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Hong Kong Institute of Science & Innovation, Chinese Academy of Sciences



Standard Operating Procedure *for Handling a Biohazardous Spill*

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A) Objectives

This document describes the procedures used by *Centre for Regenerative Medicine and Health, Hong Kong Institute of Science & Innovation, Chinese Academy of Sciences Limited* (refer to CRMH below), staff and students who work in cell culture room, cleanroom and open laboratory to respond to biohazardous spill so as to contain and control the spill and minimize the exposure.

B) Scope

This document applies to all students and staff in CRMH. Students and staff in CRMH are responsible for knowing which biohazardous materials are used in their experiments, as well as being familiar with the potential hazards posed by these materials. This document is only applicable to the spillage of biohazardous materials which biosafety level is equal to or lower than BSL 2.

C) Facility Covered

Cleanrooms, culture rooms, open laboratories, and biosafety cabinets in CRMH, 5/F, 15 Science Park West Avenue, Hong Kong Science Park, Shatin, Hong Kong

D) Definition of Biohazardous spills and agents

1. **Biohazardous spills** are spills that contain any biohazardous agents.
2. **Biohazardous agents** are any agents that are biological in nature and have the capacity to produce harmful effects upon other biological organisms. Biohazardous agents include, but not limited to:
 - Bacteria
 - Viruses
 - Fungi
 - Cell lines
 - Animal tissues
 - Clinical specimens
 - Recombinant nucleic acid products
 - Toxins of biological origin

E) Basic rules for working in the laboratory.

1. Never eat, drink, smoke or use make-up in the laboratories.
2. Never leave any ongoing experiments unattended.
3. Long hair and loose clothing should be properly confined.
4. Wear proper personal protective equipment e.g., gloves, laboratory gown, goggles, hearing protection, and eye protection when appropriate
5. Shorts, sandals and slippers are not allowed in the laboratories.
6. Know the laboratory's emergency escape routes and evacuation procedures.

7. Know the locations for the laboratory's safety equipment, including safety station, firefighting equipment, emergency shower and eyewash unit, spill kit, first-aid kit, etc
8. Know the emergency phone numbers to use to call for help in case of an emergency.

F) Personal Protective Equipment (PPE)

To handle biohazardous spills, the following PPE must be worn.

			
Lab coat	Safety goggles	Nitrile gloves	Surgical mask/ N-95 respirator
Available in Biohazard kit at Safety Station or on the bench of the control zone of cleanroom			

G) Biohazard Spill Kit

Biohazard Spill Kit is placed at Safety Station (**Appendix E**) and on the bench of the control zone in cleanrooms. The Biohazard Spill Kit includes the following components:

- Nitrile gloves
- Surgical masks
- A bottle of SoChlor Granules
- A bottle of SoChlor TAB
- An empty SoChlor Diluter bottle
- Scoop and scraper sets
- Paper towels
- White plastic waste bags
- Yellow bags for clinical waste
- A spill clean-up log card
- An Instruction manual



After each use, remember to fill the log card and report to Facility and Operation Compliance Department (F&OC) staff for kit content replacement if needed.

H) Small and Large Biohazardous Spill Classification

Biohazardous spill involving spilled volume $\leq 1000\text{ml}$ is classified as a small biohazardous spill, while the spill involving spilled volume $> 1000\text{ml}$ is classified as a large biohazardous spill. Only the biosafety Level of the spilled microorganisms which is equal to or lower than BSL 2 is under the scope of this SOP.

I) Procedures

1 General procedures

- 1.1 Put on appropriate PPE (**Section E**) before approaching the spill.
- 1.2 Before taking action against the spillage, the handler shall have the details of the spillage content as much as possible for proper precaution and action.
- 1.3 Freshly prepared 5-10% household bleach or 70% ethanol is a common disinfectant for biological spillage. Other disinfectants can be considered if appropriate. Disinfectants shall be chosen according to the properties of the spillage content and the contaminated surface.
 - 1.3.1 Precaution: Avoid applying bleach on metallic surfaces since this can cause rusting.
 - 1.3.2 Precaution: Avoid mixing bleach with alcohol or acid since this can release toxic gases such as chlorine.

2 Small Spill on the Floor or in Open Lab Area

- 2.1 Cover the spill with general paper towels.
- 2.2 Spray or pour a sufficient amount of an appropriate disinfectant onto the paper towel in **Step 2.1** to cover the whole spilled area and incubate with the spill for at least 20 minutes. Disinfectant shall be chosen according to **Step 1.3**.
- 2.3 Dispose all waste materials into an autoclave bag.
- 2.4 Wipe the spill area with clean paper towels soaked with the disinfectant according to **Step 1.3** for 1-2 more times.
- 2.5 Clean the affected area with water and dry with general paper towels to remove residual disinfectant if any.
- 2.6 Upon completion of clean-up, disinfect the gloves with 70% alcohol, remove your gloves, and wash your hands thoroughly with soap and water.
- 2.7 Report the spillage incident according to **Section I8**.

3 Large Spill on the Floor or in Open Lab Area

- 3.1 Evacuate the incident area immediately. Inform the incident to your supervisor, team manager, and F&OC team.
- 3.2 Put a signage "DO NOT ENTER: Biohazardous Spill," at the contaminated area,

and provide the contact no. of your team's lab manager and F&OC manager on the signage.

3.3 Do not allow unauthorized personnel to enter the contaminated area.

3.3.1 In case aerosols are the concern, wait for 30 minutes to allow aerosols to settle before starting to clean up the spill.

3.3.2 If the spillage could be hazardous to other people of the floor/ building, press the Emergency Call Button which locates near the entrance of the Open Lab (refer to **Appendix C** for locations), evacuate the floor/building, put a signage "DO NOT ENTER: Biohazardous Spill," at the entrance of the Open Lab, and provide the contact no. of your team's lab manager and F&OC manager on the signage

3.4 Put on appropriate PPE (**Section E**) and bring Biohazard Spill Kit (see **Section F**) to the affected area.

3.5 Sprinkle the SoChlor Granules over the spill and allow incubation for at least 5 minutes.

3.6 During the incubation period, add 7 tablets from SoChlor TAB into SoChlor Diluter bottle. Fill with 1 liter of water to the dotted line and let the tablets be fully dissolved without shaking the bottle.

3.7 Once the SoChlor Granules have absorbed the spill, collect the granules using the scoop and scraper into a white waste bag.

3.8 Use paper towels provided in the spill kit and SoChlor TAB solution to clean the area of spillage.

3.9 Dispose the scoop and scraper, towel, and gloves into the waste bag. Tie the bag to seal and dispose it to an autoclave bag.

3.10 Decontaminate reusable equipment (e.g., goggles, lab coat) if it was contaminated in the clean-up process.

3.11 Upon completion of clean-up, disinfect the gloves with 70% alcohol, remove your gloves, and wash your hands thoroughly with soap and water.

3.12 Report the spillage incident according to **Section I8**.

4 *Biohazardous Spill INSIDE a Biosafety Cabinet (BSC)*

4.1 Keep BSC running throughout the clean-up process.

4.2 Spray or wipe all surfaces of the equipment with 70% alcohol for at least 20 minutes.

4.3 Lift the grills and trays. Spray 70% ethanol and wipe all the surfaces under the work surface.

4.4 Dispose any waste into autoclave bags.

4.5 Wipe up the spill area with clean paper towels with 70% ethanol for 1-2 more

times

- 4.6 Clean the affected area with water and dry with paper towels to remove residual disinfectant if any.
- 4.7 Disinfect the BSC with ultraviolet lights for 30 minutes before using.
- 4.8 Upon completion of clean-up, disinfect the gloves with 70% alcohol, remove your gloves, and wash your hands thoroughly with soap and water.
- 4.9 Report the spillage incident according to **Section I8**.

5 *Biohazardous Spill INSIDE a Centrifuge*

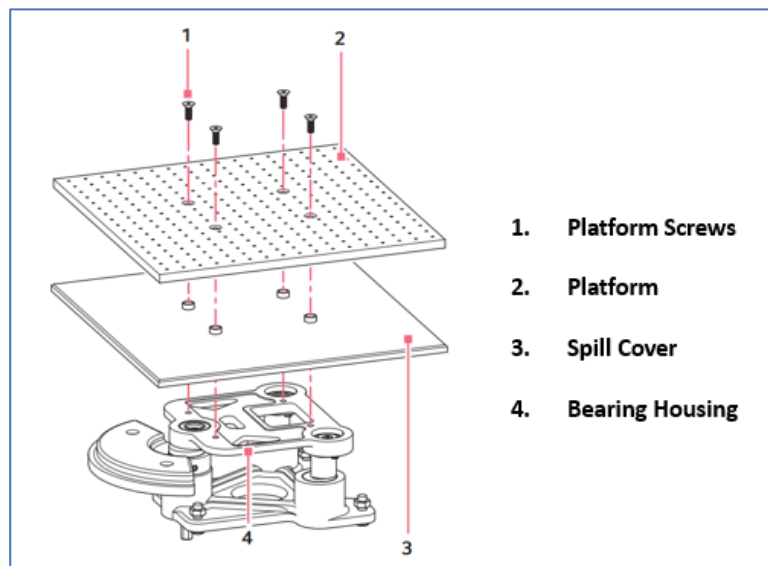
- 5.1 If a breakage is suspected in a running centrifuge, switch off the motor, leave the equipment closed for 30 minutes for aerosols to settle before opening the lid.
- 5.2 If a breakage is noticed after opening the equipment, immediately close the lid and leave for 30 minutes.
- 5.3 Place a sign on the equipment to prevent others from opening the lid.
- 5.4 Immediately alert lab manager and F&OC staff verbally when the situation allows, and provide the details of the spilled content for proper action and caution.
- 5.5 After 30 minutes, remove the microcentrifuge from the power supply or the rotor/bucket from the main centrifuge. Transfer the whole compartment unit into a functional BSC before opening it.
- 5.6 Disinfect the outside surface of microcentrifuge/rotor/bucket by spraying an appropriate disinfectant as of **Step 1.3** and let it incubate for 20 minutes inside BSC.
- 5.7 Carefully open the lid inside BSC and spray the interior of rotor/bucket with an appropriate disinfectant as of **Step 1.3** and let it incubate for another 20 minutes.
- 5.8 After the 20 minutes, dispose any broken tubes from the microcentrifuge/ rotor/ bucket into an autoclave bag.
- 5.9 After drying from disinfectant, take out the microcentrifuge/ rotor/ bucket from the BSC and put back to its original location.
- 5.10 Disinfect the BSC with ultraviolet lights for 30 minutes before using.
- 5.11 Upon completion of clean-up, disinfect the glove with 70% alcohol, remove your gloves, and wash your hands thoroughly with soap and water.
- 5.12 Report the spillage incident according to **Section I8**.

6 *Biohazardous Spill INSIDE a Shaker Incubator*

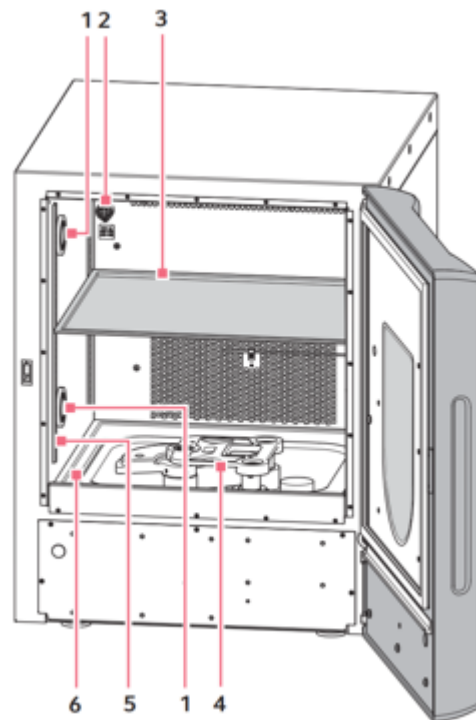
- 6.1 If a breakage occurs inside a running shaker incubator, switch off the motor, leave the equipment closed for 30 minutes for aerosols to settle before opening the door.
- 6.2 If a breakage is discovered after opening the equipment, leave the equipment

closed for 30 minutes.

- 6.3 Immediately alert lab manager and F&OC staff verbally when the situation allows, and provide the details of the spilled content for proper action and caution.
- 6.4 Place a sign on the equipment door to prevent others from opening the door.
- 6.5 After 30 minutes, open the door. Dispose any broken plastic tubes inside the shaker incubator into an autoclave bag. For broken glass, please refer to **Section G7**.
- 6.6 If there is liquid spill spread on the metallic platform, clean the interior surfaces and parts of the shaker incubator with the help from F&OC staff. In general, the steps below will be followed for thorough cleaning:
 - 6.6.1 Absorb the visible spill with general paper towels.
 - 6.6.2 Spray or pour a sufficient amount of an appropriate disinfectant onto the paper towel to cover the whole spilled area and incubate the spill for at least 20 minutes. Disinfectant shall be chosen according to **Step 1.3**.
 - 6.6.3 Unscrew contaminated flask/tube holders from the platform and immerse all the parts in 70% ethanol inside a plastic basin for at least 20 minutes.
 - 6.6.4 Unscrew the platform from spill cover and carefully take the platform out from the shaker incubator.



- 6.6.5 If any liquid spill is found inside the spill over, cover the spill with general paper towels and repeat the Step 6.6.2.
- 6.6.6 Wipe the platform and spill cover with 70% ethanol.
- 6.6.7 Wipe the remaining interior walls **FROM TOP TO BOTTOM** and drip pan of the shaker incubator with 70% ethanol.



1. Halogen lighting
2. Power socket
3. Removable shelf
4. Drive
5. Perforated rail
6. Drip pan and reservoir

6.6.8 Dispose all waste materials in autoclave bag.

6.6.9 After cleaning, reinstall the platform and spill cover back to the equipment.

6.6.10 Screw back all the cleaned and dry flask/tube holders onto the platform.

6.7 Disinfect the interior of incubator with ultraviolet light (external source, available on request) for 30 minutes.

6.8 Upon completion of clean-up, disinfect the gloves with 70% alcohol, remove your gloves, and wash your hands thoroughly with soap and water.

6.9 Report the spillage incident according to **Section I8**.

7 *Broken Glassware containing Infectious Materials*

7.1 After following the procedures in **Section I1, 2, 3, or 5**, any broken glassware should be picked up by proper devices (e.g., forceps, scoops, and scrapers, etc.) and placed into a "Biohazard Sharp Box" for further sterilization process.

8 *Reporting Procedures after the Clearance of Spillage*

8.1 After an accident or incident, you (either the injured in an accident or the witness of an incident) are required to provide a written report within 48 hours of the accident/ incident to F&OC. *CRMH Minor Incident Report for Internal Record* is mainly for accident/ incident stated in Section I 1-8 except sub-Section I3 (**Appendix A**), while *HKSTP Accident & Incident Report Form* (**Appendix B**) is mainly for accident/ incident mentioned in sub-Section I3.

8.2 F&OC staff shall assist you to complete the report and send it to your supervisor,

lab manager of your research team. For the accident/ incident mentioned in sub-Section I3, the *HKSTP Accident/ Incident Report Form* will also be sent to the Director and Deputy Director of the Centre and SHE Office of HKSTP by email she_office@hkstp.org within 72 hours of the accident/ incident.

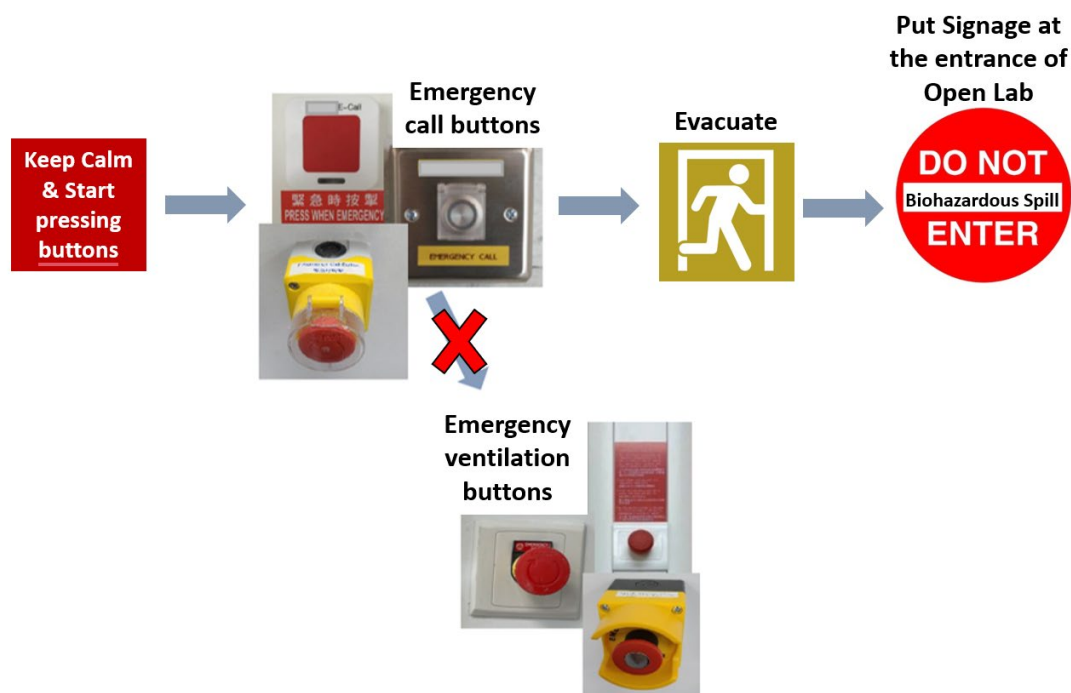
- 8.3 In addition to the reporting of accidents or incidents to HKSTP by completion of the *HKSTP Accident & Incident Report Form (Appendix B)*, F&OC is required to inform the Labour Department of any serious accidents in accordance with local legislations, i.e. the Occupational Safety and Health Ordinance (Cap. 509) and Employees' Compensation Ordinance (Cap. 282).
- 8.4 Details of the HKSTP Accident and Incident Reporting Procedures can be referred to the Section B02 of the *HKSTP SHE Handbook (Part II)- Laboratory & Research Safety Requirements*.

J) Contact Numbers

For life-threatening situations, contact the local emergency hotline by calling **999**. For other situations, call the following parties for assistance.

1. Laboratory manager and the first aider of the corresponding research team
2. F&OC Department: 2621 0608 / 2621 0676
3. HKSTP 24-hour Customer Services Hotline: 2639 8008

K) Flow Diagram for Large Spill (>1000ml) on the Floor or in Open Lab Area (under the situation stated in Section I3.3,2)



L) Abbreviations

BSC	biosafety cabinet
CRMH	Centre for Regenerative Medicine and Health, Hong Kong Institute of Science & Innovation, Chinese Academy of Sciences Limited
F&OC	Facility and Operation Compliance Department
HKSTP	Hong Kong Science and Technology Parks Corporation
PPE	personal protective equipment
SHE Office	Safety, Health, and Environment Office

Appendix A: CRMH Minor Accident & Incident Report for Internal Record

Reference No. _____



Centre for Regenerative Medicine and Health, HKISI, CAS Minor Accident & Incident Report



(for Internal Record)

Note: This report form is designed for a minor laboratory injury/ accident/ near-miss/ chemical or biohazardous spill, it should be completed and sent to the Facility and Operation Compliance (F&OC) Department within 48 hours of the accident or incident.

Name of involved staff (full name):	
Research Team:	RP1 / RP2/ RP3 (cross out inappropriate choice)
Contact information of involved staff:	Tel:
	Email:
Location of the incident:	
Date (DD/MM/YY) & Time of the incident:	
Brief Description of Accident / Incident; Cause of Accident / Incident; What actions have been taken?	
List any chemicals or biological material involved:	
List any equipment involved:	
List of PPE that the victim was wearing:	
Name of witness (full name):	
Was first aid administered? If yes, who administered the first aid and what was done	
Was the victim taken to clinic/ hospital?	
Recommendation for Prevention of Recurrence	
Accident / Incident Reported By	
Name:	Signature:
Post Title:	Date:
Accident / Incident Report Endorsed By	
Name:	Signature:
Post Title:	Date:

Reference No. _____

Appendices (if any)	
Incident Location/ Photo/ Sketches	Description

Appendix B: HKSTP Accident & Incident Report Form

	Safety, Health and Environment Office Accident & Incident Report Form	SHE Form L02/S02
		(Official use only) Reference No.:

Note: This report form should be completed and sent to the Safety, Health & Environment (SHE) Office of HKSTP within 72 hours of the accident or incident. The information provided herein will be used for investigation and compiling accident statistics.

In case of work-related accident to employee resulting in death or partial incapacity, the concerned unit of HKSTP or the client should fill in the relevant form provided by the Labor Department of Hong Kong and return it in duplicate to the Commissioner for Labor within the statutory required period.

1. Accident / Incident Information

Date:	Time:	Location:
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Type of Area:

<input type="checkbox"/> Office	<input type="checkbox"/> Laboratory/ Workshop	<input type="checkbox"/> Others (Please specify): _____
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2. Nature of Accident / Incident

<input type="checkbox"/> Fire / Explosion	<input type="checkbox"/> Spillage of hazardous substances	<input type="checkbox"/> Exposure to or contact with harmful substance
<input type="checkbox"/> Unpleasant smell	<input type="checkbox"/> Damage to property / equipment	<input type="checkbox"/> Slip, trip or fall on same level
<input type="checkbox"/> Fall of person from height	<input type="checkbox"/> Injured whilst lifting or carrying	<input type="checkbox"/> Trapped in or between objects
<input type="checkbox"/> Stepping on object	<input type="checkbox"/> Striking against fixed or stationary object	<input type="checkbox"/> Striking against moving object
<input type="checkbox"/> Trapped by collapsing or overturning object	<input type="checkbox"/> Struck by moving or falling object	<input type="checkbox"/> Struck by moving vehicle
<input type="checkbox"/> Contact with moving machinery or object being machine	<input type="checkbox"/> Contact with electricity or electric discharge	<input type="checkbox"/> Traffic accident
<input type="checkbox"/> Flooding	<input type="checkbox"/> Drowning	<input type="checkbox"/> Others (Please specify): _____

3. Personal Details (For the injured or person concerned)

Name:	Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female
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Post Title:	Phone No.:
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Division / Company Name:

Company Address:

Nature of Injury:

<input type="checkbox"/> Abrasion	<input type="checkbox"/> Dislocation	<input type="checkbox"/> Irritation
<input type="checkbox"/> Amputation	<input type="checkbox"/> Electric shock	<input type="checkbox"/> Laceration and cut
<input type="checkbox"/> Asphyxia	<input type="checkbox"/> Fractures	<input type="checkbox"/> Nausea
<input type="checkbox"/> Burn	<input type="checkbox"/> Freezing	<input type="checkbox"/> Poisoning

	Safety, Health and Environment Office Accident & Incident Report Form	SHE Form L02/S02
		(Official use only) Reference No.:

5. Agent Involved (if any)			
<input type="checkbox"/> Equipment for lifting/ conveying	<input type="checkbox"/> Material/ product being handled or stored	<input type="checkbox"/> Movable container or package of any kind	<input type="checkbox"/> Electricity supply, wiring apparatus or equipment
<input type="checkbox"/> Portable power or hand tools	<input type="checkbox"/> Ladder or working at height	<input type="checkbox"/> Floor, ground, stairs or any working surface	<input type="checkbox"/> Vehicle or associated equipment or machinery
<input type="checkbox"/> Other machinery, (please specify) _____	<input type="checkbox"/> Sewage, manhole or other confined space	<input type="checkbox"/> Gas, vapour, dust or fume	<input type="checkbox"/> Others (please specify) _____
6. Cause of Accident / Incident			
7. Recommendation for Prevention of Recurrence			
8. Accident / Incident Reported By			
Name:		Signature:	
Post Title:		Date:	
9. Accident / Incident Report Endorsed By			
Name:		Signature:	
Post Title:		Date:	

	Safety, Health and Environment Office Accident & Incident Report Form	SHE Form L02/S02
		(Official use only) Reference No.:

Appendices (if any)	
Incident Location/ Photo/ Sketches	Description

	Safety, Health and Environment Office Accident & Incident Report Form	SHE Form L02/S02
		(Official use only) Reference No.:

For Internal Use by SHE Office of HKSTP	
Further investigation required: <input type="checkbox"/> Yes <input type="checkbox"/> No	
Accident & Incident Report No.: <i>(The Report no. shall refer to corresponding reference number generated from Accident & Incident Log Record)</i>	
Accident / Incident Classification Code: <i>(if applicable)</i>	
Accident / Incident Cause Code: <i>(if applicable)</i>	
Remark: 	

Appendix C: Locations of Emergency Call Buttons and Emergency Ventilation Buttons in CRMH

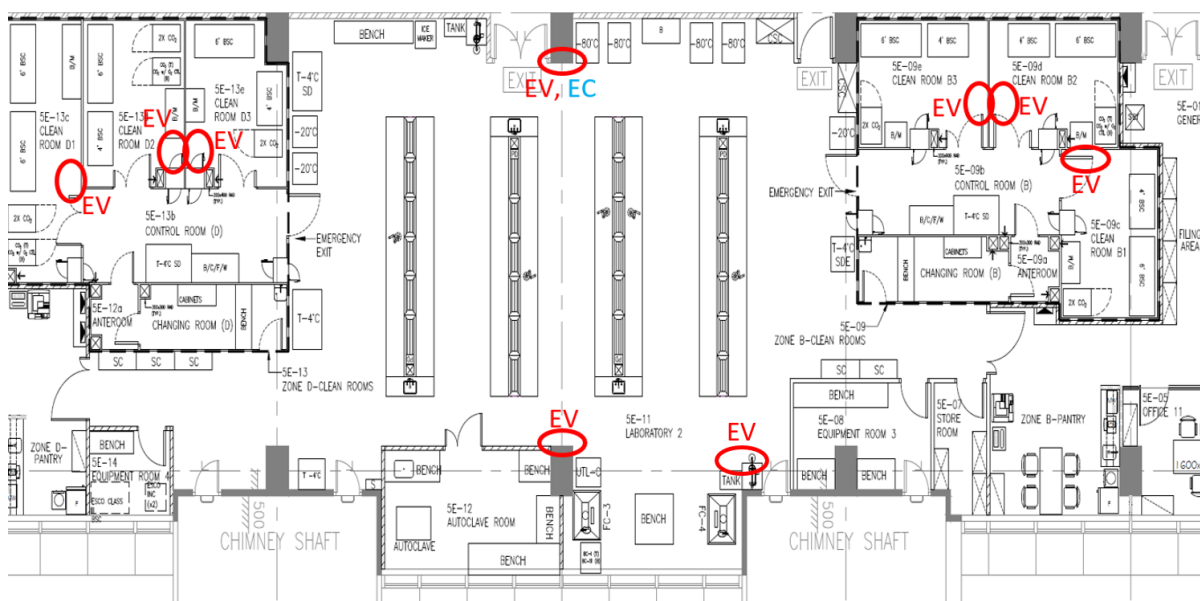


EC: Emergency Call Button to HKSTP

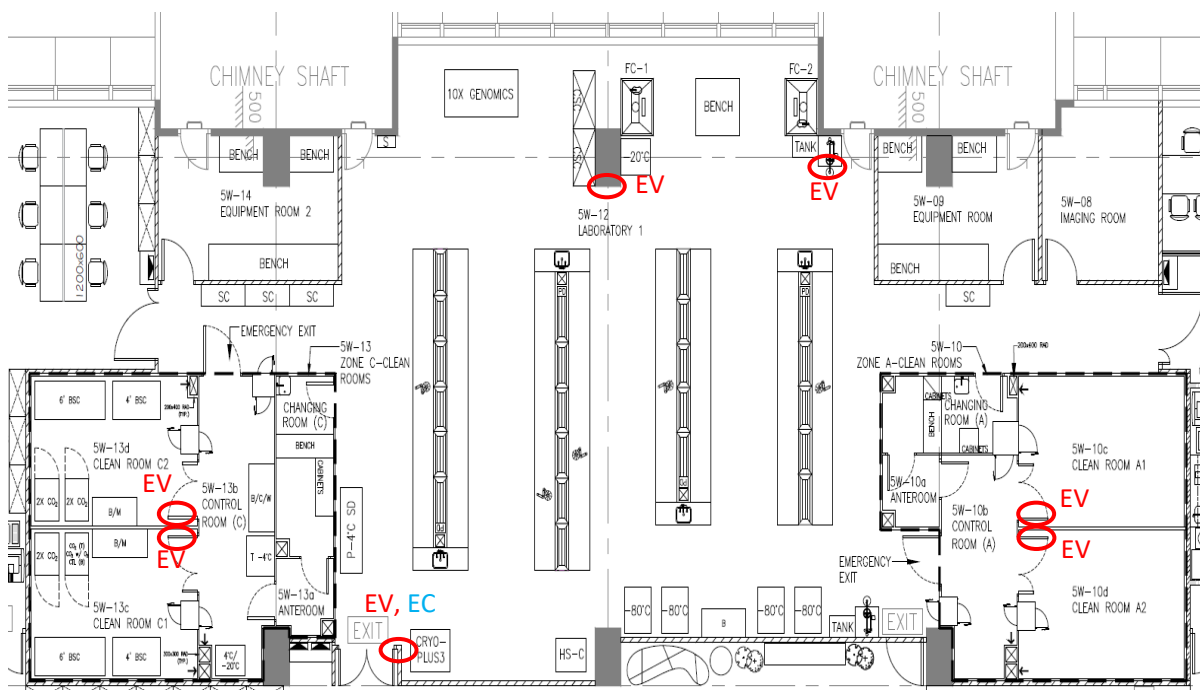


EV: Emergency Ventilation Button

Unit 501 – 507



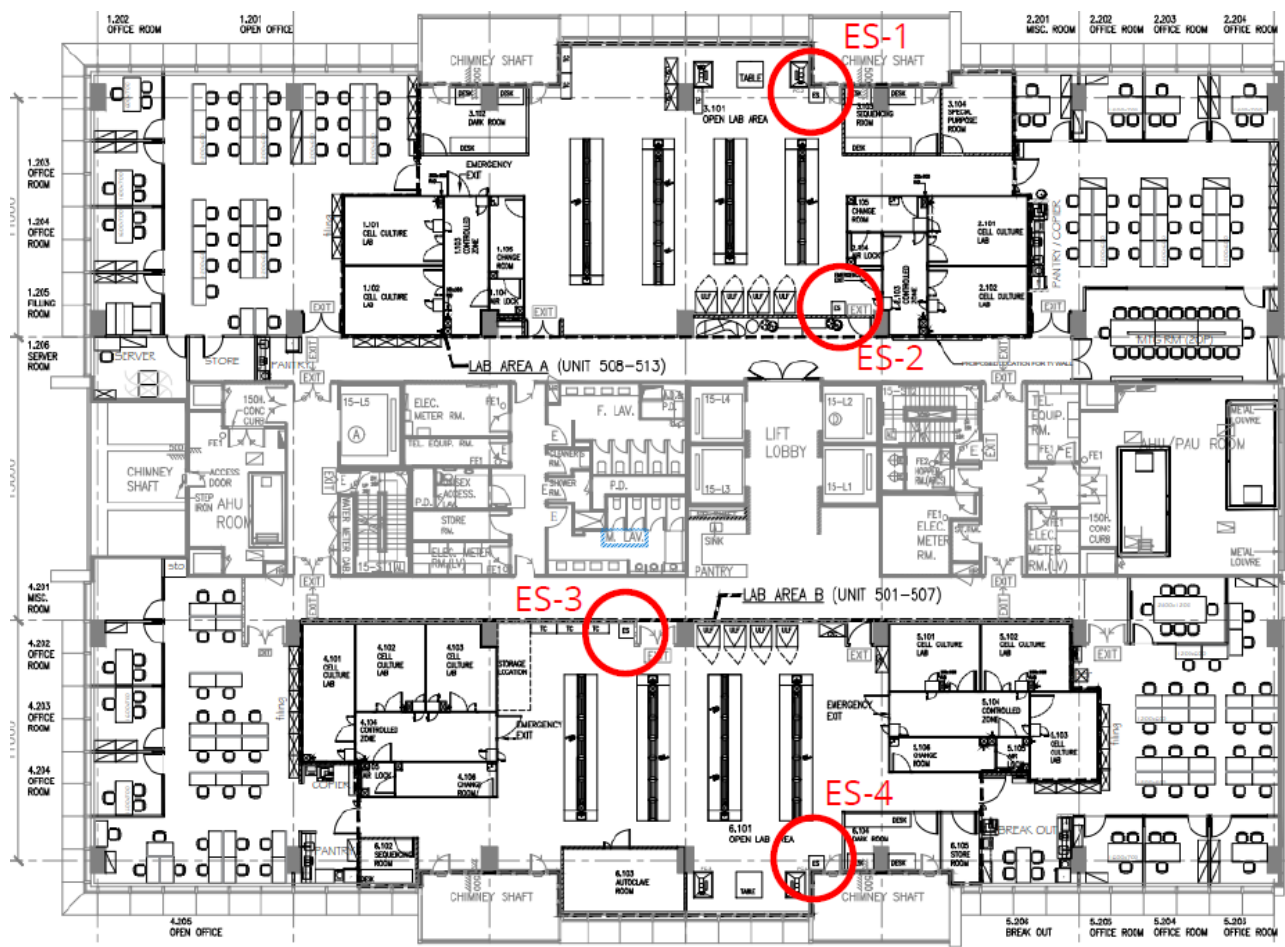
Unit 508 – 513



Appendix D: Locations of Emergency Showers and Eye Wash in CRMH

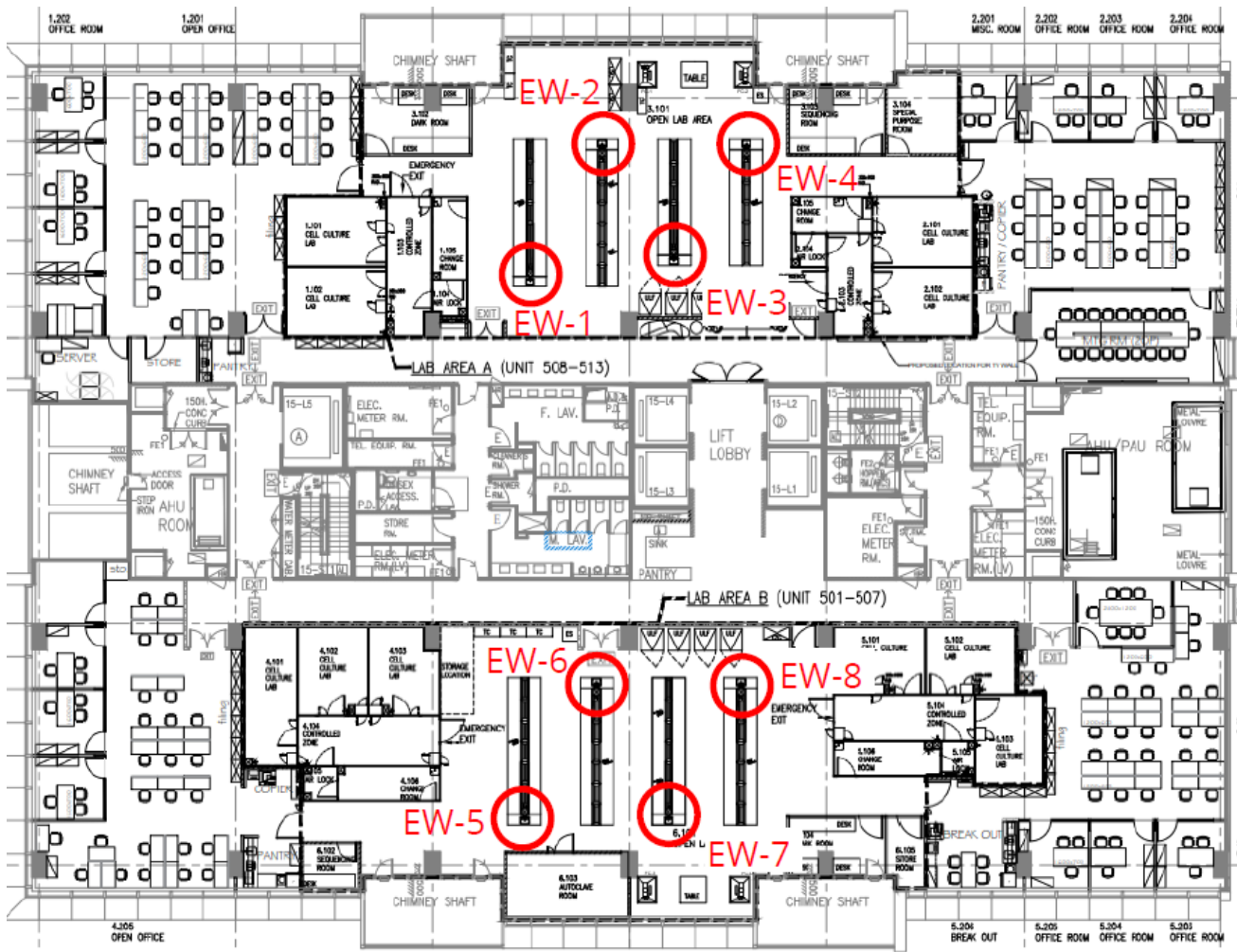


ES- Emergency Shower





EW- Eyewash Station



Unit 501 – 507

