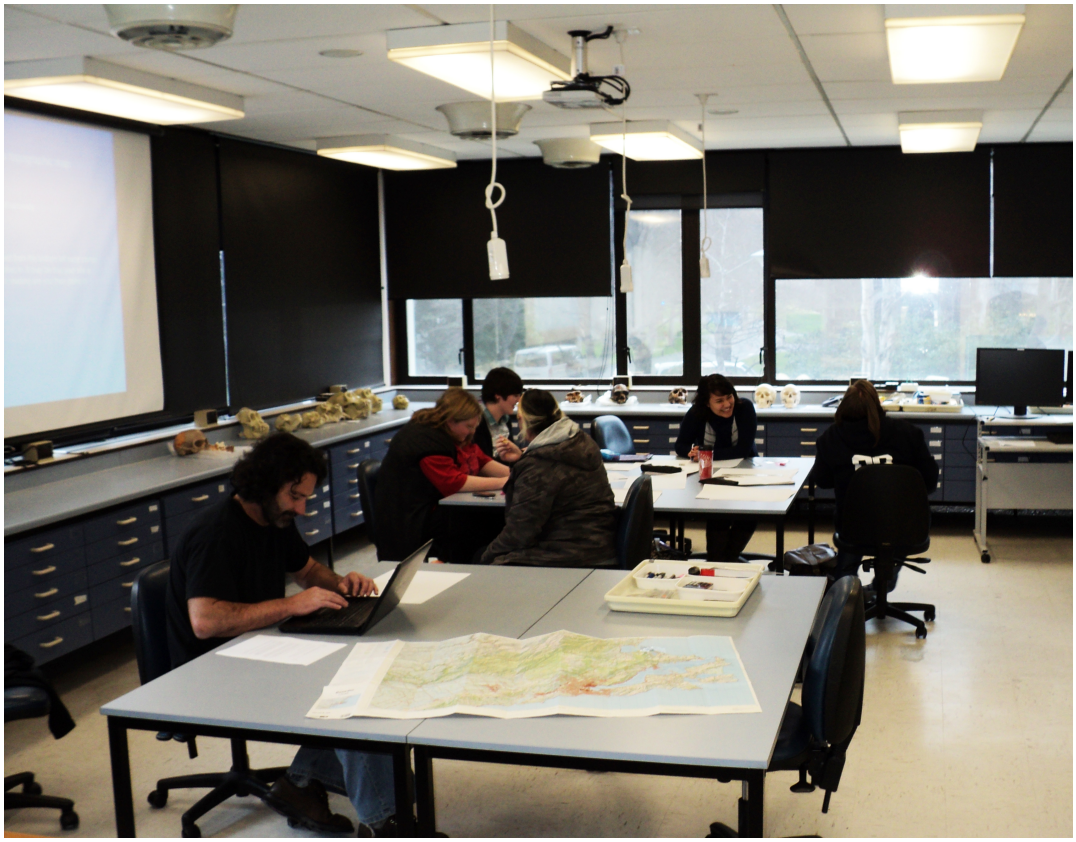
Department of Anthropology and Archaeology

LABORATORY USERS GUIDE AND HEALTH AND SAFETY MANUAL



Guidelines for the safe and correct use of the department's laboratory spaces

Version 1
15-12-2014

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Contents

Section 1 Introduction 4

Section 2 Swipe card and key access 6

Section 3 Induction training/forms..... 7

Section 4 General laboratory Health and Safety 9

Section 5 Laboratory spaces, hazards and mitigation 11

GC.13 Historic Archaeology Laboratory 11

GC.15 Microscopy 12

GC.15a Transitional Facility 12

GC.1 Collections Storeroom 14

GN.1 Sorting Laboratory (rock and ceramic) 15

GN.2 Field Store 15

GN.3 XRF Room 17

GN.4 Rock and Ceramic Preparation Room 18

GN.5 Cleaning Laboratory 19

GN.5a Drying Room 20

GN.5b Fume Room 20

1C.15 Archaeozoology Laboratory 21

1C.18 Paleobotanical Laboratory 22

1N.10 Teaching Laboratory 23

2C.23 Computer Resource Room 23

Richardson basement storage cage 24

110 Leith Street Off-site Storage Facility 25

Section 6 General Laboratory Equipment 26

Section 7 Departmental Laboratory protocols 27

Appendix 1
Example of a Laboratory Passport 28

Department of Anthropology and Archaeology

LABORATORY HEALTH AND SAFETY MANUAL

Section 1: Introduction

The purpose of this manual is to provide the Department of Anthropology and Archaeology with a set of Health and Safety rules and guidelines geared towards ensuring the safe usage of both the department's laboratory spaces and the equipment held and used within them. The Department Health and Safety Officer (DHSO) who is responsible for the safe use of these spaces, and who has prepared this document, is the Archaeology Laboratory Manager: Philip Latham. The DHSO reports directly to a departmental Health and Safety Committee tasked with overseeing the development of comprehensive departmental Health and Safety protocols and manuals. Currently this committee comprises of, in addition to the Archaeology Laboratory Manager, two academic staff members, and the IT Laboratory Manager, Heather Sadler. This committee is responsible to the Head of Department. In addition to this chain of authority the DHSO also liaises directly with both the Divisional Health and Safety Officer and the University of Otago Health and Safety Office.

As an academic center for archaeological research the Department of Anthropology and Archaeology maintains a number of laboratory and storage spaces within the Richardson Building. These include laboratory spaces geared towards the general analysis of archaeological materials and assemblages. In other words, analysis undertaken that uses only basic sorting and analytical procedures, although incorporating extensive departmental faunal and historic reference specimen collections. The department also has, however, a requirement for more specialized archaeological analytical spaces, some of which house equipment of a more hazardous nature, such as the XRF Room, The Rock and Ceramic Preparation Room and the Paleobotanical Laboratory. Along with laboratory spaces, the department also has a requirement for a number of storage facilities, one of which is housed off-site at 110 Leith Street, while another three are located within the Richardson Building.

Before allowing students and researchers to use its laboratory spaces, the Department of Anthropology and Archaeology must be satisfied that students and researchers have received a level of training sufficient to allow their safe usage of those spaces. In Section 3 the department system for student and staff induction training is outlined. The Laboratory Use Passport or Lab UP concept is also outlined in Section 3. The departmental protocols for gaining access via both swipe card and key access are discussed in Section 2 of this manual but it should be noted that access will only be granted once the appropriate level of Health and Safety/Correct Laboratory Use induction has been given.

Despite the best protocols and intentions, however, accidents and incidents may still occur. The guidelines for reporting an accident or incident (an incident is an

event may have led to a more serious accident involving damage to personnel, property or the environment, and should be reported so it may help prevent a similar event happening again with more tragic consequences) within the laboratory or storage spaces are outlined in Section 4 of this manual. The University of Otago's online Health and Safety Vault database is also outlined in Section 4.

There are a number of generic Heath and Safety regulations that are common to all of the University of Otago's laboratory spaces, and which are directly applicable to the Department of Anthropology and Archaeology. These include standard Health and Safety policies such as banning the consumption of food and drink in laboratory spaces, and enforcing the wearing of protective footwear in them at all times. These and the basic procedures in the event of a fire, earthquake or chemical spill will be spelt out in Section 4. Security of both laboratory spaces (and the often irreplaceable material held with in them), and the students and staff that inhabit them is a prime concern for the department, as is the safety of any visitors to our laboratories. Security issues and policy around visitors will be addressed in sections 2 and 4.

In Section 5 this Health and Safety laboratory manual lists each of the Department of Anthropology and Archaeology's various laboratory and storage spaces, providing a brief statement as to its purpose and uses as well as the basic procedure for accessing and using that space. Equipment housed and used within that space is outlined, as are any specific hazards, and the mitigation of, for any identified within each laboratory space. All potential hazards will be listed beneath that spaces heading, (i.e. 1C.15 Archaeozoology Laboratory). This will be done under a red hazards heading, while the correct procedures for the mitigation of these hazards will be outlined under a green mitigation heading. Each hazard number correlates directly with the same number under the mitigation heading.

Section 2: Swipe Card and Key Access

To gain access to the departmental archaeology labs the researcher or student must use a swipe card access system. Access must be put on their ID cards by the archaeological laboratory manager and is done so via the Proctor's Office. This is a security policy designed to ensure the safety of our students and researchers from outside threats while they are using the departmental laboratories. It also allows for a record to be kept of who is using the laboratories at any given time. Access using swipe cards are required for gaining entrance to the following lab spaces: the GC.13 Historic archaeology Laboratory and the GC.15 microscopy (proposed) labs; the GC.1 Collections storeroom; the Ground floor north laboratories and the 1C.15 Archaeozoology Laboratory and IC.18 Paleobotanical Laboratory (proposed).

In some cases additional key access is required to gain entry to certain laboratory spaces within these swipe card accessible laboratories. This is for those laboratory spaces that are inappropriate for more general access. This includes the GC.2 field store that may only be accessed with the direct knowledge of the Archaeology Laboratory Manager; the GC.3 XRF room, which houses equipment with specific radiation hazards; the GC.4 rock and ceramic preparation room, which has dangerous rock cutting machines as well as dust, noise and fume hazards, the GC.14 Research Fellows office; the GC.15 Microscopy (proposed); the GC.15a Transitional Facility, which is a quarantine space for potentially biohazardous archaeological samples; and the 1C.18 Paleobotanical laboratory, which is a clean lab with unique and potentially hazardous equipment (microtome and centrifuge) and chemical hazards.

Note## access will only be given to students and researchers once the required level of Health and Safety/Correct Laboratory Use induction has been provided by the Archaeology Laboratory Manager (see the following section for a more in depth outline on required levels).

Section 3: Induction Training/forms

Induction Health and Safety training for the Department of Anthropology and Archaeology's laboratory spaces needs to be somewhat flexible and involves a number of induction options as outlined below. A key part of this concept involves a Laboratory Passport, or, LP. See Appendix 1 for Laboratory Passport example.

Firstly: low level Health and Safety and correct laboratory usage inductions for students using the 1N.10 Teaching laboratory. This will involve a briefing at the first laboratory session for each class using the Teaching Laboratory. The briefing will be undertaken by either the Archaeology Laboratory Manager (second and third year laboratories), or by the course laboratory demonstrators (first year laboratories). The basic generic principles of no consuming food or drink in the laboratories, and the requirement for protective footwear to be worn at all times are to be the focus of this briefing, as is the procedure for first aid in the lab and the reporting of accidents or incidents.

No induction records are necessary for first year inductions. However, for second and third year students attendance at a second or third year class 1N.10 Teaching Laboratory Health and Safety/ Correct Laboratory Use induction given by the archaeological laboratory manager would constitute the first induction step to be signed off on a LP During the first year laboratories the department's archaeological students will be given a LP. The LP will document the level of proficiency and induction with regards to the laboratory spaces as it grows over time. On completion of the students study at the Department of Anthropology and Archaeology the LP would serve as a useful document that attests to that persons level of laboratory proficiency.

The departmental Laboratory Passport documents are held by the Archaeological Laboratory Manager and amended as appropriate during the duration of a student/ researchers time at the department. These may, however, be obtained as a record of one's laboratory experience once that person leaves the department.

Secondly: low level Health and Safety/correct laboratory usage inductions for the basic use of the laboratories, by students or new staff/researchers. The focus of this level of induction is to ensure a basic knowledge about the correct procedures for the use of all the basic laboratory spaces; the GN.5 Cleaning Laboratory, the GN.5a Drying Room, the GN.1 Sorting (Rock and Ceramic) Laboratory, the GC.13 Historic Archaeology Laboratory, and the 1C.15 Archaeozoology Laboratory.

This induction may, however, be flexible in the sense that it can be restricted to only the laboratory spaces requiring to be utilized. For example, a volunteer student doing some washing for a researcher using only the GN.5 and GN.5a laboratory spaces as part of their volunteer work, would only require an induction for those laboratory spaces, and only an induction for these spaces

would be signed off on that students LP. Or, for staff researchers or postgraduate students who plan on using multiple laboratory spaces, the induction may include all the general laboratory spaces, and the researchers would subsequently have multiple lab inductions signed off on their Passport Ups.

Once Health and Safety/correct laboratory use inductions have been signed off for all the general laboratory spaces on a researcher/student LP, then that person would be free to use those spaces without supervision. If they wish to use the more specialized laboratory spaces and the equipment within them, then they would need more in-depth induction training as laid out in the following paragraph.

Thirdly: Health and Safety/correct laboratory usage inductions that includes either or both, equipment inductions and procedure inductions. This level of induction would be the relevant type for the use of specialized spaces (or equipment held in them), such as the GN.3 XRF Room or GN.4 Rock and Ceramic Preparation Room, or the GC.15 Microscopy Room or 1C.18 Paleobotanical Laboratory.

Induction training is required for the following pieces of equipment:

- XRF machine (in GN.3)
- Microtome (in 1C.18)
- Centrifuge (1C.18)
- 16” rock saw (GN.4)
- Thin section machine saw and grinder (GN.4)
- Tile cutter (GN.4)
- Muffle furnace (GN.4)
- Ultrasonic bath (GN.5b and 1C.18)
- Petrographic microscope and camera/software (GC.15)
- Edge-wear microscopes and camera/software (GC.15)
- Paleobotanical microscopes/ camera/software (1C.18)
-Carbon coater (GN-5b)

Inductions are required for the following procedures

- Making wood specimen thin sections (1C.18)
- Making lithic or shell thin section slides (GN.4)
- Making ceramic thin section slides (GN.4)
- Making lithic or ceramic plugs (GN.4)
- Running samples on XRF machine (GN.3)
- Calibrating XRF data (GN.3)
- Artifact reconstruction using Paraloid B72 (GN.5b)

Other pieces of equipment or procedures will be added to this list if they are adopted by the department.

Section 4: General University Laboratory Health and Safety Regulations

These are general laboratory Health and Safety protocols enforced throughout the University of Otago's laboratories and are designed to protect university students and researchers from basic hazards that are common to all University laboratory spaces.

PROTECTIVE FOOTWEAR (This does not include jandals or sandals!) MUST BE WORN in the laboratory spaces at all times.

NO FOOD OR DRINK (including water) is to be consumed in any of the laboratory spaces. This is both a general good hygiene practice but also because chemicals may be used within the laboratory spaces.

Students and researchers MUST NOT INVITE UNAUTHOURISED PERSONS INTO THE LABORATORY SPACES unless they have cleared it with the Archaeology Laboratory Manager. This includes family members and friends and non-authorized students. Researchers from outside the University who wish to use the department's archaeological laboratories must receive Health and Safety inductions into the laboratory spaces they will be using.

Any UNFAMILIAR EQUIPMENT IS ONLY TO BE USED ONCE GIVEN GUIDANCE in its use by either a qualified staff member or a postgraduate researcher who has been authorized to both use and demonstrate the operating techniques for a particular piece of equipment. If the equipment (see Section 3 for details on which equipment this is) being trained up on requires a passed induction entry on the researcher/students Lab UP, then the Archaeology Laboratory Manager must sign this off, in conjunction with the qualified staff, postgraduate researcher if they have undertaken the training.

Incident reporting: REPORT ANY LABORATORY BASED ACCIDENTS OR INCIDENTS. Any laboratory based accidents, or, incidents that has or may have resulted in harm to people, damage to property or damage to the environment must be immediately reported to the Departmental Health and Safety Officer (DHSO, currently the Archaeology Laboratory Manager). Incident forms are available in each of the labs and one needs to be filled out if an incident or accident occurs. Any accident that involves serious harm or death must be reported to the Health and Safety Office immediately. Please phone 027 227 7796 or 027 489 1051 as soon as possible after the incident. Any incident or accident that occurs within the Department of Anthropology and Archaeology's laboratory spaces will be logged by the DHSO (the archaeological laboratory manager) into the University of Otago's Health and Safety online Vault database. The Archaeological Laboratory Manager (and DHSO), **Phil Latham, is currently the Departmental First Aider.**

Fire threats. If you encounter a fire in any of the laboratory spaces, or create one through your own actions, where possible attempt to extinguish it using the fire extinguisher located in, or, outside each laboratory space. Only do so,

however, if the fire is still in its infancy. Follow the instructions on the fire extinguisher if you are unsure how to operate one. If the fire is already out of control, remove anyone from immediate danger, activate the nearest fire alarm (these are situated outside the entrance to laboratories) and call 111 (1-111 from a university phone). State the building name and laboratory location, and the severity of the fire, if possible give the exact location within the laboratory and the type of fire (e.g. electrical, hazardous substance etc.).

If a fire occurs within the building, once the fire alarm has been raised the fire alarm will be sounded this consist of consistent electronic bell warning signals, at this signal you are to leave the building through the nearest fire escape route, and at this stage **Departmental Fire Wardens** (Philip Latham, Heather Sadler and Les O'Neil for the archaeology laboratory spaces) will check all the laboratory spaces are emptied of personnel. All those evacuated from the building will form up on the Union Lawn as Emergency Services arrive and deal with the threat. A number of simulated fire evacuations will occur annually.

Earthquakes. If an earthquake strikes while using the laboratory spaces use the following guidelines for action; stay inside, do not use lifts or stairs. Shelter under desks, or down beside an internal wall. Stay clear of windows that may shatter or drop broken glass on you. When earthquake stops, check your laboratory space for signs of fire, hazardous material spillages or major structural damages. In case of fire use the methods described in the previous paragraph.

Chemical spills. If while undertaking analytical methods using chemicals or fuels and you cause a bad spill or release, or encounter one unexpectedly in a laboratory space (e.g. after an earthquake event), firstly; warn others in the vicinity, evacuate the area and if spill is only minor, either contact the archaeological laboratory manager who will use a departmental spill kit (located in the 1C.18) to clean up the spill or if trained and competent use the kit to clean up the spill yourself but report the incident to the archaeological laboratory manager. The incident will subsequently be reported on the University's Health and Safety Vault online database. If you have received minor chemical burns, notify the archaeological laboratory manager who is a qualified first-aider, flush the affected area with cold water under a tap and await medical advice and treatment.

If it is a major spill, inform the archaeological laboratory manager if possible but from a safe place call 111 (1-111 from a university phone) and inform Emergency Services – if possible, provide details of substance(s) involved and the exact location of the incident within the building. Contact Campus Watch on 0800 479 5000 (or 5000 from university phone) and advise what has happened as soon as possible after Emergency Services have been contacted. If there is any injured or potentially contaminated personnel they should be checked by Emergency Services personnel before leaving the scene – DO NOT independently transport anyone to the hospital.

Section 5: Laboratory Spaces, Hazards and Their Mitigation

GC.13 HIST0RIC ARCHAEOLOGY LABORATORY

The GC.13 Historic Archaeology Laboratory as its name suggests is the departmental laboratory space for the analysis of historic archaeological assemblages. As such, it houses comparative collections of historic period bottles and ceramics. There are five table set ups (each of two tables put together) for the general analysis of artifact assemblages in this lab. These table set-ups can be modified depending the nature of the analysis being undertaken and the number of researchers utilizing the space. Additionally, a small office GC-14 is located in the historic lab for use by a departmental research fellow. As well as this, GC.13 also houses a light box set-up with camera stand and lights for the photography of artifacts.

Hazards

1 Glass fragments etc. on floor that may cut or get embedded in people's feet.
2 Retrieving items from high shelving that may cause injury through negligent manner of retrieval, i.e. standing on stools or chairs or other unsafe items.
3 Lifting of heavy boxes etc. that may cause back injuries.
4 Electrical hazards from appliances.

Mitigation

1 Always wear protective footwear in the laboratory.
2 Always use the safety ladder provided in this lab when retrieving any items from high shelves.
3 Always bend the knees when lifting heavy boxes and get assistance for boxes or objects that are too heavy for one individual.
4 The lab manager is to ensure electrical items and their cords are given regular electrical appliance checks (through the services of the contractor ApplianceCheck). Make sure all lights on the light-box set-up are switched off on the completion of any photography.

GC.15 MICROSCOPY

The GC.15 Microscopy Room houses a number of microscopes, particularly those associated with edge-wear analysis of lithic artifacts but also a petrographic microscope with camera, and a Hitachi bench top SEM. A 3-D scanner is also set up in the microscopy.

Hazards

1 Glass fragments on floor that may cut or become embedded in people's feet.
2 Electrical hazards from appliances.

Mitigation

1 Always wear protective footwear in the microscopy.
2 The lab manager is to ensure electrical items and their cords are given regular electrical appliance checks (through the services of the contractor ApplianceCheck).
2 The various pieces of equipment in this room must only be used in accordance with their specific user guidelines.

GC.15a TRANSITIONAL FACILITY FOR UNCLEARED MATERIALS

Primary Facility Operator: Philip Latham: Ext 8551 mobile 021 279 8551 email: philip.latham@otago.ac.nz

Secondary Facility Operator: Heather Sadler: Ext 8757 mobile 021 279 8757 email: heather.sadler@otago.ac.nz

As the department has a requirement to occasionally bring in un-cleared and potentially bio-hazardous material as part of over seas archaeological research, it is required to have both a dedicated register and Transitional Facility for the housing of that material. Any researcher wishing to import such material must first clear it with Transitional Facility Operator (the Archaeology Laboratory Manager). In order to import material by courier or post, a copy of the departmental import permit (held and updated annually by the Archaeology Laboratory Manager) must accompany the goods in transit to the department's transitional facility. If the researcher wishes to bring in samples on their person, they must also obtain from the facility operator a letter of consent stating that they understand that on arrival in Dunedin the samples must be brought to the facility operator to be entered into the facility register and be taken to the Transitional Facility, or be signed out of that facility for research purposes.

Under the Department of Anthropology and Archaeology's import permit conditions material that may be imported for scientific analysis includes: archaeological soil, bone, stone and vegetative material in the form of dried

pressed leaves and flowers, however, NO VIABLE SEDS ARE ALLOWED TO BE IMPORTED, although non-viable seeds (treated by radiation sterilizing) are as long as they have paperwork for their sterilization treatment.

Unless imported samples are destroyed through destructive analysis methods they need to be brought back to the Transitional Facility for safe storage on completion of research analysis. If the samples are deemed to have become safe, for example, potentially bio-hazardous sediments have been removed from samples using the appropriate procedures set out in the facility operators operating manual, then, after inspection by an MPI (Ministry of Primary Industries) inspecting officer, they may be released from quarantine into general storage. ANY RESEARCHER WISHING TO CLEAN BIOHAZARDOUS SEDIMENTS from artifacts or faunal material MUST FIRST CLEAR THIS WITH THE TRANSITIONAL FACILITY OPERATOR. The researcher will be taught the correct procedure for the removal, containment and disposal of potentially biohazrdous sediments in strict accordance with the facility operators operating manual.

Access to the Transitional Facility tightly controlled by the archaeological laboratory manager who is the primary operator of this facility. Any access to this space is gained only via the archaeological lab manager, or, in that person's absence, the secondary facility operator (the IT Laboratory Manager). Any material removed from this facility by researchers must be done in strict accordance with the facility operator's procedures and these are outlined in the department's Transitional Facility Operator's manual. Note the potential hazards in this space not only include those that may physically harm personnel, such as red imported fire ants, which can sting akin to a wasp, but also includes threats to the greater environmental security of New Zealand as a whole. If insects such as red fire ants, for example were to be inadvertently released from our quarantine facility they would constitute a great threat to New Zealanders and their environment. This means all researchers wanting to use this facility must do so in strict accordance with the operating procedures set out in the Transitional Facility Operating Manual.

Hazards

1 Biohazard threats- i.e. foreign insects or other pests but also soil/sediment based biohazardous threats (seeds, insect eggs etc.) to the wider New Zealand environment.
2 Lifting of heavy boxes etc. that may cause back injuries.

Mitigation

1 Procedures set out in the Transitional Facility operating manual for the safe storage and analysis of imported samples must be followed at all times when dealing with potentially biohazardous imported materials.
If any insects or other pests are observed in this space or any imported sample material, if possible kill it and immediately notify the facility operator (Philip Latham) or, in that person's

absence, the secondary facility operator (Heather Sadler).
MPI Pest control experts will be called in to deal with the threat if outside the facility operator's capability.

2 Always bend the knees when lifting heavy boxes and get assistance for boxes or objects that are too heavy for one individual. Use the provided trolleys where applicable for transporting heavy materials.

GC.1 COLLECTIONS STOREROOM

This is a large storage facility that has three roller-shelving units located within it. The facility is utilized by the Department of Anthropology and Archaeology for a number of purposes; these include the curation of archaeological assemblages from sites still being actively researched by academic staff, postgraduate researchers and the SPAR (South Pacific Archaeological Research) archaeological consultancy agency.

In addition the GC.1 Collections Storeroom houses extra comparative collection material that is not feasible to house in any of the research laboratories. This material includes the bulk of the moa bone and sea mammal bone assemblages, and also a large cow and horse skeletal specimens, along with a host of other faunal and lithic reference material. The collections storeroom also contains the department's reference collection of primate, early hominid and human bone casts. Excess or redundant departmental equipment may also be housed in the storage bays of this facility until their eventual disposal or re-use elsewhere.

Hazards

1 Retrieving items from high shelving that may cause injury through negligent manner of retrieval, i.e. standing on stools or chairs or other unsafe items (which is not permitted).
2 Lifting of heavy boxes etc. that may cause back injuries.

Mitigation

1 Always use the safety ladder provided in this lab when retrieving items from high shelves.
2 Always bend the knees when lifting heavy boxes and get help for boxes or objects that are too heavy for one individual.

GN.1 SORTING LABORATORY (rock and ceramic analysis)

The GN.1 Sorting Laboratory is located immediately adjacent to the swipe card access at the entrance to the Richardson ground floor north laboratories. It is the first laboratory entered when accessing those laboratories. There are six double table workspaces available within this lab. Space at these workspaces is allocated to students and researchers as required by the Archeology Laboratory Manager.

Access to the GN.2 Field Store, the GN.3 XRF Room and the GN.4 Rock and Ceramic Preparation Room is via the GN.1 Sorting Laboratory as they are situated on that western side of this room. At times, particularly when rock-cutting equipment is being used, the GN.4 Rock and Ceramic Preparation Room may disrupt the GN.1 workspace with noise emissions. The GN.5 Cleaning Laboratory and its adjacent GN.5a Drying Room and GN.5b Fume Room are also accessed via the GN.1 Laboratory. The door separating GN.1 from GN.5 should be kept closed when not being utilized in order to keep out dust and noise emissions that may be generated in the GN.5 Cleaning Laboratory.

Hazards

1 Glass fragments etc. on floor that may cut or get embedded in people's feet.
2 Retrieving items from high shelving that may cause injury through negligent manner of retrieval, i.e. standing on stools or chairs or other unsafe items.
3 Lifting of heavy boxes etc. that may cause back injuries.

Mitigation

1 Always wear protective footwear in this lab.
2 Always use the safety ladder provided in this lab when retrieving items from high shelves.
3 Always bend the knees when lifting heavy boxes and get assistance for boxes or objects that are too heavy for one individual.

GN.2 FIELD STORE

The GN.2 Field Store is situated within the greater GN.1 laboratory space. It is a lockable room kept locked at all times and access to this room is via the archaeological laboratory manager. The store contains the great bulk of field excavation and surveying gear and tools, such as ranging pole, spades shovels, coal shovels, brushes, trowels, secateurs, tape measures, saws, drawing frames, hammers, mallets, machetes, kitchen gear, thermoses etc. There is also a double chest freezer housed in this field store that contains frozen specimens destined, once processed, for the comparative collections.

Hazards

1 Retrieving items from high shelving that may cause injury through negligent manner of retrieval, i.e. standing on stools or chairs or other unsafe items.
2 Lifting of heavy boxes etc. that may cause back injuries.
3 X-rays emitted in the GN.3 XRF room housed adjacently may create a radiation hazard within the gear store when the XRF is in use.
4 Cuts and scratches from the sharp edges of equipment such as trowels, saws, machetes etc.

Mitigation

1 Always use the safety ladder provided in this lab when retrieving items from high shelves.
2 Always bend the knees when lifting heavy boxes and get assistance for boxes or objects that are too heavy for one individual.
3 Check whether the XRF machine is in use before retrieving items from the shelving directly adjacent to the XRF Room. If it is in use, liaise with the XRF operator who will cease X-raying while items are being retrieved from the store room, and who will only re start X-raying once the Field Gear Store has been vacated.
4 Always handle the tools with sharp edges housed in the GN.2 Field Store with extreme care, and wear gloves if a situation warrants it, for example pulling trowels out of the trowel storage box.

GN.3 XRF ROOM

The GN.3 XRF Room is located within the GN.1 Sorting Laboratory and is used for the chemical analysis and sourcing of stone and ceramic materials. The primary equipment housed in this room is the portable Bruker Tracer III XRF. This XRF machine must be used strictly as outlined in the Department of Anthropology and Archaeology's manual for the safe use of this XRF equipment. ACCESS TO THE GN.3 XRF ROOM IS STRICTLY RESTRICTED TO THOSE RESEARCHERS TRAINED IN THE SAFE USE OF THE BRUKER TRACER III XRF.

The orientation of the Tracer iii XRF must always be that where the X-rays emitted by the machine are directed towards the adjacent GN.2 Field Gear Store. The X-rays exit the machine head at a 45- degree angle away from the brass knob containing the filter housing on the unit. An orange light will come on when the machine is switched on and an additional red light will come on only if the X-rays have been activated and are being emitted. DO NOT REMOVE OR REPLACE SAMPLES ON THE XRF'S HEAD UNLESS THE X-RAYS ARE OFF!!!

THE LOGBOOK FOR THE TRACER III MUST BE FILLED IN EACH TIME IT IS USED; the sheet records the researcher, the date, the start time, end time and the settings and filter or vacuum pump settings. This logbook enables the following user to know exactly which settings the machine are on and whether they need to be modified for their own purpose before use.

Hazards

1 Volcanic glass fragments etc. on floor that may cut or get embedded in people's feet.
2 Radiation hazards from the handheld Bruker Tracer iii XRF that may have long-term negative effects

Mitigation

1 Always wear protective footwear in this lab
2 Access to trained staff and researchers only. Use only as directed by the department's manual for the safe use of this equipment. In brief, the broker unit must be orientated so the X-rays emitted are directed away from the user and towards the adjacent GN.2 Field Store. Samples must only be placed on or taken off the analyzing head of the machine when the X-rays are off (i.e. the red light on the machine is off)

GN.4 ROCK AND CERAMIC PREPARATION ROOM

The GN.4 Rock and Ceramic Preparation Room is a laboratory space used by departmental researchers primarily for cutting rock and ceramic samples, and the preparation of thin sections so that samples may be further analyzed. This laboratory houses a number of potentially dangerous equipment items, particularly, a large rock saw with a 16 inch blade, and a thin sectioning bench top grinding and cutting machine. There is also a tile cutter, a lap machine built into a bench, a hot plate, an oven, and a muffle furnace (to be set up) located in this laboratory. Epoxy is also utilized in the preparation of thin section slides and plugs. The equipment utilized and the tasks undertaken in this room make it one of the more dangerous laboratories in the Department of Anthropology and Archaeology.

Noise, dust and fume hazards as well as the danger of burns and cuts, or worse, are present in this particular laboratory space. Unsupervised access to this room is therefore restricted to those researchers who have been inducted into the Health and Safety protocols for this laboratory space and even then - only equipment the researcher has received induction training for may be utilized by them. The archaeological laboratory manager is the key go-to for instruction on using the rock cutting equipment in this room. The Archaeology Laboratory Manager will cut samples on behalf of researchers who are not comfortable with using this equipment, or have proved unable to reach an acceptable level of proficiency during induction training.

Hazards

1 Rock/glass fragments etc on floor that may cut or get embedded in people's feet.
2 Dust, vapor and fume inhalation that may cause lung irritation and problems. Created by the thin section machine, tile cutter, and epoxy mixing/testing on the hot plate.
3 The potential for rock and glass fragments to damage the eyes when using thin section machine.
4 Cuts from the blade on the Thin Section machine or tile cutter.
5 Potential hearing damage from the rock cutting machines.
6 Potential burn injuries from the hot plate.

Mitigation

1 Wear protective footwear in this laboratory at all times.
2 Wear particle masks when using the thin section machine, tile cutter or drill press.
Mix and use epoxy only under the ventilation hood, ensure the hood is turned on and ventilating.
3 Always wear safety glasses when using the thin section machine, tile cutter or drill press.
4 Only use the thin section machine or tile cutter as directed by the Archaeological Laboratory Manager and only after given full

induction training on these pieces of equipment.

5 Do not make direct contact with any part of the hands to the blade edge when it is in operation.
Ask the Archaeology Laboratory Manager for assistance if you are not comfortable with using this machine.

GN.5 CLEANING LABORATORY

The GN.5 Cleaning Laboratory is the primary space within the department for the cleaning of archaeological samples. This is the laboratory space where bulk archaeological samples have their sediment removed via sieves and high-pressure hoses before being dried in the GN.5a Drying Room prior to analysis in other laboratories. This laboratory space is also used as an incoming/out going loading space for items transitioning the department's facilities.

There are four sinks located within the GN.5 laboratory, three are situated along the eastern side and all these sinks are hooked up to a three-stage sediment trap. Two of the sinks are large trough like basins and each has two high-pressure drop down nozzles situated above them. These sinks are to be used for cleaning off large sediment quantities from bulk samples. The adjacent deep sink with normal style taps may also be used for cleaning off sediments from artifacts as it is also hooked up to the three-stage sediment trap. When using these sinks the student/researcher must keep a constant eye on the sediment level as it rises in the sediment trap. This captured sediment must be emptied out on a regular basis into the buckets provided using the sediment spoon. If these sinks block up because of the sediment load, use the plunger provided underneath the sinks to free up trapped material. A combination of plunging and the addition of water are normally required to free the drainage channels to the three-stage sediment trap.

The fourth sink in the GN.5 laboratory is also a deep sink with standard taps and is located on the stainless steel bench at the northern end of the laboratory, this is not to be used for the large-scale cleaning of sediments as it is not connected to the three-stage sediment trap. This sink may be used for the washing of trays etc. mopping the floors and wiping the laboratories benches. It may, however, also be used for the finer cleaning of artifacts that have already had the bulk of sediments removed.

Within this laboratory space there is a ventilation hood (situated over the northern sink) that runs full time and removes dust particles from the air within this lab. Any dry sieving of archaeological samples must be undertaken under this hood.

Hazards

1 Rock/glass fragments etc. on floor that may cut or get embedded in people's feet.

2 Retrieving items from high shelving that may cause injury through negligent manner of retrieval, i.e. standing on stools or chairs or other unsafe items.
3 Lifting of heavy boxes, items etc. that may cause back injuries.

Mitigation

1 Wear protective footwear in this laboratory at all times.
2 Always use the safety ladder provided in this lab when retrieving items from high shelves.
3 Always bend the knees when lifting heavy boxes and get assistance for boxes or objects that are too heavy for one individual.

GN.5a DRYING ROOM

The GN.5a Drying Room is an integral part of the GN.5 Cleaning Laboratory and is situated at the southeastern end of GN.5. The purpose of this space, as its name suggests, is a room dedicated to drying washed archaeological samples so that they may be taken to other laboratories for analysis. The space consists of a sealed room full of shelving and has a heating and air flow vent, together with an air extraction vent that both warms the space and creates air movement for drying samples. The heating unit that drives this unit is sitting on top of the enclosed room.

Hazards

1 Glass fragments etc. on floor that may cut or get embedded in people's feet.

Mitigation

1 Always wear protective footwear in this laboratory.

GN.5b FUME ROOM

The GN.5b Fume Room is another integral pare of the wider GN.5 Cleaning Laboratory set up. Within this small room is a stainless steel sink with taps but also owing to of the fume producing activities with in this room- a ventilation cupboard unit. Unlike a proper fume hood this ventilation cupboard is run constantly and is particularly useful for researchers who are gluing ceramics and other artifacts back together with Paraloid B72 glue. This particular glue requires the use of acetone as a mixing agent for making up both 50 percent or 12.5 per cent B72 to acetone mixes for gluing and fortifying/impregnating artifacts as required.

Hazards

1 Glass fragments etc. on floor that may cut or get embedded in people's feet.

Mitigation

1 Always wear protective footwear in this lab.

1C.15 ARCHAEOZOOLOGY LABORATORY

1C.15 is the Department of Anthropology and Archaeology's premier laboratory for undertaking archaeozoological research. For this purpose there is a dedicated faunal comparative collection corner housing the most commonly used bone reference specimens in New Zealand Archaeology, as well as a number of tropical Pacific reference specimens. The former includes fairly comprehensive, fish, bird, shell and sea mammal bone element reference collections, as well as some common mammals such as dog, pig, sheep, rat and cat. The tropical Pacific material includes fish bone and shellfish reference collections.

Hazards

1 Volcanic glass/bone fragments etc. on floor that may cut or get embedded in peoples feet.
2 Retrieving items from high shelving that may cause injury through negligent manner of retrieval, i.e. standing on stools or chairs or other unsafe items.
3 Lifting of heavy boxes, items etc. that may cause back injuries.

Mitigation

1 Always wear protective footwear in this lab
2 Always use the safety ladder provided in this lab when retrieving items from high shelves.
3 Always bend the knees when lifting heavy boxes and get assistance for boxes or objects that are too heavy for one individual.

1C.18 PALEOBOTANICAL LABORATORY

The 1C.18 Paleobotanical Laboratory is a specialized space for studying plant, seed and charcoal remains from recovered archaeological assemblages. It is also used for the preparation of appropriate archaeological material for radiocarbon (C14) dating. The work undertaken within this laboratory involves dangerous chemicals, both acids and flammable liquids and other toxic substances. It is the only departmental laboratory where a range of chemicals may be used and stored.

Within the 1C.18 laboratory space there is a fume hood to be used when working with dangerous chemicals and an eye bath is also located in this space should chemicals accidentally get into a researchers eyes. A chemical storage safe for acids and one for flammable liquids are housed under the fume hood in this laboratory, and all dangerous chemicals should be stored in these safes when not in use.

A chemical storage spill kit is located in the GN.5 Cleaning Laboratory next to the cleaning gear locker. If a manageable but significant chemical spill occurs contact the Archaeology Laboratory Manager and together use the spill kit to clean up. In the event of a major spill (which, however, is unlikely given the department's minor quantities of chemicals and chemical usage) go through the procedure set out in Section 4 under the heading chemical spills.

Hazards

1 Glass fragments etc. on floor that may cut or get embedded in people's feet.
2 Chemical burns from the mishandling of chemicals. Either splashes of chemicals on the skin or in the eyes.
3 Cuts/lacerations from misuse of the Microtome, changing/handling the Microtome blades.

Mitigation

1 Always wear protective footwear in this lab
2 Always keep chemicals in the chemical safes under the fume hood when not in use.
3 Use only as directed and wear latex gloves when handling chemicals.
4 If chemical splashes occur on skin flush thoroughly with water using tap at sink. If chemical splashes have got into the eyes use the eye wash provided in the lab. Seek medical help.
5 Use the microtome located in this laboratory only as directed and do not attempt to remove/change the blades unless you have been fully trained in this procedure.

1N.10 TEACHING LABORATORY

The 1N.10 laboratory is the Department of Anthropology and Archaeology's premier teaching laboratory and is where the department's archaeological students gain their initial laboratory experience. The kind of activities undertaken in this space include introductory faunal and artifact sorting and sourcing, studying early hominid crania casts, various mapping exercises and even occasional stone flaking work shops. There is a first aid kit and an eye bath located on the eastern wall of this laboratory.

Hazards

1 Glass fragments etc. on floor that may cut or get embedded in people's feet.
2 Retrieving items from high shelving that may cause injury through negligent manner of retrieval, i.e. standing on stools or chairs or other unsafe items.
3 Lifting of heavy soil profiles etc. that may cause back injuries.
4 Rock fragments causing injury to eyes and limbs during stone flaking workshops.

Mitigation

1 Always wear protective footwear in this laboratory.
2 Always use the safety ladder provided in this lab when retrieving items from high shelves.
3 Always bend the knees when lifting heavy boxes and get assistance for soil profiles or objects that are too heavy for one individual.
4 Ensure all attendees at stone flaking workshops are wearing safety goggles, gloves and appropriate clothing. Apply band aids if required.

2C.23 COMPUTER RESOURCE/GIS ROOM

The 2C Computer Resource Room is provided for students and post- graduate researchers who need computer resources for their projects. It is also used for some teaching purposes. Swipe card access is required to gain entry to this room and all access to this room is controlled by the IT laboratory manager, who will arrange for swipe card access to be activated on individual ID cards when access rights has been granted. While drinks are permitted in the Computer Resource Room, food is not as it is not a good hygiene practice and may annoy those sharing this space. Protective footwear is not required in this room.

Hazards

1 Electrical hazards from computers

Mitigation

1 The lab manager is to ensure electrical items and their cords are given regular electrical appliance checks (through the services of the contractor ApplianceCheck)

RICHARDSON BUILDING BASEMENT STORAGE FACILITY

The Department of Anthropology and Archaeology maintains a caged storage facility in the basement of the northern end of the Richardson Building. The department utilizes the facility for the storage of some rarely used equipment and samples. Bagged samples that require a cooler storage setting are particularly appropriate for this storage facility. Because Property Services deem the practice to represent a fire risk, owing to the presence in adjacent cage spaces of plant machinery, there is to be no cardboard boxes of material, or any paper based material stored in this basement facility.

Hazards

1 Glass fragments etc. on floor that may cut or get embedded in people's feet.
2 Retrieving items from high shelving that may cause injury through negligent manner of retrieval, i.e. standing on stools or chairs or other unsafe items.
3 Lifting of heavy boxes etc. that may cause back injuries.
4 There is a noise hazard in this storage space related to the use of a large air compressor that is housed in an adjacent cage, when in use the air compressor creates powerful noise emissions.

Mitigation

1 Always wear protective footwear in this laboratory.
2 Always use the safety ladder provided in this lab when retrieving items from high shelves.
3 Always bend the knees when lifting heavy boxes and get assistance for boxes or objects that are too heavy for one individual.
4 When entering this storage space take note a pair of ear defenders are provided just inside the door of this cage, if the air compressor located in an adjacent cage starts up, put on the ear defenders an resume your tasks.

110 LEITH STREET OFF-SITE STORAGE FACILITY

The Leith Street off-site storage facility is used by the department for the long term curation of archaeological samples, as well as for the storage of some field equipment, such as tents, wheel barrows etc. This facility is leased via Property Services from the adjacent building based Kaikorai and Metropolitan Brass Band who currently own the building.
At times, material in this off-site facility may be recalled to the Richardson laboratory facilities for further analysis. Access to the off-site storage facility to staff/researchers controlled by the Archaeology Laboratory Manager. Any staff/researchers wishing to access or retrieve samples or assemblages from this facility must liaise with that person.

Hazards

1 Glass fragments etc. on floor that may cut or get embedded in people's feet.
2 Retrieving items from high shelving that may cause injury through negligent manner of retrieval, i.e. standing on stools or chairs or other unsafe items.
3 Lifting of heavy boxes etc. that may cause back injuries.
4 Dust inhalation hazards from midden and sediment sample bag breakages.

Mitigation

1 Always wear protective footwear in this laboratory.
2 Always use the safety ladder provided in this lab when retrieving items from high shelves.
3 Always bend the knees when lifting heavy boxes and get assistance for boxes or objects that are too heavy for one individual.
4 If a bag of significant dust producing sample material breaks while retrieving archaeological samples, to prevent excessive dust inhalation use a dust mask (as provided at the off-site storage facility) before sweeping up the spilt material with the dust pan and brush.

Section 6: General Laboratory Equipment

Desk lamps/ light magnifiers

There are a number of desk lamps and lamp magnifiers located throughout the departments analytical laboratories. Staff/students researchers should see the Archaeology Laboratory Manager if they need access to one, or require a bulb to be replaced.

Balances

There are a number of sets of weighing balances dispersed throughout the department's analytical laboratories. The smaller sets are the Sartorious model ? and these are the most accurate (to 2 decimal places, although one set in the 1C.18 Paleobotanical Laboratory is accurate to 3 decimal places). It should be noted that these sets can only take up to 3 kg (3000g) and any weight placed on them greater than that amount will break the balances. Do not place more weight on a set of balances than it can handle. All of the department's balances state how much weigh they can handle. Our slightly larger balance sets can handle 8 kg (8000g) and our largest sets can handle 30 kg (30000g). Check with the Archaeology Laboratory Manager if unsure about which set of balances to use.

Binocular microscopes

There are a number of binocular microscopes within the laboratory spaces, some are more modern models with there own light sources and some are older sets that require an angled desk top lamp for a light source. These microscopes migrate around the laboratory spaces depending on research requirements. They are located in the 1C.15 Advanced Laboratory, the GN.1 Rock and ceramic sorting laboratory and the GC.13 Historic Laboratory. Liaise with the Archaeology Laboratory Manager if you require the use of a binocular microscope.

Equipment hazards

1 Electrical shock resulting in burns and worse from using basic electrical equipment

Mitigation of equipment hazards

1 The Archaeological Laboratory Manager must ensure that the department's general electrical appliances are regularly checked and evaluated as safe for use (undertaken by the contracting firm ApplianceCheck)

Section 7: Departmental Laboratory Requests and Protocols

Archaeological Laboratory Manager: Philip Latham Office 1C.11 Ext. 8551
Email: Philip.latham@otago.ac.nz

IT Laboratory Manager: Heather Sadler 2C. Ext 8757
Email: Heather Sadler@otago.ac.nz

All **requests for access to laboratory space** should come to the Archaeology Laboratory Manager but for students this request may come via your supervisor.

All **requests for laboratory related consumables**, such as, plastic bags, marker pens, graph paper etc. should be via the **Archaeology Laboratory Manager**.

All **requests for general laboratory equipment**, such as desk lamps, light magnifiers, archive boxes, calipers, balances, binocular microscopes etc. should be via the **Archaeology Laboratory Manager**.

All **requests to bring visitors into the laboratory spaces** should be to the Archaeological Laboratory Manager, for Postgraduate students this must be okayed by your supervisor(s) first and relayed to the Archaeological Laboratory Manager via them.

Clean laboratory trays are kept in the GN.5 Cleaning Laboratory, **if you use clean trays and dirty them it is your responsibility to wash and stack them for drying** as per the instructions in the GN.5 Cleaning Laboratory.

All **computer related issues or Internet access** requests for laboratory spaces should be via the **IT Laboratory Manager**.

If you make a mess while using the GN.5 Cleaning room high-pressure hoses and sinks **it is your job to clean it up**. Use the lab broom to sweep the lab clean of any of your mess, and use the mop provided to clean the floor if you have dirtied it. If the rubbish bin is full empty it in the blue bins located at the eastern access to the Richardson Building.

Do not mess with other peoples desk spaces or materials, these laboratories are professional spaces and researchers need to know that the assemblages and material they are working on is safe in these laboratories.

Do not play loud music or unduly disturb other laboratory users, wear head phones if you wish to listen to music in the laboratories**.**

If you break or damage a piece of equipment make sure you inform either the Archaeology or IT Laboratory Manager.

Appendix 1: Example of a Laboratory Passport

Department of Anthropology and Archaeology

ARCHAEOLOGY

LABORATORY PASSPORT

A document listing the Health and Safety and Correct Laboratory Use inductions, equipment and procedure training undertaken at the Department of Anthropology and Archaeology.

Name ……..

Staff /Student ID number if applicable ……..

Date issued Laboratory Use Passport ……..

Tick status

Departmental Staff member ……

Anthropology/Archaeology Student ……

Other Department Student ……

Other Department Staff member ……

Non-University of Otago researcher ……

General laboratory Health and Safety and Correct Laboratory Use Induction's have been provided for and signed off for the following spaces.

Signed off by DHSO Date

1N.10 Teaching Laboratory ……..

GN.5 Cleaning Laboratory ……..

GN.5a Drying Room ……..

GN.1 Sorting Laboratory (rock and ceramic) ……..

GC.13 Historic Archaeology Laboratory ……..

GC.16 Microscopy ……..

1C.15 Advanced (Archaeozoology) Laboratory……..

GN.4 Rock/Ceramic preparation Laboratory ……..

GN.3 XRF Room ……..

1C.18 Paleobotanical Laboratory ……..

Induction training undertaken and passed for the following equipment:

	Signatures		Date
	Inductor	**Inductee**	
Bruker Tracer III XRF	……	……	……
Thin Section Machine	……..	……	……
16 " Rock saw	……..	……	……
Ultrasonic bath	……..	……	……
Microtome	……..	……	……
Centrifuge	……..	……	……
Petrographic microscope Camera and software	……..	……..	……
Use-wear microscopes Camera and software	……..	…….. ……	……
Paleobotanical microscopes Camera and software	……..	……	……
Muffle Furnace	……..	……	……
SEM	……..	……	……
3-D scanner plus software	……..	……	……
Stereo-micrcoscope Olympus	……..	……	……
Inverted microscope Olympus	……..	……	……
Transmitted light Zeiss microscope	……..	……	……
Refelected light Zeiss microscope	……..	……	……
Carbon coater	……..	……	……
……..	……..	……	……

The induction training has been successfully undertaken and passed for the following procedures:

	Signatures		Date
	Inductor	**Inductee**	
Making lithic thin sections	……	……	……
Making Ceramic thin sections	……	……	……
Making epoxy plugs	……	……	……
Making wood thin sections	……	……	……
Running samples on XRF	……	……	……
Calibrating XRF data	……	……	……
Artifact reconstruction using Paraloid B72	……	……	……
Prepping botanical 4 SEM	……	……	……
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