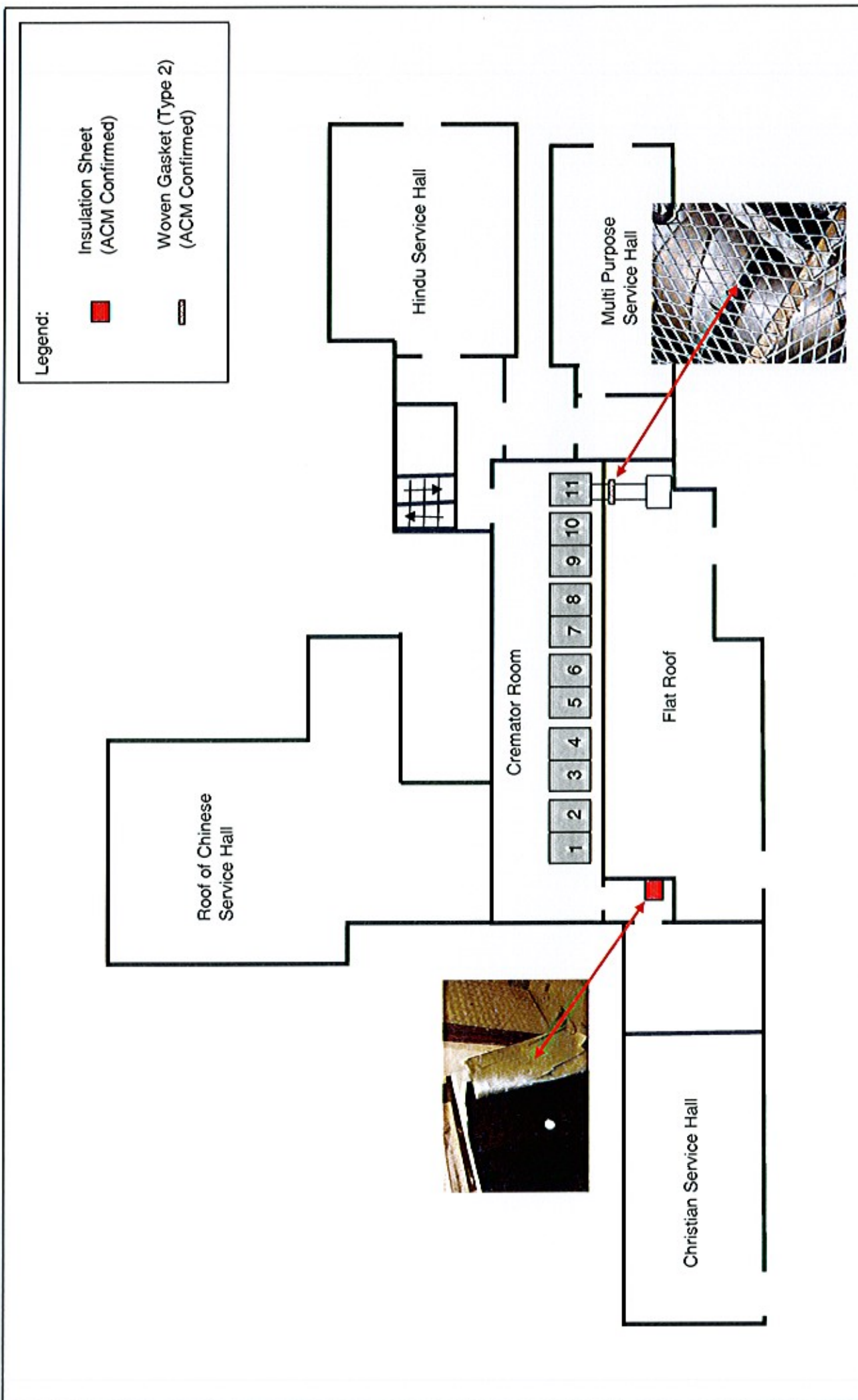
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	CHECK		JOB NO.	60028568	DRAWN	MCYT
					DRAWING NO.	1.3
					Rev	-



ENSR AECOM Asbestos Consultancy for Reprovisioning of Cape Collinson Crematorium Sampling Location Plan, G/F	SCALE	N.T.S.	DATE	Apr-08
	CHECK JOB NO.	60028568	DRAWN	MCYT
			DRAWING No.	3.1
			Rev	-



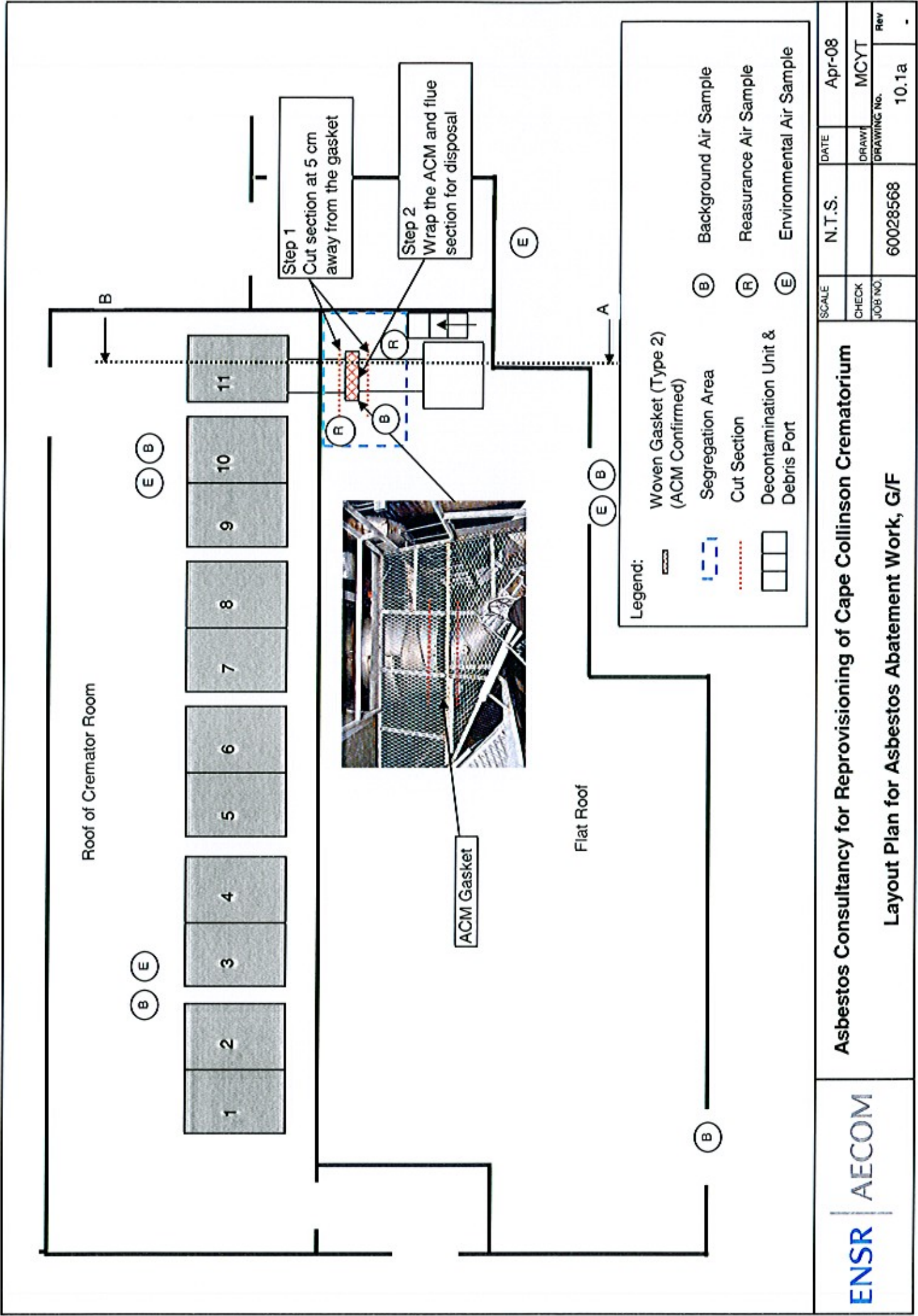
	Asbestos Consultancy for Reprovisioning of Cape Collinson Crematorium Sampling Location Plan, 1/F			SCALE	N.T.S.	DATE	Apr-08
			CHECK		DRAWN	MCYT	
		JOB NO.	60028568	DRAWING NO.	3.2	Rev	-



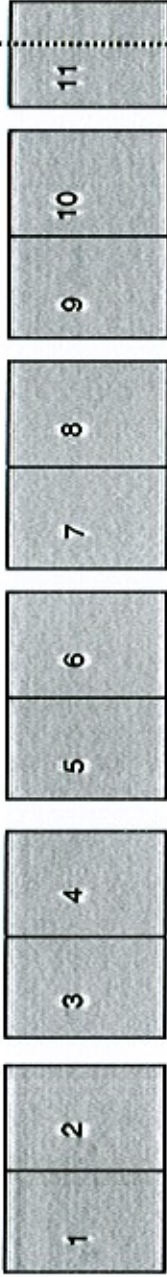
Legend:

- Insulation Sheet (ACM Confirmed)
- Woven Gasket (Type 2) (ACM Confirmed)

ENSR AECOM	Asbestos Consultancy for Reprovisioning of Cape Collinson Crematorium ACM Location Plan, G/F			SCALE N.T.S.	DATE Apr-08
	CHECK JOB NO.		DRAWN DRAWING No.		MCYT
	60028568		4.1		Rev -



Roof of Cremator Room



Step 1
Cut section at 5 cm
away from the gasket

Step 2
Wrap the ACM and flue
section for disposal

Flat Roof

Legend:





- Woven Gasket (Type 2) (ACM Confirmed)
- Segregation Area
- Cut Section
- Decontamination Unit & Debris Port
- Background Air Sample
- Reassurance Air Sample
- Environmental Air Sample

	Asbestos Consultancy for Reprovisioning of Cape Collinson Crematorium		SCALE	N.T.S.	DATE	Apr-08
	Layout Plan for Asbestos Abatement Work, G/F		CHECK		DRAWN	MCYT
			JOB NO.	60028568	DRAWING NO.	10.1a
					REV	-

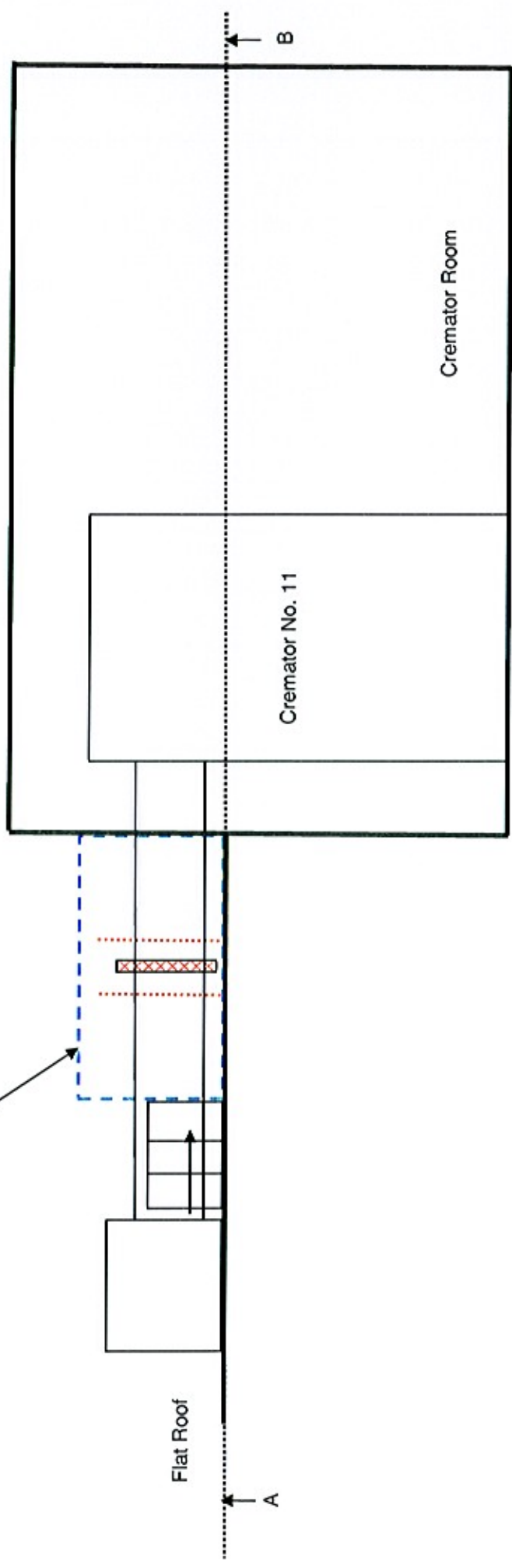


ACM Gasket

Legend:

-  Woven Gasket (Type 2) (ACM Confirmed)
-  Segregation Area
-  Cut Section
-  Decontamination Unit & Debris Port

Roof of Cremator Room



ENSR AECOM	Asbestos Consultancy for Reprovisioning of Cape Collinson Crematorium Layout Plan for Asbestos Abatement Work (Cross-Sectional View AB)				SCALE N.T.S.	DATE Apr-08	Rev -
	CHECK JOB NO.: 60028568	DRAWN MCVT	DRAWING NO. 10.1b	Rev -			

APPENDIX A

Photographic Records

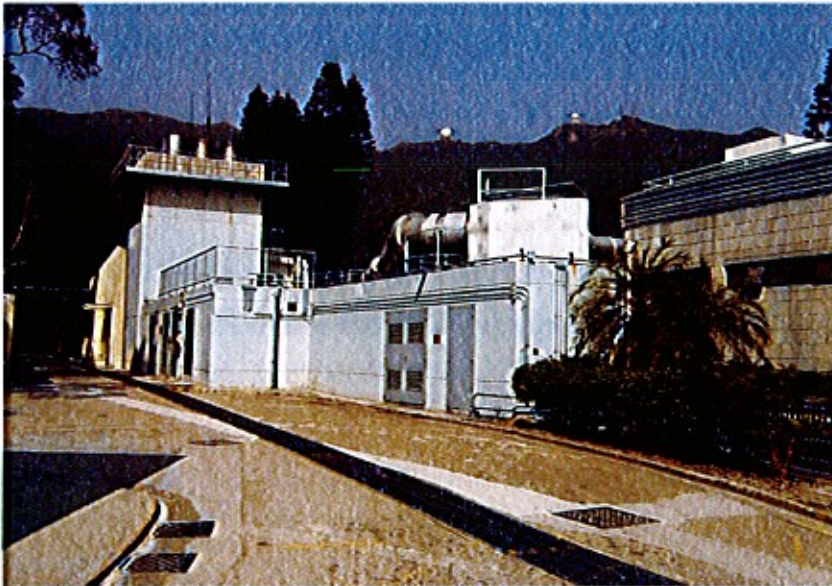


Photo 1:
Cape Collinson Crematorium



Photo 2:
Cape Collinson Crematorium



Photo 3:
Cape Collinson Crematorium

ENSR | **AECOM**

Asbestos Consultancy for Cape Collinson Crematorium

Survey Photo

SCALE	N.T.S	DATE	Mar 08
CHECK		DRAWN	MCYT
JOB NO.	60028568	DRAWING No.	A1
		Rev	-



Photo 4:

Grille Panel at Chinese Service Hall



Photo 5:

Ventilation Exhaust at Chinese Service Hall

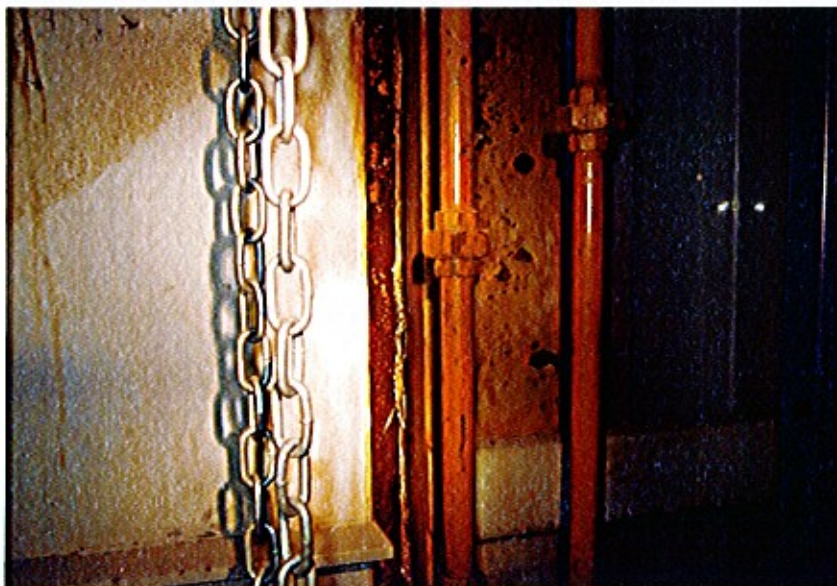


Photo 6:

Gasket (Type 1) at Hindu Service Hall

SCALE	N.T.S	DATE	Mar 08
CHECK		DRAWN	MCYT
JOB NO.	60028568	DRAWING No.	A2
		Rev	-



Photo 7:

Gasket (Type 1) at Hindu Service Hall

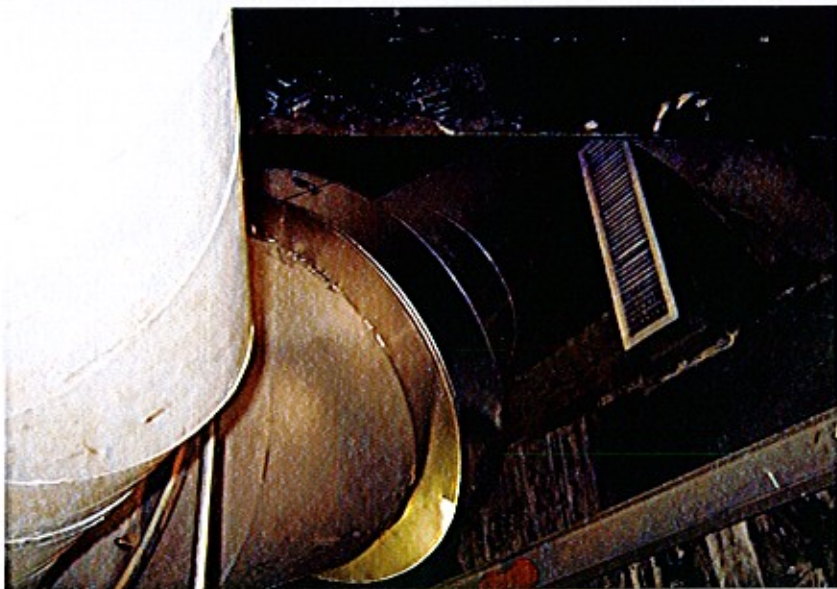


Photo 8:

Exhaust Flue for Cremator at Hindu Service Hall



Photo 9:

Interior Lining of Cremator at Hindu Service Hall

SCALE	N.T.S	DATE	Mar 08
CHECK		DRAWN	MCYT
JOB NO.	60028568	DRAWING No.	A3
		Rev	.

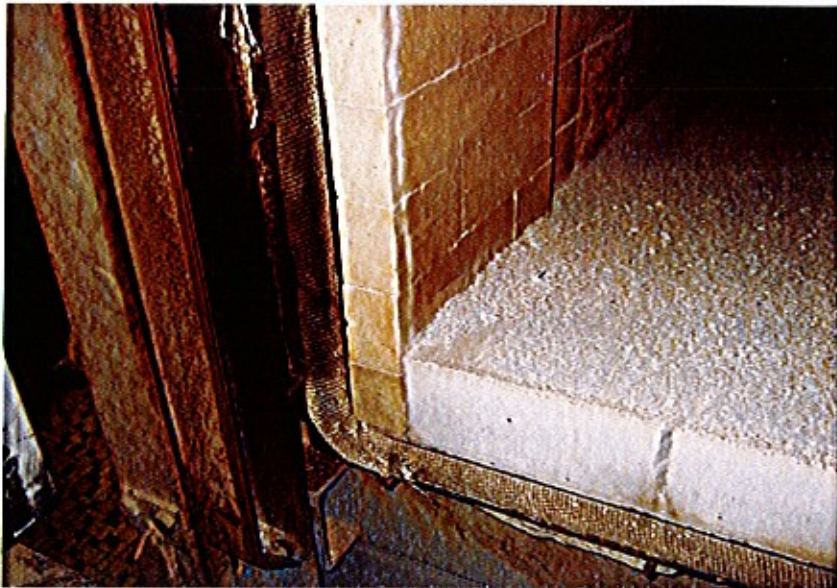


Photo 10:

Door Seal of Cremator at Hindu Service Hall



Photo 11:

Cremator No. 9 & 10 at Cremator Room

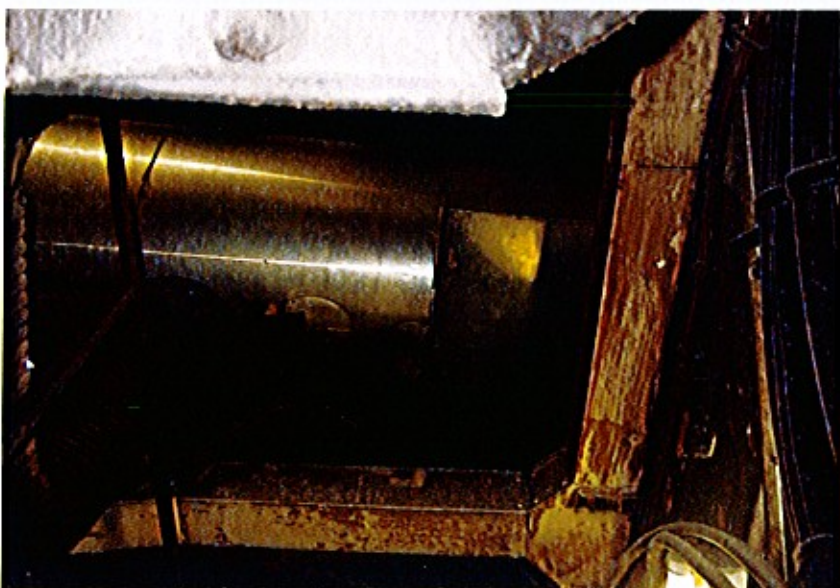


Photo 12:

Exhaust Flue at Cremator No. 1, Cremator Room

SCALE	N.T.S	DATE	Mar 08
CHECK		DRAWN	MCYT
JOB NO.	60028568	DRAWING No.	A4
		Rev	-



Photo 13:

Insulation Sheet outside Cremator Room

(ACM Ref. No. CC-02)
(ACM Confirmed)



Photo 14:

Main Switch Room



Photo 15:

Rubber Flexible Joint at Corridor
outside Cremator Room



Photo 16:

Switch Box at Switch Room

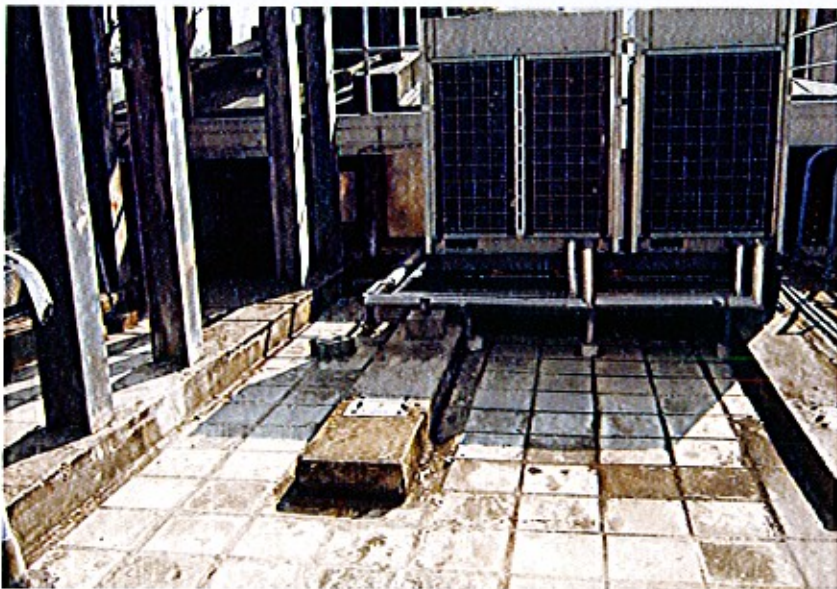


Photo 17:

Roof Tile at Roof



Photo 18:

Exhaust Flue from Cremator at Hindu Service Hall

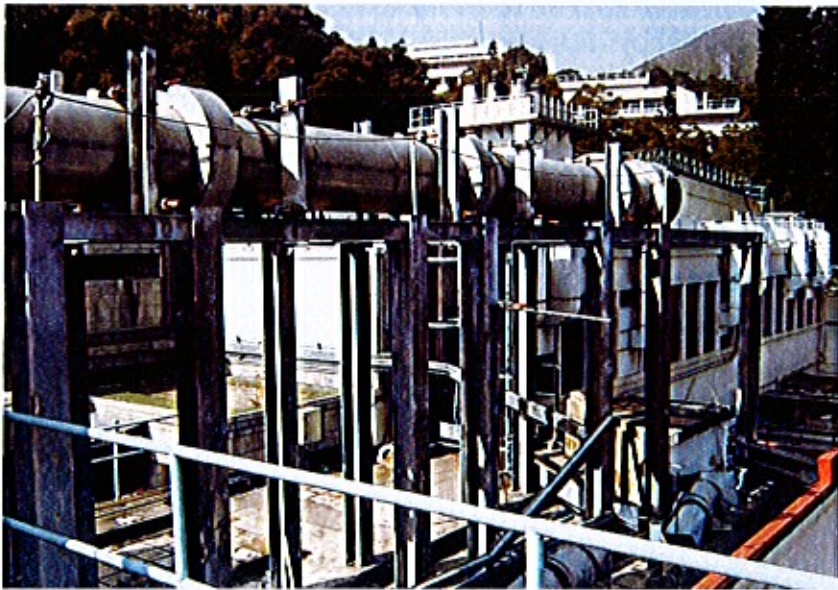


Photo 19:

Exhaust Flue from Hindu Service Hall
to the Chimney Stack



Photo 20:

Ventilation Duct at Roof



Photo 21:

Roof of Chinese Service Hall

SCALE	N.T.S	DATE	Mar 08
CHECK		DRAWN	MCYT
JOB NO.	60028568	DRAWING No.	A7
		Rev	-



Photo 22:

Ventilation Duct at Roof

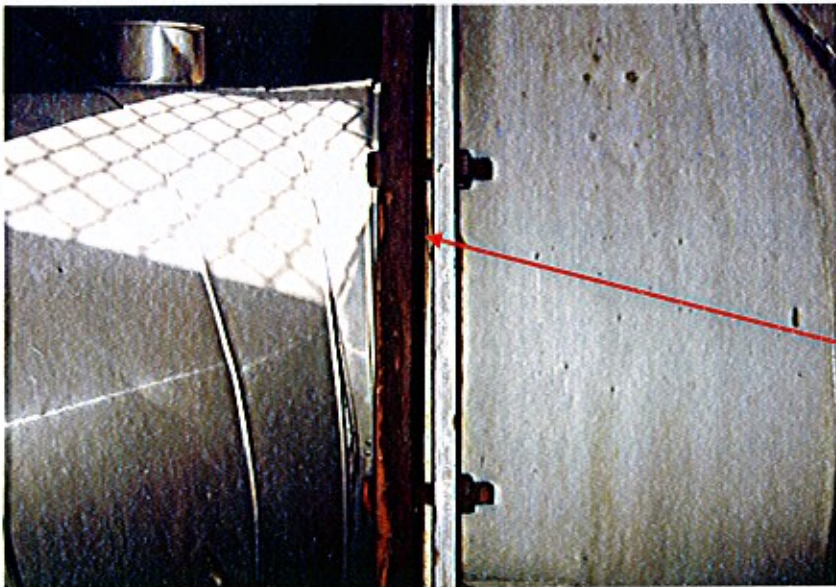


Photo 23:

Woven Gasket (Type 2) from
Cremator No. 11 outside Cremator
Room

(ACM Ref. No. CC-01)
(ACM Confirmed)



Photo 24:

Exhaust Flue from Cremator to the
Chimney Stack

SCALE	N.T.S	DATE	Mar 08
CHECK		DRAWN	MCYT
JOB NO.	60028568	DRAWING No.	A8
		Rev	-



Photo 25:

Chimney Stack



Photo 26:

Interior Lining of Chimney Exhaust



Photo 27:

Air Duct Insulation Material at Roof of Chinese Service Hall

SCALE	N.T.S	DATE	Mar 08
CHECK		DRAWN	MCYT
JOB NO	60028568	DRAWING No.	A9
		Rev	-



Photo 28:

Floor Tile at General Office



Photo 29:

Connection of Exhaust Flue to the Chimney Stack

SCALE	N.T.S	DATE	Mar 08
CHECK		DRAWN	MCYT
JOB NO.	60028568	DRAWING No.	A10
		Rev	-

APPENDIX B

Bulk Sample Analysis report



東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

8/F., Block B, Verlstrong Industrial Centre, 34-36 Au Pui Wan Street, Folan, Hong Kong
Tel : 2695 8318 E-mail : etl@ets-testconsult.com
Fax : 2695 3944 Web site : www.ets-testconsult.com



TEST REPORT

Form F/AB/R/01/Issue 7 (1/1) (08/03)

REPORT NO. BUA80210

IDENTIFICATION AND DETERMINATION OF ASBESTOS CONTAINING MATERIAL

Project : Cape Collinson Crematorium Report Date : 18 March 2008
(B/114/08)

Customer : ENSR Asia (HK) Ltd Test Method : TPE/002/A &
TPE/004/A : Clause 5.1

Address : 11/F, Grand Central Plaza Tower 2, 138 Shatin Rural Comm. Road, Shatin, HK Page : 1 of 2

The sample(s) referenced as shown below were taken from site and examined to determine the presence of asbestos fibres by following methods:

1. Sampling using the method set out in the In-house method TPE/001/A - Sampling of asbestos in bulk
2. Fibres in the samples were identified using a polarised light and dispersion staining technique as described in the In-house method TPE/002/A - Identification of asbestos bulk samples.
3. Determination of asbestos-containing material (ACM) by visual estimation using the method set out in the In-house method TPE/004/A - Determination of asbestos-containing material by visual estimation, gravimetric reduction & point-counting method.

RESULTS

Date of sampling by ETS-Testconsult technician : 13 March 2008
The sampling was carried out in the company of : Mr Michael To
Date of identification : 17 March 2008

Sample Reference Number	Sample Location	Results	Conclusion (ACM/Non-ACM/ Non-Determined)
B/114/08/1	Cremator door seal at Hindu Service Hall	Asbestos not detected	non-ACM
B/114/08/2	Cremator door seal at Hindu Service Hall	Asbestos not detected	non-ACM
B/114/08/3	Flue gasket at control room inside Hindu Service Hall	Asbestos not detected	non-ACM
B/114/08/4	Insulation brick inside cremator at Hindu Service Hall	Asbestos not detected	non-ACM
B/114/08/5	Insulation brick inside cremator 8 at cremator room	Asbestos not detected	non-ACM
B/114/08/6	Insulation sheet outside cremator room	Chrysotile	ACM



東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

8/F, Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Folan, Hong Kong
Tel : 2695 8318 E-mail : etl@ets-testconsult.com
Fax : 2695 3944 Web site : www.ets-testconsult.com



TEST REPORT

Form F/AB/R/01/Issue 7 (1/1) [08/03]

Our report no. BUA80210

Page 2 of 2

Sample Reference Number	Sample Location	Results	Conclusion (ACM/Non-ACM/Non-Determined)
B/114/08/7	Air duct gasket at roof above cremator room	Asbestos not detected	non-ACM
B/114/08/8	Flue gasket of cremator 11 at roof	Chrysotile	ACM
B/114/08/9	Flue gasket of cremator 11 at roof	Chrysotile	ACM
B/114/08/10	Grille panel at roof of cremator room	Asbestos not detected	non-ACM
B/114/08/11	Air duct insulation at roof of Chinese Service Hall	Asbestos not detected	non-ACM
B/114/08/12	Air duct insulation at roof of Chinese Service Hall	Asbestos not detected	non-ACM
B/114/08/13	Grille panel at roof of Chinese Service Hall	Asbestos not detected	non-ACM
B/114/08/14	PVC floor tile with mastic at general office (12" grey)	Asbestos not detected	non-ACM
B/114/08/15	PVC floor tile with mastic at general office (12" grey)	Asbestos not detected	non-ACM

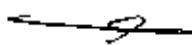
Remarks:

'ACM' refers to a sample that is found to be an asbestos containing material as defined in the Air Pollution Control Ordinance.

'Non-Determined' refers to a sample that should be further analysed by Gravimetric Reduction & Point Counting method for the determination of asbestos containing material.

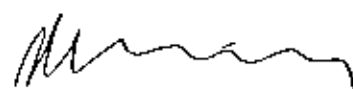
'Non-ACM' refers to a sample which asbestos cannot be detected during the identification.

REPORTED BY :



LEE, Siu Fung Clifford
Supervisor

APPROVED BY :



FAN, Fook Shing Dennis
Technical Director


DF/CL/ec

Hong Kong Accreditation Service (HKAS) has accredited this laboratory under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation. This report shall not be reproduced unless with prior written approval from this laboratory



東業德勤測試顧問有限公司
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Fax : 2695 3944

Web site : www.ets-testconsult.com

TEST REPORT

Form F/AB/R/07/Issue 6 (1/1) [07/03]

VISUAL ESTIMATION

Customer Information

Customer : ENSR Asia (HK) Ltd
Address : 11/F, Grand Central Plaza Tower 2, 138
Shatin Rural Comm. Road, Shatin, HK
Project : Cape Collinson Crematorium
(B/114/08)
Order Ref. : ---

Laboratory Information

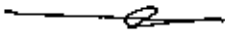
Report No. : BUA80211
Report Date : 18 March 2008
Test Date : 17 March 2008
Page : 1 of 1
Test Method : In-house method
TPE/004/A : Clause 5.1

<u>Sample Ref. No.</u>	<u>Result</u>	<u>Percentage</u>
B/114/08/6	Chrysotile	80%
B/114/08/8	Chrysotile	80%
B/114/08/9	Chrysotile	80%

The percentages quoted above are approx. percentages by weight and are based on subjective visual assessment only.

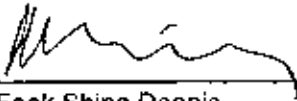
*Non-HOKLAS accreditation.

REPORTED BY:



LEE, Siu Fung Clifford
Supervisor

APPROVED BY:



FAN, Fook Shing Dennis
Technical Director


DF/CL/ec

APPENDIX C

Hazard Ranking Scheme

Hazard Rank	ACM Condition	Disturbance Potential
1	Good	Low
2	Good	Moderate
3	Good	High
4	Fair	Low
5	Fair	Moderate
6	Fair	High
7	Poor	Any

APPENDIX D

CODES OF PRACTICE AND LOCAL REGULATIONS RELATING TO ASBESTOS

1. The Air Pollution Control Ordinance (Cap. 311) – Part IX Asbestos Control Work
2. Factories and Industrial Undertakings (Asbestos) Regulations (L.N. of 1997)
3. The Waste Disposal Ordinance (Cap. 354)
4. "Code of Practice on Asbestos Control – Preparation of Asbestos Investigation Report, Asbestos Management Plan and Asbestos Abatement Plan" issued by the Secretary for Planning, Environment and Lands.
5. "Code of Practice on Asbestos Control –Asbestos Work Using Full Containment or Mini Containment Method" issued by the Secretary for Planning, Environment and Lands.
6. "Code of Practice on Asbestos Control – Asbestos Work Using Glove Bag Method" issued by the Secretary for Planning, Environment and Lands.
7. "Code of Practice on Asbestos Control –Safe Handling of Low Risk Asbestos Containing Material" issued by the Secretary for Planning, Environment and Lands.
8. "Code of Practice – Safety and Health at Work with Asbestos" issued by the Occupational Safety and Health Branch, Labour Department.
9. "Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste" issued by the Secretary for Planning, Environment and Lands.
10. Factories and Industrial Undertakings (Asbestos) (Approval of Respiratory Protective Equipment) Notice issued by Labour Department.