

DECOMMISSIONING AND DISPOSAL OF CLINICAL WASTE INCINERATORS AT BLOCK K, QUEEN MARY HOSPITAL WASTE MANAGEMENT PLAN

SEPTEMBER 18, 2018





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QUEEN MARY HOSPITAL

DATE: 18 SEPTEMBER 2018

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QUALITY MANAGEMENT

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SIGNATURES

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Comment	Response
(1) Section 3.1.7 - Noted that the ash belongs to Part A Chemical Waste, please indicate that EPD's Direction for disposal under section 17 of Waste Disposal Ordinance should be obtained prior to disposal.	Noted. Information has been incorporated into Section 3.1.7 and Section 4.5.1 of the revised WMP.
(2) Sections 3.4 and 4.5.7 - 4.5.9 - Please remove the parts on "Sewage" which is not relevant.	Sections 3.4 and 4.5.7 - 4.5.9 have been removed
(3) Tables 4.1 & 4.2 and Sections 4.3.8 & 4.5.3 - Please revise the relevant tables/sections to ensure the waste classifications are consistent. Please also be reminded that contaminated waste such as used HEPA filters, scabbled materials and the HEPA filtered materials should be handled and disposed of as chemical waste in accordance with the Waste Disposal (Chemical Waste)(General) Regulation (not under the Admission Ticket System).	Sections 4.3.8 and 4.5.3 have been revised accordingly.



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1 BASIC INFORMATION

1.1 PROJECT BACKGROUND

- 1.1.1 Established in 1937, Queen Mary Hospital (QMH) is a major acute hospital in the Hong Kong West Cluster (HKWC) of the Hospital Authority (HA), serving a population of over 531,000 in the Central and Western and Southern Districts as well as treating many patients in other geographical districts in Hong Kong. It provides a full range of acute and tertiary services, including 24-hour Accident and Emergency (A&E) services, in-patient services, ambulatory care and rehabilitation services, as well as specialist services covering a wide range of specialties and subspecialties for the residents.
- 1.1.2 Being the teaching hospital of the Li Ka Shing Faculty of Medicine of The University of Hong Kong, QMH is responsible for providing professional clinical training, pioneering innovative technology, and conducting clinical trials for new treatment modalities. In addition, QMH serves as a tertiary and quaternary referral centre for many complex and advanced services such as organ transplant, neonatal intensive care, coronary care, burns and reconstructive surgery and neurosurgery, for the entire territory. Since July 2003, QMH has become the only designated liver transplant centre in Hong Kong to provide world-class standard liver transplant service. The A&E Department of QMH has been designated as one of the five trauma centres in the territory.
- 1.1.3 The redevelopment plan, featuring the use of QMH's northern site to fit the hospital's future service model as an academic health sciences center, involves the decanting of existing facilities of the north end of QMH complex to the ex-Senior Staff Quarters (SSQ) (which had been converted to and renamed as Block T). It presents a golden opportunity to enable the hospital to enhance its role as a premier teaching hospital, as well as further improving the hospital environment for our patients, medical students, academic partners and colleagues.
- 1.1.4 The Phase 1 Redevelopment Project of Queen Mary Hospital is conducted in two stages:
- Stage I Preparatory Works:
- Conversion works at the vacated SSQ (renamed as Block T)
 - Construction of a link bridge connecting Block T and the buildings in the hospital complex
 - Road widening works within the hospital boundary
- Stage II Main Works:
- Demolition of Clinical Pathology Building (CPB) and Housemen Quarters (HQ) of QMH as well as University Pathology Building of The University of Hong Kong (UPB)
 - Construction of New Block
 - Provision of an additional access road
 - Construction of a proposed rooftop helipad
- 1.1.5 As part of the preparatory works for Redevelopment of QMH-Phase 1, it was proposed to decommission and dispose of the abandoned clinical waste incinerators and associated chimneys in Block K, QMH, in 2 phases. Since the proposed decommissioning works constitute a designated project under Item 3, Part 2, Schedule 2 of EIAO, an application for Environmental Permit (EP) for the works were submitted to EPD and an EP (i.e. EP-545/2017) was subsequently issued for the proposed works.
- 1.1.6 During the implementation of preparatory works for the Phase 1 Redevelopment Project of QMH, another abandoned clinical waste incinerator in the UPB was identified when the building was being vacated.
- 1.1.7 University Pathology Building (UPB) is part of The University of Hong Kong and is located within the Queen Mary Hospital (QMH), 102 Pok Fu Lam Road on Hong Kong Island. One (1) abandoned waste

incinerator is found in 5/F with one (1) associated chimney from the ceiling of Incinerator Room, 5/F to the Rooftop of UPB.

- 1.1.8 As part of the preparatory works for Phase 1 Redevelopment Project of QMH, it is required to decommission and dispose of the existing clinical waste incinerator at Incinerator Room at 5/F of UPB and associated chimney.
- 1.1.9 Queen Mary Hospital is located in 102 Pok Fu Lam Road on Hong Kong Island. **Figure 1.1** shows the location of the Queen Mary Hospital and the QMH Phase 1 Redevelopment Project boundary.
- 1.1.10 The clinical waste incinerator is located at the Incinerator Room at 5/F of the UPB. The floor area of the Incinerator Room is approximately 5.8m² (1.5m (D) x 3.8m (W)). The layout plan of 5/F of UPB and the layout of the Incinerator Room are presented in **Figure 1.2**. The chimney of the incinerator is located at the rooftop of UPB. The chimney is approximately 7m in height, 0.3m in diameter and is directly connected to the incinerator at 5/F of UPB. **Figure 1.3** shows the layout of the rooftop of UPB with the incinerator's chimney.
- 1.1.11 The incinerator at the Incinerator Room is approximately 1.28m³ (0.75m (W) x 1.7m (H) x 1m (D)) and consists of one combustion chamber with a furnace capacity of approximately 0.375m³. The incinerator is driven by Towngas with a maximum thermal throughput of 135kW.

1.2 OBJECTIVES

- 1.2.1 The requirement for a WMP is stated in Part C, Condition 2.20 of the Environmental Permit EP-545/2017/A dated 12 September 2018 as follows: "a Waste Management Plan (WMP) shall be submitted to the Director for approval within two weeks before commencement of the decommissioning works. The WMP shall include but not limited to the following information:
 - (i) the findings of the residual ash investigation and asbestos investigation;
 - (ii) the types and volume of wastes to be covered;
 - (iii) the types and volume of materials that could be recycled and reused;
 - (iv) location of the disposal site(s) for various types of wastes;
 - (v) the recommended mitigation measures to minimize the potential environmental nuisance that may arise from disposal of wastes".

1.3 LEGISLATION AND REQUIREMENTS

- 1.3.1 The relevant legislation and associated guidance notes applicable to the study for the assessment of wastes management implications include:
 - Waste Disposal Ordinance (Cap. 354) and subsidiary Regulations;
 - Air Pollution Control Ordinance (Cap. 311);
 - Code of Practice on Asbestos Control – Preparation of Asbestos Investigation Report, Asbestos Management Plan and Asbestos Abatement Plan, EPD;
 - Gazette Notice 25/1997 - GN 3021 and GN 3022;
 - Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C);
 - Environmental Impact Assessment Ordinance (EIAO) (Cap. 499) and subsidiary Regulations;
 - Land (Miscellaneous Provisions) Ordinance (Cap. 28);
 - Public Health and Municipal Services Ordinance (Cap. 132);
 - Hong Kong Planning Standards and Guidelines (HKPSG), Chapter 9 – Environment;
 - A Policy Framework for the Management of Municipal Solid Waste (2005 – 2014);
 - Hong Kong Blueprint for Sustainable Use of Resources 2013–2022, 2013, the Environment Bureau;

- Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, EPD (1992);
- Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TC (W)) No. 33/2002 Management of Construction and Demolition Material Including Rock;
- ETWB TC(W) No.31/2004 Trip Ticket System for Disposal of Construction and Demolition Materials; and
- WBTC Nos.25/99, 25/99A and 25/99C. Incorporation of Information on Construction and Demolition Material Management in Public Works Subcommittee Papers.

2 DEMOLITION MATERIALS

2.1 IDENTIFICATION OF WASTE SOURCES

2.1.1 One clinical waste incinerator at Incinerator Room, 5/F of UPB, and one associated chimney from the ceiling of Incinerator Room, 5/F to the Rooftop of UPB will be decommissioned and demolished. The opening of the demolished chimney at the rooftop will be sealed up to minimise the entry of rainwater. All works will be carried out inside the Incineration Room and the rooftop under full containment to avoid the release of any residual ash to the environment.

2.1.2 The items to be disposed of are summarised in **Table 2.1** and shown in **Figure 2.1**.

Table 2.1 Items to be Disposed of

Item No.	Description
1.1	Incinerator units
1.2	Wall-mounted control panel for incinerator
1.3	Steel framework, inner and outer steel shell of chimney
1.4	Insulation materials of the chimney

2.1.3 A list of substances or chemicals (in any form, quantity and concentration), including asbestos, dioxins, polychlorinated biphenyls (PCBs) and heavy metals (HMs), is specified under *Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation of the Waste Disposal Ordinance (WDO)* that would cause pollution or constitute a danger to health or risk of pollution to the environment. Potential chemical wastes to be generated from the decommissioning and demolition of the incinerator and associated chimney include residual ash and asbestos-containing materials.

2.1.4 The key environmental impacts are associated with the residual ash remaining in the incinerator unit and ash collector. Ash sampling and analysis were undertaken to identify the associated risks and enable environmental protection and mitigation measures to be proposed accordingly.

3 WASTE INVESTIGATIONS

3.1 RESIDUAL ASH

- 3.1.1 Visual inspection of the clinical waste incinerator site was conducted on 13 August 2018.
- 3.1.2 To establish the conditions in relation to the residual ash, and there was sufficient residual ash inside the combustion chamber and from the bottom of combustion chamber, detailed ash sampling was undertaken on 21 August 2018. There is no residual ash found inside other parts of the incinerator and chimney.
- 3.1.3 The contamination confirmatory investigation was undertaken by a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory to examine the levels of Dioxins, Polychlorinated Biphenyls (PCBs), Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs), Petroleum Carbon Ranges (PCR) and Heavy Metals (HMs) in the residual ash.
- 3.1.4 The sampling location is summarised in **Table 3.1**. One (1) sample of residual ash was collected from the incinerator combustion chamber. The residual ash sample was tested for Dioxins, PCBs, VOCs, SVOCs, PCR and HMs.

Table 3.1 Ash Sampling Locations

Ash Sampling	Location
Residual Ash	Bottom of combustion chamber of Incinerator

- 3.1.5 All PCBs, VOCs and SVOCs were not detected in the ash sample. **Tables 3.2** and **3.3** list the results of the HMs, PCBs and Dioxins analysis. Detailed analytical results are presented in **Appendix 3.1**.

Table 3.2 Heavy Metals (HMs) Analysis of Residual Ash Samples

Parameter	Reporting Limit (mg/kg)	Sampling Result (mg/kg)
		Residual Ash
Antimony	1	17
Arsenic	1	6
Barium	1	605
Cadmium	0.2	4.8
Cobalt	1	5.9
Copper	1	217
Lead	1	160
Manganese	1	1000
Mercury	0.05	<0.05
Molybdenum	1	24
Nickel	1	42
Tin	1	6.6
Zinc	1	1730
Chromium III	1	68.7
Chromium VI	1	<1
Chemical Waste*		Yes

Note: * Classification in accordance with Part B Chemical Waste under Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation

Table 3.3 Polychlorinated Biphenyls (PCBs) and Dioxins Analysis of Residual Ash Samples

Parameter	Reporting Limit (mg/kg)	Sampling Result
		Residual Ash
Dioxins (I-TEQ)	-	0.0075 ng/g
PCBs	0.1	<0.1 mg/kg
Chemical Waste*		Yes

Note: * Classification in accordance with Part A Chemical Waste under Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation

- 3.1.6 As shown in **Tables 3.2 – 3.3**, Residual Ash sample was found to contain heavy metals and dioxin.
- 3.1.7 In summary, the ash belongs to Part A Chemical Waste under Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation. Protective measures would be required when the incinerator is demolished. EPD's Direction for disposal under Section 17 of Waste Disposal Ordinance should be obtained prior to the disposal of Part A Chemical Waste.
- 3.1.8 As the incinerator was operated for a short time after installation, it is expected that residual ash deposited inside the incinerator unit is minimal. The estimated total volume of contaminated residual ash to be removed for the incinerator is about 0.04m³.

3.2 ASBESTOS-CONTAINING MATERIALS

- 3.2.1 An asbestos assessment was undertaken on 23 August, 2018 by a Registered Asbestos Consultant. The Asbestos Investigation Report (AIR) is presented in **Appendix 3.2**.
- 3.2.2 Asbestos inspections were conducted for the incinerator and the associated materials including the exhaust chimney, brick to door of incinerator, brick inside the incinerator and door seal.
- 3.2.3 Four (4) potential asbestos-containing materials (ACMs) were collected for asbestos analysis, including two door seal samples, brick to door of incinerator and brick inside incinerator.
- 3.2.4 No ACMs were identified in the survey related to the incinerator and associated chimney in the UPB. Hence, no ACMs generated from the demolition works of incinerator on 5/F and the associated chimney at the Rooftop of UPB is anticipated.

3.3 CHIMNEY

- 3.3.1 There was no ash deposited inside the chimney. It is estimated that 1.6m³ of steel framework and outer steel shell would be generated from the demolition of the chimney.

4 WASTE MANAGEMENT

4.1 MANAGEMENT APPROACH

4.1.1 The demolition works shall adopt a waste management hierarchy. The waste management options will be categorised for the preference from an environmental viewpoint. The options considered to be preferable have the least environmental impacts. The hierarchy is as follows:

- Highest priority – Avoidance and minimisation;
- Reuse of materials;
- Recovery and recycling; and
- Lowest priority – Treatment and disposal.

4.2 ESTIMATES OF WASTES GENERATION

4.2.1 **Table 4.1** summarised the estimated quantity and type of waste to be generated from the demolition works of the incinerator and associated chimney at UPB.

Table 4.1 Summary of Demolished and Disposed Items for the Project

Type of Waste	Demolished and Disposed Item	Estimated Quantity
Chemical Waste	Residual ash	0.04 m ³
	Used HEPA filters, scabbled materials and the HEPA filtered materials	1m ³
	Combustion chamber and outer shell panels, polythene wrapping sheets, used PPE, waste generated from the dismantling work of the containment at Incinerator Room and cloths used for wet wiping	5m ³
	Wastes generated in demolition of chimney including inner steel shell, insulation materials, used PPE, waste generated from the dismantling work and cloths used for wet wiping	5m ³
General Waste	Wall-mounted control panel	0.3m ³
	Steel framework and outer steel shell of chimney	1.6m ³

4.3 WASTE REDUCTION

4.3.1 Decommissioning of the incinerator and chimney shall be conducted under full containment to avoid the release of any residual ash to the environment, which could be generated during the decommissioning works. All openings shall be sealed with three-layers of fire retardant polythene sheets. The following sections detail the approach.

Demolition Works

4.3.2 The residual ash inside the incinerator shall be removed by scabbling. All inner walls of incinerator shall be cleaned using a High Efficiency Particulate Air (HEPA) vacuum cleaner and the wet wipes. The scabbled material and the filtered materials from the HEPA vacuum cleaner shall be packed on site and stored in polythene-lined steel drums for disposal of at the designated treatment facility. The

collection, transportation and disposal of chemical waste should be carried out by licensed waste collector monitored by the Trip Ticket System.

- 4.3.3 The chimney shall be dismantled to manageable size from the top down starting from the rooftop area. Inner and outer steel shells shall be separated from insulation materials in the detached sections of the chimney before disposed of.
- 4.3.4 The detached sections of the incinerator and associated chimney shall be wet wiped before wrapping them with three layers of fire retardant polythene with a third layer secured with duct tape, and segregated from the chemical waste.
- 4.3.5 The insulation-lined combustion furnace shall be dismantled to manageable size and wet wiped before wrapping them with three layers of fire retardant polythene with a third layer secured with duct tape.
- 4.3.6 All outer layers of polythene sheets shall be decontaminated by wet wipes before leaving the work area.
- 4.3.7 All workers shall wear full PPE which should include disposable protective overall (such as Tyvek) with hood, nitrile gloves, shoe covers, and full-face positive pressure respirators equipped with a combination cartridge that filters particulate and removes organic vapour.
- 4.3.8 Following the completion of the demolition work, all surfaces in the incinerator room shall be decontaminated by HEPA vacuuming and wet wiping. Then the innermost polythene sheet shall be sprayed with Polyvinyl Alcohol (PVA) and upon drying, the inner polythene sheet shall be peeled off. The PVA decontamination process shall then be repeated for the second and third layers of the polythene sheets. All polythene sheets used shall be handled and disposed of as chemical waste in accordance with the Waste Disposal (Chemical Waste)(General) Regulation.

4.4 POSSIBLE RECYCLING AND REUSE OF MATERIALS

Waste Generated from Demolition of Chimney at Rooftop

- 4.4.1 Waste generated from demolition of chimney including steel framework and outer steel shell will be cut to smaller pieces and recycled. It is estimated that 1.6m³ of steel framework and outer steel shell would be recycled.

Waste Generated from Demolition Works at Incinerator Room

- 4.4.2 As there is no evidence to confirm that all the deposited/contaminated ash inside the incinerator unit, chimney, etc. can be completely removed by the vacuum cleaner/wet wiping, it seems not justified that part of the incinerator unit/ chimney can be recycled. Only the wall-mounted control panel in the Incinerator Room would be recycled.

4.5 WASTE DISPOSAL

Chemical Waste

- 4.5.1 EPD's Direction for disposal under Section 17 of Waste Disposal Ordinance should be obtained prior to the disposal of the chemical waste belongs to Part A Chemical Waste under Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation.
- 4.5.2 All chemical waste should be handled and disposed of in accordance with the Air Pollution Control Ordinance and the Waste Disposal Ordinance as appropriate, and agreement from the relevant disposal facilities should be sought prior to disposal of such waste.
- 4.5.3 All residual ash collected from the incinerator, used HEPA filters, scabbled materials and the HEPA filtered materials shall be disposed of at Chemical Waste Treatment Centre (CWTC). For the disposal of chemical waste produced from the Project, the Specialist Contractor is required to register with the EPD as a Chemical Waste Producer and to follow the requirements stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes shall be used. Appropriate labels shall be affixed securely on each chemical waste container indicating the chemical characteristics of the chemical waste, such as explosives, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. The Specialist Contractor should engage a licensed waste collector to collect, transport and disposed of the chemical wastes in accordance with the *Waste*

Disposal (Chemical Waste) (General) Regulation of WDO under the monitoring of the Trip Ticket System.

- 4.5.4 Other wastes such as the combustion chamber, outer shell panels and chimney, polythene wrapping sheets, used PPE, waste generated from the dismantling work of the containment and cloths used for wet wiping are considered as chemical wastes and shall be stored in appropriate containers such as drums and jerricans for disposal of at designated landfill site. As there is no evidence to confirm that all the deposited/contaminated ash inside the incinerator unit, chimney, etc. can be completely removed by the vacuum cleaner/wet wiping, it seems not justified that part of the incinerator unit/ chimney can be recycled. The combustion chamber is constructed with refractory bricks which will be removed individually and the outer steel shell will be cut to smaller pieces for disposal at designated landfill.
- 4.5.5 Wastes generated in demolition of chimney including inner steel shell, insulation materials, used PPE, waste generated from the dismantling work and cloths used for wet wiping are considered as chemical wastes and shall be stored in appropriate containers such as drums and jerricans for disposal of at designated landfill site. It is estimated that 5m³ of waste would be generated.
- 4.5.6 With the implementation of the recommended mitigation measures, no adverse environmental impacts arising from disposal of wastes are anticipated.
- 4.5.7 **Table 4.2** summarises items that will be demolished and disposed for the Project and their proposed outlets.

Table 4.2 Summary of Demolished and Disposed Items for the Project and Their Proposed Outlets

Item No.	Demolished and Disposed Item	Estimated Quantity	Proposed Outlet
1.	Residual ash	0.04 m ³	CWTC
2.	Used HEPA filters, scabbled materials and the HEPA filtered materials	1m ³	CWTC
3.	Combustion chamber, outer shell panels and chimney ⁽¹⁾ , polythene wrapping sheets, used PPE, waste generated from the dismantling work of the containment at Incinerator Room and cloths used for wet wiping	5m ³	Designated Landfill ⁽²⁾
4.	Wastes generated in demolition of chimney including inner steel shell, insulation materials, used PPE, waste generated from the dismantling work and cloths used for wet wiping	5m ³	Designated Landfill ⁽²⁾
5.	Wall-mounted control panel	0.3m ³	Recycler listed under Hong Kong Waste Reduction Website
6.	Steel framework and outer steel shell of chimney	1.6m ³	Recycler listed under Hong Kong Waste Reduction Website

Notes:

(1) The combustion chamber is constructed with refractory bricks which will be removed individually and the outer steel shell will be cut to smaller pieces for disposal at designated landfill.

(2) As there is no evidence to confirm that all the deposited/contaminated ash inside the incinerator unit, chimney, etc. can be completely removed by the vacuum cleaner/wet wiping, it seems not justified that part of the incinerator unit/ chimney can be recycled.

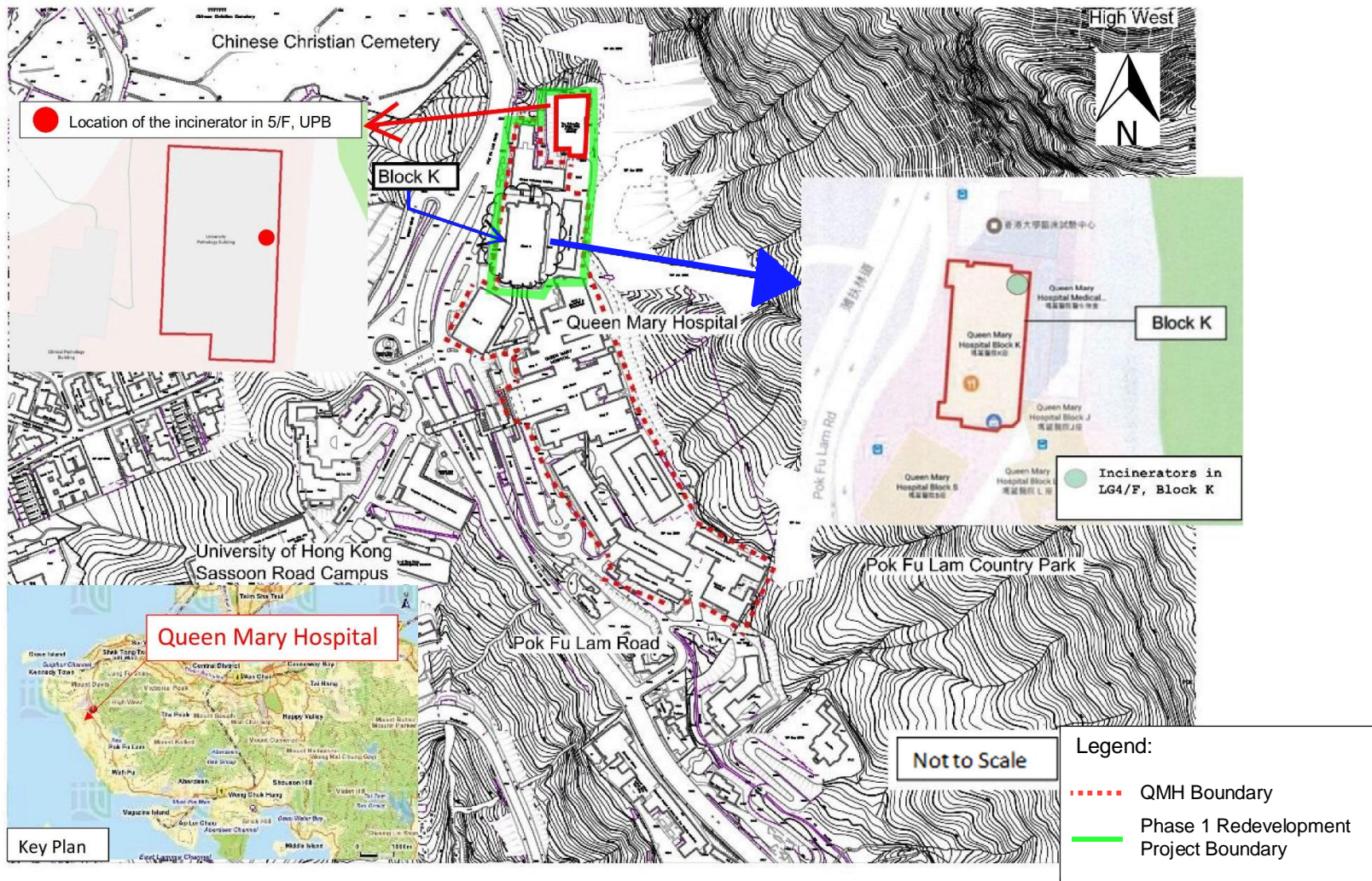
5 AUDIT REQUIREMENTS

- 5.1.1 Environmental site audit should be conducted by an Independent Environmental Checker (IEC) during decommissioning and demolition works to check, review, verify and validate the overall environmental performance of the project, including the implementation of the WMP.
- 5.1.2 The following audit procedures should be adopted:
- To ensure the wastes are handled, collected, stored and disposed of in compliance with this WMP and relevant regulations;
 - To instruct the Contractor when action is required to reduce or prevent any impacts; and
 - To prepare a summary of the environmental performance of the Contractor on completion of the Project.

6 WASTE MANAGEMENT RECORDS

- 6.1.1 The collection, transportation and disposal of chemical waste generated from the demolition works shall be carried out by licensed waste collector monitored by the Trip Ticket System. For every trip transporting waste off-site to the designated landfill or treatment centre, a waste disposal record should be produced and prepared for checking by the IEC.
- 6.1.2 The waste disposal records should include the following:
- Nature and type of wastes;
 - Quantities of wastes;
 - Waste Collector; and
 - Reception point.
- 6.1.3 A summary of the environmental performance of the Contractor including the waste disposal records would be prepared by the IEC on completion of the Project for submission to EPD.

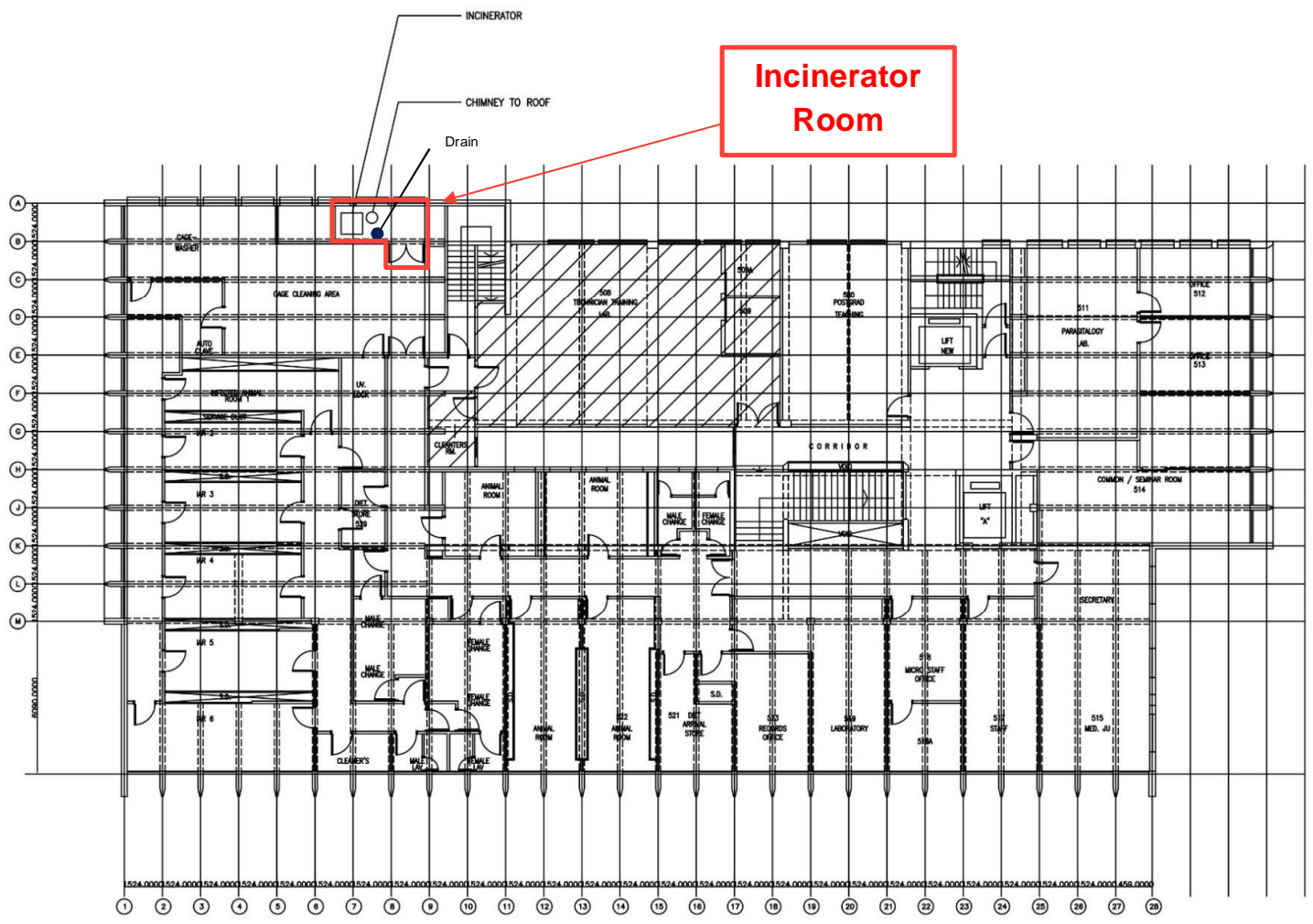
FIGURES



Layout Plan of the Incinerator Room with the Study Area

Figure
1.1

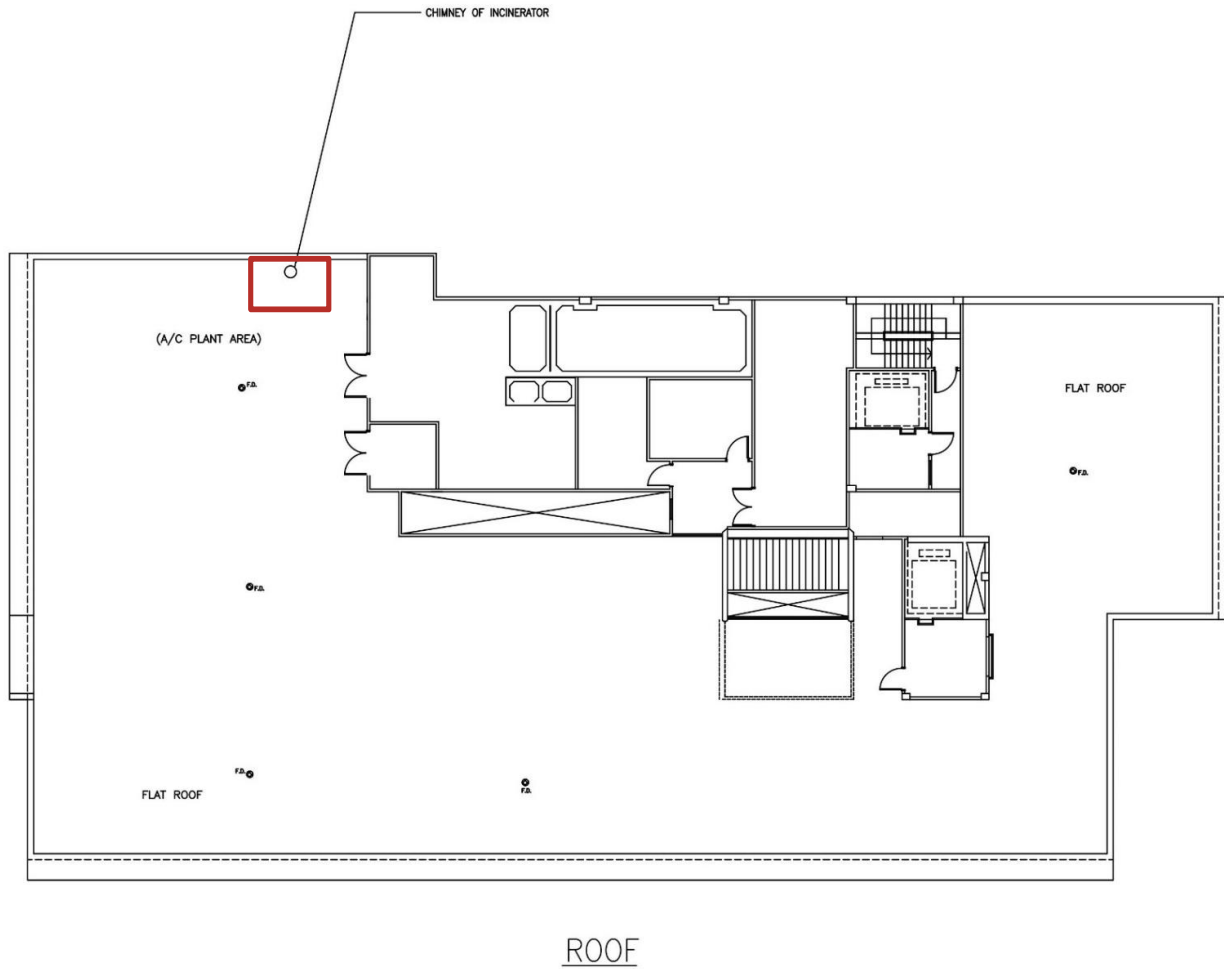




5/F Plan of UPB Showing the Location of the Incinerator Room

Figure
1.2

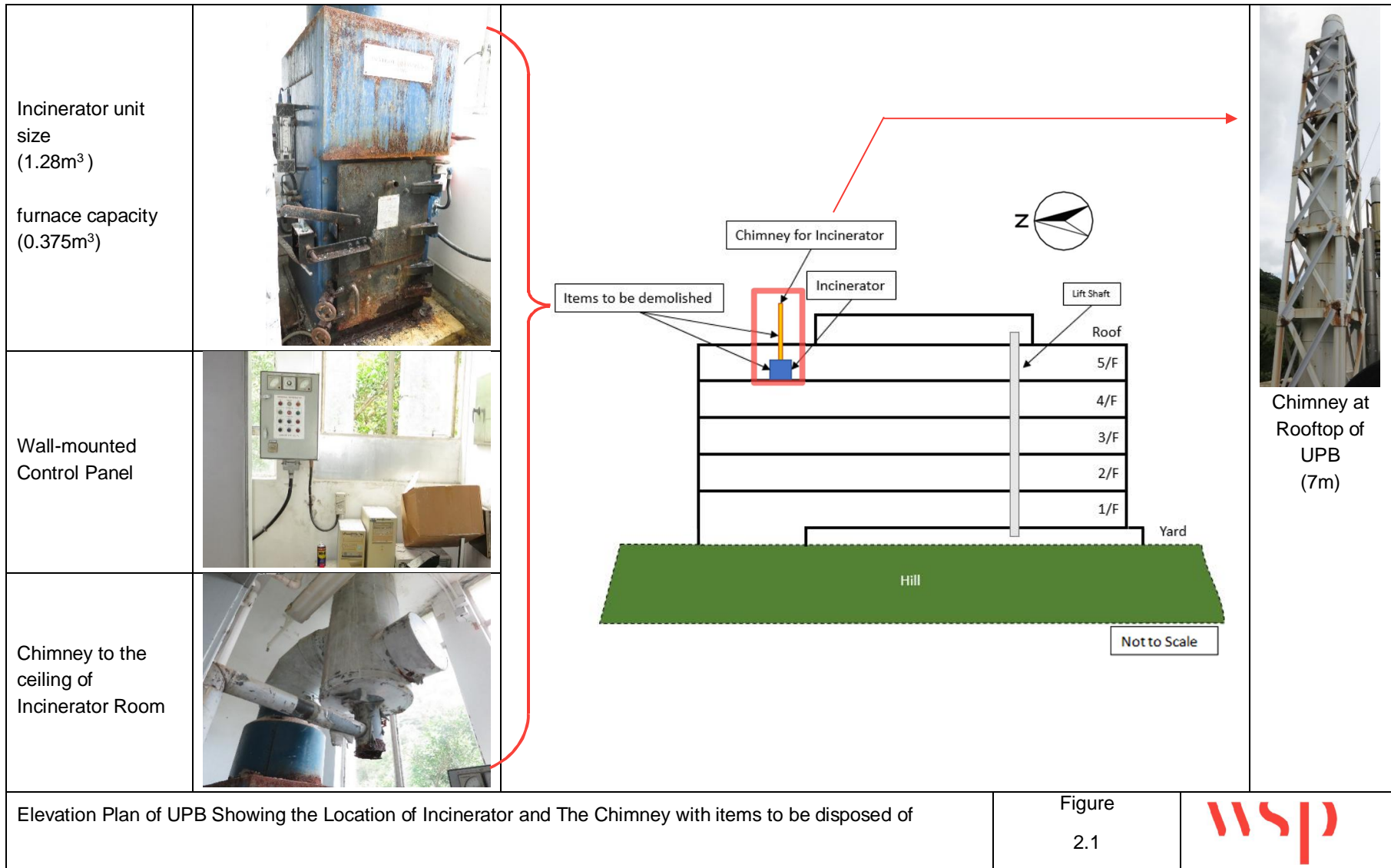




Rooftop Plan of UPB Showing the Location of the Chimney of Incinerator

Figure
1.3





APPENDIX

3.1

RESIDUAL ASH ASSESSMENT REPORT



ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR ALEX CHEUNG	WORK ORDER	: HK1845598
CLIENT	: WSP (ASIA) LIMITED		
ADDRESS	: 7/F ONE KOWLOON, 1 WANG YUEN STREET, KOWLOON BAY, KOWLOON, HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 21-AUG-2018
		DATE OF ISSUE	: 1-SEP-2018
PROJECT	: RBRG	NO. OF SAMPLES	: 1
		CLIENT ORDER	:

General Comments

- Sample(s) were received in ambient condition.
- Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.
- Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.
- Dioxins was subcontracted to and analysed by ALS Czech Republic.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories

Position

Richard Fung  General Manager

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the **ALS Laboratory Group**

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WORK ORDER : HK1845598
SUB-BATCH : 1
CLIENT : WSP (ASIA) LIMITED
PROJECT : RBRG



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1845598-001	UPB_Ash	ASH	21-Aug-2018 13:50	PR1885397-001



CERTIFICATE OF ANALYSIS

Work Order	: PR1885397	Issue Date	: 31-Aug-2018
Customer	: ALS Technichem (HK) Pty Ltd.	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: Mannix Chan	Contact	: Client Service
Address	: 11/F, Chung Shun Knitting Centre 1-3 Wing Yip Street Kwai Chung Hong Kong	Address	: Na Harfe 336/9 Prague 9 - Vysocany 190 00 Czech Republic
E-mail	: mannix.chan@alsglobal.com	E-mail	: customer.support@alsglobal.com
Telephone	: ----	Telephone	: +420 226 226 228
Facsimile	: ----	Facsimile	: +420 284 081 635
Project	: ----	Page	: 1 of 2
Order number	:	Date Samples	: 28-Aug-2018
C-O-C number	: ----	Received	
Site	: ----	Quote number	: PR2011ALSTE-HK0268 (CZ-251-18-0460)
Sampled by	: client	Date of test	: 29-Aug-2018 - 31-Aug-2018
		QC Level	: ALS CR Standard Quality Control Schedule

General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory.
The laboratory declares that the test results relate only to the listed samples.

Responsible for accuracy

Signatories
Zdeněk Jiráček

Position
Environmental Business Unit
Manager

Testing Laboratory No. 1163
Accredited by CAI according to
CSN EN ISO/IEC 17025:2005





Analytical Results

Sub-Matrix: ASH				Client sample ID		Laboratory sample ID		Client sampling date / time	
				HK1845598-001		UPB-Ash		PR1885397-001	
				21-Aug-2018 13:50					
Parameter	Method	LOR	Unit	Result	MU	Result	MU	Result	MU
Physical Parameters									
Dry matter @ 105°C	S-DRY-GRCI	0.10	%	89.0	± 6.0%	----	----	----	----
PCDDs and PCDFs (Dioxins and Furans)									
2378-TCDD	S-DFHMS01	-	ng/g DW	<0.0013	----	----	----	----	----
12378-PeCDD	S-DFHMS01	-	ng/g DW	<0.0022	----	----	----	----	----
123478-HxCDD	S-DFHMS01	-	ng/g DW	<0.0025	----	----	----	----	----
123678-HxCDD	S-DFHMS01	-	ng/g DW	<0.0025	----	----	----	----	----
123789-HxCDD	S-DFHMS01	-	ng/g DW	<0.0025	----	----	----	----	----
1234678-HpCDD	S-DFHMS01	-	ng/g DW	0.0490	± 30.0%	----	----	----	----
OCDD	S-DFHMS01	-	ng/g DW	0.210	± 30.0%	----	----	----	----
2378-TCDF	S-DFHMS01	-	ng/g DW	<0.016	----	----	----	----	----
12378-PeCDF	S-DFHMS01	-	ng/g DW	<0.001	----	----	----	----	----
23478-PeCDF	S-DFHMS01	-	ng/g DW	<0.001	----	----	----	----	----
123478-HxCDF	S-DFHMS01	-	ng/g DW	<0.0016	----	----	----	----	----
123678-HxCDF	S-DFHMS01	-	ng/g DW	<0.0016	----	----	----	----	----
123789-HxCDF	S-DFHMS01	-	ng/g DW	<0.0016	----	----	----	----	----
234678-HxCDF	S-DFHMS01	-	ng/g DW	<0.0016	----	----	----	----	----
1234678-HpCDF	S-DFHMS01	-	ng/g DW	<0.058	----	----	----	----	----
1234789-HpCDF	S-DFHMS01	-	ng/g DW	<0.029	----	----	----	----	----
OCDF	S-DFHMS01	-	ng/g DW	<0.041	----	----	----	----	----
TEQ-Lowerbound	S-DFHMS01	-	ng/g DW	0.0007	----	----	----	----	----
TEQ-Upperbound	S-DFHMS01	-	ng/g DW	0.0075	----	----	----	----	----

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, delivery date in brackets without a time component will be displayed instead. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.

Key: LOR = Limit of reporting; MU = Measurement Uncertainty

The end of result part of the certificate of analysis

Brief Method Summaries

Analytical Methods	Method Descriptions
Location of test performance: V Raji 906 Pardubice - Zelene Predmesti Czech Republic 530 02	
S-DFHMS01	CZ_SOP_D06_06_175 - except chap. 10.2.3.1, 10.2.3.7, 10.2.3.8, 10.2.5 (US EPA 1613B, CSN P CEN/TS 16190): Determination of tetra- to octa-chlorinated dioxins and furanes by isotope dilution method using HRGC-HRMS and calculation of TEQ parameters from measured values. The samples were stored in laboratory in the darkness and under temperature <4°C. Actual LOQ are noticed in the annex.
S-DRY-GRCI	CZ_SOP_D06_01_045 (CSN ISO 11465, CSN EN 12880, CSN EN 14346), CZ_SOP_D06_07_046 (CSN ISO 11465, CSN EN 12880, CSN EN 14346, CSN 46 5735) Determination of dry matter by gravimetry and determination of moisture by calculation from measured values.

A '*' symbol preceding any method indicates laboratory or subcontractor non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information. If the report contains subcontracted analysis, those are made in a subcontracted laboratory outside the laboratories ALS Czech Republic, s.r.o.

The calculation methods of summation parameters are available on request in the client service.



Attachment no. 1 to the Certificate of Analysis for work order PR1885397

Sample:

HK1845598-001 UPB-Ash

ALS SAMPLE ID: PR1885397/ 001

Measurement results PCDD/Fs:

Sample: HK1845598-001 UPB-Ash					
			Final extract [μ l]:	75	
Sample weight [g]:	1.779		Injection volume [μ l]:	4	
Dry matter [%]:	89		Acquisition date [d.m.y]:	30.8.2018	
2,3,7,8-PCDD/Fs	Result [ng/g dw]	Limit of Detection [ng/g dw]	Limit of Quantification [ng/g dw]	¹ I-TEFs	I-TEQ Upperbound [ng/g dw]
2,3,7,8-TCDD	< 0.0013	0.0013	0.0026	1	0.0013
1,2,3,7,8-PeCDD	< 0.0022	0.0022	0.0044	0.5	0.0011
1,2,3,4,7,8-HxCDD	< 0.0025	0.0025	0.005	0.1	0.00025
1,2,3,6,7,8-HxCDD	< 0.0025	0.0025	0.005	0.1	0.00025
1,2,3,7,8,9-HxCDD	< 0.0025	0.0025	0.005	0.1	0.00025
1,2,3,4,6,7,8-HpCDD	0.049	0.0023	0.0046	0.01	0.00049
OCDD	0.21	0.0035	0.0071	0.001	0.00021
2,3,7,8-TCDF	< 0.016	0.0079	0.016	0.1	0.0016
1,2,3,7,8-PeCDF	< 0.001	0.001	0.002	0.05	0.000051
2,3,4,7,8-PeCDF	< 0.001	0.001	0.002	0.5	0.00051
1,2,3,4,7,8-HxCDF	< 0.0016	0.0016	0.0032	0.1	0.00016
1,2,3,6,7,8-HxCDF	< 0.0016	0.0016	0.0032	0.1	0.00016
1,2,3,7,8,9-HxCDF	< 0.0016	0.0016	0.0032	0.1	0.00016
2,3,4,6,7,8-HxCDF	< 0.0016	0.0016	0.0032	0.1	0.00016
1,2,3,4,6,7,8-HpCDF	< 0.058	0.029	0.058	0.01	0.00058
1,2,3,4,7,8,9-HpCDF	< 0.029	0.029	0.058	0.01	0.00029
OCDF	< 0.041	0.02	0.041	0.001	0.000041
I-TEQ from quantified 2,3,7,8-PCDD/Fs - "Lowerbound"					0.0007
I-TEQ from 2,3,7,8-PCDD/Fs -, "Mediumbound"					0.0041
Maximum possible I-TEQ - "Upperbound"					0.0075
PCDDs	Result [ng/g dw]		PCDFs	Result [ng/g dw]	
Tetra-CDDs	< 0.028		Tetra-CDFs	< 0.3	
Penta-CDDs	< 0.031		Penta-CDFs	< 0.028	
Hexa-CDDs	< 0.025		Hexa-CDFs	< 0.026	
Hepta-CDDs	0.086		Hepta-CDFs	< 0.12	
OCDD	0.21		OCDF	< 0.041	

¹I-TEF according to NATO.

The limit of quantification is defined as double of the detection limit.

The limit of detection is defined as the amount of analyte producing a signal with $S/N \geq 3$.

The value of detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double ($k=2$) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked "<" are below limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 2017/644 and EN 1948-4.

"Mediumbound" is levels defined in Regulation 2017/644.



CERTIFICATE OF ANALYSIS

Client	: WSP (ASIA) LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 13
Contact	: MR ALEX CHEUNG	Contact	: Richard Fung	Work Order	: HK1845598
Address	: 7/F ONE KOWLOON, 1 WANG YUEN STREET, KOWLOON BAY, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	Amendment	: 1
E-mail	: alex.wh.cheung@wsp.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3900 2021	Telephone	: +852 2610 1044	Date Samples Received	: 21-Aug-2018
Facsimile	: +852 2856 9902	Facsimile	: +852 2610 2021	Issue Date	: 12-Sep-2018
Project	: HKU UPB INCINERATOR			No. of samples received	: 1
Order number	:	Quote number	: HKE/1415a/2017	No. of samples analysed	: 1
C-O-C number	: H029972				
Site	: UPB AT QMH				

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Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

<i>Signatories</i>	<i>Position</i>	<i>Authorised results for</i>
Anh Ngoc Huynh .	Senior Chemist	Organics
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Wong Wing , Kenneth	Manager - Metals	Metals



General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 21-Aug-2018 to 11-Sep-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1845598

Sample(s) were received in ambient condition.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Dioxins was subcontracted to and analysed by ALS Czech Republic.



Analytical Results

Sub-Matrix: ASH

Client sample ID

Client sampling date / time

				UPB_Ash	---	---	---	---
				21-Aug-2018 13:50	---	---	---	---
Compound	CAS Number	LOR	Unit	HK1845598-001	---	---	---	---
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	14.9	---	---	---	---
EG: Metals and Major Cations								
EG020: Antimony	7440-36-0	1	mg/kg	17	---	---	---	---
EG020: Arsenic	7440-38-2	1	mg/kg	6	---	---	---	---
EG020: Barium	7440-39-3	1.0	mg/kg	605	---	---	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	4.8	---	---	---	---
EG020: Cobalt	7440-48-4	1.0	mg/kg	5.9	---	---	---	---
EG020: Copper	7440-50-8	1	mg/kg	217	---	---	---	---
EG020: Lead	7439-92-1	1	mg/kg	160	---	---	---	---
EG020: Manganese	7439-96-5	1.0	mg/kg	1000	---	---	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	---	---	---	---
EG020: Molybdenum	7439-98-7	1	mg/kg	24	---	---	---	---
EG020: Nickel	7440-02-0	1	mg/kg	42	---	---	---	---
EG020: Tin	7440-31-5	1.0	mg/kg	6.6	---	---	---	---
EG020: Zinc	7440-66-6	1	mg/kg	1730	---	---	---	---
EG049: Trivalent Chromium	16065-83-1	1.0	mg/kg	68.7	---	---	---	---
EG3060: Hexavalent Chromium	18540-29-9	1.0	mg/kg	<1.0	---	---	---	---
EP-066: Polychlorinated Biphenyls								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	---	---	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)								
EP076HK: Naphthalene	91-20-3	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Acenaphthene	83-32-9	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Fluorene	86-73-7	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Phenanthrene	85-01-8	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Anthracene	120-12-7	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Fluoranthene	206-44-0	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Pyrene	129-00-0	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	---	---	---	---



Sub-Matrix: ASH				Client sample ID	UPB_Ash	---	---	---	---
				Client sampling date / time	21-Aug-2018 13:50	---	---	---	---
Compound	CAS Number	LOR	Unit	HK1845598-001	---	---	---	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued									
EP076HK: Chrysene	218-01-9	0.500	mg/kg	<0.500	---	---	---	---	---
EP076HK: Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	---	---	---	---	---
EP076HK: Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	---	---	---	---	---
EP076HK: Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	---	---	---	---	---
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	---	---	---	---	---
EP076HK: Dibenz(a,h)anthracene	53-70-3	0.500	mg/kg	<0.500	---	---	---	---	---
EP076HK: Benzo(g,h,i)perylene	191-24-2	0.500	mg/kg	<0.500	---	---	---	---	---
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate									
EP076HK: Phenol	108-95-2	0.50	mg/kg	<0.50	---	---	---	---	---
EP076HK: Hexachlorobenzene (HCB)	118-74-1	0.200	mg/kg	<0.200	---	---	---	---	---
EP076HK: Bis(2-ethylhexyl)phthalate	117-81-7	5.00	mg/kg	<5.00	---	---	---	---	---
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)									
EP070HK_SR: C6 - C8 Fraction	----	5	mg/kg	<5	---	---	---	---	---
EP071HK_SR: C9 - C16 Fraction	----	200	mg/kg	<200	---	---	---	---	---
EP071HK_SR: C17 - C35 Fraction	----	500	mg/kg	<500	---	---	---	---	---
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)									
EP074_SR: Benzene	71-43-2	0.2	mg/kg	<0.2	---	---	---	---	---
EP074_SR: Toluene	108-88-3	0.5	mg/kg	<0.5	---	---	---	---	---
EP074_SR: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	---	---	---	---	---
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	---	---	---	---	---
EP074_SR: Styrene	100-42-5	0.5	mg/kg	<0.5	---	---	---	---	---
EP074_SR: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	---	---	---	---	---
EP074_SR: Xylenes (Total)	----	2.0	mg/kg	<2.0	---	---	---	---	---
EP-074_SR-B: Oxygenated Compounds									
EP074_SR: 2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	---	---	---	---	---
EP074_SR: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	---	---	---	---	---
EP-074_SR-E: Halogenated Aliphatics									
EP074_SR: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	---	---	---	---	---
EP074_SR: Trichloroethene	79-01-6	0.1	mg/kg	<0.1	---	---	---	---	---



Sub-Matrix: ASH				Client sample ID	UPB_Ash	---	---	---	---
				Client sampling date / time	21-Aug-2018 13:50	---	---	---	---
Compound	CAS Number	LOR	Unit	HK1845598-001	---	---	---	---	---
EP-074_SR-E: Halogenated Aliphatics - Continued									
EP074_SR: Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	---	---	---	---	---
EP-074_SR-G: Trihalomethanes (THM)									
EP074_SR: Chloroform	67-66-3	0.04	mg/kg	<0.04	---	---	---	---	---
EP074_SR: Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	---	---	---	---	---
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	---	---	---	---	---
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%	99.7	---	---	---	---	---
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%	94.3	---	---	---	---	---
EP-066S: PCB Surrogate									
EP066: Tetrachlorometaxylene	877-09-8	0.1	%	118	---	---	---	---	---
EP066: Dibutylchloroendate	1770-80-5	0.1	%	105	---	---	---	---	---
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%	94.6	---	---	---	---	---
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%	101	---	---	---	---	---
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	100	---	---	---	---	---
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%	94.6	---	---	---	---	---
EP074_SR: Toluene-D8	2037-26-5	0.1	%	101	---	---	---	---	---
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	100	---	---	---	---	---



Laboratory Duplicate (DUP) Report

Matrix: SOIL

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1895744)								
HK1845598-001	UPB_Ash	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	14.9	14.1	5.70
EG: Metals and Major Cations (QC Lot: 1895564)								
HK1845598-001	UPB_Ash	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.00
		EG020: Cadmium	7440-43-9	0.2	mg/kg	4.8	5.1	5.50
		EG020: Barium	7440-39-3	0.5	mg/kg	605	618	2.24
		EG020: Cobalt	7440-48-4	0.5	mg/kg	5.9	7.0	16.9
		EG020: Manganese	7439-96-5	0.5	mg/kg	1000	1020	1.91
		EG020: Tin	7440-31-5	0.5	mg/kg	6.6	7.4	11.8
		EG020: Antimony	7440-36-0	1	mg/kg	17	18	0.00
		EG020: Arsenic	7440-38-2	1	mg/kg	6	7	0.00
		EG020: Copper	7440-50-8	1	mg/kg	217	221	1.63
		EG020: Lead	7439-92-1	1	mg/kg	160	167	3.81
		EG020: Molybdenum	7439-98-7	1	mg/kg	24	27	12.8
EG020: Nickel	7440-02-0	1	mg/kg	42	45	6.47		
EG020: Zinc	7440-66-6	1	mg/kg	1730	1700	1.91		
EG: Metals and Major Cations (QC Lot: 1904581)								
HK1845814-001	Anonymous	EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.00
EP-066: Polychlorinated Biphenyls (QC Lot: 1890174)								
HK1845598-001	UPB_Ash	Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1880314)								
HK1844672-001	Anonymous	Naphthalene	91-20-3	50	µg/kg	<50	<50	0.00
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.00
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.00
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.00
		Phenanthrene	85-01-8	50	µg/kg	122	123	0.00
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.00
		Fluoranthene	206-44-0	50	µg/kg	378	383	1.28
		Pyrene	129-00-0	50	µg/kg	359	360	0.406
		Benz(a)anthracene	56-55-3	50	µg/kg	199	201	0.993
		Chrysene	218-01-9	50	µg/kg	207	213	2.82



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1880314) - Continued								
HK1844672-001	Anonymous	Benzo(b)fluoranthene	205-99-2	50	µg/kg	310	294	5.26
		Benzo(k)fluoranthene	207-08-9	50	µg/kg	94	97	3.58
		Benzo(a)pyrene	50-32-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	158	147	7.02
		Dibenz(a,h)anthracene	53-70-3	50	µg/kg	<50	<50	0.00
		Benzo(g,h,i)perylene	191-24-2	50	µg/kg	184	150	20.1
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 1880314)								
HK1844672-001	Anonymous	Bis(2-ethylhexyl)phthalate	117-81-7	1000	µg/kg	710	720	0.00
		Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<50	<50	0.00
		Phenol	108-95-2	500	µg/kg	<500	<500	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1880312)								
HK1844446-008	Anonymous	C9 - C16 Fraction	----	200	mg/kg	<200	<200	0.00
		C17 - C35 Fraction	----	500	mg/kg	<500	<500	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1880318)								
HK1844446-008	Anonymous	C6 - C8 Fraction	----	5	mg/kg	<5	<5	0.00
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 1880319)								
HK1844446-008	Anonymous	Benzene	71-43-2	0.1	mg/kg	<0.2	<0.2	0.00
		Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.00
		Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.00
		Styrene	100-42-5	0.2	mg/kg	<0.2	<0.2	0.00
		ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.00
		meta- & para-Xylene	108-38-3	0.4	mg/kg	<0.4	<0.4	0.00
			106-42-3					
		Xylenes (Total)	----	1	mg/kg	<0.6	<0.6	0.00
EP-074_SR-B: Oxygenated Compounds (QC Lot: 1880319)								
HK1844446-008	Anonymous	2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	<2	0.00
		2-Butanone (MEK)	78-93-3	2	mg/kg	<2	<2	0.00
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 1880319)								
HK1844446-008	Anonymous	Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	0.00
		Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	0.00
		Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.00



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 1880319)								
HK1844446-008	Anonymous	Chloroform	67-66-3	0.04	mg/kg	<0.04	<0.04	0.00
		Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	0.00
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 1880319)								
HK1844446-008	Anonymous	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	<0.2	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: SOIL				Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)		
						LCS	DCS	Low	High	Value	Control Limit	
EG: Metals and Major Cations (QC Lot: 1895564)												
EG020: Antimony	7440-36-0	1	mg/kg	<1	5 mg/kg	106	----	83	117	----	----	
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	92.0	----	80	106	----	----	
EG020: Barium	7440-39-3	0.5	mg/kg	<0.5	5 mg/kg	98.9	----	80	116	----	----	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	101	----	87	110	----	----	
EG020: Cobalt	7440-48-4	0.5	mg/kg	<0.5	5 mg/kg	98.6	----	80	119	----	----	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	102	----	89	114	----	----	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	101	----	92	117	----	----	
EG020: Manganese	7439-96-5	0.5	mg/kg	<0.5	5 mg/kg	105	----	80	114	----	----	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	116	----	87	122	----	----	
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	5 mg/kg	105	----	88	113	----	----	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	105	----	85	112	----	----	
EG020: Tin	7440-31-5	0.5	mg/kg	<0.5	5 mg/kg	105	----	86	115	----	----	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	112	----	83	118	----	----	
EG: Metals and Major Cations (QC Lot: 1904581)												
EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	2.5 mg/kg	105	----	85	115	----	----	
EP-066: Polychlorinated Biphenyls (QC Lot: 1890174)												
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	0.5 mg/kg	112	----	43	152	----	----	
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1880314)												
Naphthalene	91-20-3	50	µg/kg	<50	25 µg/kg	92.4	----	60	99	----	----	
Acenaphthylene	208-96-8	50	µg/kg	<50	25 µg/kg	89.2	----	57	91	----	----	



Matrix: SOIL		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1880314) - Continued											
Acenaphthene	83-32-9	50	µg/kg	<50	25 µg/kg	93.2	----	59	97	----	----
Fluorene	86-73-7	50	µg/kg	<50	25 µg/kg	96.1	----	61	99	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	25 µg/kg	95.8	----	62	100	----	----
Anthracene	120-12-7	50	µg/kg	<50	25 µg/kg	62.7	----	54	87	----	----
Fluoranthene	206-44-0	50	µg/kg	<50	25 µg/kg	101	----	66	103	----	----
Pyrene	129-00-0	50	µg/kg	<50	25 µg/kg	99.8	----	62	105	----	----
Benz(a)anthracene	56-55-3	50	µg/kg	<50	25 µg/kg	92.6	----	63	102	----	----
Chrysene	218-01-9	50	µg/kg	<50	25 µg/kg	95.3	----	65	101	----	----
Benzo(b)fluoranthene	205-99-2	50	µg/kg	<50	25 µg/kg	98.7	----	63	102	----	----
Benzo(k)fluoranthene	207-08-9	50	µg/kg	<50	25 µg/kg	102	----	60	107	----	----
Benzo(a)pyrene	50-32-8	50	µg/kg	<50	25 µg/kg	53.6	----	50	90	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<50	25 µg/kg	88.6	----	49	99	----	----
Dibenz(a,h)anthracene	53-70-3	50	µg/kg	<50	25 µg/kg	88.8	----	46	97	----	----
Benzo(g,h,i)perylene	191-24-2	50	µg/kg	<50	25 µg/kg	87.8	----	38	97	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 1880314)											
Phenol	108-95-2	500	µg/kg	<500	25 µg/kg	81.9	----	67	117	----	----
Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<50	25 µg/kg	92.9	----	66	112	----	----
Bis(2-ethylhexyl)phthalate	117-81-7	1000	µg/kg	<1000	25 µg/kg	122	----	104	124	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1880312)											
C9 - C16 Fraction	----	200	mg/kg	<200	31.5 mg/kg	93.4	----	62	128	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	86.3	----	51	115	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1880318)											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	100	----	79	124	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 1880319)											
Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	106	----	77	117	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	108	----	83	118	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	108	----	81	117	----	----
meta- & para-Xylene	108-38-3	0.4	mg/kg	<0.4	0.5 mg/kg	108	----	76	126	----	----
	106-42-3										
Styrene	100-42-5	0.2	mg/kg	<0.2	0.25 mg/kg	106	----	78	120	----	----



Matrix: SOIL		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 1880319) - Continued											
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	110	----	78	123	----	----
Xylenes (Total)	----	1	mg/kg	<1.0	0.75 mg/kg	109	----	80	121	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 1880319)											
2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	2.5 mg/kg	94.4	----	81	124	----	----
2-Butanone (MEK)	78-93-3	2	mg/kg	<2	2.5 mg/kg	101	----	75	121	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 1880319)											
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	0.25 mg/kg	102	----	79	121	----	----
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	0.25 mg/kg	104	----	81	116	----	----
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	0.25 mg/kg	103	----	85	116	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 1880319)											
Chloroform	67-66-3	0.04	mg/kg	<0.04	0.25 mg/kg	109	----	77	121	----	----
Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	0.25 mg/kg	95.0	----	79	115	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 1880319)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	105	----	71	122	----	----



Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: SOIL

					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1895564)										
HK1845543-001	Anonymous	EG020: Antimony	7440-36-0	5 mg/kg	108	----	75	125	----	----
		EG020: Arsenic	7440-38-2	5 mg/kg	94.4	----	75	125	----	----
		EG020: Barium	7440-39-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	101	----	75	125	----	----
		EG020: Cobalt	7440-48-4	5 mg/kg	91.2	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	92.5	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	86.9	----	75	125	----	----
		EG020: Manganese	7439-96-5	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	97.1	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	5 mg/kg	108	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	92.2	----	75	125	----	----
		EG020: Tin	7440-31-5	5 mg/kg	107	----	75	125	----	----
EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----		
EG: Metals and Major Cations (QC Lot: 1904581)										
HK1845598-001	UPB_Ash	EG3060: Hexavalent Chromium	18540-29-9	2.5 mg/kg	110	----	75	125	----	----
EP-066: Polychlorinated Biphenyls (QC Lot: 1890174)										
HK1845598-001	UPB_Ash	Total Polychlorinated biphenyls	----	0.5 mg/kg	91.2	----	50	130	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1880314)										
HK1844672-002	Anonymous	Naphthalene	91-20-3	250 µg/kg	90.2	----	50	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	104	----	50	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	87.1	----	50	130	----	----
		Fluorene	86-73-7	250 µg/kg	90.0	----	50	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	69.3	----	50	130	----	----
		Anthracene	120-12-7	250 µg/kg	78.6	----	50	130	----	----



Matrix: SOIL

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1880314) - Continued										
HK1844672-002	Anonymous	Fluoranthene	206-44-0	250 µg/kg	55.0	----	50	130	----	----
		Pyrene	129-00-0	250 µg/kg	53.6	----	50	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	83.8	----	50	130	----	----
		Chrysene	218-01-9	250 µg/kg	83.0	----	50	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	73.4	----	50	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	104	----	50	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	85.6	----	50	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	69.0	----	50	130	----	----
		Dibenz(a,h)anthracene	53-70-3	250 µg/kg	69.8	----	50	130	----	----
Benzo(g,h,i)perylene	191-24-2	250 µg/kg	64.0	----	50	130	----	----		
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 1880314)										
HK1844672-002	Anonymous	Phenol	108-95-2	250 µg/kg	89.3	----	50	130	----	----
		Hexachlorobenzene (HCB)	118-74-1	250 µg/kg	96.1	----	50	130	----	----
		Bis(2-ethylhexyl)phthalate	117-81-7	250 µg/kg	# Not Determined	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1880312)										
HK1844446-012	Anonymous	C9 - C16 Fraction	----	31.5 mg/kg	84.0	----	50	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	74.3	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1880318)										
HK1844446-012	Anonymous	C6 - C8 Fraction	----	4.5 mg/kg	110	----	50	130	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 1880319)										
HK1844446-001	Anonymous	Benzene	71-43-2	0.25 mg/kg	103	----	50	130	----	----
		Toluene	108-88-3	0.25 mg/kg	100	----	50	130	----	----
		Ethylbenzene	100-41-4	0.25 mg/kg	112	----	50	130	----	----
		meta- & para-Xylene	108-38-3 106-42-3	0.5 mg/kg	110	----	50	130	----	----
		Styrene	100-42-5	0.25 mg/kg	107	----	50	130	----	----
		ortho-Xylene	95-47-6	0.25 mg/kg	103	----	50	130	----	----
		Xylenes (Total)	----	0.75 mg/kg	108	----	50	130	----	----



Matrix: SOIL				<i>Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report</i>						
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Spike Concentration</i>	<i>Spike Recovery (%)</i>		<i>Recovery Limits (%)</i>		<i>RPD (%)</i>	
					<i>MS</i>	<i>MSD</i>	<i>Low</i>	<i>High</i>	<i>Value</i>	<i>Control Limit</i>
EP-074_SR-B: Oxygenated Compounds (QC Lot: 1880319)										
HK1844446-001	Anonymous	2-Propanone (Acetone)	67-64-1	2.5 mg/kg	102	----	50	130	----	----
		2-Butanone (MEK)	78-93-3	2.5 mg/kg	90.8	----	50	130	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 1880319)										
HK1844446-001	Anonymous	Methylene chloride	75-09-2	0.25 mg/kg	113	----	50	130	----	----
		Trichloroethene	79-01-6	0.25 mg/kg	106	----	50	130	----	----
		Tetrachloroethene	127-18-4	0.25 mg/kg	111	----	50	130	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 1880319)										
HK1844446-001	Anonymous	Chloroform	67-66-3	0.25 mg/kg	102	----	50	130	----	----
		Bromodichloromethane	75-27-4	0.25 mg/kg	93.6	----	50	130	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 1880319)										
HK1844446-001	Anonymous	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.25 mg/kg	108	----	50	130	----	----

Surrogate Control Limits

Sub-Matrix: ASH		<i>Recovery Limits (%)</i>	
<i>Compound</i>	<i>CAS Number</i>	<i>Low</i>	<i>High</i>
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-066S: PCB Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloroendate	1770-80-5	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

ALS Technichem (HK) Pty Ltd

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 Tel : (852) 2610 1044 Fax : (852) 2610 2021 Email: hongkong@alsglobal.com



SAMPLE SUBMISSION FORM (Environmental test)

Note : * The following information is required to expedite sample analysis. Please complete all the necessary details and return this form with your samples. Test(s) will not be started until a COMPLETED form is received.
 # Items will be subject to additional charge and needed further confirmation & arrangement.

Reporting information for Final Report

*Company Name: WSP (Asia) Ltd
 *Client Contact: Name: Alex Cheung Email: Alex.WH.Cheung@wsp.com
 Tel: 39002021 Fax: 28569902
 *Report address to: 7/F, One Kowloon, 1 Wang Yuen Street, Kowloon Bay
 *Postal Address (if different): _____

Soft copy report delivery (if different from above)

*Client Contact Name (1st): Alex Cheung Email: Alex.WH.Cheung@wsp.com
 *Client Contact Name (2nd): Irene Yeung Email: Irene.Yeung@wsp.com

Billing information for Invoice (if different from reporting information for final report)

Note : Client Name on invoice will be the company Name of the Final report.

*Invoice to (c/o company): _____
 *Client Contact Name: _____ Tel: _____
 Email: _____
 *Invoice address to: _____

*Purchase Order/ Client Order No: _____
 * ALS Quotation No.: HKE/1415a/2017
 *Project Name/No: HKU UPB Incinerator
 Site Name (if any): UPB at QMH

Environmental Division
 Hong Kong
 Work Order Reference
HK1845598



Telephone : +852 2610 1044

Sampling and delivery

Sampling by: Client # ALS others: _____
 *Sample(s) delivery by: Client # ALS others: _____

*Expected TAT (Working days): Regular (7-10) #Express (5) #Double Express (3) #Other (____)

Other remark: _____

SAMPLE ANALYTICAL REQUIREMENTS (Supplementary sheet attached Yes, _____ pages No)

Lab ID	*Sample ID.	Matrix	*Sampling Date/Time	*Analysis Required (Tests)
1.	UPB_Ash	Ash	21 Aug 2018 / 16:00	Metals, VOCs, SVOCs, PCBs, PCR, Dioxin

SAMPLE RECEIVE INFO: (Lab Use Only)

Received Date/ Time:	<u>21 AUG 2018 15:20</u>	Document Received Date/Time:	<u>21 AUG 2018 15:20</u>
Sorting Date/ Time:	<u>21 AUG 2018 16:30</u>	Esky Count:	<u>1 x Plastic bag</u>
Condition:	<u>Ambient</u> / Chilled / Frozen	Ice Bricks / Ice	Yes / <u>NO</u>
Bottle information:	<u>3 x 250 ml soil Jars</u>		
Tray No:	<u>S 326</u>	Sort by:	<u>Ketsu Lau</u>

CHAIN OF CUSTODY DOCUMENTATION

H 029972



ALS Laboratory Group

CLIENT: WSP (Asia) Limited

SAMPLER: Arnold Young

ADDRESS / OFFICE: 7/F, One Kowloon, 1 Wang Yuen St. Kowloon Bay

MOBILE:

PROJECT MANAGER (PM): ALEX CHEUNG

PHONE 3900 2021

PROJECT ID: HKUUPB INCINERATOR

EMAIL REPORT TO: alex.wh.cheung@wsp.com

SITE: QMH-UPB

P.O. NO.:

EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date):

QUOTE NO.: HKE/14/15A/2017

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

COOLER SEAL (circle appropriate)

Intact: Yes No (N/A)

SAMPLE TEMPERATURE

CHILLED: Yes (No)

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

METALS
VOCs
SVOCs
PCR
PCB
Dioxin

SAMPLE INFORMATION (note: S = Soil, W=Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
--------	-----------	--------	------	------	-------------	---------------

1.	UPB - ASH	Ash	21/8/18	1:50 pm		3
----	-----------	-----	---------	---------	--	---

METALS	VOCs	SVOCs	PCR	PCB	Dioxin
✓	✓	✓	✓	✓	✓

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: Arnold Young
Of: WSP (Asia) Limited
Name: Alex Cheung
Of: WSP (Asia) Limited

Date: 21 Aug 2018
Time: 1:55 pm
Date: 21 Aug 2018
Time: 1:55 pm

Name: MA
Of: ALS (CHK)

Date: 21/8/2018
Time: 15:20

Con' Note No:
Transport Co:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;
V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.



ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street, Kwai Chung
N.T., Hong Kong
T +852 2610 1044 E +852 2610 2021



Turnaround Times

Our standard laboratory turnaround time (TAT) will be **10 working days** while the TAT for Dioxin Testing is **15 working days**. Turnaround time for **Biological Testing is 6-8 weeks after the confirmation**. Electronic reports in PDF & Excel format will be emailed/ faxed to client attention within the TAT shortly after results are checked and approved by the laboratory's HOKLAS approval signatories of the relevant testing. Hardcopy reports & invoices will be mailed to clients shortly after. Work orders received at the laboratory **after** 12pm are deemed received the following day for the calculation of turnaround times. For high end boutique analyses the turnaround time will be 10-15 working days from the receipt of samples.

Note: Saturdays, Sundays and Public Holidays will not be considered as the working days.

Service Inclusions

The service offered by ALS will include the following additional items at no extra charge.

- Sample containers appropriately prepared, labelled and pre-dosed with preservatives.
- Cooler boxes to facilitate the "refrigeration" of samples en route to the laboratory. (We recommend the use of ice for chilling samples and ice bricks only for maintaining the temperature of samples that have already been chilled).
- On call access to ALS technical expertise.

Sample Container Requirements

ALS provides pre-treated and labelled sample containers, for all analytical work to be conducted at the laboratory. Samples for analysis should be chilled whilst en route to the laboratory. **Please contact the laboratory for bottles arrangement.**

Item1: 34/2002: Sediment Samples

Test Parameter	Label Colour	Container Type (Preservation)
Metals and Semi-volatile Organics		One x 250 gram soil jar with Teflon liner <i>(none)</i>
TBT-Interstitial		2L in HDPE Plastic Bag <i>(none)</i>
Biological testing	White	6L in HDPE Plastic Bags <i>(none)</i>
Toxicity Testing		

Item2: RBRG: Land Contamination

Test Parameter	Label Colour	Container Type (Preservation)
INORGANICS/ORGANICS		
All testing except Dioxin		One x 250ml glass <i>(none)</i>
Dioxin		One x 250ml glass <i>(none)</i>

Groundwater Samples and QA/QC samples

Test Parameter	Label Colour	Container Type (Preservation)
METALS		
Hexavalent Chromium, Total Cyanide	Blue	One x 250 ml plastic <i>(NaOH)</i>
Heavy Metals (Total / Lab Filtered)		One x 250 ml plastic <i>(none)</i>
ORGANICS		
VOCs/BTEX/TPH(C ₁ -C ₆)	Maroon	Two x 40 ml amber vials <i>(HCl)</i>
Semi-volatile Organics, TPH (C10-C36), PCB		One x 1 L amber glass <i>(none)</i>
TBT		One x 1 L amber glass <i>(none)</i>
Dioxin		One x 1 L amber glass <i>(none)</i>

QUOTATION: HKE/1415a/2017

(Please quote this number with all relevant sample submissions and refer to quotation validity below)

COMPANY:	WSP (Asia) Limited	DATE:	19 April 2018
ATTENTION	Mr Arnold Yeung	PHONE:	3900 2178
EMAIL:	Arnold.Yeung@wsp.com	NO OF PAGES:	9 Pages
PROJECT:	Chemical Analysis for Soil and Groundwater Samples in Year 2017 - 2018		
FROM:	Jessica Li	EXTENDED TO:	31 DECEMBER 2018

Dear Mr Yeung,

Further to your enquiry, thank you for providing ALS the opportunity to submit this quotation covering your analytical testing requirements. ALS is very keen to work with you on this important project, delivering high quality data, good communication and timely and reliable service.

This quotation has been developed based on information provided. Please refer to all sections within this quotation to ensure that we have scoped your project correctly. Please do not hesitate to contact ALS for updating or reissuing, should this be required.

Acceptance of this quotation is required within 90 days from date of issue. Please advise ALS (via email) upon acceptance, to allow this quote to be loaded into our Laboratory Information Management System and/or to order the required sample containers.

Yours Sincerely,

Jessica Li
Senior Customer Services
ALS Laboratory Group
Environmental Division - Hong Kong

Reviewed and Approved

Ivan Leung
Manager - Customer Services
ALS Laboratory Group
Environmental Division - Hong Kong

Agreed and Accepted by:

Name of Signatory:
Company Chop and Authority Signature
Date:



Analytical Charges

Item 1: Sediment Testing (34/2002)

Sediment Samples – Chemical Testing (TAT: 10 working days)

Analyte Description	ALS Method Code	In-house Method Reference	Reporting Limits (mg/kg) (or as indicated)	Unit Price per sample (HK\$)
Metals & Metalloid				
Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Silver (Ag), Zinc (Zn),	EG020*	USEPA 6020A	0.1-1	
Mercury (Hg)			0.05	
Organic-non-PAHs				
Total PCBs ¹ (reported as 18 congeners)	EP065*	USEPA 8270 USEPA 8082	3 µg/kg per congener	
Organic-PAHs				
Low Molecular Weight PAHs ² : -Acenaphthene, -Acenaphthylene, -Anthracene, -Fluorene, -Naphthalene, -Phenanthrene	EP076*	USEPA 8270	50 µg/kg (each)	
High Molecular Weight PAHs ² : -Benzo(a)anthracene, -Benzo(a)pyrene, -Chrysene, -Dibenzo(a,h)anthracene, -Fluoranthene, -Pyrene, -Benzo(b) & (k)fluoranthene, -Indeno(1,2,3-c,d)pyrene, -Benzo(g,h,i)perylene	EP076*	USEPA 8270	150 µg/kg (each)	
Tributyltin in Interstitial Water	EP390*	USEPA 8323	0.015µg TBT/L	

*The laboratory is HOKLAS accredited for the in-house method as quoted. The relevant method references are as listed.

- Low MW PAH: Acenaphthene, Acenaphthylene, Anthracene, Fluorene, Naphthalene, Phenanthrene
- High MW PAH: Benzo(a)anthracene, Benzo(a)pyrene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Indeno(1,2,3-c,d)pyrene, Benzo(g,h,i)perylene
- PCB -Total: The concentration of 18 PCB congeners shall be tested and reported individually. The concentration of Total PCB shall be calculated as the sum of 18 PCB congeners



Sediment Samples – Biological Testing (TAT: 6–8 weeks)

Analyte Description	ALS Method Code	In-house Method Reference	Reporting Limits	Price per Sample (HK\$)
10 day burrowing Amphipod	ET001	USEPA 600/R-94/025 June 1994 Test Method 100.4	--	
20-day burrowing Polychaete	ET002	Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments, PSEP, July 1995	--	
48-96 hour Larvae	ET012	Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments, PSEP, July 1995	--	
Ancillary Testing				
Moisture	EA055	In house	0.1%	Inc.
Particle size distribution	--	In house - Wet sieving	1%	
Total organic carbon	EP005	APHA 5310B	0.05%	
Pore water Quality Measurement				
pH Value	--	pH electrode method	0.1 pH unit	Inc.
Ammonia	--	Colorimetric method	0.01 mg/L	
Salinity	--	In house	0.1 ppt	

^ Note:

Reference sediment shall be tested (both chemical and biological testing) with each batch of sample tested. The testing of reference sediment sample is charged as ONE sample for each analysis batch.

ALS HK can provide Reference sediment sampling service. Reference sediment shall be collected from EPD designated Port Shelter area, Sai Kung. Cost per sampling trip: HK\$8,500 per trip

If reference sediment can be collected by client, ALS HK can provide the detail coordinates and locations of the sampling area to client. ALS will provide all the required sampling bags for sampling.



Item2: RBRG: Land Contamination

Analyte Description	ALS Method Code	In-house Method Reference	Reporting Limit			Unit Cost per Sample (HK\$)
			Soil (mg/kg)	Ground Water (µg/L)	Blanks (µg/L)	
Metals						
Lead	EG020*	USEPA 6020A	1	1	1	
Antimony			1	1	1	
Arsenic			1	10	10	
Barium			1	1	1	
Cadmium			0.2	0.2	0.2	
Cobalt			1	1	1	
Copper			1	1	1	
Manganese			1	1	1	
Molybdenum			1	1	1	
Nickel			1	1	1	
Tin			1	1	1	
Zinc			1	10	10	
Mercury			0.05	0.5	0.5	
Chromium III [^]	EG049*	By Calculation	1	20	20	
Chromium VI	EG3060* in soil EG050* in water	USEPA3060 APHA 3500 Cr: D	1	20	20	
Volatile Organic Compounds						
Acetone	EP074_SR*	USEPA 8260	50	500	500	
Benzene			0.2	5	5	
Bromodichloromethane			0.1	5	5	
2-Butanone			5	50	50	
Chloroform			0.04	5	5	
Ethylbenzene			0.5	5	5	
Methyl tert-Butyl Ether			0.5	5	5	
Methylene Chloride			0.5	50	50	
Styrene			0.5	5	5	
Tetrachloroethene			0.04	5	5	
Toluene			0.5	5	5	
Trichloroethene			0.1	5	5	
Xylenes (sum of meta & para, ortho)			2	20	20	
Petroleum Carbon Ranges (PCR)						
C6 - C8	EP071HK_SR*	USEPA 8015/8260	5	20	20	
C9 - C16			200	500	500	
C17 - C35			500	500	500	

*The laboratory is HOKLAS accredited for the in-house method as quoted. The relevant method references are as listed.

[^] Chromium III = Total Chromium - Chromium VI

*NR = Not required



RBRG: Land Contamination

Analyte Description	ALS Method Code	In-house Method Reference	Reporting Limit			Unit Cost per Sample (HK\$)
			Soil (mg/kg)	Ground Water (µg/L)	Blanks (µg/L)	
Semivolatile Organic Compounds						
Acenaphthene	EP076HK*	USEPA 8270	0.5	2	2	
Acenaphthylene			0.5	2	2	
Anthracene			0.5	2	2	
Benzo(a)anthracene			0.5	NR [^]	2	
Benzo(a)pyrene			0.5	NR [^]	2	
Benzo(b)fluoranthene			0.5	1	1	
Benzo(k)fluoranthene			0.5	NR [^]	2	
Benzo(g,h,i)perylene			0.5	NR [^]	2	
Bis(2-Ethylhexyl)phthalate			5	NR [^]	20	
Chrysene			0.5	1	1	
Dibenzof(a,h)anthracene			0.5	NR [^]	2	
Fluoranthene			0.5	2	2	
Fluorene			0.5	2	2	
Hexachlorobenzene			0.2	4	4	
Indeno(1,2,3-cd)pyrene			0.5	NR [^]	2	
Naphthalene			0.5	2	2	
Phenanthrene			0.5	2	2	
Phenol			0.5	NR [^]	2	
Pyrene			0.5	2	2	
Total PCBs	EP066*	USEPA 8270	0.1	1	1	
Dioxin	Subcontracted to ALS Prague		50 ng/g	---	---	
TBTO	EP390	LCMSMS	5	---	---	
Free Cyanide	EK025MD*	APHA 4500CN:B, C,E & I	1	0.01 mg/L	0.01 mg/L	

*The laboratory is HOKLAS accredited for the in-house method as quoted. The relevant method references are as listed.

Remarks:

QA/QC samples (equipment blank, trip blank, field blank and duplicate) are excluded and will be charged as samples

Optional services:

Provision of Decon^{**}: HK\$

Provision of Teflon Bailer^{**}: HK\$

Sample Pick up/Delivery charge: HK\$

^{**} Cash on delivery

Express Services

And we can offer express turnaround time services upon request, the additional charges as follows:

Express TAT Services	Price Schedule
5 Working days TAT express services	original prices +50%
3 Working days TAT express services	original prices +100%

^{**} The express TAT services must be specially arranged and agreed by ALS in advance.

APPENDIX

3.2

ASBESTOS INVESTIGATION REPORT

FUGRO TECHNICAL SERVICES LIMITED

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Fax : +852 2450 6138
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Website : www.fugro.com

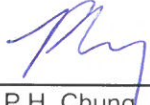


ASBESTOS INVESTIGATION REPORT

Client : WSP (Asia) Limited

Project : Asbestos Survey for an Incinerator and
Associated Parts of the incinerator including
the internal chimney on 5/F,
University Pathology Building (UPB), QMH

Report No. : 0081/18/ED/0119

**Prepared and
Certified by** : 
P.H. Chung
EPD Registered Asbestos Consultant (1080)

Project Team members:
Tony W.L. Wong, & Cheryl T.W. Yiu

Date : 13/9/2018

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AIR Report No.: 0081/18/ED/0119

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2.0	PARTICULARS OF CONCERNED PARTIES
3.0	SCOPE OF WORKS
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	4.1 Record Review
	4.2 Field Work
	4.3 Sampling
	4.4 Laboratory Analysis
5.0	CONCLUSIONS AND RECOMMENDATIONS

APPENDICES

APPENDIX 1	Location Plan
APPENDIX 2	Photographic Record of Site Survey
APPENDIX 3	Sampling Location Plan
APPENDIX 4	Laboratory Test Report

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AIR Report No.: 0081/18/ED/0119

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1.0 INTRODUCTION

Fugro Technical Services Limited (FTS) was appointed by WSP (Asia) Limited to conduct an asbestos investigation for an incinerator at University Pathology Building (UPB) at Queen Mary Hospital, Pok Fu Lam.

The project site contains an abandoned incinerator at Cage Cleaning Area 5/F with an exhaust chimney extending to the Roof floor. The incinerator is planned to be removed and the building was vacant at the time of survey. Nearby hospital staff and visitors are the sensitive receivers identified in the immediate vicinity.

The surveyed areas are shown in **Appendix 1**.

2.0 PARTICULARS OF CONCERNED PARTIES

Owner

University of Hong Kong Estate Office
Address: 17/F, Kennedy Town Centre,
23 Belcher's Street,
Kennedy Town,
Hong Kong

Tel. : 2816 8236

Fax : 2855 0346

Contact Person: Mr. Nicholas Cheung

Client

WSP (Asia) Limited
Address: 7/F, One Kowloon,
1 Wang Yuen Street,
Kowloon Bay,
Hong Kong

Tel. : 2579 8899

Fax : 2856 9902

Contact Person: Dr. Alex W.H. Cheung

Registered Asbestos Consultant

Mr. P.H. Chung (1080)

Address: Room 723 - 726, 7/F, Block B,
Profit Industrial Building,
1-15 Kwai Fung Crescent,
Kwai Fong, Hong Kong

Tel. : 3565 4485

Fax : 3565 4160

Registered Asbestos Laboratory

Fugro Technical Services Limited
MaterialLab Division (4001)
Address: Fugro Development Centre,
5 Lok Yi Street,
17 M.S. Castle Peak Road,
Tuen Mun,
N.T., Hong Kong

Tel. : 2452 7165

Fax : 2450 6138

Contact Person: Mr. John Ho



3.0 SCOPE OF WORKS

FTS was appointed by WSP (Asia) Limited:

- conduct an asbestos investigation for the incinerator;
- conduct bulk sampling and laboratory analysis of suspected asbestos-containing materials by a HOKLAS accredited laboratory; and
- prepare and submit an Asbestos Investigation Report (AIR) and an Asbestos Abatement Plan (AAP) to the approval of the EPD, if necessary.

4.0 WORK UNDERTAKEN

4.1 Record Review

Drawings, previous survey records regarding asbestos-containing materials of the existing premises were not available for review prior to the asbestos inspection.

4.2 Field Work

Asbestos inspection at the subject area was carried out on 23 August 2018. The inspections were limited to the exposed-to-view areas of the building, which were accessible to the Consultant without the removal of any external or internal building fabrics, fixtures and fittings. The Consultant did not for the purpose of these surveys, examine any unexposed areas of the building such as concealed or underground water pipes, cables, mains, etc. and any areas of the building which were dangerous or hazardous to the Consultant. There were no inaccessible areas at the time of inspections.

The following suspected materials were inspected during the inspection and are summarized in **Table 1**. Photographic record of these materials are enclosed in **Appendix 2**.

Table 1

Items Inspected	Materials	Location	Photo No.	Composition
Incinerator	Incinerator	Cage Cleaning Area, 5/F	N1	Metal
	Exhaust chimney	Cage Cleaning Area, 5/F	N2-N3	Metal with no glass fibre insulation
		Cage Cleaning Area, R/F	N4	Metal with glass fibre insulation
			N5	Metal
	Brick to door of incinerator*	Cage Cleaning Area, 5/F	N6-N7	Suspected asbestos-containing brick
	Brick inside incinerator*	Cage Cleaning Area, 5/F	N8-N9	Suspected asbestos-containing brick
	Door seal*	Cage Cleaning Area, 5/F	N10	Suspected asbestos-containing door seal

*Samples were taken for laboratory analysis.



4.3 Sampling

Sampling and analysis of suspected asbestos-containing materials was carried out on 23 August 2018 by Mr. Ho Ping, a HOKLAS approved sampler representing Fugro Technical Services Limited, the Laboratory. Mr. P.H. Chung (the Registered Asbestos Consultant) was present when the laboratory carried out the sampling. The results of sampling are summarized in **Section 4.4** and the laboratory test reports are attached in **Appendix 4** as supporting document. The following sampling strategies listed in **Table 2** were adopted as far as practicable: -

Table 2

Type of Materials	Area or Length	Number of Samples Neglect as ACM	Number of Samples to confirm as ACM
Homogeneous surface materials e.g. coating, plaster, etc.	<100 sq.m.	At least 3	1
	100 – 500 sq.m.	5	1
	> 500 sq.m.	At least 7	1
Thermal insulation e.g. rope lagging, boiler insulation, etc.	Each homogeneous run	At least 3	1
Miscellaneous materials e.g. corrugated sheet, floor tile, etc.	Each homogeneous material	At least 2	1

4.4 Laboratory Analysis

4 samples of suspected asbestos-containing materials were collected on 23 August 2018. The samples were then analyzed for the presence and type of asbestos according to the Laboratory’s HOKLAS accredited testing procedures. The sampling locations and results after the laboratory testing are summarized in **Table 3** and **Appendices 3 & 4**.

Table 3

Sample Code	Sample Nature	Sampling Location	Photo No.	Type and Content of Asbestos Present
PE180834/1	Door seal	Cage Cleaning Area, 5/F	S1	Non-ACM
PE180834/2	Door seal	Cage Cleaning Area, 5/F	S2	Non-ACM
PE180834/3	Brick to door of incinerator	Cage Cleaning Area, 5/F	S3	Non-ACM
PE180834/4	Brick inside incinerator	Cage Cleaning Area, 5/F	S4	Non-ACM

FUGRO TECHNICAL SERVICES LIMITED

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AIR Report No.: 0081/18/ED/0119

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5.0 CONCLUSIONS AND RECOMMENDATIONS

- 5.1 Based on the information collected during the survey, it is concluded that asbestos-containing material was not identified in the surveyed area (refer to **Appendix 1**).
- 5.2 Every effort has been made to visually examine all materials within the scope of this project and, where appropriate and accessible to us.
- 5.3 It should be noted that the information presented in this report only describes the conditions of the surveyed premises as at the time of survey. The user of this AIR, both premises owners and building work contractors should be aware if suspect materials not identified or sampled during this survey are revealed, a Registered Asbestos Consultant should be consulted before proceeding with any work in the premises.

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APPENDIX 1

LOCATION PLAN

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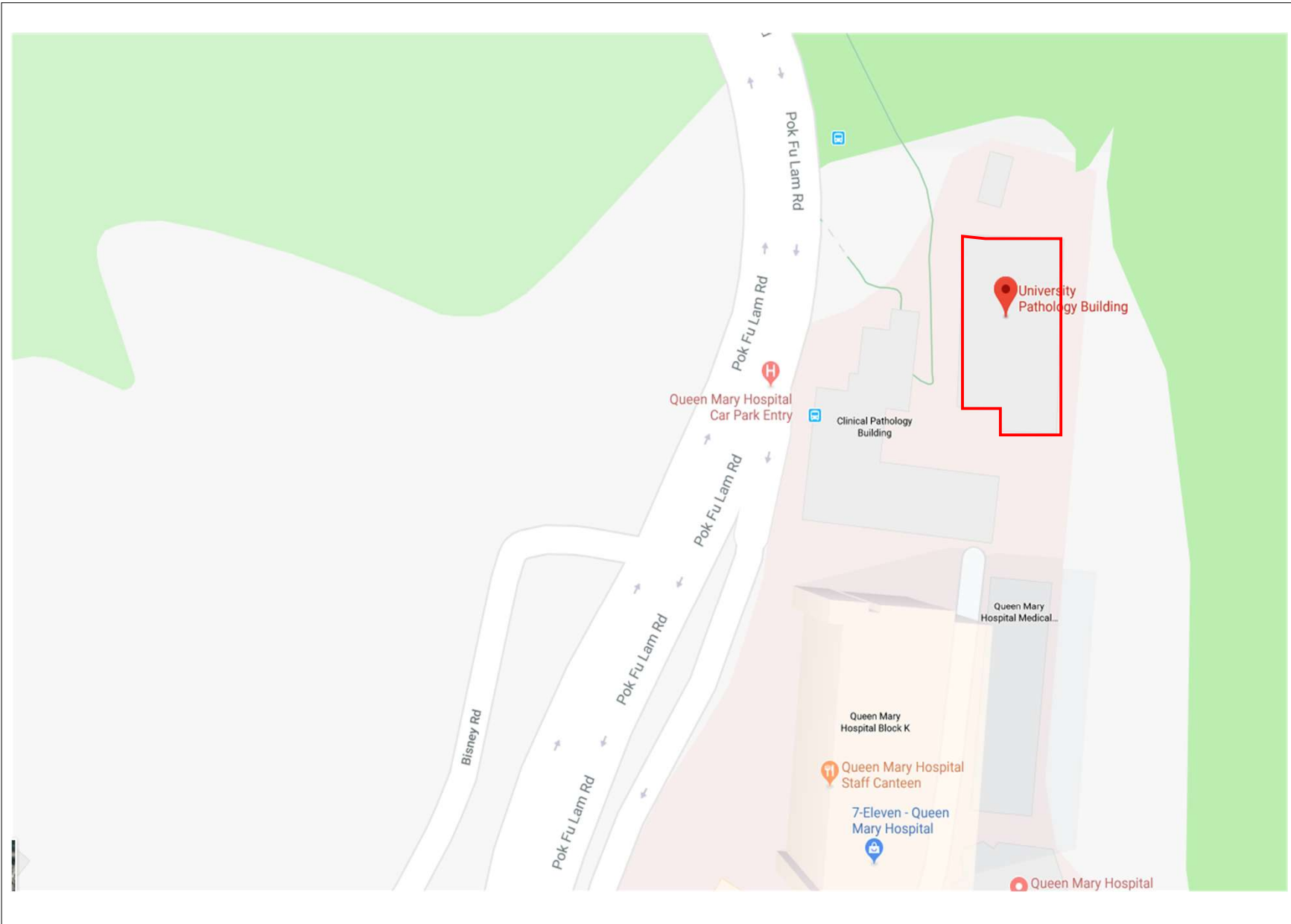

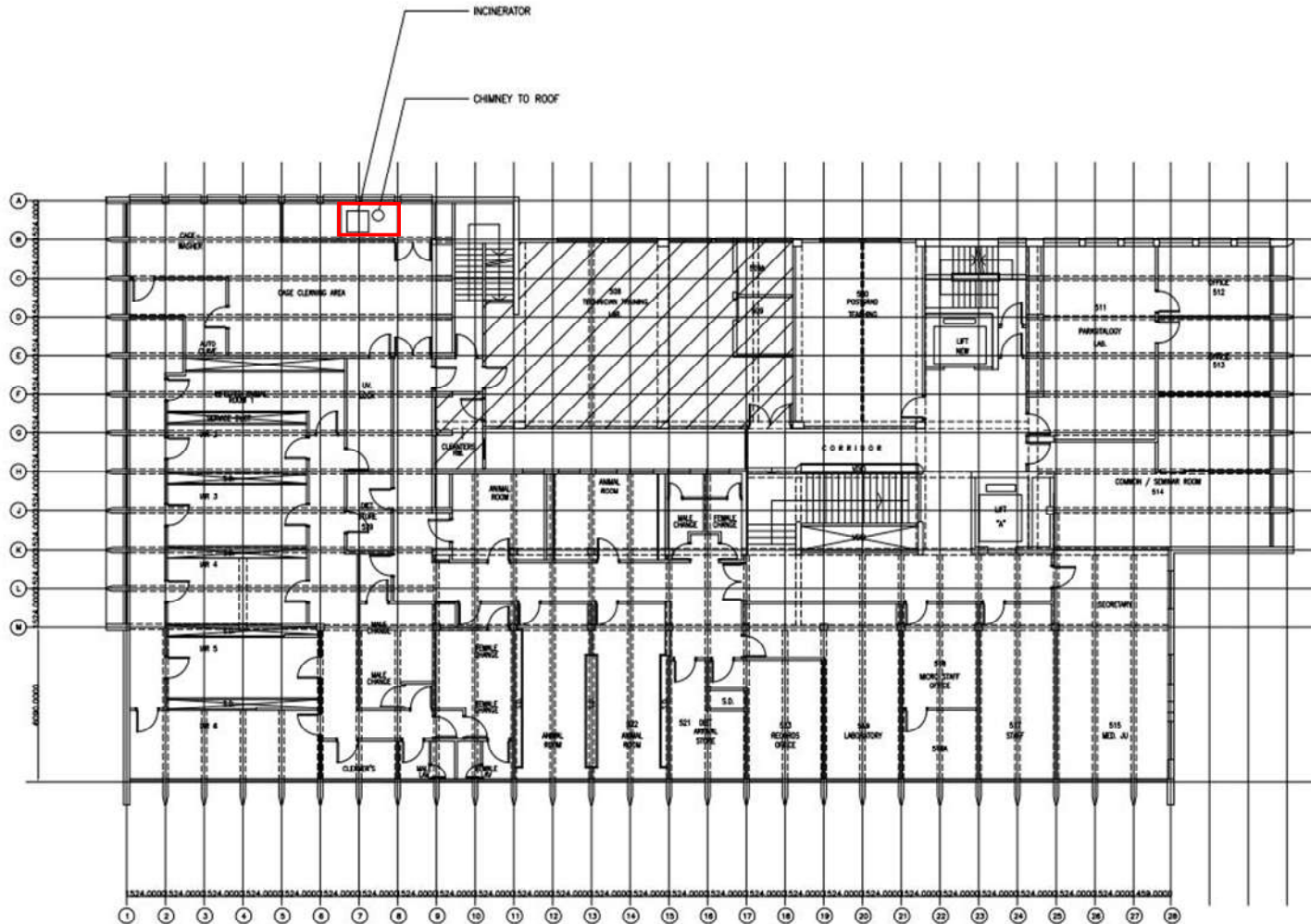


Figure: 1	
Project Title: Asbestos Survey for an Incinerator and Associated Parts of the Incinerator including the internal chimney on 5/F, University Pathology Building (UPB), QMH	
Drawing Title: Location Plan	
Our ref. no.: 0081/18/ED/0119	
Prepared by: Cheryl T.W. Yiu	
Scale: Not to Scale	
Legend:	
	Scope of Investigation
Rev.	Date
0	05/09/2018

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5/F

Figure: 2

Project Title:
Asbestos Survey for an
Incinerator and
Associated Parts of the
Incinerator including the
internal chimney on 5/F,
University Pathology
Building (UPB), QMH

Drawing Title:
Location Plan

Our ref. no.:
0081/18/ED/0119

Prepared by:
Cheryl T.W. Yiu

Scale: Not to Scale

Legend:

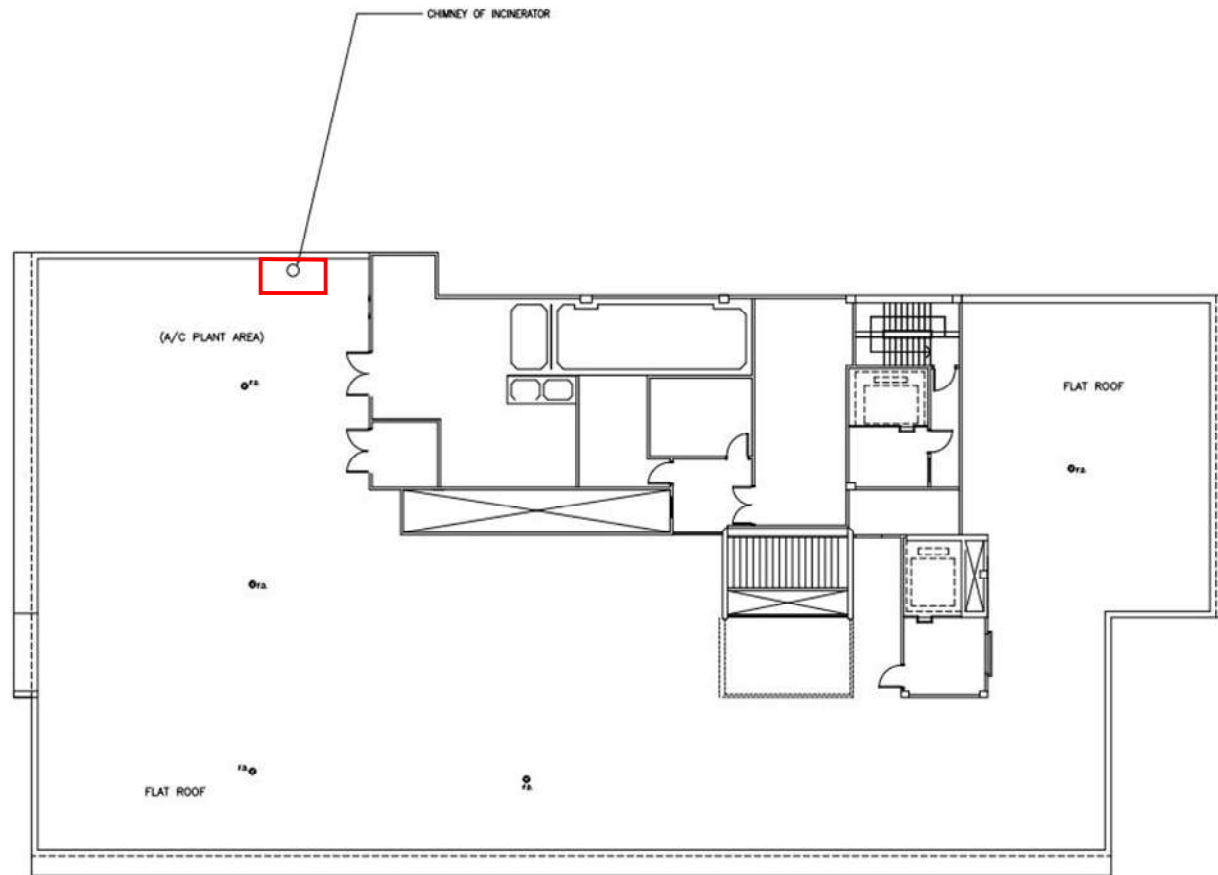
Scope of Investigation

Rev.	Date
0	05/09/2018

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Roof

Figure: 3

Project Title:
Asbestos Survey for an
Incinerator and
Associated Parts of the
Incinerator including the
internal chimney on 5/F,
University Pathology
Building (UPB), QMH

Drawing Title:

Our ref. no.:
0081/18/ED/0119

Prepared by:
Cheryl T.W. Yiu

Scale: Not to Scale

Legend:

Scope of Investigation

Rev.	Date
0	05/09/2018

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APPENDIX 2

PHOTOGRAPHIC RECORD OF SITE SURVEY

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Website : www.fugro.com



Report No.: 0081/18/ED/0119

Sampling Photos



Photo S1. Door seal, (PE180834/1), sampled at Cage Cleaning Area, 5/F, UPB, was confirmed as non-ACM.



Photo S2. Door seal, (PE180834/2), sampled at Cage Cleaning Area, 5/F, UPB, was confirmed as non-ACM.

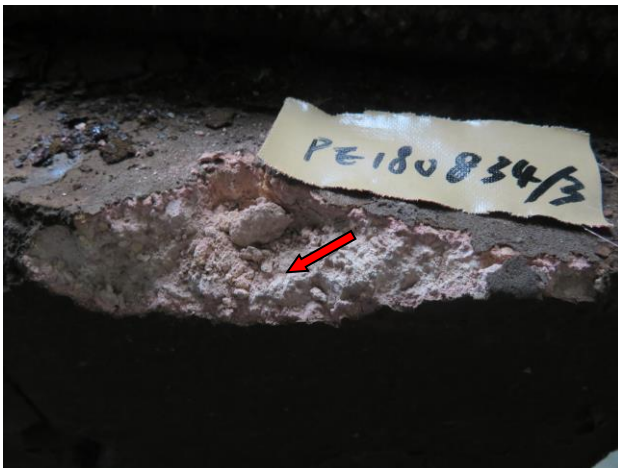


Photo S3. Brick to door of incinerator, (PE180834/3), sampled at Cage Cleaning Area, 5/F, UPB, was confirmed as non-ACM.



Photo S4. Brick inside incinerator, (PE180834/4), sampled at Cage Cleaning Area, 5/F, UPB, was confirmed as non-ACM.

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Non-ACM Photos



Photo N1. Incinerator, photo taken at Cage Cleaning Area, 5/F, UPB.



Photo N2. Exhaust Chimney with no insulation, photo taken at Cage Cleaning Area, 5/F, UPB.



Photo N3. Metal exhaust chimney, photo taken at Cage Cleaning Area, 5/F, UPB.



Photo N4. Exhaust Chimney with glass fibre insulation, photo taken at, R/F, UPB.



Photo N5. Metal exhaust chimney, photo taken at R/F, UPB.



Photo N6. Non-ACM brick to door of incinerator, photo taken at Cage Cleaning Area, 5/F, UPB.

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Non-ACM Photos



Photo N7. Non-ACM brick to door of incinerator, photo taken at Cage Cleaning Area, 5/F, UPB.



Photo N8. Non-ACM brick inside incinerator, photo taken at Cage Cleaning Area, 5/F, UPB.

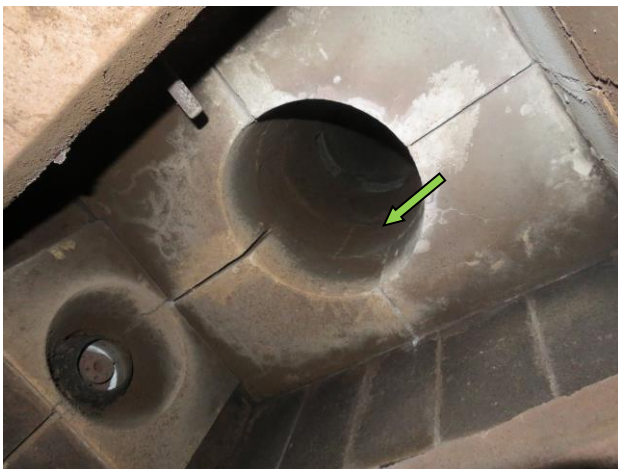


Photo N9. Non-ACM brick inside incinerator, photo taken at Cage Cleaning Area, 5/F, UPB.



Photo N10. Non-ACM door seal, photo taken at Cage Cleaning Area, 5/F, UPB.

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APPENDIX 3

SAMPLING LOCATION PLAN

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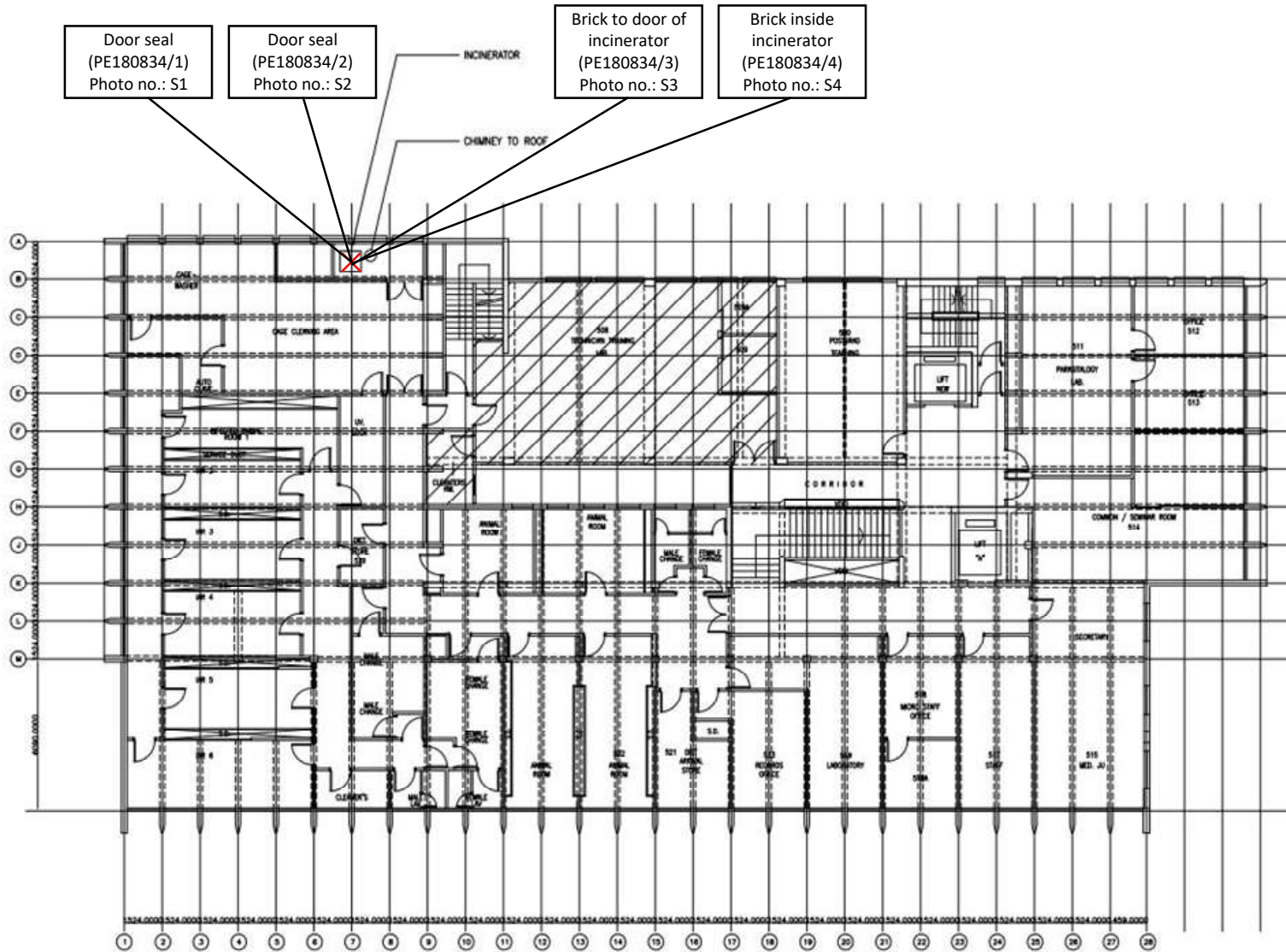


Figure: 4
Project Title:
Asbestos Survey for an
Incinerator and
Associated Parts of the
Incinerator including the
internal chimney on 5/F,
University Pathology
Building (UPB), QMH
Drawing Title:
Sampling Location Plan

Our ref. no.:
0081/18/ED/0119

Prepared by:
Cheryl T.W. Yiu

Scale: Not to Scale

Legend:
X Sampling Location

Rev.	Date
0	05/09/2018

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APPENDIX 4

LABORATORY TEST REPORT

FUGRO TECHNICAL SERVICES LIMITED

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MaterialLab



Report No. : 160404PE180834



TEST REPORT ON SAMPLING AND ANALYSIS OF BULK MATERIALS

Page 1 of 2

Information Supplied by Client

Client : Fugro Technical Services Limited
Client address : Room 723 & 725, 7/F, Block B, Profit Industrial Building, 1 – 15 Kwai Fung Crescent, Kwai Fong, Hong Kong
Project : Bulk Sampling at an incinerator and Associated Parts of the incinerator including the internal chimney on 5/F, University Pathology Building (UPB), Queen Mary Hospital
Test required : 1. Presence of asbestos
2. Type of asbestos, if present
3. Determination of asbestos-containing material (ACM) by visual examination

Laboratory Information

Lab. sample I.D. : PE180834/1 to 4
Sample description : 4 nos. bulk materials sampled from the project site
Date of sampling : 23/08/2018
Sampling method : In-house methods G-T-021 & G-T-022
Sampled by : P. Ho
Date of test completed : 27/08/2018
Test method : In-house methods G-T-023 & G-T-028

Test Results :

Lab. Sample I.D.	Sample Nature	Sampling Location	Sampling Method	Asbestos Fibres		ACM / Non-ACM
				Presence	Type	
PE180834/1	Door seal	Cage Cleaning Area, 5/F	G-T-021	Not detected	-	Non-ACM
PE180834/2	Door seal	Cage Cleaning Area, 5/F	G-T-021	Not detected	-	Non-ACM
PE180834/3	Brick to door of incinerator	Cage Cleaning Area, 5/F	G-T-022	Not detected	-	Non-ACM

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MaterialLab

Report No. : 160404PE180834

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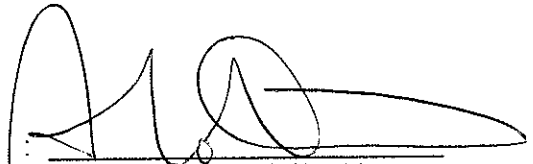
Test Results :

Lab. Sample I.D.	Sample Nature	Sampling Location	Sampling Method	Asbestos Fibres		ACM / Non-ACM
				Presence	Type	
PE180834/4	Brick inside incinerator	Cage Cleaning Area, 5/F	G-T-022	Not detected	-	Non-ACM

- Remarks:
1. The sample is either classified as an ACM (>1% asbestos by weight) or a non-ACM (not >1% asbestos by weight) as defined in the Air Pollution Control Ordinance.
 2. The sampling was instructed by and was taken in presence of Registered Asbestos Consultant : Mr. Chung Pak Hin.
 3. Photographic records and sampling location plans are detailed in asbestos investigation report.

Tested by : T.O. Chan

Certified by


Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date

29/8/2018

** End of Report **