

Healthcare and Energy Materials Laboratory

(E3 05-09, E3 05-10, E3 05-14, E3 05-15)

Standard Operating Procedures (SOP)

Basic Laboratory Safety (08 May 2008)

Prepared by

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1. General

- ◆ Only authorized persons (users) are allowed to access and work in the laboratory.
- ◆ Any visitors, new users etc. who has not been briefed by the laboratory technologist or professional officers, must be accompanied by a staff of the lab when entering the laboratory. The lab staff will be responsible for the safety of that person.
- ◆ All new users must read the standard operating protocol, safety rules and regulations and emergency protocol before they start working in the laboratory.
- ◆ Lab supervisor has the rights to deny any users from the usage of the laboratory.
- ◆ Any users who failed to follow the laboratory standard operating protocol and observe basic safety practices will be denied access to the laboratory and its facilities.
- ◆ When in doubt, always check with lab technologists or lab supervisor.
- ◆ All injuries and accident must be reported to the lab technologists or supervisor as soon as possible.
- ◆ Working alone in the laboratory is strictly forbidden after office hours. A second person must be present in the lab or adjacent lab and know that you are working in the lab.
- ◆ All food and drinks are strictly forbidden in the laboratory.
- ◆ All samples must be labeled with your name, date and material.

2. Basic laboratory Safety

- ◆ Lab coat must be worn at all times in the lab.
- ◆ Lab coats and/or gloves are strictly not allowed in Meeting Rooms, Staff Offices, General Offices, Restrooms, Lobby Area to prevent contamination from spreading to other areas.
- ◆ Always wear disposable gloves when handling anything in the lab.
- ◆ Users wearing contact lenses must put on a chemical safety goggle.
- ◆ Close-toed shoes must be worn in the lab.
- ◆ Hair should be tied back if it is too long.
- ◆ Nails should be kept short and the hands must be washed at the end of operations and very thoroughly before leaving the laboratory.
- ◆ All hand-to-mouth operations are forbidden.
- ◆ Coats, bags etc. must not be brought into the laboratory. Purses, wallets, valuables etc must be carried on the person.
- ◆ Lab coats must be hung up in the lab after use on coat hangers provided.

- ◆ Lab coats should be sent for washing weekly. Check with lab technologist or supervisor on where to deposit the lab coat for washing. Lab coat must not be brought home for washing.
- ◆ If the laboratory coat is badly contaminated and unsuitable for wear, user must check with lab technologist and supervisor for its proper disposal.
- ◆ No smoking at all times.
- ◆ Working area must be clean and uncluttered after use.
- ◆ All broken glasses, sharps and needles must only be discarded in sharp container found in the laboratory.
- ◆ Gloves must be removed from the hand before touching the door handle.
- ◆ Be aware of the hazards in the laboratory (See Appendix 1 for the location of hazards)
- ◆ Always wear appropriate personal protective equipment (PPE) when carrying out the experiment/work.
- ◆ Doors should be kept closed at all times unless during transportation of chemicals or equipment.
- ◆ Do not leave potentially dangerous experiments unattended.

3. Safety handling of sharps

- ◆ All sharp waste should be disposed off into the sharp disposal container.
- ◆ Do not leave unprotected sharps (razor blades, scalpel tips, etc.) unattended on bench tops. Contain the sharp items in a tray or a suitable container.
- ◆ Be careful when cleaning up after experimental procedures that require the use of sharps as sharp items may have become hidden in the garbage.
- ◆ Never leave an uncovered needle on the counter. Always rest the needle in its cap while waiting to use the assembled needle and syringe or in between steps of a procedure.
- ◆ Do not walk around the lab with an uncapped needle or syringe and needle.
- ◆ Do not bend, break, or otherwise manipulate needle by hand.
- ◆ Never recap needles. If it is absolutely necessary, recap use a cap-holding device or a pair of forceps or a one-handed technique to scoop the cap up.
- ◆ Never discard sharps into regular trash bins or biological waste.
- ◆ Never try to recover sharp material after it has been disposed off into the sharp container.
- ◆ Do not place sharps container on the floor of the lab at all times.

- ◆ Keep sharps containers covered at all times except when sharps are being deposited into the container.
- ◆ Do not overfill sharp containers beyond the recommended fill line or beyond $\frac{3}{4}$ full.

4. Classification of Emergencies

- ◆ All users must be familiar with the classification of the emergencies.
- ◆ Report any emergency situations to the lab technologist. In the absence of the lab technologist, inform Faculty Safety Officer and Campus Security (for Emergency Type 1 and 2). For Emergency Type 3, inform Faculty Safety Officer, Campus Security and SCDF. See Appendix 2 for contact details.
- ◆ Emergency evacuation route can be found in Appendix 3
- ◆ Location of first aiders can be found in Appendix 4

Three classifications of Emergencies

Emergency Type 1

- Any incident that is considered minor in nature and has no potential risk of threatening other faculty or facilities in the Faculty and is within the capability of Faculty personnel to handle
- Inform Faculty Safety Officer and Campus Security
- Example: Minor fire and minor chemical spillage

Emergency Type 2

- Any incident that is considered serious in nature and has potential risk of threatening other faculty or facilities in the faculty, though still within the capability of the Faculty to handle
- Raise alarm
- Inform Faculty Safety Officer and Campus Security
- Example: Fire involving flammable storage, chemical/biological spillage in substantial quantity

Emergency Type 3

- Any serious incident that is considered to be beyond the capability of the faculty to handle and requires assistance from external emergency services
- Raise alarm
- Inform Faculty Safety Officer, Campus Security and SCDF

- Example: Major gas leakage due to rupture of storage tank, major fire, major chemical/biological spillage, radioactive contamination, terrorist attack.

Handling of Emergency

Minor Fire

If fire is small enough to be put out with a portable extinguisher, use the PASS technique,

- Pull the pin
- Aim at the base of the fire
- Squeeze or press the handle
- Sweep the nozzle, horn or hose from side to side until the fire goes out

Always position yourself at an exit or means of escape behind you before you attempt to use an extinguisher to put out the fire.

Never fight a fire if

- You do not know what is burning
- The fire is spreading rapidly beyond the spot where it started
- You do not have proper equipment
- You might inhale toxic smoke
- Your instinct tells you not to

Major fire

- Remain calm and take immediate actions as follows:
- Stop whatever you are doing
- Raise the alarm
- Leave the building (Do not use the lift)
- Proceed to the designated assembly point
- Call Campus Security

Action to be taken by lab technologist at the scene

- Break nearest fire alarm glass to raise the alarm if it is not already done so
- Report the fire to Campus Security and Faculty Safety Officer

- Direct the occupants to proceed in an orderly way via the nearest available exit/staircase to the designated assembly point
- Check each floor to ensure that nobody is in the building
- Proceed to the assembly point
- Carry out roll call immediately at the assembly point
- Report status to the faculty safety officer and security officer

Chemical Spills

Minor chemical spill (Emergency type 1)

- Turn off all burners in the lab and switch off all electrical equipment
- Hold your breath and leave the room immediately.
- Warn others to stay out of the spill area to prevent spread of contamination.
- Post a sign on the door warning others of the spill.
- Remove any contaminated clothing and put it into a bag to be disposed.
- Wash hands and exposed skin and inform your PI or supervisor about the spill.
- Put on protective clothing (lab coat, gloves, mask, eye protection, shoe covers) and assemble clean-up materials (spill kit).
- Wait 30 minutes before re-entering the contaminated area to allow dissipation/settling of aerosols.
- Cover the spill with paper towels and gently apply disinfectant, proceeding from the outer edge of the spill to its center. Refer to MSDS for appropriate type of decontaminant.
- Leave in place for at least 30 minutes. (Refer to MSDS for contact time).
- Collect all treated materials and discard in a container. Use forceps to pick up any broken glass and place in a sharps container.
- Re-wipe the spill area with decontaminant. Remove gloves and wash hands thoroughly.
- Dispose the wastes according to procedures.

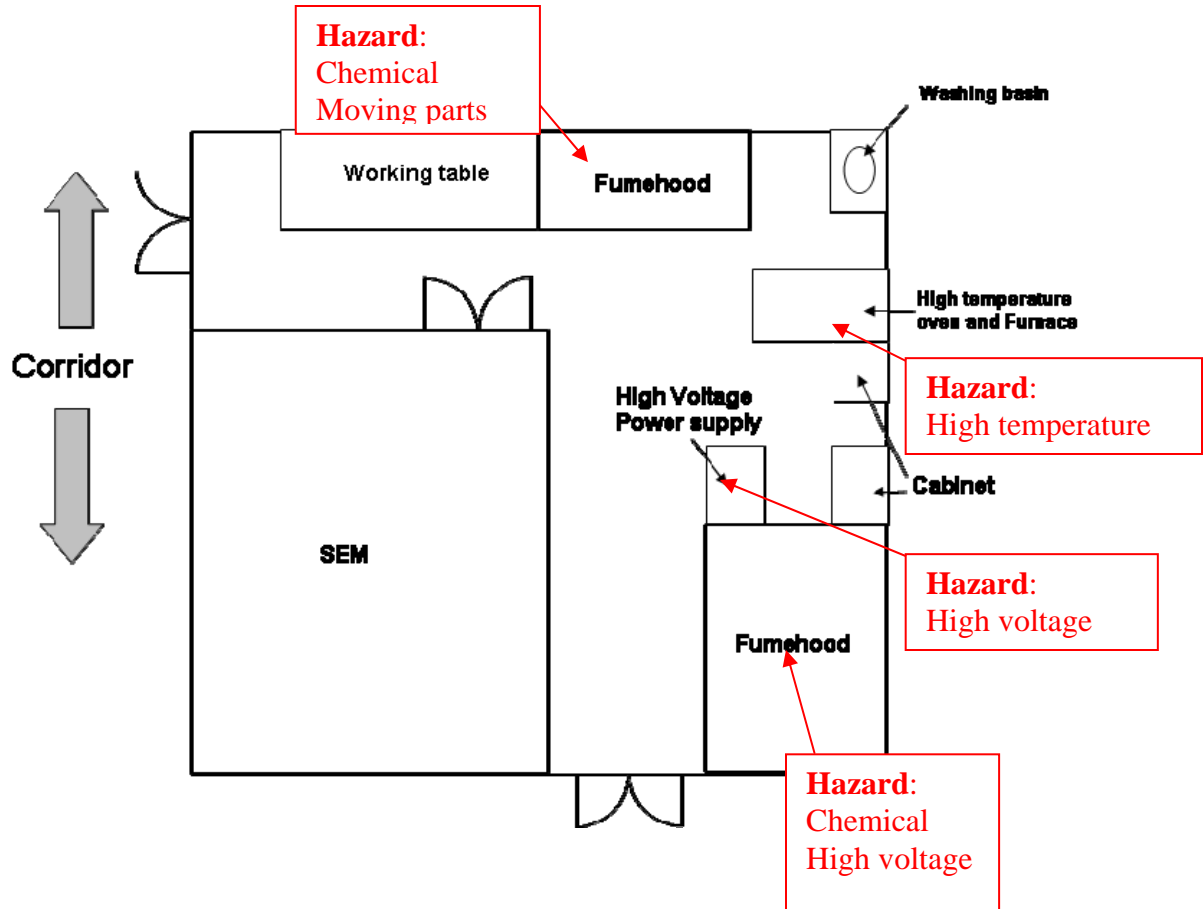
Major chemical spill (Emergency type 2)

- Turn off all burners in the lab and switch off all electrical equipment
- Evacuate all staff and students and assign them to a safe place.
- Inform the Faculty Safety Officer and the Campus Security

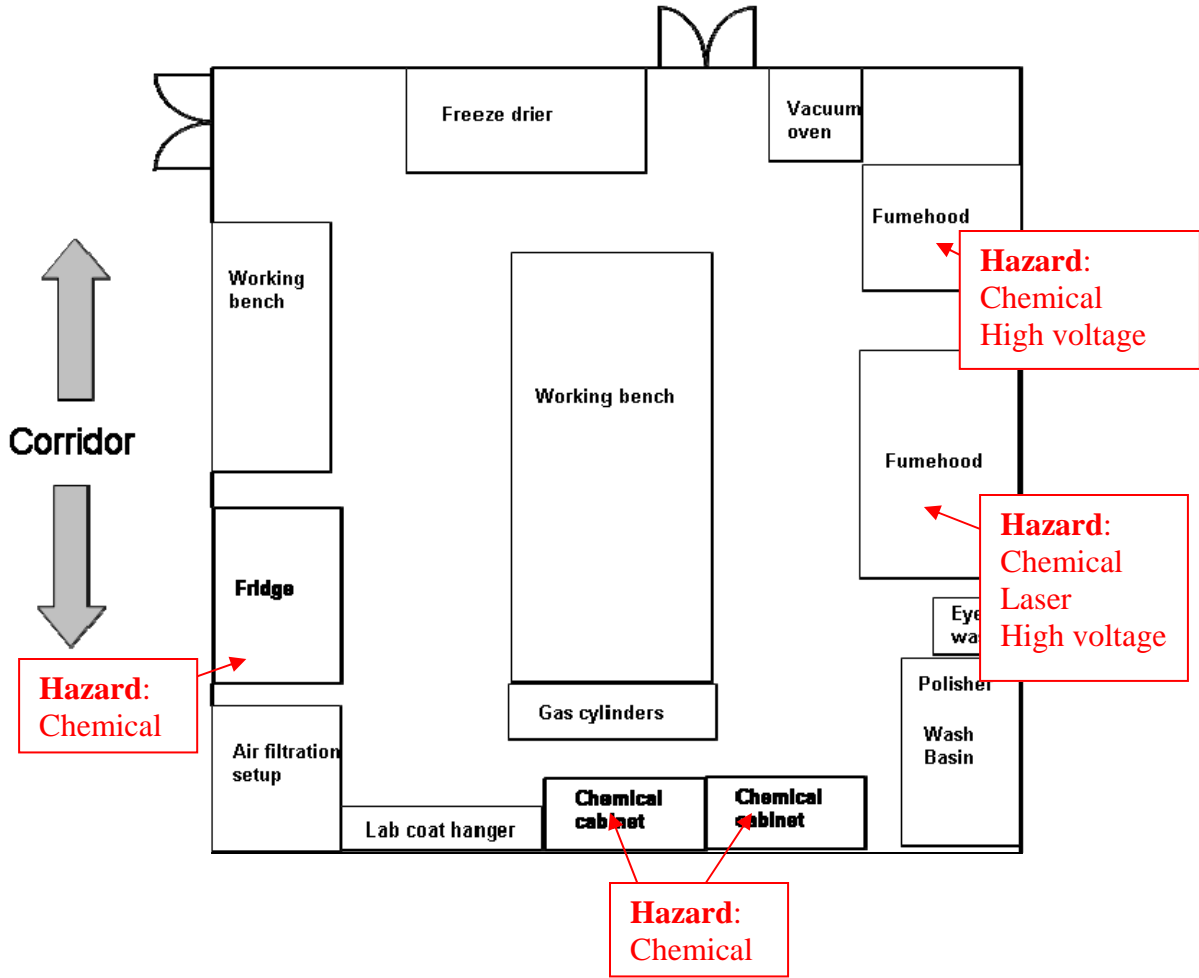
All staffs and students can only go back to their respective laboratories after an “All Clear Message” is announced. A flow chart of the emergency response plan can be found in Appendix 5.

Appendix 1 (Location of Hazards)

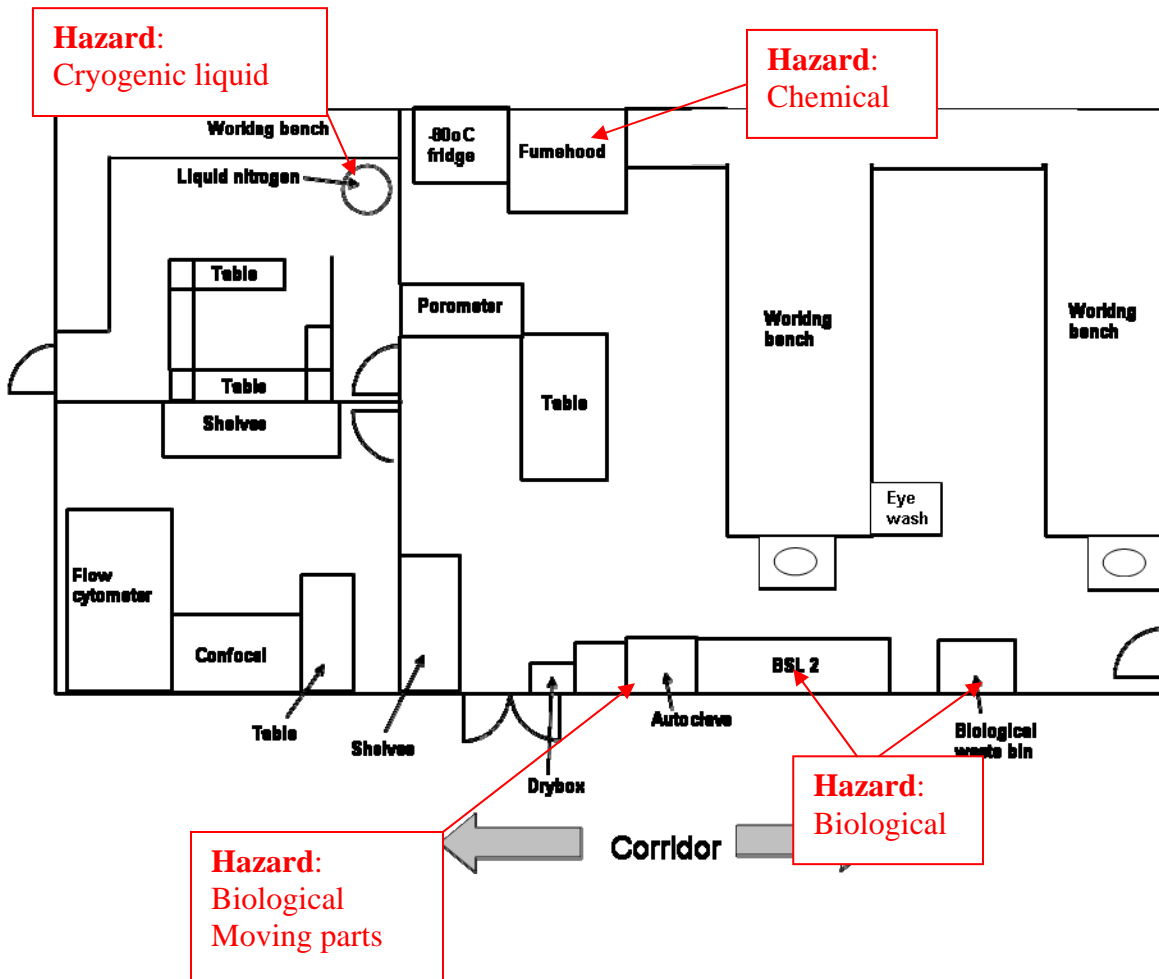
E3 05-09 (Not drawn to scale), 10 March 2008



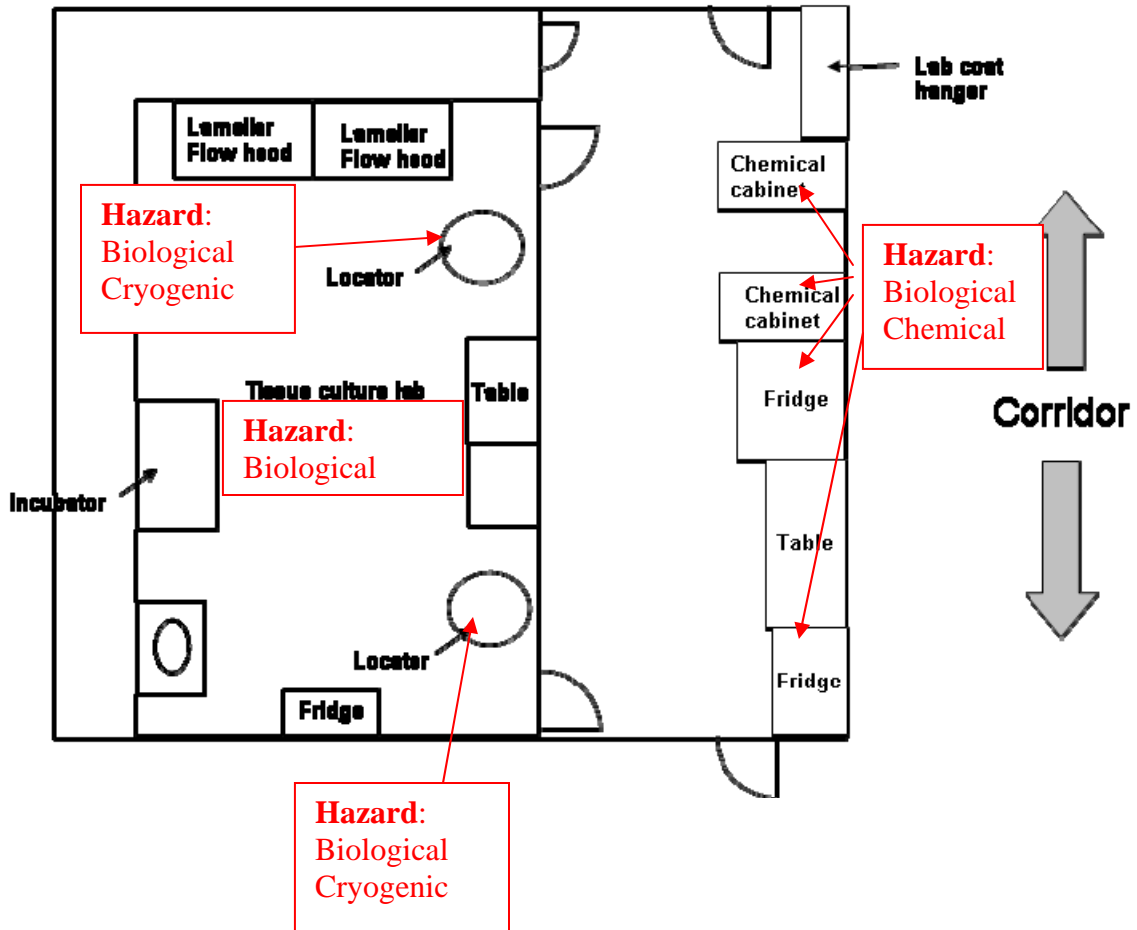
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E3 05-14 (Not drawn to scale), 10 March 2008



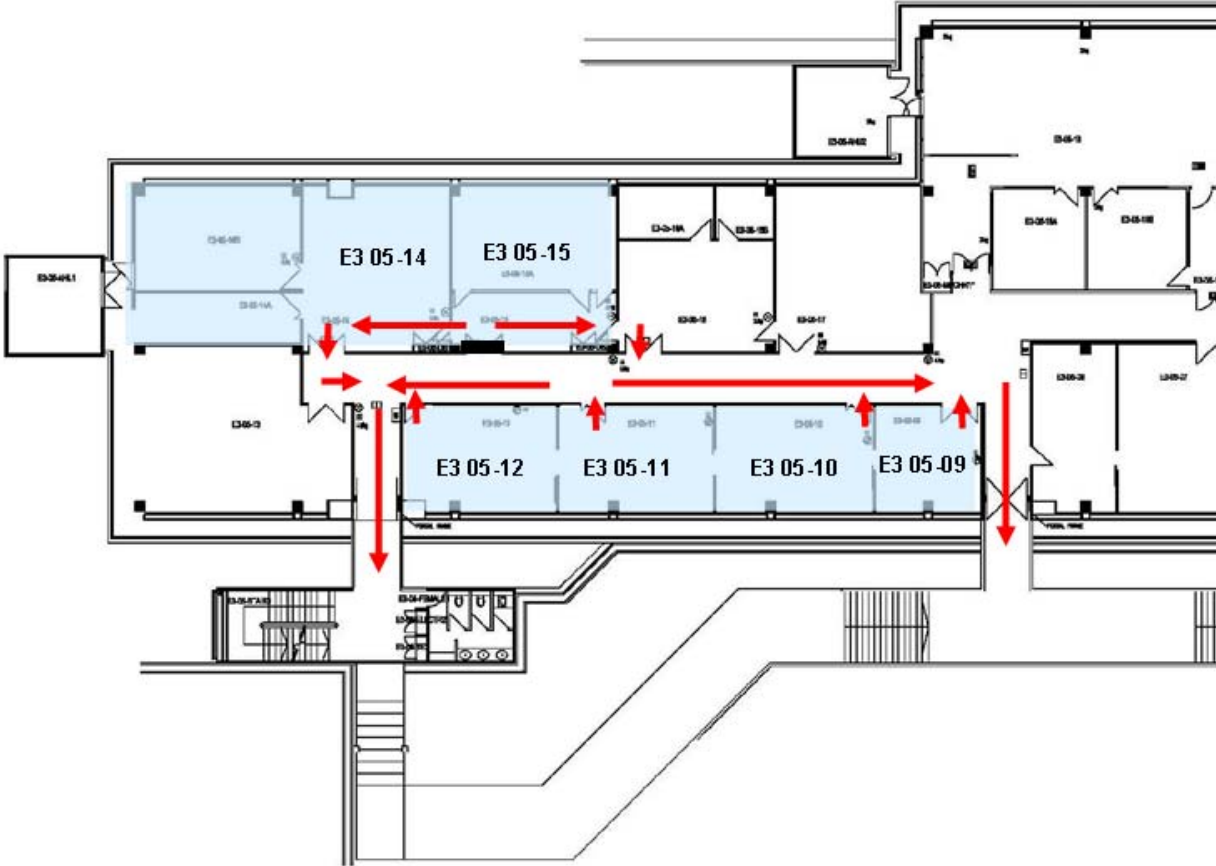
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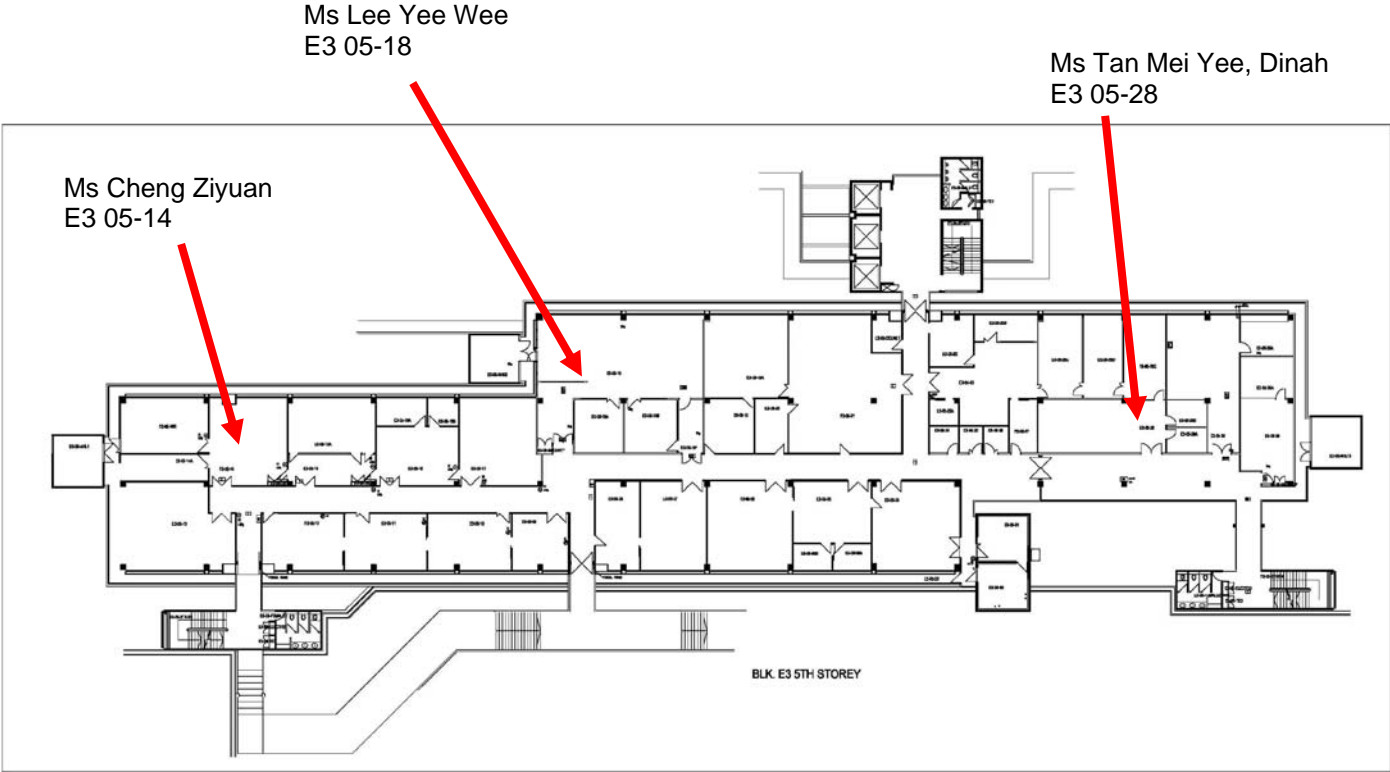
Appendix 2 (Emergency Contact Numbers)

Laboratory Supervisor: Prof Seeram Ramakrishna	6516 8596 (Office) 9088 9978 (mobile)
Laboratory technologist: Mr Teo Wee Eong	6516 4272 (Office) 9127 8293 (mobile)
Professional Officer: Ms Cheng Ziyuan	6516 5499 (Office) 9185 0139 (mobile)
Faculty Safety Officer: Francis Cheng	6516 8599 (Office) 9006 3314 (mobile)
First Aider: Ms Tan Mei Yee, Dinah	6516 6649
First Aider: Ms Lee Yee Wei	6516 5985
Campus Security Hotline	6516 1616
Campus Security Post (E5)	6516 2364 / 67757345
Campus Security Post (E3A)	6516 6866 / 67780369
Singapore Civil Defense Force (SCDF) / Ambulance	995
Police	999
Non Emergency Ambulance	1777

Appendix 3 (Emergency Evacuation Route)



Appendix 4 (First Aider location)



Appendix 5 (Emergency Flow Chart)

