

## **Major Projects**

### **Facilities Management**

# PRELIMINARY OPERATIONAL WASTE MANAGEMENT PLAN

for the

## STAGE 2 OF THE BIOLOGICAL SCIENCES PROJECT

UNSW Kensington Campus

**30 September 2016**

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## **1. Introduction**

Stage 2 of the Biological Sciences Project (BSPS2) is to be constructed on the UNSW Kensington Upper Campus. Development approval for the BSP is to be sought under State Significant Development Application.. UNSW has obtained the Secretary's Environmental Assessment Requirements (SEAR's) for this project which includes the need to address Service and Waste issues both during construction and in building operation. Construction Waste Management is addressed within the Preliminary Construction Management Plan (PCMP) for the BSPS2. The Contractor, once appointed is required to formalise the Construction Management Plan (CMP) addressing the construction waste management requirements of the PCMP and the SSD Conditions of Consent.

This Preliminary Operational Waste Management Plan (POWMP) has been prepared to address the proposed operational waste management of the new facility.

## **2. UNSW Interim Waste Plan**

This Waste Minimisation Plan describes UNSW's current waste management procedures and achievements and outlines targets and actions to achieve sustainable outcomes and to meet its legislative requirements and financial goals.

UNSW's Sustainability has set an objective of increasing recycling across campus to 80% (decreasing landfill waste to 20%) and to ensure that all waste capable of being re-used or recycled is re-used and recycled. The plans include discussion on how separation of waste streams are managed and recycled and identified future waste management options for the campus. The Waste Minimisation Plan covers all facilities within the UNSW Kensington Campus and will be the basis for Operational Waste Management within the BSPS2.

## **3. Proposed New Building**

The BSPS2 is the refurbishment of an existing operational building, located at campus grid reference D26. It lies to the north of the Biological Sciences Building (D26) and to the south of the Wallace Wurth Building (C25).

Stage 2 will consist of consist 16,947m<sup>2</sup> GFA in a multi-storey building that will house a variety of teaching and research laboratories. The building is being designed to be flexible enough to contain a range of other potential uses with a focus on sciences.

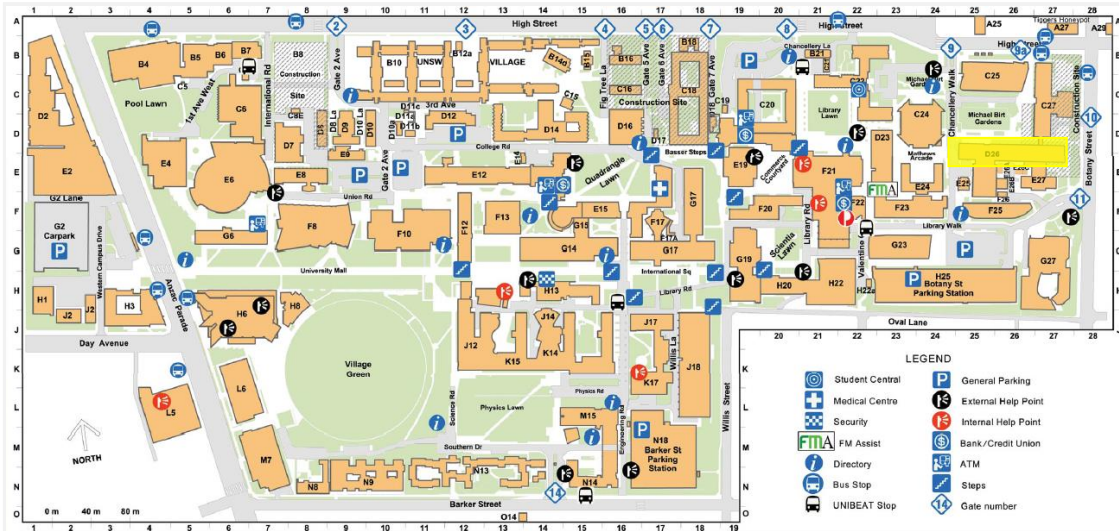


Figure 1: Location of proposed BSPS2 in relation to UNSW Kensington Campus.

#### 4. Existing Management of Waste

Access to the existing Bioscience Precinct is located off Botany Street at Gate 11. Formal waste storage rooms are provided to the existing loading dock. BSPS2 will be serviced by all of the waste rooms provided in E26.

Waste is separated into general, chemical, biological and paper waste streams as follows:

- general waste (collected Monday to Saturday);
- paper and cardboard (collected Monday to Friday);
- chemical waste (collected weekly);
- biological waste (collected daily); and
- hard waste (collected on demand).

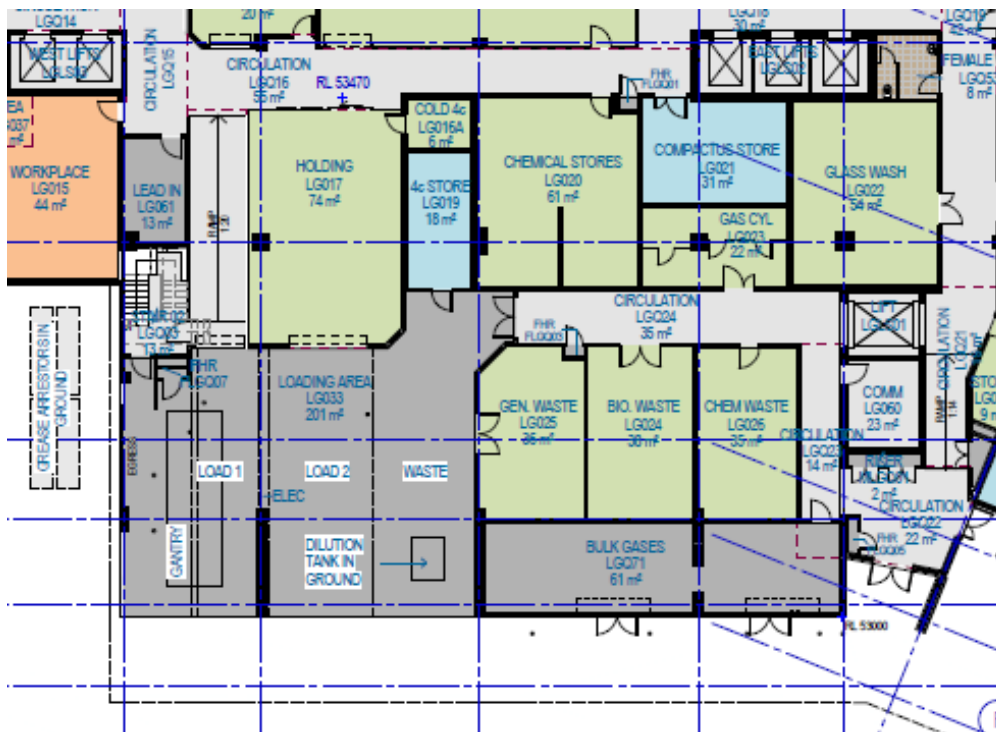
All waste is collected and held at the loading dock collection point for collection by UNSW Waste Contractors.

#### 5. Proposed Management of Waste

Waste pick-up from the D26 through E26 will be through Gate 11 from Botany Street, as shown in the figure below.



E26 provides secure storage rooms for waste on the Lower Ground Floor (refer Figure below). These storage rooms will include storage of general, chemical and biological waste. Chemical waste will continue to be stored securely, local to laboratory areas and disposed of on regular basis in accordance with UNSW Laboratory Hazardous Waste Disposal Guideline (OHS321) – Refer Attachment B.



As the project is a refurbishment of an existing building, there is no additional operational waste expected to be generated as a part of this project.

In accordance with UNSW Waste Minimisation Strategies, it is intended that the new facility will feature initiatives to improve overall recyclable waste targets in line with current policies and recommendation. Some of these initiatives may include:

- the use of separate bins to assist Alternative Waste Technology (AWT). to process source separated food waste, and other waste streams from general waste; and
- provision of separate, collection boxes for recycling printer toners and batteries.

The incorporation and location of waste minimisation initiatives will be developed in further stages of the BSPS2 design.

## **6. Attachment A – UNSW Laboratory Hazardous Waste Disposal Guideline**

<b>Policy Hierarchy link</b>	<a href="#">Work Health and Safety Act 2011</a> <a href="#">Work Health and Safety Regulation 2011</a> <a href="#">Work Health and Safety Policy</a>		
<b>Responsible Officer</b>	Director, UNSW Safety and Sustainability		
<b>Contact Officer</b>	Manager, UNSW Health & Safety		
<b>Superseded Documents</b>	HS321 Laboratory Hazardous Waste Disposal Guideline V3.2		
<b>File Number</b>	2016/00370		
<b>Associated Forms and Documents</b>	HS014 <a href="#">Chemical Waste Inventory Form</a> HS015 <a href="#">Biological Waste Collection Form</a> <i>Toxfree</i> Radiation Waste Declaration Form HS016 <a href="#">Radioactive Waste Transfer Request Form</a> <i>HS908 Cleaning in Moderate to High Risk UNSW Facilities Procedure</i>		
<b>Version</b>	<b>Authorised by</b>	<b>Approval Date</b>	<b>Effective Date</b>
4.0	Director, UNSW Safety and Sustainability	21 March 2016	21 March 2016

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## 1. Introduction and Scope

The purpose of this document is to assist the University of New South Wales (UNSW) Australia, in meeting its legislative requirements when disposing of hazardous waste generated by workshops, and research and teaching laboratories. This guideline is not applicable to locations where UNSW workers are occupying premises controlled by another organisation. At these locations, that organisation's waste disposal procedures must be followed. This guideline is also not applicable to UNSW Canberra.

Where UNSW workers are occupying premises controlled by another organisation, that organisation's waste disposal procedures will need to be followed.

Clear waste streams are needed in order to prevent the inappropriate mixing of incompatible substances and also so the cleaners and waste contractors are not exposed to the risk of unexpected hazards.

During the planning phase of projects, the hazards associated with the storage and disposal of wastes should be addressed and should include waste minimisation strategies.

This procedure applies to all UNSW facilities and operations where hazardous substances are used for research or teaching. It includes chemical waste (solids, liquids and gases), infectious and biological hazardous waste, general laboratory waste, glass, sharps, radioactive wastes and other hazardous liquids and materials.

All wastes from PC3 facilities (physical containment level 3) must be treated as potentially contaminated and should be either chemically decontaminated or autoclaved.

Waste disposal is summarized in a pictogram on the UNSW Health & Safety website

## 2. Definitions

**Animal carcasses:** deceased animals or animal tissue that has been used for research or teaching, and that does not contain other hazardous substances. Carcasses and tissues that have been contaminated with any other hazardous substances are Co-mingled waste.

### **Biological waste:**

- any material from animals (including humans, birds and fish), plants and invertebrates, whether or not the material is recognisable, and including the whole organism (carcass)
- microorganisms (including protozoa & other parasites) fungi, archaea, bacteria, unicellular algae, viruses and viroids,
- anything else that could cause disease in a host (such as prions)
- genetically modified organisms (GMOs) or products from GMOs,
- SSBA (see definition)
- any material that is contaminated with or potentially contaminated with any of the above, including:
  - disposable laboratory plastic-ware, petri-dishes, culture bottles, pipettes, disposable equipment, disposable gloves and clothing, infected bedding, soil and water, left-over feed.

**Broken glass:** broken laboratory glassware. Considered a sharp and therefore must be disposed of into a rigid, puncture-proof container. Ordinarily, broken glass pieces will be placed into the 15 litre white buckets, particularly pieces that are too large to place in a laboratory sharps bin. Broken glass must be segregated into separate buckets labelled either Contaminated or Non-contaminated broken glass, with the nature of the contamination as described in 4.2.

**Chemical waste:** all chemicals, or materials that are contaminated with chemicals that are to be disposed. This includes, but is not limited to explosive, flammable liquids/solids, poisonous, toxic, ecotoxic, infectious substances, waste oils/water, hydrocarbons/water mixtures, emulsions; wastes from the production, formulation and use of resins, latex, plasticisers, glues/adhesives; wastes resulting from surface treatment of metals and plastics; residues arising from industrial waste disposal operations; and wastes which contain certain compounds such as: copper, zinc, cadmium, mercury, lead, contaminated plant and equipment, and asbestos.

**Co-mingled waste:** a combination of two or more waste categories, such as biological and radioactive waste, infectious and chemical wastes, animal tissues containing cytotoxic chemicals, oil-saturated rags (section 4.6.4 and 4.11).

### **Cytotoxic waste:**

- waste materials that are or may be directly toxic to cells, kills cells, or prevent their reproduction or growth.
- waste material that is, or may be, contaminated with a cytotoxic drug during the preparation, transport or administration of chemotherapy. Cytotoxic drugs are toxic compounds known to have carcinogenic, mutagenic and/or teratogenic potential.
- waste materials that contain or may contain agents which, as a side effect, can damage healthy, noncancerous tissues or organs which have a high proportion of actively dividing cells.

**Domestic waste:** uncontaminated laboratory waste is similar to household waste, that is, paper, boxes, plastic wrappers, paper towels and any other disposable material that *has not been* in contact with chemical, biological, infectious, GMO, cytotoxic, SSBA, radioactive or other hazardous substances. Much of this waste can be recycled.

**Note:** *Do not dispose of gloves, pipettes, plastic laboratory disposables, tips or tubes, whether or not they have come into contact with any contaminants, into a laboratory domestic waste bin.*

**Double containment:** any container of viable microorganisms must be transported between laboratories, or to pressure steam sterilizers within the building, within a second unbreakable and closed container. Both containers must be readily decontaminated. All GMOs must be transported according to the OGTR (Office of the Gene Technology Regulator) Guidelines for the Transport, Storage and Disposal of GMOs.

**GMO:** Genetically modified organism, as defined by the OGTR (Office of the Gene Technology Regulator).

**General laboratory waste:** potentially or actually contaminated laboratory waste. This includes paper, paper towels, gloves, pipettes, tips, tubes and other general laboratory material, including those that may be contaminated with trace amounts of infectious biological matter or chemical residues (such as absorbent materials that have been used to clean up spills or to disinfectant surfaces are included in general laboratory waste. General waste that is potentially or actually contaminated with a biological or chemical hazard cannot be disposed of as domestic waste.

**Hazardous waste:** any laboratory or workshop waste that has the potential to cause harm to people or to the environment. It includes:

- explosive flammable liquids/solids, poisonous, toxic, ecotoxic, infectious substances, chemicals, potentially unstable substances,
- biological, clinical, GMO, Quarantine, SSBA wastes,
- waste oils/water, hydrocarbons/water mixtures and emulsions,
- wastes from the production, formulation and use of resins, latex, plasticizers, glues/adhesives,
- wastes resulting from surface treatment of metals and plastics,
- residues arising from industrial waste disposal operations, and
- wastes containing certain compounds such as: copper, zinc, cadmium, mercury, lead and asbestos.

**Human tissue:** recognisable human tissue or body parts.

**Laboratory:** facility where research and/or teaching may be carried out. Includes animal facilities, invertebrate facilities, and associated constant temperature rooms.

**OGTR (Office of the Gene Technology Regulator):** Federal body governing all aspects of work involving genetically modified organisms.

**Plant workshop waste:** typical waste includes hydrocarbons such as oil and grease, detergents, batteries, scrap metal, timber off cuts, perspex, fibreglass, paint, obsolete plant and equipment and building materials.

**Safety Data Sheet (SDS):** information sheet provided by the manufacturer/producer of a chemical or biological agent, that includes information & advice on safety requirements for the handling of that substance.

**Sharps:** objects or devices used in the laboratory or workshop, that have sharp points, protruding pieces or cutting edges capable of cutting or piercing the skin. This includes (loaded or empty) syringes with needles, suture needles, glass slides and coverslips, broken glass, broken tissue-culture plastic-ware, scalpel blades, box-cutter

blades, saw blades, broken bone edges, and pointy-tipped surgical instruments (e.g. small drill-bits, fine-nosed scissors and forceps). Sharps waste must be collected in a rigid, puncture-proof container (see AS4031). See also 4.2 and 4.3.

**Radioactive waste:** material that has a:

- A. specific activity greater than 100 becquerels per gram (2.7 nCi/gm or 2.7  $\mu$ Ci/Kg) **AND**
- B. total activity of one of the following:
  - i. greater than **40 kBq** (~ 1 $\mu$ Ci) of Group1 radionuclides, **OR**
  - ii. greater than **400 kBq** (~ 10  $\mu$ Ci) of Group2 radionuclides, **OR**
  - iii. greater than **4 MBq** (~ 100  $\mu$ Ci) of Group 3 radionuclides, **OR**
  - iv. greater than **40 MBq** (~ 1 mCi) of Group 4 radionuclides.

**Note:** UNSW cannot **dispose** of radioactive waste. It must be stored until the background level has reached an acceptable level. See section 4.8 Radioactive waste requirements.

**Schedule 4 drugs:** prescribed restricted substances which are listed under Schedule 4 of the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP), and are known as Prescription Only Medicine or Prescription Animal Remedy.

**Schedule 8 drugs:** those drugs which are listed under Schedule 8 of the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) which is incorporated within the Drugs and Poisons and Controlled Substances (DPCS) Act and are also known as Drugs of Addiction.

**SSBA (Security Sensitive Biological Agent):** Biological agents considered a security concern in Australia, according to the Federal Government's Department of Health.

### 3. Responsibility

Managers and supervisors must ensure that:

- a) the requirements described in this document are implemented;
- b) waste types are identified and segregated into the appropriate waste streams;
- c) hazardous waste is stored, labelled and transported appropriately;
- d) workers receive appropriate training that includes waste segregation, storage requirements, transportation requirements, labelling, emergency procedures, spill control and awareness of all associated hazards.

All hazardous waste generated for the purposes of research or teaching shall be:

- a) managed as described in Section 4 of this Guideline.
- b) segregated into the waste categories identified in Table 1 Hazardous Waste Categories;
- c) Waste must be clearly labelled as described in the relevant section of this guideline. Additional information may be added if required.

There must be ready access to spill kits and appropriate Personal Protective Equipment (PPE) close to the waste storage location.

Table 1: Hazardous Waste Categories

<b>Waste Category &amp; Colour Code</b>	<b>Waste Descriptor</b> (See Section 3 Definitions)	<b>Specific Category Information</b>	<b>Legislation, Australian Standard</b>
<b>Domestic</b>	Paper and plastics – non contaminated	4.1	<ul style="list-style-type: none"> <li>AS/NZS 2243.3</li> </ul>
<b>Broken glass</b>	Broken glass – non contaminated Broken glass - contaminated	4.2	<ul style="list-style-type: none"> <li>AS/NZS 2243.1</li> </ul>
<b>Sharps</b>	Sharps e.g. scalpel blades, syringe needles	4.3	<ul style="list-style-type: none"> <li>AS/NZS 2243.3</li> <li>AS 4031</li> </ul>
<b>Chemical</b>	Chemicals – hazardous Chemicals – non-hazardous liquids	4.4	<ul style="list-style-type: none"> <li>NSW WHS Act and Regulations</li> <li>POEO Act 1997</li> <li>AS/NZS 2243.2</li> </ul>
<b>Biological</b>	Infectious, Biological, Clinical, GMO, human blood or body fluids, infectious animal carcasses or material, SSBA	4.5	<ul style="list-style-type: none"> <li>AS/NZS 2243.3</li> <li>AQIS</li> <li>Gene Technology Act and Regulation</li> <li>National Security Act and Regulation</li> </ul>
<b>Animal Carcasses</b>	Animal carcasses and recognisable animal tissues	4.6	<ul style="list-style-type: none"> <li>AS/NZS 2243.3</li> </ul>
<b>Cytotoxic</b>	Cytotoxic drugs or materials contaminated with cytotoxic drugs including contaminated sharps	4.7	<ul style="list-style-type: none"> <li>AS/NZS 2243.1 &amp; .2</li> </ul>
<b>Radioactive</b>	Radioactive waste with activity above the prescribed cut-off must be stored at UNSW until decayed	4.8	<ul style="list-style-type: none"> <li>NSW Radiation Control Act and Regulation</li> <li>AS/NZS 2243.4</li> </ul>
<b>Schedule 4 and Schedule 8 Drugs</b>	Prescription only drugs (S4) and Drugs of addiction (S8)	4.9	<ul style="list-style-type: none"> <li>NSW Poisons and Therapeutic Goods Act and Regulation</li> </ul>
<b>Human Tissue</b>	Recognisable Human Tissues or body part	4.10	<ul style="list-style-type: none"> <li>NSW Anatomy Act and Regulation</li> </ul>
<b>Co-mingled</b>	Mixed waste categories	4.11	<ul style="list-style-type: none"> <li>AS/NZS 2243.3</li> </ul>
<b>General Laboratory Waste</b>	Potentially or actually contaminated general laboratory disposable materials e.g. including soft waste (PPE) and tips/tubes contaminated with residues including absorbent materials used with disinfectants.	4.12	<ul style="list-style-type: none"> <li>Health Industries Resources, waste management</li> <li>EMIAA</li> </ul>
<b>Plant Workshop Waste</b>	Typical waste includes hydrocarbons such as oil and grease, detergents, batteries, scrap metal, timber off cuts, perspex, fibre glass, paint, obsolete plant and equipment and building materials	4.13	<ul style="list-style-type: none"> <li>DECCW</li> </ul>

### 3.1.1 Table 2: UNSW Hazardous Waste Collection Days

Waste Type	Collection schedule:
Biological	Biological waste store collection: C64 bins every work day, early
Biological	All other waste bins and waste in freezers collected Tuesdays and/or Fridays or on request to FM Assist
Chemical	Online collection request by close of business Mondays for collection Thursdays 8am 4pm (can vary with increased demand).

For chemical waste collection, complete the [online request form](#). Email the Biological (HS015) waste request forms to: [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au)

For problems with missed pick-ups, phone FM Assist: 9385 5111, or email [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au)

## 4. Waste description and disposal requirements

### 4.1 Domestic Waste disposal

Domestic waste must only be placed in a bin labelled “Domestic Waste”. This may also include *uncontaminated and non-GMO* plant material and animal bedding. Domestic waste must not be mixed with any other waste category. Bins are to be lined with black plastic in order to differentiate domestic waste from other types of waste.

If domestic waste is contaminated, it takes on the waste category of the contaminating substance.

Uncontaminated paper and cardboard may be placed into the blue paper recycling wheelie bins.

Any domestic-type waste generated in a PC3 facility must only be removed from the facility following autoclaving in the double-ended autoclave.

#### 4.1.1 Labelling

The bin for collecting non contaminated domestic waste must be labelled as “**Domestic Waste**”. **Stickers for this** are available free of charge from the Upper Campus Stores through SciQuest ERM.

#### 4.1.2 Storage

Black-plastic lined bin.

#### 4.1.3 Disposal

Cleaning staff collect Domestic Waste bins at least weekly. They will not touch Domestic Waste bins that contain non-domestic type wastes (gloves, pipettes etc.). Domestic waste is removed from UNSW by separate waste contractors.

### 4.2 Broken Laboratory Glass Waste disposal

Broken glass is considered a Sharp and must be disposed of into a rigid, puncture-proof container that meets Australian Standard requirements (see AS 4031).

The white 20L buckets (see Fig. 1) are available from:

- Faculty of Science WebStore, Lowy Building LG08 x52007
- Chemistry Store, Applied Sciences Building F10 – ext. 54695

### **Non-contaminated broken glass**

- All large pieces of broken glass are to be collected in the white 20L lidded buckets.
- The bucket must be labelled “Non-contaminated broken glass” unless the glass has been contaminated.

### **Contaminated broken glass**

- Contaminated broken glass must be segregated from non-contaminated broken glass and the bucket labelled as “Contaminated broken glass”, and name the contamination eg biological, or type of chemical.
- *NOTE:* If contaminated glass ends up in the bucket with uncontaminated glass, the bucket must be labelled according to the contamination as “Contaminated broken glass”.
- Small glass items, such as pasteur pipettes, glass slides, cover slips and small glass vials can be disposed of into yellow sharps containers. See also 4.3.

When disposing of any broken glass, ensure any contamination hazard is taken into account before disposal.

***Note:** Only glass “sharps” are to be placed in buckets that are labelled as containing broken glass. Do not mix broken glass with sharps of other materials or with other types of waste.*

#### **4.2.1 Labelling**

The broken glass waste label requires the following information:

**Waste Category:** (type of) Broken glass

**Specific hazard information:** Broken Glass – keep lid closed

**Waste Generator:** person responsible for the waste

**Date:** date or period over which the waste was generated

**Building:** Building and building number (grid code)

**Room:** where the waste was generated (laboratory or facility, room number)

#### **4.2.2 Storage**

All broken glass must be stored in a white 20L broken glass bucket with the lid closed.

#### **4.2.3 Disposal**

Irrespective of the type of contamination, the white bucket waste is disposed of as **chemical waste**.

When the bucket is full, close the lid and fill out a chemical waste request form identifying the number of glass buckets to be removed. Waste requests are made via the [online request form](#).

### **4.3 Sharps Waste disposal**

All sharps are to be collected in a rigid, puncture-proof container that meets Australian Standard requirements (see AS 4031).

Large broken glass pieces are collected in the *white buckets* (described in 4.2).

Small items with sharp edges are collected in the *yellow* sharps bins, unless they contain cytotoxic contamination and must therefore be discarded into a *purple* cytotoxic sharps bin. Fill the bins up to the level indicated on the front label. Overfilling the bins can result in sharps injuries, so do not overfill them. Do not force items into the container.

No sharp is to be discarded into anything other than a designated sharps bin (4.3 - see figure 1) or a designated white bucket as described in 4.2.

The sharps bins are to remain in the area where the sharps are generated until the container is full or the container is no longer required. The bins are to be locked closed and removed from the area to the relevant (biological/cytotoxic) waste collection point

- The bins **must not be used** unless properly assembled, as this can increase the risk of a sharps injury.
- The bins **must not be used** for any other purpose than for the disposal of sharps, **including** (where present) the use of half an unassembled bin for ANY other purpose, as this can lead to confusion and possible sharps injuries.

**Note:** *do not dispose of liquids into sharps bins. They are not leak-proof.*

UNSW supplies Australian Standard AS 4031 approved sharps containers for free. They are available from the WebStore:

- Faculty of Science WebStore, Lowy Building LG08 x52007
- Chemistry Store, Applied Sciences Building F10 – ext. 54695

#### 4.3.1 Labelling

For areas using the yellow and purple C64 clinismart bins, full yellow and purple sharps bins, once full and locked off, can be placed unlabelled into the yellow or purple C64 clinismart bins (colour as appropriate).

All other sharps bins require the following additional information to be included:

**Waste Generator:** person responsible for the waste

**Building:** Building and building number (grid code)

**Room:** where the waste was generated (laboratory or facility, room number)

#### 4.3.2 Storage

Sharps waste must be stored in an appropriate sharps bin (figure 1) which is kept near to where the sharps are generated.

#### 4.3.3 Disposal

When the sharps bin is full, the lid must be closed and then locked by activating the locking mechanism. Yellow sharps bins are discarded into yellow biological waste bins, and purple cytotoxic sharps bins are discarded into the purple cytotoxic bins at a waste collection point (see the Biological Waste Collection Schedule) or to the upper campus biological waste store.

**Note:** *Do not autoclave sharps bins:*

- *the plastic will melt, potentially leaving exposed sharps*
- *melted plastic can block the autoclave's vent mechanism*

- *there may be chemical residues which could be explosive, corrosive or produce toxic fumes*

**Figure 1: Sharps containers – yellow for biological, purple for cytotoxic, 20L white for broken lab glassware and larger sharps**



#### **4.4 Chemical Waste disposal**

**Hazardous** chemicals from teaching and research facilities and from workshops must, under no circumstances, be allowed to enter storm water drains. **Do not dispose of any hazardous chemical down the sink (see also section 4.4.7).** In addition, careful consideration shall be given to the location and bunding of

chemical waste containers to ensure any potential leaks do not enter indoor or outdoor drains, including storm water drains.

**Non-hazardous** liquid chemical wastes disposal must be as described in paragraph 4.4.8.

**Hazardous** chemical wastes must be appropriately labelled and segregated during storage according to 4.4.5 and 4.4.6. Not all chemical waste is incinerated as it depends on the material. Some waste is treated and recycled.

Spill kits must be available for all types of hazardous waste generated. Workers must be trained and competent in spill clean-up procedures, such as described in HS421 Chemical Spills Guideline.

Where metal or plastic drums are used for containing or transporting waste, they must be compatible with the liquids they are intended to contain, and must be placed in spill containment trays at all times to contain the waste in the event of a leak. Chemical compatibility guides will be helpful in checking if your container is suitable e.g. <http://www.calpaclab.com/chemical-compatibility-charts/>.

Empty glass containers, such as Winchesters, should not be used to collect or store chemical wastes. See 4.4.3 for disposal. Glass containers should be packaged to minimise damage to the container.

Glass Winchesters should be transported in polypacks, racks, or some other suitable non-breakable container.

#### **4.4.1 Solid chemical waste**

Solid chemical waste comes in a variety of forms and so containers can vary.

Powder waste (or similar) can be an inhalation risk eg when closing a waste bag. Preferably use the original container if no longer needed, or a lidded plastic container.

General laboratory waste, such as gloves, paper towels, rags etc, that are or may be contaminated with hazardous chemicals, can be disposed of in chemical-waste plastic bags unless there are items that could puncture the bag. More robust containers can be appropriate, such as white 20 L plastic buckets.

Biological tissues that have been chemically fixed or treated and are therefore no longer considered a biological hazard, need to be wrapped and sealed into appropriate containers so that the tissues are not recognizable and there is no leakage.

Contaminated broken glass and sharps disposal is described in 4.1.and 4.2.

#### **4.4.2 Liquid-waste containers**

Liquid-waste containers (available from the upper and lower campus stores) must be kept closed (sealed) at all times except when you are actually adding waste. It is not adequate to seal containers closed with cork, rubber, or ground-glass stoppers; aluminum foil; and polyethylene film or parafilm. Open the container only for as long as you need to add the waste.

A container with a funnel in the opening is not considered closed unless the funnel itself seals to the container and would prevent spillage.

If the waste is likely to generate gases during storage, vented caps should be used. These wastes must be stored so that vented fumes do not pose a hazard.

#### 4.4.3 Secondary containment (bundling) of liquid waste

All liquid waste containers must be banded i.e. the waste container placed within an embankment or secondary container in order to prevent any spills or leaks from travelling

These secondary containers must be compatible with the chemicals they are intended to contain. The height of the bund required will depend on the potential total of the volume of liquid in storage, and the bund volume normally is 120% of the volume. Segregation of incompatible hazardous wastes must be observed.

#### 4.4.4 Empty chemical containers

Containers that are empty, or contain only small residual amounts of liquid, are disposed of as chemical waste and must be identified as 'empty' on the Chemical Waste form.

Glass Winchesters, when empty, should be rinsed and disposed of as 'empty' chemical waste. They should not be used to collect liquid waste as significant chemical reactions can occur if the waste mixes with any residue in the Winchester. In addition, over time the glass can fatigue leading to the base fracturing.

#### 4.4.5 Specific Hazardous Waste

- **Peroxide forming compounds** (e.g. diethyl ether,) must have a date of receipt and opening written on the container. The maximum storage period must not have expired. This is generally six months. If the storage period has expired, you must contact the HS Unit.
- **Unknown waste** is handled on a case by case basis.
  - Avoid generating unknowns by keeping the chemical register up to date and keeping good records of the waste you produce.
  - Diligently label all waste containers.
  - On completion of research projects, and before leaving the University, research workers and students must decontaminate equipment, and either dispose of their chemicals and samples, or pass them on to their Supervisor.
- **Explosive waste** is handled on a case by case basis.
  - Avoid generating this waste by storing the chemical as recommended on the SDS.
  - Diligently observe the expiration dates on chemical labels.
- **Radioactive liquid wastes** measured **above** background levels are not allowed to be disposed of. See Section 4.8 for handling this waste.
- **Tissue samples in fluid**, such as animal or human tissue samples fixed in formalin, are disposed in the following manner:
  - Drain off the fluid into a chemical waste container (no solid pieces are to remain in the fluid). This fluid becomes chemical waste, must be labelled according to its hazard. It is collected by the chemical waste contractor.
  - The solid wastes are wrapped so that they are unidentifiable as tissue, and don't leak. They become solid chemical waste, must be labelled according to the chemical hazard. Solid chemical waste is collected by the chemical waste contractor.

#### 4.4.6 Labelling of chemicals waste

Chemical waste must be labeled in accordance with the following:

**Clause 335 WHS Regulation, Part 3 of Schedule 9:** If it is reasonably likely that a waste product is a hazardous chemical, then the label on the container of the hazardous waste must be written in English and at a minimum, include the following:

- the product identifier;
- the name, Australian address and business telephone number of either the manufacturer or the importer, (if the waste was generated in a UNSW laboratory then waste generator's contact details should be used); and
- a hazard pictogram and hazard statement that is consistent with the correct classification of the chemical.

Label formats that can be used are available for download from the WHS website. Local areas can add their own specific details. Download labels as follows:

[HS429a Corrosive waste labels ACID](#)

[HS429b Corrosive waste labels BASE/ALKALI](#)

[HS429c Halogenated Flammables](#)

[HS429d Non-halogenated Flammables](#)

[HS429f Toxic waste labels](#)

#### 4.4.7 Storage of chemicals waste

##### a) Collection Point

Ensure there are defined waste collection points in each area or building and that these areas have restricted access to members of the public. If the waste collection point is inside the laboratory, occupants are to ensure the area is kept clear, is dedicated to waste storage and is labelled accordingly. Bund the waste collection points appropriate to the size of the container(s).

##### b) Waste Segregation

The principle is the same for chemical waste as it is for chemical storage. Waste should be segregated in accordance with chemical compatibility and Dangerous Goods class.

Where many different substances are being used and it is not practicable to have separate containers for each individual substances the following waste categories are acceptable:

- Halogenated Hydrocarbons
- Non-Halogenated Hydrocarbons
- Aqueous Waste – Acid [dilute solutions less than 5M\*]
- Aqueous Waste – Alkali [dilute solutions less than 5M\*]
- Aqueous Waste with Heavy Metal Content
- Aqueous Waste with non-Heavy Metal Content

**Note** \*: Any acids or alkalis more concentrated than this should not be mixed. They should be stored as their individual constituent (e.g. Hydrochloric acid, Nitric acid etc.) for pick-up by the chemical waste contractor. Alternatively, they could be diluted or neutralised, following a safe work procedure, and put out for collection.

#### 4.4.8 Disposal of Chemical Waste

- Facilities Management have an [online request form](#) for the disposal of chemical wastes.

- For further information about the collection of chemical waste contact [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au)
- You can complete a chemical waste request form as described in the summary in Section 5.1.

#### 4.4.9 Permits to dispose of liquids down the sink or to trade waste

As described in this document, all chemical waste must be collected and arrangements made for its safe disposal using an EPA licensed waste contractor. There are two exceptions to this as outlined in HS750 Non-hazardous liquid chemical waste disposal.

- a) A non-hazardous liquid substance or mixture which is present at a concentration below the concentration cut-off point for a hazard class in the GHS and which is NOT hazardous to the aquatic environment, may be poured down the sink but you must get a permit to do this as described in HS750
- b) Building has a trade waste  
UNSW must comply with the conditions of its Trade Waste Agreement with Sydney Water therefore, you must ensure that only **non-hazardous** waste enters the building trade waste, unless you have *specific exemption from FM*, as described in HS750

#### 4.5 Biological Waste disposal

The process selected for the decontamination of biological waste must be periodically validated to ensure ongoing efficacy.

**Note:** *some biological agents, such as Prions, may require more than one decontamination method to successfully render them non-viable. Refer to AS/NZS2243.3 to check the requirements for your biological agent.*

**Note:** *Any Security Sensitive Biological Agents (SSBA) waste disposal must also follow the Department of Health requirements, in consultation with the UNSW HS Unit, and in addition to Section 4.5 of this guideline.*

Any container of viable microorganisms, including any waste that may contain viable organisms, shall be transported outside the facility within a second unbreakable and closed container, which can be readily decontaminated.

Biological waste is either liquid, non-liquid waste (solid), or mixed. The following describes the methods for the treatment and disposal of each type.

The yellow biological waste bins and sharps containers, and the purple cytotoxic waste bins and sharps containers, must be locked closed once full, and must be locked for transport.

##### 4.5.1 Liquid biological waste

###### (a) Chemical decontamination

Liquid biological waste that contains or potentially contains infective agents or GMOs, can be decontaminated by using the appropriate chemical decontaminant, such as identified in AS/NZS2243.3:2010 Appendix F.

The UNSW *Guideline for the disinfection of tissue culture waste* (HS324) includes dilution tables for the use of bleach and iodine, to help select the appropriate final concentration of the decontaminant. New generation, commercially available decontaminants such as Virkon, F10 and Trigene are

surface decontaminants and as such are not to be used for the decontamination of liquid biological waste.

**Warning:**

DO NOT chemically treat the waste AND then autoclave it. This can lead to dangerous situations such as flammable, explosive, corrosive and toxic atmospheres inside the autoclave. Chemically treated substances, the waste is disposed of as *chemical* waste.

**(b) Untreated liquid biological waste**

Liquid biological waste that contains or potentially contains infective agents or GMOs, can be sealed into 1 litre bottles and placed into the yellow Clinismart bins. A maximum of 3 bottles per bin is permitted.

**(c) Waste containing cytotoxic substances**

Liquid cytotoxic waste can be sealed into 1 litre bottles and placed into the purple Cytosmart bins. A maximum of 3 bottles per bin is permitted. See also, Section 4.7.

**4.5.2 Disposal of liquid biological waste**

Once decontaminated, this waste is disposed of as *chemical waste* and must follow the requirements for the disposal of chemical waste described in 4.4. unless it meets the criteria described in HS750 Non-Hazardous Liquid Chemical Waste Disposal procedure.

Where clinismart bins are in use, liquid biological waste that has not been chemically decontaminated can be collected into 1 litre plastic bottles, the lid sealed firmly, and place into a C64 clinismart bin with a maximum of three such bottles per bin.

**4.5.3 Solid biological waste**

Do not throw or drop heavy waste into a biological waste bin as this can significantly damage the bin (cracking or splitting). Cracked or split bins can lead to hazardous waste loss in the lab, in transit to the bio-waste store, in the bio-waste store & on the transport truck. We are responsible for our waste until it is actually destroyed. It should not be necessary to have to clean up a spill outside the facility, and any biological spill clean-up will be a serious issue for those involved. A spill of GMO waste outside the facility must be reported to the RECS unit ASAP.

Solid biological waste is disposed of in one of two different ways. a) autoclave method and b) non-autoclave method.

- No animal carcasses are to be placed into any domestic waste bin. All carcasses are to be disposed of as biological waste unless they contain cytotoxic substances or are perfused with a hazardous chemical.
- Carcasses contaminated with ionizing radiation are not to be disposed of until approval is received from the UNSW Radiation Safety Officer.
- Carcasses that contain infective agents or viable GMOs should be autoclaved before disposal. They must go out as bio-waste, whether or not they have been autoclaved.
- If the waste is likely to putrefy before the day of bio-waste collection, it is advised to either freeze it or put it in a cold-room until the afternoon before the day of collection, and then take it to the yellow bin. The waste contractors usually arrive very early in the morning.
- Carcasses must be wrapped or bagged before being placed into C64 bins,

so that anybody fluid seepage is contained within the parcel.

- Remember, you must double-contain all of the above waste for transport to the autoclave or yellow bin if these are located outside the facility.
- If using the new C64 litre Clinismart bin system (Figure 3), solid GMO waste and wrapped, small animal, uninfected carcasses can be placed directly into these bins without autoclaving. It is advised to freeze all waste that can putrefy, such as carcasses, before placing in the bins and taking the bins to the bio-waste store. The bin liner must be tied closed and the bin-lid must be locked for transport to the waste store.
- To disposal of laboratory-animal waste and bedding, and plant soil and containers:
  - If the waste is **not** contaminated with infectious microorganisms, GMOs, radiation or chemicals, it may be disposed of as solid domestic waste. No such waste is to be disposed of to building drainage, storm water or sewerage system. If you need extra regular green wheelie bins for this domestic waste, contact FM Assist on 9385 5111.

#### (a) Autoclave method

**Note:** You must follow the autoclave process described in **Appendix 1: Autoclave Requirements**.

- Waste is contained in autoclave or autoclavable clinical waste bags that have the biohazard symbol on the outside. The waste is autoclaved according to the requirements in AS/NZS2243.3, which have been reproduced here in *Appendix 1: Autoclave Requirements for autoclaving bio-waste*.
- Once autoclaved, the treated waste is labelled (see 4.5.6) and placed into a yellow bio-waste bin for collection by the Bio-waste contractor.

#### (b) Non-autoclave method

- In those areas using the yellow, 240L wheelie bins, and where there is no access to an autoclave, biological waste is placed into an autoclave or clinical waste bag which is then sealed. It is placed into another bio-waste bag, with the biohazard symbol on the outside, which is then sealed. Solid waste can also be wrapped in opaque wrapping and then sealed into a biological waste bag. This waste is labelled according to 4.5.2. and placed into a yellow bio-waste bin for collection by the Bio-waste contractor.
- If using the new C64L Clinismart bin system (Figure 3), the bin itself needs to be lined (available from Stores). Solid biological waste can be placed directly into the bin. The bin liner must be tied closed, and the bin lid must be locked for transport to the bio-waste store.

#### 4.5.4 When freezing waste

Some freezers are used to store both biological waste as well as valuable samples. If Sterihealth is responsible for collecting biological waste from your freezer, please note that they will remove the entire contents of the freezer unless there is very clear indication which items are not for disposal.

Sterihealth has a bright pink sticker that can be used to clearly show the items that are for disposal. These stickers are available through FM General Services.

#### 4.5.5 Disposal of solid biological waste

All biological waste (that is not contaminated with cytotoxic chemicals or other hazardous substances) must be either:

- placed directly into a lined, C64L Clinismart bin or
- collected in a robust plastic bag (autoclave or yellow clinical waste)

bag) and then double-contained for any transport outside of the facility (e.g. to the autoclave or to the bio-waste store). The outside container must display the biohazard symbol (figure 2).

- Solid waste, such as whole or part animal carcasses, or recognisable human tissue, must be wrapped so that contents are not visible or identifiable.

#### 4.5.6 Labelling solid waste

- Bio-waste that is disposed of into the yellow 240 L or 660 L wheelie-bins must have the following label:

**Waste Category:** e.g. Biological waste

**Specific hazard information:** if relevant e.g. Risk Group 2 or Infectious waste etc. If it is infectious, include DG 6.2 and the symbol as shown in Figure 2.

**Waste Generator:** person responsible for the waste

**Date:** date or period over which the waste was generated

**Building:** Building and building number (grid code)

**Room:** where the waste was generated (laboratory or facility, room number)

Figure 2: - Hazard symbols for biological waste



#### 4.5.7 Storage

- Biological waste in robust plastic bags must be contained in a solid-based container with a lid. The container is to be labelled “Biological Waste” and must display a biological hazard symbol (see figure 2).
- If the waste is likely to putrefy before the day of bio-waste collection, it is advised to either freeze it or put it in a cold-room until the afternoon before the day of collection, and then take it to the yellow wheelie-bin. The waste contractor often arrives very early in the morning.

#### 4.5.8 Disposal

- UNSW provides a biological waste contractor to remove biological waste from all University campuses. For the location of the nearest biological waste collection points (yellow biological bins, figure 3) contact FM Assist by emailing [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au).

**Figure 3: - biological waste bins**

240L Yellow Biological Waste Wheelie Bin	64L Yellow Biological-waste Clinismart Bin
	

- People in the Lowy, Wallace Wurth and the Biological Sciences buildings take their biological waste to the upper campus Biological Waste store, where it is collected by the biological waste contractor.
- A number of other laboratories across campus are on a regular biological waste collection schedule.
- Contact [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au) for further information, to be included on the regular collection schedule or to arrange a one-off collection. For irregular and one-off collections, you will need to complete the biological waste collection form (HS015) and email to FM general waste services.
- Yellow C64L clinismart bins are not appropriate for biological waste from PC1 facilities, unless that waste is from an OGTR-certified facility. For more information, contact the UNSW Biosafety Coordinator.

#### **4.6 Animal, plant and invertebrate carcasses and related wastes disposal**

All animal (including human, birds and fish), plant and insect carcasses from all research and teaching areas are to be collected in autoclave or yellow clinical waste bags, displaying the biohazard symbol. These must be disposed of as described in 4.5.

Additional *specific* precautions and requirements apply to any carcasses that are contaminated with radioactive material (4.8), chemicals (4.4), cytotoxic substances (4.7), or that contain infectious agents or GMOs (4.5). See each of the individual hazard categories on how to deal each of these.

Carcasses are to be frozen before placing into the bin. See also 4.5.4

Carcasses that contain cytotoxic substances must be put into the purple cytotoxic bins for incineration. (See 4.7)

No carcasses are to be placed into domestic waste bins.

Any *uncontaminated* solid animal waste products (not carcasses or tissue) and bedding, plant soil, plant containers and insect wastes (i.e. that are **not** contaminated with infectious microorganisms, GMOs, radioactive material or

chemicals) may be disposed of as solid domestic waste. No such waste is to be disposed of to building drainage, storm water or the sewerage system. If you need extra regular green wheelie bins for this domestic waste, email your request to [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au). This waste must be sealed into robust plain plastic bags and must not be labelled or in any way identifiable.

#### 4.6.1 Labelling of carcass waste

The Carcass waste label requires the following information:

**Waste Category:** e.g. Animal carcass, or, fish carcasses, etc.

**Specific hazard information:** If infectious, add DG 6.2 infectious waste, if also contains a toxic, corrosive or some other hazardous chemical then a relevant GHS pictogram or DG symbol must also appear on the label.

**Waste Generator:** person responsible for the waste

**Date:** date or period over which the waste was generated

**Building:** Building and building number (grid code)

**Room:** where the waste was generated (laboratory or facility, room number)

#### 4.6.2 Storage of carcasses

- Carcasses must be contained in a robust plastic bag and preferably stored in a **minus 20 °C** freezer (or at least in a cold room).
- For buildings that regularly generate carcasses and use the upper campus BioSciences biological waste store, carcasses are to be stored in the freezer or cold room until the evening before collection, when they are to be moved to the waste store.

*Note: biological waste is collected on a regular work day morning. There is no pick-up on weekends, public holidays or over the Christmas shutdown so avoid taking putrefiable waste to the store if it won't be collected for several days.*

- Carcasses are either biological waste or cytotoxic waste and should be appropriately wrapped and labelled. They must go into either a yellow or purple bin with the respective yellow biohazard or purple cytotoxic symbol on it, as appropriate.
- For other areas that are either not regular generators of carcasses or do not have access to the upper campus bio-waste store, their freezer or cold room needs to be listed as one of the Biological waste Contractor's waste collection points and the contractor will go to this area (on request) to collect the carcasses. Any specific hazard must be noted on the carcass label.

#### 4.6.3 Disposal of carcasses

- The bio-waste contractor will remove carcass waste in the upper campus bio-waste store, any of the regular carcass collection points and any of the sporadic collection points that have indicated they have carcass waste to collect, according to the collection schedule in Table 2.
- Due to the irregular demand for the collection of carcasses in some areas, these areas will need to email the biological waste request form (HS015) for removal of carcasses on each occasion to [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au).
- To find out the location of your nearest collection point, or to have your carcass freezer or cold room added to the collection schedule, email [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au)

#### 4.6.4 Mixed waste (biological and chemical)

Mixed waste must be managed according to the highest risk. A biological hazard that is exposed to a hazardous chemical, such as for

decontamination or fixation, will no longer be biological hazard. The waste must be managed as chemical waste as described in section 4.4

An example of mixed waste would be tissues in a chemical fluid bath, such as when fixed in formalin. These are disposed of as chemical waste in the following manner:

- Drain off the fluid into a chemical waste container (no solid pieces are to remain in the fluid). If the fluid contains viable microorganisms or GMOs, it must be chemically treated (Appendix F in AS/NZS2243.3). This fluid becomes *chemical waste*, must be labelled according to its hazard and is collected by the chemical waste contractor.
- The solid wastes are wrapped so that they are unidentifiable as tissue, and don't leak. If the tissue contains cytotoxic chemicals it must be disposed of as cytotoxic waste into a purple cytotoxic bin (see 3.8). In all other cases they become solid *chemical waste*, must be labelled according to the chemical hazard and collected by the chemical waste contractor.

#### 4.7 Cytotoxic Waste disposal

For wastes containing cytotoxic drugs, and any Schedule 4 drug from biological/clinical-based research facilities, must be placed into the purple cytotoxic bins: Cytosmart bins, purple sharps containers, and/or purple lined waste bins, with the white telophase cytotoxic symbol (figure 4). See also 4.7

The bins should be identified as 'Cytotoxic waste – incinerate at 1100°C'.

Liquid cytotoxic waste can be sealed into 1 litre bottles and placed into the purple Cytosmart bins. A maximum of 3 litres (bottles) per bin is permitted.

If you are using cytotoxic chemicals please contact the HS Unit on extension 51565 for storage and disposal requirements.

Toxic wastes from non-biological/clinical based facilities should be disposed of as hazardous chemical waste as described in section 4.4

- **Animal, plant and fish carcasses** containing cytotoxic chemicals must be bagged according to 4.7 requirements and *also* CLEARLY labelled with the Cytotoxic Waste symbol, including information about the chemical. These go into purple cytotoxic bins. Do not put these carcasses into the yellow biological waste bins because these carcasses *must* be incinerated (not autoclaved and then incinerated).

Toxic wastes from non-biological/clinical based research facilities should be disposed of as hazardous chemical waste as described in section 4.4

##### 4.7.1 Labelling cytotoxic waste

- Where cytotoxic waste is collected into the purple plastic bags, the cytotoxic hazard symbol must be displayed (figure 4) and the following label affixed:

**Waste Category: Cytotoxic Waste – incinerate at 1100°C**

**Specific hazard information: Relevant GHS pictogram or DG Class 6, name of chemical(s)**

**Waste Generator:** person responsible for the waste

**Date:** date or period over which the waste was generated

**Building:** Building and building number (grid code)

**Room:** where the waste was generated (laboratory or facility, room number)

**Figure 4: Hazard symbol for cytotoxic waste**



#### 4.7.1 Storage

- Cytotoxic waste in robust plastic bags must be contained in a solid-based container with a lid and the container labelled “Cytotoxic Waste” and display a Cytotoxic hazard symbol (see figures 4 and 5).

#### 4.7.2 Disposal

- Cytotoxic waste (purple cytotoxic waste bins) is collected from all biological waste collection points by a clinical waste contractor. Contact FM general services, [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au) for any enquiries.

## 4.8 Radioactive Waste Requirements

Radioactive Waste can only be disposed of through an approved University process, with the direct approval of the UNSW Radiation Safety Officer.

Only material having less than the following activity may be disposed of as waste:

- a) a concentration activity of less than 100 Bq per gm [2.7 mCi/kg] (i.e. not radioactive according to the legal definition) **OR**
- b) Total activity of a given quantity of waste is  $<1$  where Total Activity =  $A1/40 + A2/400 + A3/4000 + A4/40000$  **AND**
  - A1 represents the total activity (kBq) of group 1 radionuclides
  - A2 represents the total activity (kBq) of group 2 radionuclides
  - A3 represents the total activity (kBq) of group 3 radionuclides
  - A4 represents the total activity (kBq) of group 4 radionuclides

Radioactive waste must be stored until the activity has reduced to the described, acceptable level. Once the levels have reduced to less than **a)** or **b)** above, it can be disposed of as hazardous waste by Emailing the RSO with a waste inventory, HS014\_Waste\_Inventory\_Form, (outlining, isotopes, activity and volume), and a Radiation Declaration form, ([Toxfree Waste Declaration](#)) for approval for disposal.

The documentation and approval can then be sent to FM General Services to arrange collection and disposal.

You can use radioactivity decay reckoners (see link section 6.3) to calculate when radioactive waste will decay to levels determined by the EPA, which will allow its removal by contractors as chemical waste."

- **Carcasses** containing **ionising radiation** must be bagged and labelled according to 4.6 Carcass Waste requirements, and stored frozen. However, this waste must be appropriately shielded until the radiation activity meets the requirements in points **a)** or **b)**.
  - They must not be autoclaved until the activity meets points **a)** or **b)**.
  - Carcasses must also be labelled with the Radiation Hazard symbol.
  - This waste could include associated bedding, soil and containers.
  - The freezer must show the Radiation Hazard symbol.

Please contact the UNSW Radiation Safety Officer on ext. 52912 for advice regarding your radioactive carcass waste disposal requirements.

### 4.8.1 Liquid radioactive waste

1. Radioactive liquid waste should be kept in a container labelled 'Radioactive Waste' until it is suitable for disposal. Labelling needs to include the following information:
  - a) Type of Radioisotope;
  - b) Calculated Activity at date of Radioactive Waste Disposal Request (Bq/gram);
  - c) Contact name of waste generator and phone number;
  - d) Originating School.
2. Radioactive organic solvent waste and water solutions should also be kept separate even if they are of the same radioisotope.
3. Radioisotopes which have short half-lives, (e.g.  $P^{32}$ ) should be kept for a period of time depending on volume and activity (see 4.8.1 b) until the radioisotopes have decayed to below OEH disposal levels. This waste can then be disposed of as normal chemical waste (provide **former** radioactive details on the chemical waste form and fax to HS Unit).

Mixed radioactive liquid wastes with short-lived isotopes [e.g., <30-day half-life ( $^{32}\text{P}$ )] should be segregated from isotopes with half-lives between 30 and 90 days ( $^{35}\text{S}$ ,  $^{125}\text{I}$ ) and from long-lived isotopes ( $^3\text{H}$ ,  $^{14}\text{C}$ ).

You must maintain an inventory of all activity added to waste containers, in order to ensure that the activity limit of 100 Bq/gm is not exceeded. They are usually measured quantities and should not be difficult to add up. Where total activity may exceed the limit, there are a number of alternatives:

- a) Short half-life radionuclides, can be allowed decay in storage until appropriate levels are reached.
- b) For long half-life radionuclides, it may be possible to mix differing levels of waste activities of the same radionuclides, to ensure that the total activity for that radionuclide remains below 100 Bq/gm.

**Note:** Do not mix different radionuclides

- c) If this is not possible, carefully decant ONLY the high level scintillation liquid into a suitable vessel for long term storage. Label this as above and send a signed Radiation Waste Transfer form to the HS Unit.

### Scintillation Waste and Scintillation Vials

To dispose of scintillation vials and their contents:

1. Collect sealed vials into a metal or fibreboard drum (available from HS Unit) which has been lined with a strong plastic bag.
2. Seal the inner liner.
3. Seal the drum.
4. Label the drum with:-
  - a) your name
  - b) your laboratory
  - c) a description of the contents
  - d) the radionuclide
  - e) activity (Bq) of isotope at current date
  - f) weight (kg) of waste
  - g) the date
5. Send a signed Chemical Waste form *including* the above information to HS Unit.

Liquid scintillation vials and contents may be disposed of together *if* the activity concentration is below 100 Bq per gm (2.7 mCi per kg). Keep this type of waste separate and place in a hazardous waste drum lined with a strong plastic bag. Identify separately on the Chemical Waste form. Scintillation waste with activity concentration above 100 Bq per gm (2.7 mCi per kg) must be stored. Please contact the UNSW Radiation Safety Officer on ext. 52912 for advice.

#### 4.8.2 Solid radioactive waste

Solid radioactive waste (contaminated pipette tips, lab coats, gloves, absorbent materials used to mop up spills etc.) should be segregated as for liquid wastes into differing isotopes and then placed in a suitable container appropriate to the radioisotope (e.g., Fibre drums). The container should be lined with a thick strong plastic bag and labelled with radioactive hazard signs and completed waste labels. Where possible the container should be securely stored locally until decayed, pending disposal.

All Radiation Hazard signs and labels must be removed from items before placing them into the lined container. This container must have the Radiation Hazard signs and labels on the outside and can be used until full. If the containers are unable to be stored for decay in the area, contact the RSO in order to have the waste transported to the University's radiation store. This arrangement must be made prior to the waste being generated.

All requests for the pick-up & transfer of radioactive waste should be emailed to FM General Services and the UNSW Radiation Safety Officer as required.

For storage and later disposal of radioactive carcasses, see 4.8.

#### **4.9 Scheduled Drugs Waste Requirements (S4, S8 and S9 drugs)**

Schedule 4 drug waste is to be discarded into the purple cytotoxic waste bins (section 4.7).

Schedule 8 and Schedule 9 drug waste must be destroyed in the presence a police officer. This can be arranged by calling Maroubra Local Area Command on 9349 9299, or by contacting the RECS Unit. For further information relating to the Schedule 8 and drugs of addiction, go to the RECS unit [webpage](#).

#### **4.10 Human Tissue Waste disposal**

If you are disposing of recognisable human tissue, please contact [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au) to make a special arrangement for collection. Unrecognisable human tissues can be disposed as described in section 4.6.

#### **4.11 Co-mingled Waste disposal**

When dealing with mixed waste streams, e.g. biological and radioactive, infectious material and animal carcasses, cytotoxic material and animal carcasses, chemicals and solids, you must ensure that you address all hazards associated with the storage and disposal of the waste. This should be done during the planning phase of the project, and should include waste minimisation strategies. See also 4.6.4

Before combining wastes and prior to storage or disposal, an assessment of each situation shall be conducted by the generator of the waste or their supervisor, and approved by the area supervisor or laboratory manager.

Contact the HS Unit if you need further information regarding co-mingled waste.

#### **4.12 General Laboratory Waste disposal**

General laboratory waste is disposed of either as Chemical waste or as Biological waste, depending on the hazardous nature of the residue. It is not domestic waste.

General Laboratory Waste includes all waste paper, gloves, laboratory plastic-ware (e.g. plastic pipette tips, plastic tubes, petri-dishes, *whether or not they have been used*) outer wrappers, or other general laboratory material that is or may be contaminated with chemical or biological residues.

Absorbent materials and disinfectants that have been used to decontaminate surfaces or spills should be treated as chemical waste. They must not be treated as Domestic Waste.

##### **4.12.1 From chemical and teaching laboratories as well as workshops**

This general waste, if hazardous, is considered to be chemical waste and put out for collection by the Chemical Waste Contractor. For the disposal of non-hazardous liquid chemical waste, please refer to HS750 Non-hazardous liquid chemical waste disposal procedure.

#### 4.12.2 From (micro)-biological and teaching laboratories as well as animal facilities

This general waste is considered to be biological waste and put into the yellow bins for collection by the Biological-Waste Contractor (*unless* it has been chemically decontaminated).

#### 4.12.3 Labelling general laboratory waste

- The General Laboratory Waste label requires the following information:

**Waste Category:** General laboratory waste

**Specific hazard information:** Chemical residue (or Biological residue – depending on the type of lab where the waste was generated). If relevant, add the DG information or the biohazard symbol to the outside of the container.

**Waste Generator:** person responsible for the waste

**Date:** date or period over which the waste was generated

**Building:** Building and building number (grid code)

**Room:** where the waste was generated (laboratory or facility, room number)

#### 4.12.4 Storage

- All **General Laboratory Waste** must be collected in a robust plastic bag. The robust plastic bag must be contained in a solid-based container with a lid, and labelled “General Laboratory Waste”. If it is biological waste it goes into a yellow bin. If it is chemical waste it goes to the chemical waste collection point.

#### 4.12.5 Disposal

- General Laboratory Waste that may contain chemical residues **must not** be autoclaved. It is critical to label and segregate the various waste streams in your laboratory to ensure that no chemical waste is autoclaved and the appropriate waste stream is selected. Traces of hazardous chemical substances could result in an explosion, and injury and/or release of toxic vapours if autoclaved.
- General Laboratory Waste from biological workplaces can be taken to any Biological Waste collection point and placed directly into a yellow Biological Waste bins. These bins will be collected by the biological waste contractor according to the bio-waste collection schedule.
- General Laboratory Waste that contains cytotoxic residues must be disposed of as cytotoxic waste into the purple bins.

### 4.13 Plant Workshop Waste disposal

Typical plant workshop waste includes hydrocarbons (such as oil and grease), detergents, batteries, scrap metal, timber off cuts, perspex, fibre-glass, obsolete plant and equipment, and building materials.

a) Treat the following workshop waste as chemical waste:

- hydrocarbons (e.g. oil or grease),
- asbestos (you must contact FM General Services for advice on handling asbestos),
- batteries (some batteries can be recycled, see 4.15),
- paints
- other chemicals used in the workshop.
- Empty chemical, oil, petrol, solvent etc. containers.

- b) All other waste must be placed in suitable waste receptacles before disposal in a skip or other appropriate container for reuse or recycling (e.g. scrap metal, timber off cuts, perspex, fibre glass, obsolete plant and equipment and building materials).
- If any of these wastes or materials have been mixed or contaminated with chemicals then they should be discarded as Chemical Waste (section 4.4).

#### 4.13.1 Labelling

- The bin for collecting non contaminated workshop waste must be labelled in order to ensure it is segregated from chemical or other waste streams.

#### 4.13.2 Storage

- A robust container appropriate to the material being stored, e.g. metal bin for steel waste.

#### 4.13.3 Disposal

- Staff or students must dispose of waste in an appropriate skip or container for reuse, recycling or collection by a contractor.
- Skips will be collected as scheduled or upon demand by contacting FM General Services.
- Facilities cleaning staff will only collect domestic waste and not plant workshop waste.

### 4.14 Other Hazardous Waste

- **Polychlorinated biphenyls (PCBs)**

At no stage should polychlorinated biphenyls (PCBs) or other halogenated compounds be mixed with other waste. These require special disposal through the Health & Safety Unit.

*Note: Refer to HS301 PCB Spill Response and Disposal Procedure*

- **Asbestos**

Where asbestos material has been identified or is suspected within the infrastructure of a building i.e. pipe lagging, roof sheeting, wall insulation etc., you must contact your Faculty or Divisional Client Manager.

Contact the HS Unit if you have ovens, furnaces or other laboratory equipment which you suspect may pose an asbestos risk. There are various contractors used by UNSW who are licenced to manage asbestos.

### 4.15 Miscellaneous (batteries, mobile phones)

Batteries of any description should not be disposed of with general waste. They contain heavy metals and other contaminants that leach from the casing and could contaminate groundwater.

#### Mobile phones

Mobile phones, their batteries and all accessories can be recycled by depositing them in the specific recycling tubes in your school or at the following locations:

- FM Assist, Level 2, Mathews Building
- Arc Precinct, Level 2, Basser College
- The Chancellery, Level 1

### **Batteries recycled**

Spent batteries that are D-size and smaller, and all button batteries from your small laboratory devices, can be recycled by depositing them in the specific recycling tubes at various collection points. Many schools and areas have their own battery-recycling tubes. There are also recycling tubes at the following locations:

- FM Assist, Level 2, Mathews Building
- Arc Precinct, Level 2, Basser College
- The Chancellery, Level 1

### **Batteries NOT recycled:**

All other batteries, including “wet” batteries, dry car or marine batteries which are sealed, are not accepted for recycling and are to be disposed of as chemical waste (see Section 4.4)..

For further information about batteries or mobile phone recycling, email [sustainability@unsw.edu.au](mailto:sustainability@unsw.edu.au).

## **5. Summary of Waste Collection**

### **5.1 Waste for collection by Chemical waste Contractor**

1. Have an appropriate, designated area in the laboratory for the storage of hazardous waste until pick-up.
2. Ensure that waste storage is in accordance with chemical compatibility.
3. Containers must be in good condition, not leaking and not over-full. All containers must have fully closable lids. If lids do not adequately seal then containers must be replaced. We have a duty of care to the chemical waste contractor to ensure our waste is in a safe condition for transport.
4. The waste container's material must be compatible with the waste it contains. Appropriate containers can be obtained from stores (See Waste Management references in 6.3):
  - Upper campus – Biosciences Store
  - Lower campus – Chemistry Store
5. Containers should be banded to accommodate at least the container's contents.
  - Bunds in areas that may be affected by rain must be monitored and water removed following rain in order that they are kept dry. Wherever possible, store chemicals under cover.
6. Containers must remain closed, unless adding or removing waste.
7. Containers must be labelled as detailed in section 4.4.5 as the container label must include the name of the person responsible.
8. **To get your waste picked up:**
  - **From the upper campus waste store:**
    - i. Chemical waste disposal inventory form must be completed before chemical waste is transferred to the waste store.
    - ii. Complete the form by going online at [http://fntoolbox.unsw.edu.au/chemicalwaste/users/sign\\_in](http://fntoolbox.unsw.edu.au/chemicalwaste/users/sign_in)
    - iii. See also HS503 Protocol for Chemical Waste Store G04

- **From elsewhere on campus:**
  - i. Download the chemical waste form from the HS Unit website.
  - ii. Complete the details accurately especially regarding the chemical substance, the quantity, the exact location of the waste and local contact details for the contractor in case there are specific questions about the nature of the waste etc.
  - iii. Email the completed form to: [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au)

**Chemical waste will be picked up on Thursdays, between 8am and 4pm**

On the day of the pick-up ensure access for the contractor. If the waste is located in a locked room, provide details for the person who has a key to this room.

## **5.2 Waste (including cytotoxic) for collection by Biological waste Contractor**

1. Sharps waste must be in appropriate sharps containers
2. If using the C64L Clinismart or Cytosmart bins, non-liquid waste can be placed directly into the bin – purple for cytotoxic, yellow for biological.
3. If using the yellow 250 L wheelie bins, biological waste must be in autoclavable bags showing the appropriate biohazard symbol. Infectious waste must be double-contained.
  - a. Bags and containers must be labelled.
  - b. Bags and containers must be in good condition, not leaking, not over-full and must be sealed. We have a duty of care to the waste contractor to ensure our waste is in a safe condition for transport.

**Biological waste will be picked up from the designated points early in the mornings on weekdays only,**

4. To get your waste picked up:
  - a) Take the waste to the yellow wheelie bin that is in your designated collection area. OR  
Take the yellow bin to the biological waste store (upper campus)
  - b) If the waste is located in a locked room, provide details for the person who has a key to this room.
  - c) Those submitting periodic collection requests should email their form to: [fmgeneralservices@unsw.edu.au](mailto:fmgeneralservices@unsw.edu.au)

## **5.3 Radioactive waste storage**

Radioactive waste must be stored on campus until the activity is below the required level described in Section 4.8. To have radioactive waste taken to the UNSW radiation waste store, contact the Radiation Safety Officer on ext. 52912.

## **6. Acknowledgements, References, Appendices**

The University of Melbourne's Environment Health and Safety Manual was reviewed and parts utilised, with permission, in the production of this document.

### **6.1 References**

[Work Health and Safety Act 2011](#) and [Work Health and Safety Regulation 2011](#)

[Environmentally Hazardous Chemicals Act 1985](#)

[Waste Avoidance and Resource Recovery Act 2001](#)

[Protection of the Environment Operations Act 1997](#) (POEO Act)

[Hazardous Waste \(Regulation of Exports and Imports\) Act 1989](#)

Health Industry Resources - [Waste Management](#)

NSW [Office of Environment and Heritage \(OEH\)](#)

EPA: [Waste management and resource recovery framework](#) – waste classifications

[Radiation Control Act 1990](#) and [Radiation Control Regulation 2013](#)

[Environment Protection Agency \(EPA\) NSW](#)

[Biological Control Act 1985](#)

[Poisons and Therapeutic Goods Regulation 2008](#)

[The Australian Dangerous Goods Code](#)

[Office of the Gene Technology Regulator](#)

[Department of Health](#) for SSBA's, *National Security Act 2007* and *National Security Regulations 2008*

[Australian Standards:](#)

- AS1940 The Storage and Handling of Flammable and Combustible Liquids
- AS/NZS2243.1 Safety in Laboratories Part 1: Planning & operational aspects
- AS/NZS2243.2 Safety in Laboratories Part 2: Chemical aspects
- AS/NZS2243.3 Safety in Laboratories Part 3: Microbiological safety and containment,
- AS2243.4 Safety in Laboratories Part 4: Ionising radiations
- AS/NZS2243.10 Safety in Laboratories Part 10: Chemical Storage
- AS4031 Non-reusable containers for the collection of sharp medical items used in health care areas

## 6.2 Associated Documents

UNSW [Work Health and Safety Policy](#)

UNSW [Radiation safety webpage](#)

UNSW [Hazardous Waste Disposal pictogram](#)

HS323 [Biosafety Procedure](#)

HS324 [Disinfection of Tissue-Culture Waste Guideline](#)

HS301 [PCB Spill Response and Disposal Procedure](#)

HS750 Non-hazardous Liquid Chemical Waste procedure

HS332 [Hazardous Substances and Dangerous Goods procedure](#)

HS421 [Chemical Spills Guideline](#)

HS429 [Labelling of Hazardous Chemicals Guideline](#)

HS503 [Protocol for Chemical Waste Store G04](#)

HS429a [Corrosive waste labels ACID](#)

HS429b [Corrosive waste labels BASE/ALKALI](#)

HS429c [Halogenated Flammables](#)

HS429d [Non-halogenated Flammables](#)

HS429f [Toxic waste labels](#)

## 6.3 UNSW links

UNSW Waste Management Operations Summary

[Ordering from stores](#) via SciQuest ERM

UNSW Waste Management and Chemistry store (lower campus)

Radioactivity Decay calculator ([ready reckoner](#)), (this is an example only).

FM services [Archibus](#) - to log a request for bins

UNSW [online chemical request](#)

UNSW [Hazardous Waste Disposal Pictogram](#)

## 6.4 Appendix 1: Autoclave Requirements (AS/NZS2243.3:2010)

1. The effectiveness of the autoclave being used to decontaminate the waste must be **validated monthly** and the results of each month's testing kept for at least 12 months, such as in the autoclave logbook. They must be made available to the HS Unit on request and may be requested by other regulatory bodies (such as the Office of the Gene Technology Regulator [OGTR]).
  - (a) The effectiveness of the **autoclave** must be validated each month (OGTR requirement) by the use of:
    - thermocouples or resistance thermometers, to ensure that the required temperature has been achieved; and either
    - chemical indicators which use a combination of moisture, heat and time and which progressively change colour with the time exposed at the specified temperature; or
    - biological indicators such as spore strips; or
    - enzyme indicators.
2. In addition to the **annual boiler inspection**, where GMO waste is being decontaminated, the autoclave must be **calibrated annually** by a qualified person and the results of each year's calibration must be kept for the previous 5 years and made available on request. Autoclave calibration must include the calibration of the thermocouple and safety valves.
3. **Each autoclave load** must be performed using a combination of temperature and time that has been validated as effective in rendering the infectious material or GMO non-viable. Additional consideration is required when autoclaving animal carcasses and soils as longer times may be required to reach the required parameters, and to effectively decontaminate the waste.
  - i. Each load must be packed and loaded to allow for the penetration of steam into the material being decontaminated in accordance with AS/NZS2243.3;
  - ii. the coldest part of the load must be exposed to a minimum temperature of 121°C and 103 kPa for at least 15 minutes or at 134°C and 203 kPa for at least 3 minutes in accordance with AS/NZS2243.3;
  - iii. Methods for monthly validations, and to ensure successful GMO/infectious waste decontamination, include :
    - a. chemical indicators which use a combination of moisture, heat and time and which progressively change colour with the time exposed at the specified temperature; or
    - b. biological indicators such as spore strips; or
    - c. enzyme indicators.
  - iv. Measures must be taken to ensure that loads that have been processed can be differentiated from loads that have not (e.g. by use of **autoclave** tape).

AS/NZS2243.3:2010, Section 12, for autoclave validation.  
AS/NZS2243.3:2010, Section 10.6, for autoclave requirements
4. Once autoclaved, the waste is placed into yellow bio-waste bins for collection by the biological waste contractor.

## 6.5 Appendix 2: History

This procedure will be reviewed to address changes in legislation or any changes within the University that impact on the management of hazardous waste.

Version	Authorised by	Approval Date	Effective Date	Sections modified
1.0	Director Human Resources	09/2003	Sept/2003	New document (ML)
0.1	Director Human Resources	01/11/2006	01/Nov/2006	Consultation draft. Whole document. Focus on laboratory waste. Segregated laboratory wastes into 13 different waste streams with corresponding procedures for each one. (AJ)
2.0	Director Human Resources	22/03/2007	22/March/2007	4.2, 4.3, 4.4, 4.5, 4.7, 6.1 Clarified procedures for bio-waste, co-mingled waste, glass waste and chemical waste from stakeholders meeting Changes to biological waste sections due to new waste contractor (AJ)
2.1	Manager OHS&WC	31/7/07	31/July/2007	4.12 Update of changes to disposal of general laboratory waste (AJ)
2.2	Manager OHS&WC	13/11/07	13/Nov/2007	4.0 Table 1 Change to bio-waste collection day (AJ)
2.3	Manager OHS	13/12/2010	13/12/2010	1. Facilities Management looking after waste management administration and HS Unit technical. 2. Web link's updated from old site to new site
3.0	Director Human Resources	14/04/2011	14/04/2011	Review entire document. Reformat to UNSW Guideline template. Revised Austr Standard2243.3, add references to SSBAs, revised waste collection responsibility (KN)
3.1	Manager OHS	9/4/2013	9/4/2013	Review entire document. Add: SDS definition, reference to S4 drugs, include Clinismart and Cytosmart bin system, reference to disinfection guideline and waste disposal pictogram. Update waste collection times and FM contact details (KN)
3.2	Director, UNSW Safety and Sustainability	30 April 2014	30 April 2014	Reviewed for administrative updates
4.0	Director, UNSW Safety and Sustainability	21 March 2016	21 March 2016	Reviewed for content currency & links. Added information about chemical labelling, solid chemical waste, chemical waste storage in Winchesters, biological waste storage in freezers, non-hazardous liquid chemical waste & trade waste disposal (HS750). Amended section 4.4.5 (was 3.5.5) so that waste label requirements match requirements from WHS Regulation 2011 and UNSW Chemical Labelling guidelines