ANFF-NSW
COVID-19 Safe Return-to-Work Plan

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ANFF NSW Node

UNSW SYDNEY

VERSION CONTROL

Date	Version	Details	Person
05-Jun-2020	V1.00	Submitted to UNSW Phoenix Recovery Team	Matt Boreland

22-Jun-2020	V1.01	Updated version based on feedback from UNSW Phoenix Recovery Team:
		• *1 Executive Summary*:
		  ○ Added text in physical distancing to explicitly note stay-at-home requirements if unwell
		• 4 Physical distancing
		  ○ Added text to remind staff & users to stay home if unwell
		• *5 Health Measures: hygiene, case reporting*
		  ○ Added text noting that minimisation of close-proximity during training
		• *6 Communications*:
		  ○ Added text to note core messages of the additional signage
		• *7.3 COVID-19 Notification Requirements*:
		  ○ Added linking to NSW health public heath guidelines
		• 8 Shut-down risk management:
		  ○ Section added to detail shutdown plans if required
			Matt Boreland

1 Executive Summary

ANFF-NSW supports research across multiple faculties and is relied upon by over 250 researchers, multiple Centres of Excellence and other high impact/profile research programs including >A $220M of ARC and NHMRC funded projects. Consequently, the impact of a COVID related shutdown at ANFF-NSW is significantly higher than in an individual laboratory.

UNSW's Return-to-Work protocols will apply at ANFF-NSW. However, because of the high impact potential there may be instances, now or in future, where we may also need to implement measures beyond the standard UNSW Return-to-Work protocols. The following points summaries the COVID measures are in place at ANFF-NSW:

- **UNSW Safe Return to Campus Policy/Training**
  All ANFF-NSW staff and lab users are required to complete the UNSW training and be approved to by their supervisor to return to campus before accessing the ANFF-NSW labs. In the case of lab users, it is the responsibility of the user and their supervisor to ensure that this condition has been met.
- **Physical Controls**
  HEPA filtered cleanrooms and associated cleanroom PPE enable significantly lower contact potential between lab users and contaminants from the outside environment resulting in reduced exposure risk.

- **Physical distancing**
  All ANFF-NSW users & staff must stay at home if they are unwell. A 1.5m physical distancing requirement applies for all activities in cleanroom labs, plant areas and office space. Maximum room occupancy levels have been set.

  SPECIAL EXCEMPTION: One-on-One Training of new ANFF-NSW Users is an essential activity which breaches the <1.5m distancing requirements. Upgraded PPE including P2/95 masks and face shields will be used to bring protection levels in line with recommendations for NSW health workers in COVID zones (https://www.health.nsw.gov.au/Infectious/covid-19/Pages/ppe.aspx).

- **Communications/signage**
  Multiple communication routes will be used to update users on COVID-19 protocols and status:
    - ANFF-NSW mailing list (anffnsw-users@lists.unsw.edu.au),
    - ANFF-NSW web page which has a dedicated COVID-19 section (https://www.anff-nsw.org/covid-19-response/),
    - ANFF-NSW scheduling software has notification functions to alert users to changes in the lab (https://anff-nsw.org/scheduler/Web/?).

  These electronic modes will be augmented by additional COVID-19 signage in the labs and at lab entry points.

- **Monitoring/Tracing**
  Equipment booking software enables orderly scheduling of access to the lab and records usage information. Access to the lab is controlled by security-card operated doors and real-time lab-occupancy levels are monitored in parallel via a tap-in/tap-out electronic logbook. Data from theses system are available for tracing if a COVID-19 case related to ANFF-NSW staff or users is reported.
- **Ongoing review**
  COVID measures and compliance levels will be reviewed weekly as a standing agenda item at ANFF's lab meeting

2 UNSW Safe Return to Campus Policy/Training

UNSW has developed a detailed COVID-19 policy and training structure to enable a Safe Return to Campus. The UNSW policy forms the foundation of ANFF-NSW COVID-19 Safe Return to Campus Policy, with additional localised requirements as detailed in the current document.

One of the cornerstones of the UNSW policy is that all staff/students must complete the UNSW training module and be approved to be allowed to return. This same training and approval process is also a mandatory requirement for ANFF-NSW staff and users to complete before re-accessing ANFF-NSW labs. In the case of lab users, it is the responsibility of the user and their supervisor to ensure they have met all of UNSW's Safe Return to Campus - Compliance & Approval requirements.

EXTERNAL/NON-UNSW USERS: please contact ANFF-NSW before re-accessing the ANFF-NSW labs so that we can ensure that you have the appropriate trainings in place.

3 Physical Controls

The ANFF-NSW labs use HEPA filtered air to provide ISO 5[1] to ISO 7 grade cleanrooms with positive air pressure to enable fabrication of micro and nano-scale devices in a low particle environment. For comparison, surgical operating theatres ISO 6 to ISO 7 range. To maintain the clean environment, all users are required to were PPE including a minimum of hair-cover, mask, goggles, gloves, and booties. In the ISO 5 area full clean-room suits are stipulated (see Figure 1 ANFF user in ISO 5 cleanroom wearing a full cleanroom suit.).

Figure 1 ANFF user in ISO 5 cleanroom wearing a full cleanroom suit.

The combination of HEPA cleaned air and associated cleanroom PPE enables a significantly lower contact potential between users and contaminations from the outside environment. Consequently COVID-19 exposure risks are much more controlled compared to a non-cleanroom lab or office environment.

3.1 Lab PPE Protocols

Previously the focus of "gowning up" when entering the labs was to maintain the cleanliness of the cleanrooms. These have been modified and tightened to enhance protections against COVID-19 within the ANFF-NSW labs.

- **WASH IN / WASH OUT** The ANFF labs have hand-wash stations at all entry/exits points. It is now compulsory to wash hands on ENTRY and EXIT to the labs to reduce hand-based transmission routes into the labs. Posters for upgraded hand washing procedures have been posted at each wash station.
- **GLOVES FIRST and ALWAYS** Gloves now go on first, before other PPE. This measure reduces bare hand contact to other PPE, reducing hand-based transmission routes in the lab. In addition, no equipment in the lab is to be operated with bare hands, and gloves must be worn at all times. (Previously gloves went on last.)

[1] Smaller number are cleaner in the ISO ratings nomenclature

- **MASKS ALWAYS IN ALL LABS** Masks must be worn in all ANFF labs at all times to reduce oral transmission routes in the lab. (Previously masks were optional in some labs.)
- **NO SHARING GARMENTS** Cleanroom garments must not be shared. This measure to reduces garment-based, touch-transfer in the lab. Disposable "Tyvek" suits have been issued to users as required. (Previously some users had their own cleanroom garments and some shared.)
- **CHANGE ALONE** The change room areas are relatively small. To provide social distancing the change rooms are to be occupied by one-person at a time, to increase social distancing.

4 Physical distancing

In the first instance ANFF-NSW users & staff must stay at home if they are unwell. Otherwise, physical distancing of >1.5m will always be required in all labs and office activities, in line with UNSW protocols. Note that this is in addition to the protections afforded by the ANFF-NSW HEPA filtered cleanrooms and PPE which provide additional levels of protection to COVID transmission.

4.1 Lab/Office Occupancy Caps

To facilitate physical distancing, maximum occupancy levels have been set based on room area, fraction of available floor space, traffic/circulation routes, and operator locations to enable a minimum of $4m^2$ of space per user. In addition, localised caps have been set at specific operator location and circulation routes where physical distancing cannot otherwise be maintained. The associated floorplans are shown in *Appendix A ANFF-NSW floor plans.*

These headcount caps are displayed via lab/office door signage, which has been in place for several weeks. An electronic display of the live lab occupancy level is now also located at the lab entry for users to double check before entering a lab (see Figure 3 Entry display of the lab entry logbook, showing the current (live) occupancy and the maximum for the lab.).

All ANFF-NSW users are required to pre-book at least one piece of equipment before entering the lab. The system enables orderly scheduling of la user by providing user awareness of peak usage times and the number of concurrent bookings.

4.2 Access restrictions to Offices

To increase social distancing, access to the ANFF office is limited to residents of the office (except by pre-approved/formal appointment). All "hot-desk computers for Raith/WVASE software, can now only be accessed remotely via TeamViewer.

4.3 Staggered work teams

The use of red/blue team staggering was not considered to be feasible for lab-based staff due to the relatively small staff head count at ANFF-NSW. However, staggered starting times are already in place and several staff work part-time, which reduces the onsite population at any given time. Where possible, ANFF staff are working-from-home for most of the week (e.g. ANFF management and admin staff) thereby providing staggered staffing for these roles.

4.4 Meetings

ANFF meetings are conducted using Zoom or MS Teams for videoconferencing to ensure physical distancing.

4.5 Physical distancing exception: One-on-One training.

One-to-one training is an essential activity in the ANFF-NSW labs to enable onboarding of new ANFF users. However, due to the necessary close-proximity of the trainer and trainee, the 1.5m physical distancing rule cannot be met. Consequently, one-on-one training has not been allowed since the early stages of the

COVID-19 pandemic. As part of ANFF-NSW's Safe Return-to-Campus preparations, the following layers of PPE will be added during trainings to the existing cleanroom apparel:

1. High grade P2/95 mask
2. Full face shield

These levels of PPE are in line with recommendations for NSW health workers in COVID zones (https://www.health.nsw.gov.au/Infectious/covid-19/Pages/ppe.aspx & http://cec.health.nsw.gov.au/keep-patients-safe/COVID-19/Personal-Protective-Equipment-PPE). Close-proximity will also be minimised wherever possible. Given the low levels of COVID-19 now in the community, the clinical-level PPE provides protection well above the likely exposure potential in the ANFF-NSW cleanrooms. Nevertheless, access to one-on-one training will remain a restricted activity and will be regularly reviewed, especially in the context of community outbreaks that may increase risk.

Details of safety controls for One-on-One training have been recorded in the UNSW HS017 HS Risk management form and submitted as part of ANFF-NSW Return-to-Campus Application.

5 Health Measures: hygiene, case reporting

ANFF-NSW will follow UNSW Health Measures protocols including hygiene, case reporting and conditions for return to work. The following have been applied across ANFF-NSW:

- handwashing and hand sanitiser facilities are available in office and lab areas
- daily cleaning of touchpoints and surfaces office and lab entry areas
- IPA will be used for cleaning in the labs
- disinfectant has been procured for use in office areas

In the case of the ANFF-NSW labs, hygiene requirements are largely addressed by the HEPA filtration and standard cleanroom PPE. As such addition cleaning measures will be focused on the lab entry areas especially the doors, doorhandles, PPE cupboards that may be touched with bare hands.

UNSW COVID-19 case management protocols will be followed if a suspected COVID-19 case is discovered within the scope of ANFF-NSW. Due to the high impact potential of a COVID-19 case withing ANFF-NSW, users of the ANFF-NSW labs will need to notify ANFF-NSW, in addition to their supervisors, if they are exposed to potential infection (e.g. a positive COVID test, or required to enter quarantine). See *COVID-19 Notification Requirements*

6 Communications

Regular communication with the user base is important to the smooth operation of the ANFF-NSW labs. As such there are several long-standing communications modes in place:

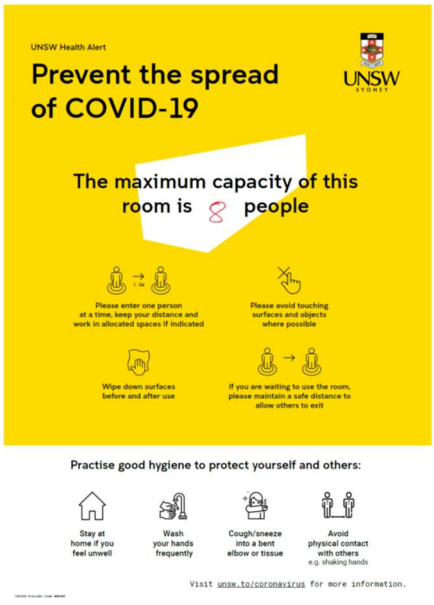
- **ANFF-NSW mailing list** (anffnsw-users@lists.unsw.edu.au),
- **ANFF-NSW web page** has a dedicated COVID-19 section (https://www.anff-nsw.org/covid-19-response/),
- **ANFF-NSW scheduling software** has notification functions to alert users to changes in the lab (https://anff-nsw.org/scheduler/Web/?).
- NEW: **ANFF-NSW electronic tap-in/tap-out screens** will alert lab users of current occupancy

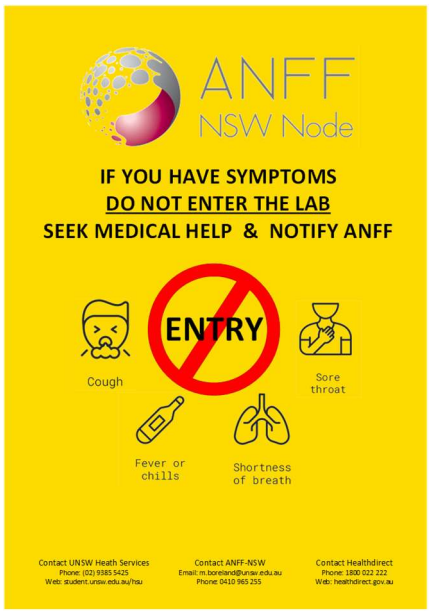
In addition to these electronic mode, additional signage has been added to the ANFF-NSW areas including:

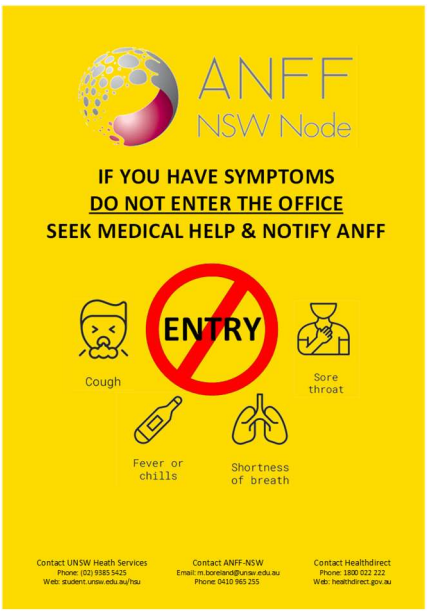
- **Room occupancy caps:** includes reminders on stay-at-home if unwell, distancing, hygiene etc

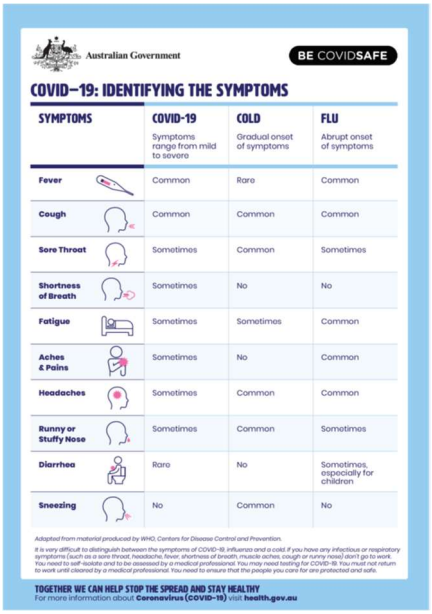
- **PPE protocols:** change alone; wash-in/wash-out; gloves first/always; mask in all labs; no shared garments
- **COVID entry restrictions**: do not enter if you have symptoms
- **COVID-19 Identifying Symptoms:** summary of COVID-19 symptoms (from health.com.au)

Figure 2 Examples of COVID-19 signage in use at ANFF-NSW









7 Monitoring and tracing

7.1 Electronic monitoring

Access to ANFF-NSW labs is controlled via security-card operated doors which is recorded by UNSW Security. A recently installed tap-in/tap-out electronic logbook, which is based around the existing security card, also monitors and records room occupancy levels in real-time (see Figure 4). The lab entry e-logbook displays the maximum allowed occupancy level, and alerts the lab users if their entry will breach the occupancy cap. It

also enables ANFF-NSW staff to readily monitor the current occupancy levels via the displays at each lab entry, or via centralised dashboard display in the ANFF-NSW office area. The real-time monitoring enables real-time remedial responses to non-compliant occupation levels in the lab.

Data from e-logbook and the scheduling software is available for tracing if a COVID-19 case is reported.

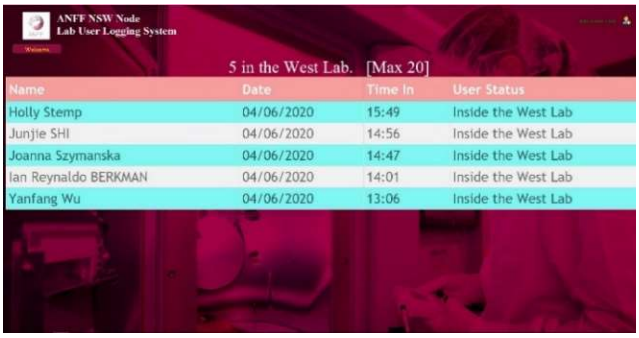


Figure 3 Entry display of the lab entry logbook, showing the current (live) occupancy and the maximum for the lab.

Figure 4 Dashboard display of the lab entry log-book system, showing the real-time and the maximum occupancy levels.

7.2 Lab Captains

Each lab has an assigned "Lab Captain" who provides daily/random checks of compliance levels in the ANFF-NSW labs/office and ensure all COVID-19 measures are functioning.

Table 1 List of Lab Captains.

Lab	Lab Captain / back-up
West labs	Joanna Szymanska / Pierrette Michaux
East labs (upper)	Ute Schubert / Joann Szymanska
East labs (lower)	Andrew See / Fay Hudson
South labs	Jeff Chung / Gordon Bates
Far East labs	Mark Gross / Jos Firth
ANFF Offices	Karen Jury / Nora Cowen / Anna Adams / Lucy Wong

7.3 COVID-19 Notification Requirements

ANFF-NSW supports research across multiple faculties and is relied upon by over 250 researchers, multiple Centres of Excellence and other high impact/profile research programs including >A $220M of ARC and NHMRC funded projects. Consequently, the impact of a COVID related shutdown at ANFF-NSW is significantly higher than in an individual laboratory. Due to the high impact potential it is important that responses to a possible infection source are rapid. Such a rapid response requires a rapid notification of a possible infection sources.

Therefore, all ANFF-NSW users are required to notify ANFF-NSW, if they are exposed to potential infection (e.g. a positive COVID test, or required to enter quarantine). The notification to ANFF-NSW is in addition to their supervisor required by the UNSW Health Measures policy. Following notification to ANFF-NSW, the user's access to ANFF-NSW labs is de-activated until they are no longer a high risk. The standard applied is based on the current public health guidelines according to NSW Health which are updated regularly on their web site: https://www.health.nsw.gov.au/Infectious/controlguideline/Pages/novel-coronavirus.aspx

7.4 Compliance Escalation

It is incumbent on all ANFF-NSW staff and ANFF-NSW Lab Users to abide by the COVID-19 measure and actively discourage non-compliance to COVID-19 measures. Typically, non-compliance will be addressed

informally “at the coal-face” by ANFF Lab Captains to recommunicate the requirements. In the case of repeated non-compliance, the following escalation route will be applied:

- First case: ANFF-NSW Lab captain reports to ANFF-NSW Project manager
  (Project Manager contacts the lab user)
- Second case: Project Manager reports to ANFF-NSW Facility Business Manager
  (Facility manager contacts the lab user’s supervisor)
- Third case: Facility Business Manager reports to ANFF-NSW Director
  (Meeting between lab user, supervisor, Facility Business Manager, & Director for decision on suspension of lab access)

8 Shut-down risk management

ANFF-NSW has remained operational thus far throughout the COVID-19 pandemic. However, it may become necessary to implement shut-downs as part of UNSW COVID-19 case management protocols or in response to a broader community lockdown requirement from NSW State Government. Consequently, a two-stage system for lab shut-down plan has been developed for ANFF-NSW should an urgent shut-down be required. A detailed summary for the two stages of shutdown are shown in Table 2 and Table 3.

A Stage 1 shutdown can be achieved in one day to provide a rapid-response, “soft” shutdown for relatively short lockdowns. The Stage 1 shutdown is nominally similar to the process typically used for extended long-weekends (e.g. Easter holidays). A Stage 2 shutdown requires an addition 3 – 5 days to enable a “full” shutdown for longer periods, which is nominally similar to the process typically used for End-of-year shutdowns. The two stages can be sequentially phased to enable a same-day initial response via the “soft” shutdown (e.g. for local/UNSW outbreak requiring a fast lockdown response) which can then be transitioned to a “full” shutdown if required.

It is envisaged that progression to a “full” shutdown will only be required in cases of extreme community outbreaks, which are expected the have sufficient warning (i.e. NSW Health case numbers) to accommodate the 3-5 days required for a full shutdown. Communication to the ANFF-NSW user base regarding any shutdown will be via a combination of broadcast email, web-page notices and alerts on the ANFF-NSW bookings system.

9 Ongoing review.

ANFF-NSW has regular lab meeting, every Friday. These meetings are open to ANFF-NSW users and are minuted. For timely and transparent communication, these minutes are available to our users on our website (https://www.anff-nsw.org/documents/lab-meeting/) with headline items noted via a broadcast email on the ANFF-NSW mailing list (anffnsw-users@lists.unsw.edu.au).

A standing COVID-19 agenda item has been in place at these ANFF-NSW Lab Meetings since the end of March 2020. COVID-19 measures and compliance levels are reviewed with decisions/actions made as required.

Table 2 Details for the ANFF-NSW Stage-1/"Soft" lab shutdown plan

Shutdown level	Phase	Tasks/Activities	Staffing requirement	Time Frame	Key dependencies/risks	Comments
STAGE 1 "Soft" shutdown *(nominally the same as process implemented for long-weekend and "Easter" shutdowns)*	Shutdown	• HVAC, Exhaust, PCW active • DIW off & isolated • Tools to standby (powered up but not processing) • Gas supply shutoff (lines still charged and LLS active) • <u>Option</u>: removal/disposal of open chemical bottles • <u>Option</u>: disposed active chemical solutions (const. temp bath) • <u>Option</u>: close some PCW connections (minimise flood risk)	All Process Eng. Staff All Equip. Eng. Staff **Minimum:** Process team x2: GB + PMM Eng. team x2: JS + US (assumes no chemical disposal)	1 day MBE (Molecular Beam Epitaxy) 1 days	<u>External</u> • No external contractors needed for soft shutdown <u>Internal</u> • ANFF staff availabilities • JC availability for setting MBE to idle (SB backup)	• Similar to weekend shutdown • MBE has two standby levels: "hot" were sources are at high temp; "cold" where sources are at low temp. It will take 2-3 days for hot sources to reach cold idle state
	Hibernation	Daily "caretaker" attention required • Remote monitoring by SCADA • Daily on-site checks (floods, alarms, etc) **Minimum:** at least weekly checks	At least 1 Equip. Eng. Staff (on rotation) 1 Proc. Eng. Staff on-call (on rotation)	1 – many weeks	<u>Internal</u> • MBE source damage if power fails (if sources are "hot") • Proc. Eng maybe required if attention required for specialised tool trips. (e.g. EBL) • If caretaker disallowed by COVID lockdown or staff quarantine then response to on-site mishaps is restricted (e.g. floods, alarms, etc)	• Long soft shutdown periods only viable if caretake functions are possible
	Restart	• Re-open lab	**Minimum:** 1 Equip. Eng 1 Proc. Eng.	1 day MBE 5 – 14 days	<u>Internal</u> • JC availability for MBE shutdown (SB backup)	• MBE restart dependent on "hot" vs "cold" shutdown. I.e. restart from cold is longer

GB: Gordon Bates; PMM: Prince Matthew; JS: Joanna Szymanska; US: Ute Schubert; PAM: Pierrette Michaux; JC: Jeff Cheung [SB: Steve Bremner back up for MBE]; FH: Fay Hudson

Table 3 Details for the ANFF-NSW Stage-1/"Soft" lab shutdown plan

`Shutdown level	Phase	Tasks/Activities	Staffing requirement	Time Frame	Key dependencies/risks	Comments

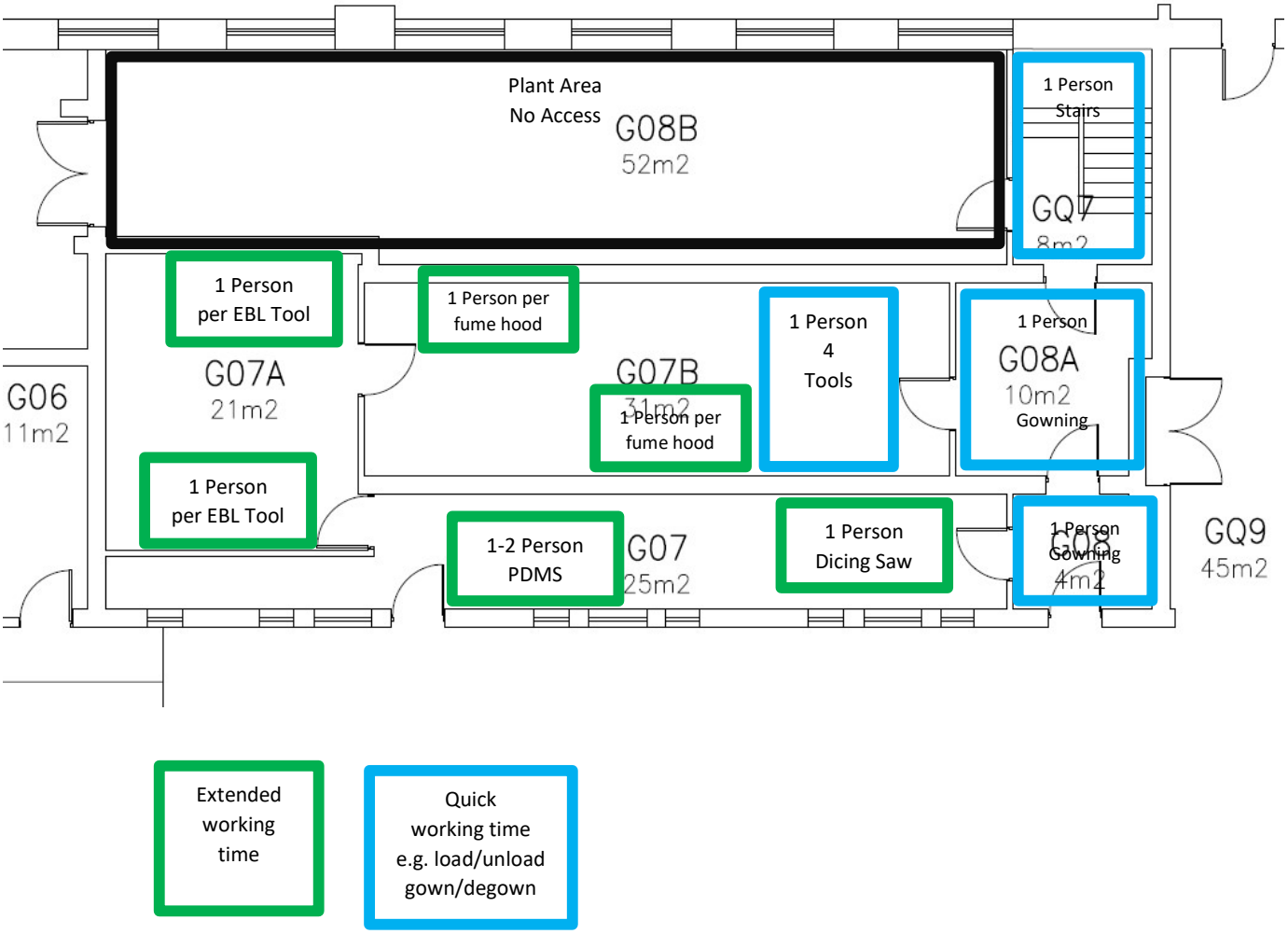
STAGE 2 "Full" shutdown
 	
(nominally the same as process implemented for end-of-year shutdown period)
	Shutdown	• HVAC off
		• Exhaust off
		• PCW off
		• DIW Off & Isolated
		• Chemicals removed/disposed (opened bottles only)
		• Tools powered down
		• Spec. Gas System (SGS) shutdown
		  ○ Purge gases from gas shed to tools
		  ○ Gas shed pumps off
		  ○ Close gas bottles
		  ○ Disarm LSS
		• Closed signage posted
			All Process Eng. Staff
			
			All Equip. Eng. Staff
			
			Minimum:
			Eng team x 2:
			GB + PMM
			Proc. team x 2:
			JS + US
			
			MBE team x1
			JC
				1.5 – 2 days
				
				MBE (Molecular Beam Epitaxy)
				
				3 – 5 days
					<u>External</u>
					• Umech: SGS shutdown (backup plan: GB/PMM for faster response).
					• ABM & Peter Horn: Not needed.
					• Chemical disposal: dependent on waste contractor availability & J12 Waste Chem capacity. (backup plan: lab storage.)
					<u>Internal:</u>
					• ANFF staff availabilities
					• JS/PAM availability for EBL shutdown
					• JC availability for MBE shutdown (SB backup)
					• MBE shutdown period depends on operation status at shutdown
						• Significant reduction in electricity requirements
						• MBE has two start points for shutdown: "hot" were sources are at high temp (5-day shutdown required); "cold" where sources are at low temp. (3-day shutdown required). "Hot" sources are exposed to expensive damage if shutdown prematurely

	Offline	Unattended up to 3-6 weeks (i.e. status equiv. to an End-of-Year shutdown)	Minimal. Only required if emergency, such as flood, or overheating of lab space, rain ingress etc	3 - 6 weeks	<u>Internal</u> • Unattended rain ingress or other flooding • Damage from long period without humidity/temperature control • Loss of N2 flowing to furnaces result in contamination (furnaces at room temp)	• 3-6 weeks is of the order of past implementations for "Christmas" shutdowns. • Longer shutdowns are feasible but may increase restart risks
	Restart	• Restart all of the above	All Process Eng. staff All Equip. Eng. staff	3 days MBE 5 – 14 days	<u>External</u> • Umech availability to restart SGS backup plan: GB/PMM) <u>Internal</u> • JS/PAM availability for EBL start-up • JC availability for MBE shutdown (SB backup) • Process tool fault/errors during power-up • Shutdowns longer than 6 weeks may increase the probability of restart failures due to system stagnation	• Faster than standard "Christmas shutdown" as no compliance testing required (RCDs, fume cupboards, fire suppression, PAT testing)

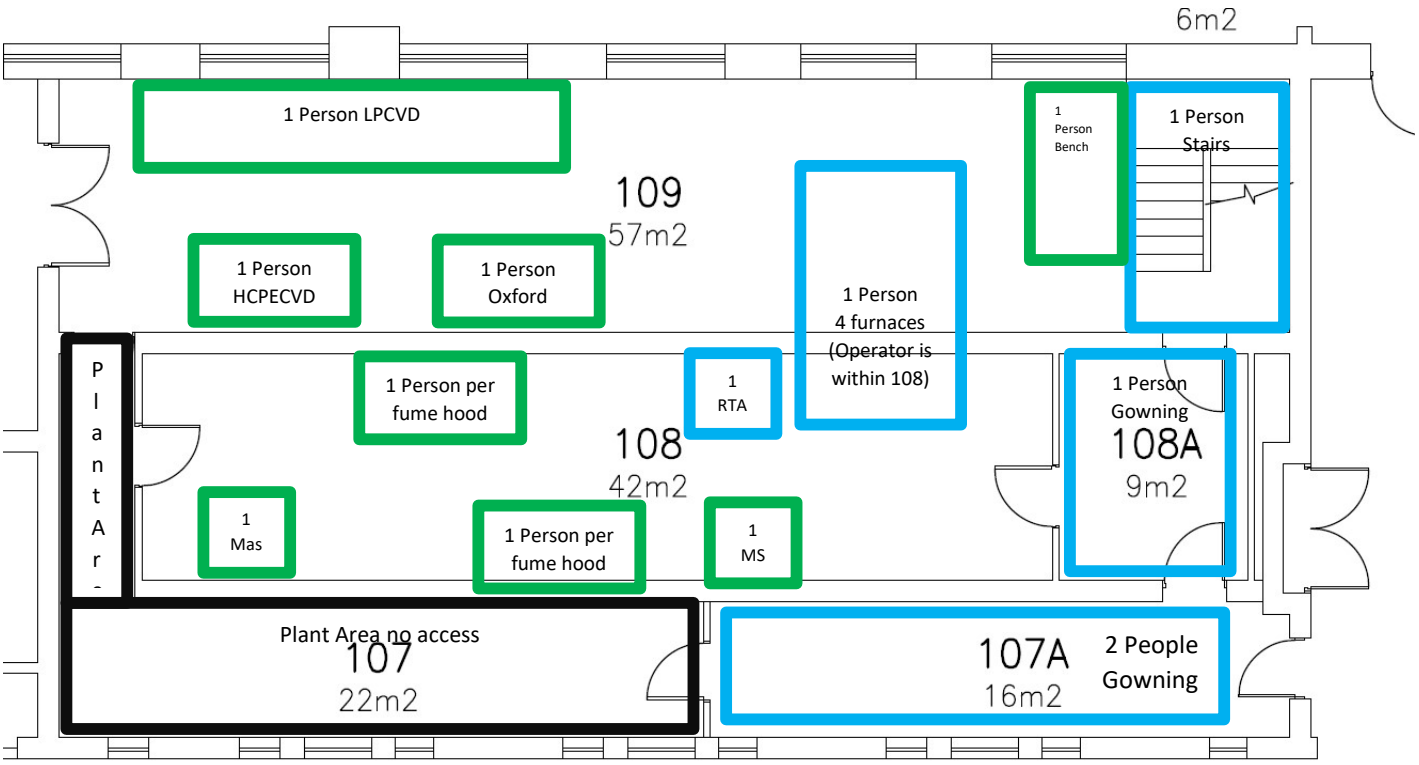
GB: Gordon Bates; PMM: Prince Matthew; JS: Joanna Szymanska; US: Ute Schubert; PAM: Pierrette Michaux; JC: Jeff Cheung [SB: Steve Bremner back up for MBE]
Umech: gas contractor; ABM: gas consultant

10 Appendix A ANFF-NSW floor plans

ANFF Lower East Labs G08 J12 (Indicative only. Drawing not to scale)



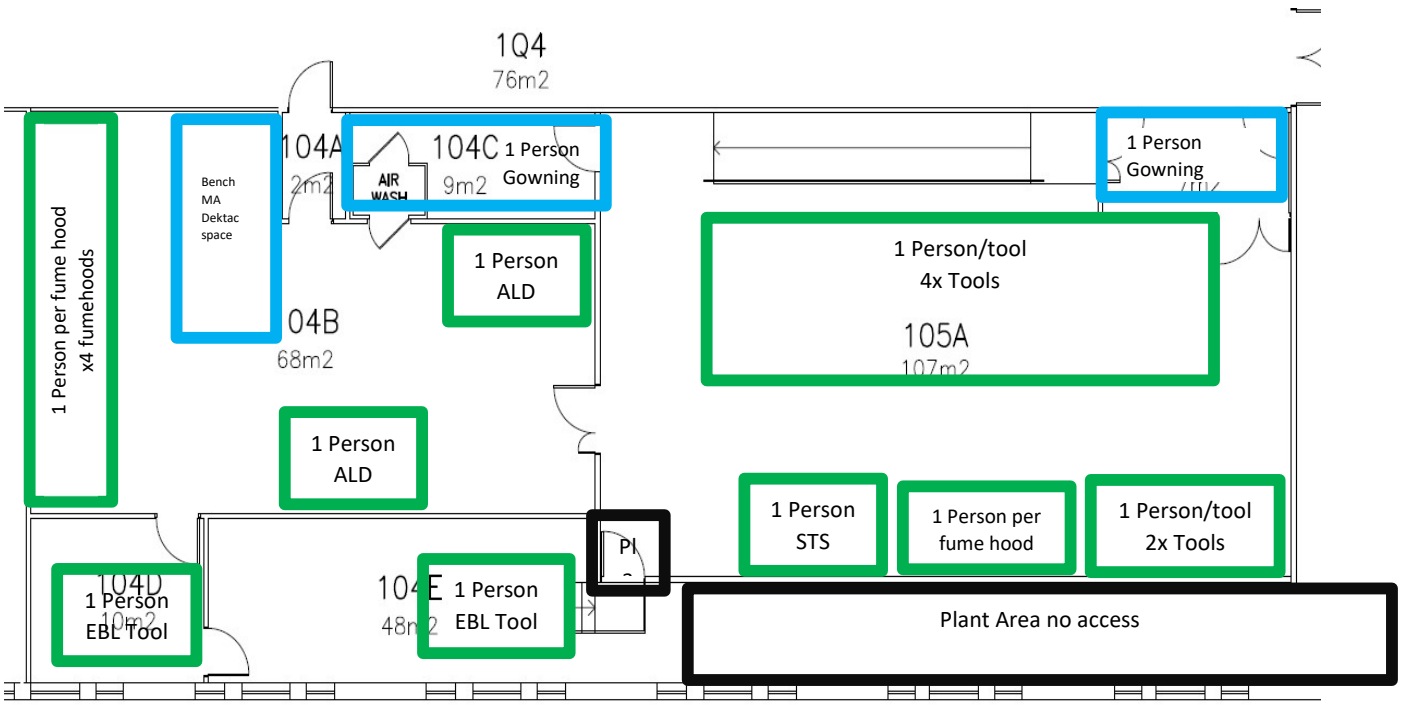
ANFF Upper East Labs 107A J12 (Indicative only. Drawing not to scale)



Extended working time

Quick working time ego load/unload gown/degown

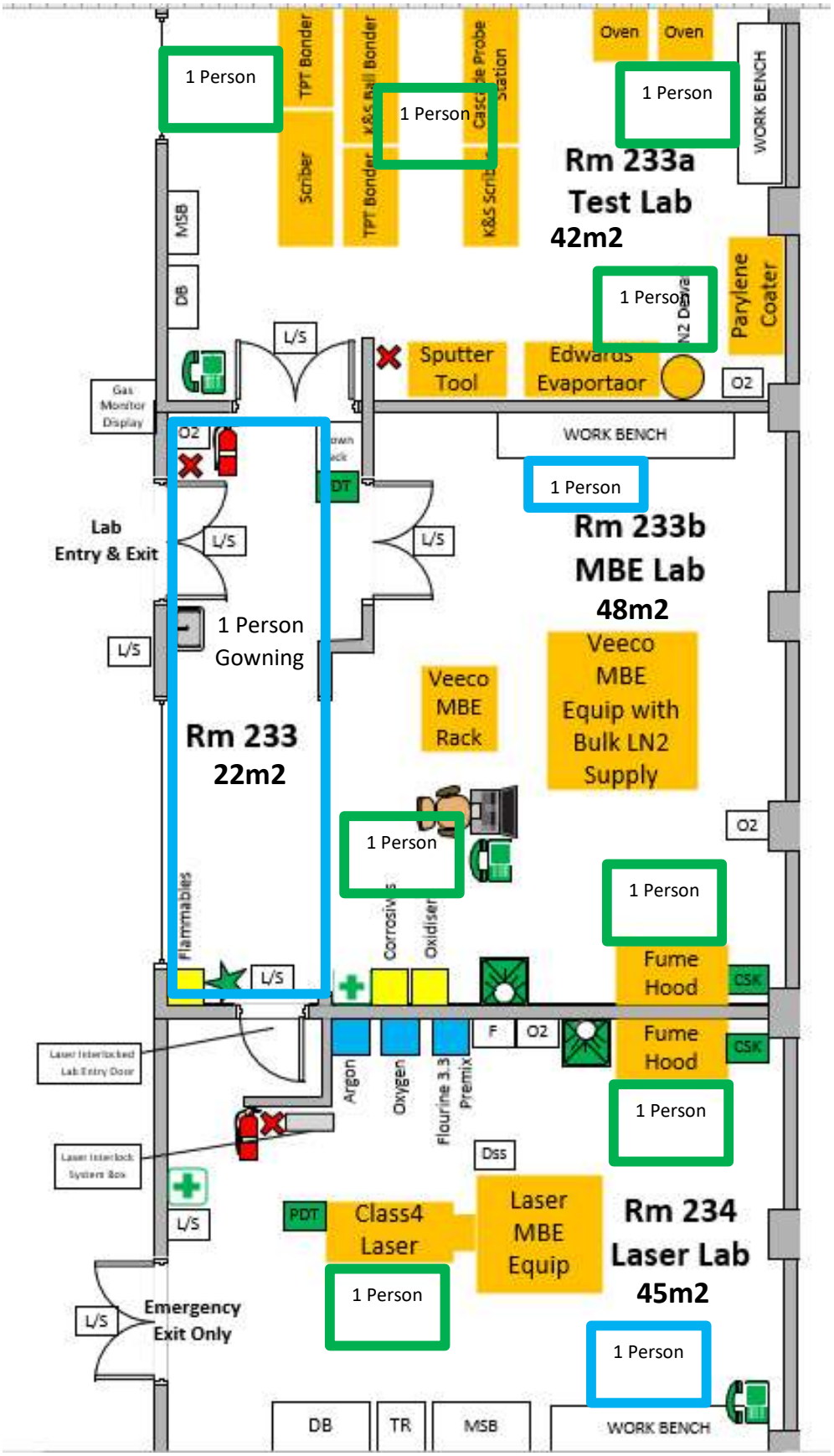
ANFF West Labs 105 J12 Newton (Indicative only. Drawing not to scale)



Extended working time

Quick working time e.g. load/unload gown/degown

ANFF South Lab 233 K15 (Archibus plan unavailable. Drawing not to scale)

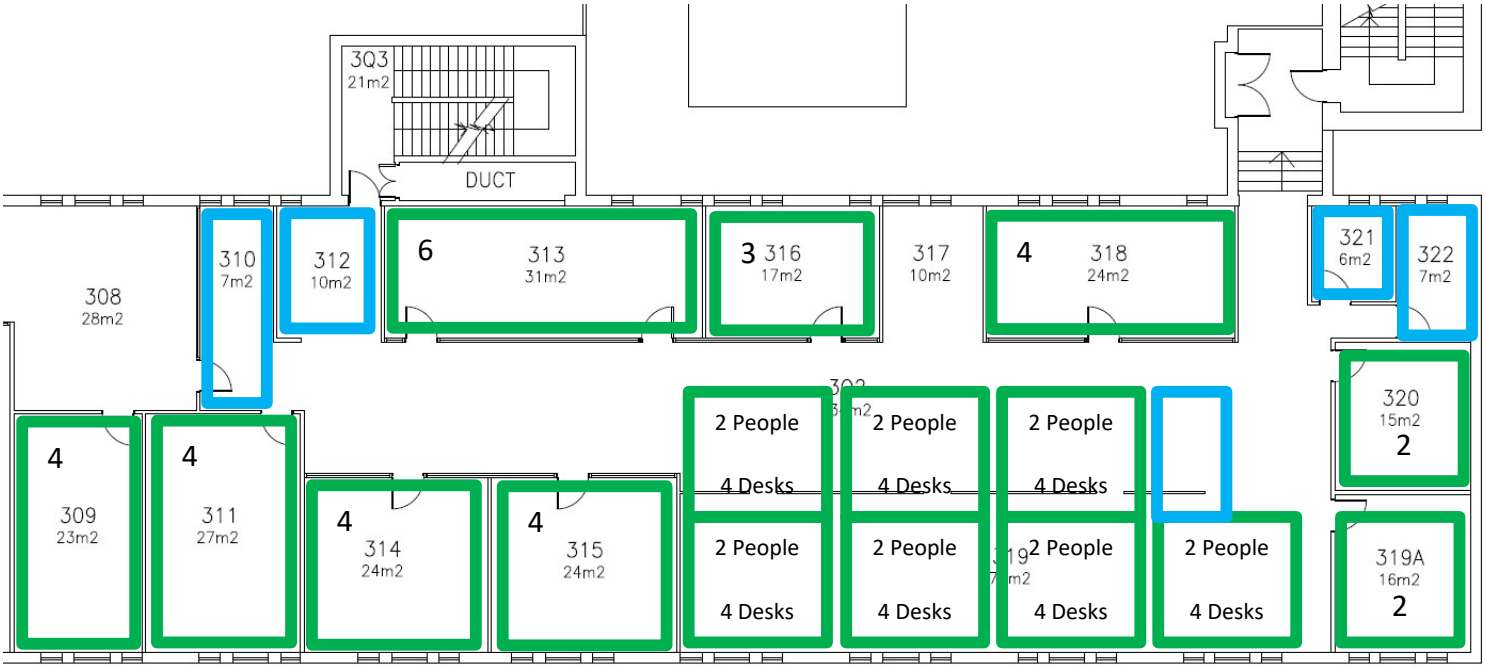


Quick working time e.g. load/unload gown/degown

Extended working time

Far East Lab Ion Implanter G28 K15 (Archibus plan unavailable. Drawing not to scale)

Quick working time e.g. load/unload gown/degown

Extended working time

ANFF Offices L3 J12 Newton Rm 310 (Indicative Only. Drawing not to scale)