



UNIVERSITY
OF WOLLONGONG
AUSTRALIA

Preliminary Operational Waste Management Plan

University of Wollongong – Western Building

September 2017



Western Building – Schematic Design (View from South-East)

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I INTRODUCTION

The new Western Building is to be constructed on the University of Wollongong campus. Development approval for Western Building is to be sought under State Significant Development Application no. SSD 8596. SEARs for the State Significant Development (SSD 8596) was issued by the NSW Department of Planning and Environment on 20 July 2017.

UoW 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 Western Building. 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.

The benefits of implementing an effective WMP include:

- Minimised risk of environmental pollution, occupational health and safety incident, litter, odour and pests;
- Reduced costs associated with staff resource time, waste servicing and waste disposal; and
- Improved amenity, environmental, and social outcomes.



2 PROPOSED NEW BUILDING

The proposed site is within the Western Precinct of the Wollongong Campus and is opposite Building 21 - Early Start Facility on the Campus Ring Road and as shown in **Figure I** below. The site currently houses teaching space and general purpose demountables, most which are assigned for relocation prior to this development. Works are required to be completed by December 2019 to be available for Semester 1, 2020 and once finished will accommodate:

- A site footprint of approximately 3,500m²;
- A four-storey base building, that would equate to approximately 10,000m² in gross floor area;
- Specialist studio facilities; and
- Academic & Professional Staff Offices.



Figure I: Project Site

3 LEGISLATIVE AND GUIDANCE

Waste legislation and guidelines applicable to the development is outlined below:

Table 1 – Waste Legislation and Guidance

Name of Legislation/Guideline	Authority	Notes
Waste Avoidance and Resource Recovery (WARR) Act 2001	NSW Environment Protection Authority (EPA)	The WARR Act promotes extended producer responsibility of waste and resources through minimised consumption of natural resources, efficient use of natural resources, and minimised disposal of waste through waste avoidance, reuse and recycling. It promotes industry and community participation and responsibility for reducing and managing waste.
Protection of the Environment Operations (POEO) Act 1997 & Amendment Act 2011	NSW EPA	The POEO Act enables the Government to establish legislative instruments and regulation for setting environmental standards, goals, protocols and guidelines.
POEO (Waste) Regulation 2014	NSW EPA	The Waste Regulation sets out legislation relating to the waste levy in NSW, waste tracking and management requirements for dangerous goods / hazardous wastes, resource recovery exemptions, and pollution offences.
Waste Classification Guidelines (Part 1) 2014	NSW EPA	The Guidelines provide information on how to classify, manage, treat and dispose of different classifications of waste to ensure risks to the environment and human health due to inappropriate management of waste are minimised.
Waste Avoidance and Resource Recovery (WARR) Strategy 2014-21	NSW EPA	The WARR Strategy outlines the State Government's long term targets for waste avoidance, resource recovery, and litter and illegal dumping for the domestic, construction and demolition, commercial and industrial sectors which are necessary for the environmental and economic future of the State of NSW.
Wollongong Development Control Plan (DCP) 2009	Wollongong City Council	Part E, Chapter E7 of Council's DCP requires construction and demolition projects to minimise the volume of waste generated through reuse, recycling and efficient selection and use of resources, and promoting adaptability in building design and focussing upon end of life deconstruction. The DCP requires that development provide appropriately located, sized and accessible waste storage facilities and maintain waste management systems which are compatible with collection services and maximise recovery of resources.
Better Practice Guideline for Waste Management in Commercial and Industrial (C&I) Facilities 2012, Stripout Waste Guidelines 2016	NSW EPA, Better Buildings Partnership	The Guidelines have been generated as a handy reference and resource for contractors, architects, designers, consultants, developers, building owners and managers. They contain minimum provisions for waste management in commercial and industrial facilities, and during building stripout and refurbishment activities.



Building Code of Australia (BCA)	Australian Building Codes Board	The BCA have the aim of achieving nationally consistent and minimum standards of relevant health and safety, amenity and sustainability objectives. The BCA is a set of technical provisions for the design and construction of buildings and other structures.
Relevant Australian Standards (AS)	Standards Australia	The Standards are specifications, procedures and guidelines which ensure products, services and systems are safe, reliable and consistent. Australian Standards which apply to waste management include AS 2890.2 (parking facilities for off-street commercial vehicles), AS1319 (safety signs) and AS4123.7-2006 (mobile waste containers and colour coding requirements).

4 UOW WASTE MANAGEMENT ACTION PLAN 2015- 2018

The Facilities Management Division (Environment Unit) of the University of Wollongong (UOW) has developed a Waste Management Action Plan 2015- 2018. The Waste Management Action Plan covers all facilities within the UoW Wollongong Campus and will be the basis for Operational Waste Management within the new Western Building. The plans include discussion on how separation of waste streams are managed and recycled and identifies future waste management options for the campus and to ensure that all waste capable of being re-used or recycled is re-used and recycled.

The waste management objectives of this Plan are to achieve the following:

- Continuous reduction in solid waste to landfill per EFTSU (equivalent full-time student unit) each year;
- Increase overall recycling rate to 70% of total waste by 2020;
- 75% of waste diverted from landfill by 2020;
- Work towards zero waste to landfill.

The UOW's Waste Management Action Plan 2015 – 2018 carried out an audit of the Wollongong Campus and Innovation Campus. It reports a resource recovery rate of 44% diversion from landfill for the year 2014. The Plan provides information on waste audits undertaken in 2014 which showed that a large proportion of waste generated at the university comprised of office paper, newspaper, magazines and cardboard which was recycled, and food and garden organic materials which were composted. The remainder of waste generated was sent to landfill.

Actions of the Waste Management Action Plan 2015 - 2018 as relevant to this WMP are as follows:

- Building design standard to include waste system;
- Consolidate waste collection points and have options for all streams and volumes;
- Reduce the number of waste bins serviced by cleaners from desks;
- Achieve an increase in the volume of composting units on campus;
- Collect more recyclables by stream, including plastic bags, wrap and polystyrene;
- Extend the Green Labs program to additional UOW laboratories;
- Set up and support reuse programs (e.g. for furniture, electronics and office materials);
- Ensure waste management is part of induction processes;

UOW also has an Environmental Management Plan and Laboratory Waste Disposal Procedure (as part of UOW's Policies and Guidelines) which should be referred to for further more detailed information.

5 DEMOLITION AND CONSTRUCTION

WASTE MANAGEMENT PLAN

WASTE STREAMS, CLASSIFICATION AND QUANTITIES

The Building Contractor will be responsible for completing tables such as those below for all construction waste generated at the site. It is estimated that approximately 680 tonnes of waste will be generated by the construction of the Western Building, and about 83% of this can be recovered and diverted from landfill.

Table 2 – Estimated Waste Generation (tonnes) – Construction Activities

Waste Type	Waste Classification	Estimated % Recovery	Reuse (tonnes)	Recycling (tonnes)	Disposal (tonnes)	Potential Reuse / Recycling Method
Construction of Western Building						
Brick	General solid (non-putrescible)	90%	84	25	13	Cleaned for reuse or crushed for reuse on-site in landscaping and driveways. Removed for reuse and recycling offsite.
Concrete	General solid (non-putrescible)	80%	-	105	26	Reused on-site for filling, levelling or road base where possible. Removed for reuse and recycling off-site.
Timber	General solid (non-putrescible)	50%	37	-	37	Untreated timber reused or mulched for reuse in landscaping on-site. Treated timber reused as formwork, bridging, blocking or propping.
Plasterboard	General solid (non-putrescible)	95%	-	117	6	Plasterboard with low levels of contamination removed for recycling offsite. Contaminated plasterboard removed off-site for disposal.
Sand/Soil	General solid (non-putrescible)	100%	125	-	-	Sand/soil reused on site unless contaminated.
Metal	General solid (non-putrescible)	95%	5	30	-	Steel recycled off-site by an appropriately licensed facility. Majority of other metals will be recycled where economically viable.
Other	Mix of General solid (non-putrescible and putrescible)	50%	-	35	35	Sediment fencing, geotextile materials, paints, PVC tubing, staff compound waste.
Total		83%	247	311	122	

The demolition of the existing car park and the removal of existing trees will generate waste and resources that should be close to 100% recoverable primarily through reuse on site or recycling off site. Potential waste streams that will be generated during construction and demolition activities are listed in Table 3 along with their proposed management method.

Table 3 – Potential waste streams – Construction and demolition activities

Waste Type	Waste Classification	Estimated % Recovery	Potential Reuse / Recycling Method
Demolition of existing car park			
Asphalt	General solid (non-putrescible)	100%	Reused on or offsite for fill.
Granular base / sub base materials	General solid (non-putrescible)	100%	Reused on site as fill or in landscaping.
Top soil	General solid (non-putrescible)	100%	Reused on site as fill.
Removal of Approximately 113 trees			
Wood chip	General solid (non-putrescible)	100%	Shredded and reused at the site and/or recycled via composting at appropriately licensed facility. Significant trees will be relocated either on or offsite.
Construction of Western Building			
Brick	General solid (non-putrescible)	90%	Cleaned for reuse or crushed for reuse on-site in landscaping and driveways. Removed for reuse and recycling offsite.
Concrete	General solid (non-putrescible)	80%	Reused on-site for filling, levelling or road base where possible. Removed for reuse and recycling off-site.
Timber	General solid (non-putrescible)	50%	Untreated timber reused or mulched for reuse in landscaping on-site. Treated timber reused as formwork, bridging, blocking or propping
Plasterboard	General solid (non-putrescible)	95%	Plasterboard with low levels of contamination (e.g. nails, screws, wall coverings) removed for recycling offsite. Contaminated plasterboard removed off-site for disposal
Sand / Soil	General solid (non-putrescible)	100%	Sand/soil reused on site unless contaminated.
Metal	General solid (non-putrescible)	95%	Steel recycled off-site by an appropriately licensed facility. Majority of other metals will be recycled where economically viable.
Other	Mix of general solid (non-putrescible and putrescible)	50%	Sediment fencing, geotextile materials, paints, PVC tubing, staff compound waste.

Additional waste streams that will be generated during construction and demolition activities are listed in Table 4 along with their proposed management method.

Table 4 – Potential waste streams – Construction and demolition activities

Waste Type	Waste Classification	Potential Reuse / Recycling Method
Packaging Material		
Plastic wrap / stretch wrap	General solid (non-putrescible)	Off-site recycling
Cardboard	General solid (non-putrescible)	Off-site recycling
Metal ties	General solid (non-putrescible)	Off-site recycling
Plastic ties	General solid (non-putrescible)	Investigate recycling opportunities
Wooden crates	General solid (non-putrescible)	Return to suppliers. Investigate reuse and recycling opportunities.
Plant Maintenance		
Tyres	General solid (non-putrescible)	Off-site recycling or disposal.
Empty oil drums and other drums (e.g. fuel, chemicals, paints, spill clean ups)	Hazardous if containers used to store Dangerous Goods and have not been washed or vacuumed to remove residues. Otherwise, general solid (non-putrescible).	Transport of Dangerous Goods to comply with the Dangerous Goods Code. Off-site recycling or disposal by an appropriately licensed facility.
Batteries	General solid (non-putrescible)	Off-site recycling
Staff Compound		
Office paper	General solid (non-putrescible)	Off-site recycling.
Cardboard	General solid (non-putrescible)	Off-site recycling.
Recyclable drink containers	General solid (non-putrescible)	Off-site recycling.
Garbage	General solid (non-putrescible)	Investigate energy recovery opportunities

Packaging materials

NSW RESOURCE RECOVERY TARGET – CONSTRUCTION AND DEMOLITION PROJECTS

Each development can contribute to overall NSW State resource recovery targets. For the construction and demolition (C&D) sector, the resource recovery target is 80% by 2021 (increasing from 75%). A growing body of research has demonstrated that construction and demolition projects are achieving resource recovery rates of over 80%, including up to 25% in waste reductions, and between 20% and 66% in cost savings due to avoided disposal costs⁹.

Waste avoidance measures during building fit-out activities can also be implemented to divert further waste landfill through sustainable reuse of furniture and fittings from other buildings undergoing strip-out and refurbishment.

When choosing between waste minimisation options, the following hierarchy for waste management is preferred:

- waste avoidance/reduction
- reuse
- recycling
- energy recovery
- treatment
- disposal to landfill

The objective of this hierarchy is to show a preference for waste management options in order of their environmental impacts. State targets and the landfill levy have been established to support this hierarchy and to stimulate reuse and recycling markets for the benefit of the wider community.

Further to this, landfill space in the Greater Sydney Area is rapidly approaching capacity with population growth throughout the region¹⁰.

As part of the Western Building Project, construction and demolition project managers will pursue this hierarchy and seek out waste reduction opportunities to realise cost savings and improved economic, social and environmental outcomes.

WASTE AVOIDANCE, REUSE AND RECYCLING MEASURES

The following measures will be investigated and implemented (where economically feasible) to work towards achieving the State resource recovery target of 75% waste materials reused or recycled:

- During demolition activities, materials will be carefully dismantled and sorted for reuse and recycling where applicable.
- Framing timber, windows, doors and joinery will be reused on site or recycled off site where feasible.
- Plumbing, fittings and metal elements will be recycled off site where feasible.
- Formwork (temporary or permanent moulds) will be reused where possible.
- Appropriate sorting and segregation of wastes will be undertaken to ensure efficient reuse and recycling of materials throughout construction and demolition activities.
- Site disturbance will be minimised to limit unnecessary excavation and excavated material will be reused on site where possible.
- Green waste (i.e. garden organics) will be mulched and reused in landscaping.
- Construction materials will be selected taking into consideration their long lifespan and potential for reuse at the end of their initial use.
- Pre-cut and prefabricated materials will be carefully ordered to size, and prefabricated components will be used for internal fit-outs where possible.



- Materials will be delivered on an 'as needed' basis to prevent degradation of materials through weathering and moisture damage.
- Materials, including reuse and recycling materials, will be stored and kept in good condition.
- Trade work on site will be coordinated and appropriately sequenced to increase efficiency and reduce waste materials.
- Packaging waste will be reduced by the return of packaging to suppliers where possible, use of returnable bulk packaging, through bulk purchasing and requesting cardboard or metal drums, and metal straps, in place of plastics that can't be recycled.
- Staff/subcontractors will be informed of waste and resource management procedures and resource recovery targets.
- Contractors will be made aware of the legal requirements for disposing of waste in NSW.
- Contracts will include measures which reinforce the requirement to sort wastes effectively for reuse and recycling.

6 MONITORING AND REPORTING

Regular compositional and/or observational waste audits, staff and student surveys, and inspections of waste storage areas and procedures should be undertaken as per UOW's Waste Management Action Plan 2015 - 2018 requirements.

Record-keeping

The waste handling and holding areas, and the loading dock and waste enclosure area will be closely monitored during the first few weeks of operation and peak operation to ensure space provisions are adequate during collections and to incorporate any efficiencies or reduced number of backup bins where possible.

Records of waste volumes reused, recycled and disposed of are to be maintained. Records of waste volumes and weights removed by contractors are to be maintained.

Evidence for waste disposal and recycling services will be retained. This includes weighbridge dockets, invoices, receipts and a log book recording waste classifications and containing the site validation certificate. All entries must include:

- Time and date
- Description and weight / volume of waste
- Waste facility used
- Vehicle registration and company name

The log book and associated receipts must be made available for inspection by Council, EPA or UOW officers at any time during site works, and a final summary provided to UOW at the end of construction and refurbishment phase works.

Inspections

Daily inspections will be undertaken prior to leaving the site to ensure all waste items are appropriately contained and covered so as not to become a source of windblown litter and to ensure storm water controls are in place in case of rain to prevent waste contamination of storm water drains.

The contents of bins/skips will be regularly inspected by the Site Manager, or dedicated and appropriately trained personnel (i.e. training in these measures can be demonstrated), to ensure effective sorting of waste and resources is being undertaken on site. Personnel training and signage will be reviewed where procedures are not being complied with.

7 CONSTRUCTION WASTE MANAGEMENT

MANAGEMENT OF WASTE DURING CONSTRUCTION

Reuse, Recycling and Disposal

The materials and procedures for reuse and/or recycling as identified in Section 5 (Table 4 and Table 5) will be implemented where economically feasible.

Only project waste that cannot be cost effectively reused or recycled will be taken to an appropriately licensed facility for treatment to recover further resources or for disposal to landfill in an approved manner.

Segregation of Waste Materials

Effective source separation is required to achieve reuse and recycling targets. The following measures will be followed for this purpose:

- A dedicated area will be nominated for the storage of materials for reuse, recycling and disposal allowing for access and handling arrangements.
- Dedicated areas for the placement of reusable or recyclable wastes will be provided and clearly signposted.
- Tarps, lids or other measures will be provided to prevent damage by the elements and to prevent windblown litter and dust.
- Separate recycling skips/bins will be utilised for bricks, concrete, plasterboard, timber and metal during the construction phase to facilitate the separation of materials that will be reused on-site or sent for recycling.
- Recycling contractors will be consulted to determine quality criteria for collections.
- Separate receptacles shall be provided for the safe disposal of hazardous waste types including batteries.
- Separate receptacles will be required for drink containers and paper/cardboard recycling at staff compound facilities and site offices during temporary installation of these facilities.

Where space constraints exist at the site and can be demonstrated, the Building Contractor will consult with recycling contractors to determine which recyclable materials can be stored within the same skips/bins for sorting again off-site.

Contaminated / Hazardous Wastes

The Site Manager should stop work immediately if contaminated or hazardous materials are spilled or uncovered during demolition works and contact the relevant Hazardous Materials Waste Contractor prior to further works being undertaken.

Handling, transport and disposal of asbestos or other contaminated and/or hazardous material must meet the requirements of the NSW EPA's POEO (Waste) Regulation 2014 and updated provisions (as at March, July and August 2015) and Occupational Health and Safety legislation (Work Cover NSW).

Liquid Wastes

Liquid waste can include wash down waters, fuel, hydraulic or engine oil, paints and solvents. Liquid waste is typically generated during washing of plant or as a result of spillages. Any liquid wastes or dangerous goods wastes generated must be disposed of by a suitably qualified contractor to a licensed facility.

If a spill occurs, the contractor must immediately identify the spilled material, notify the Site Manager and contain the spill as soon as possible. Containment measures will be provided at appropriate locations and spill kits will be located in close proximity to dangerous goods storage areas and active project work areas. Material Safety Data Sheets (MSDS) will be located on the site and nearby spill kits.



WASTE STORAGE AREAS

The waste storage area will be nominated by the Building Contractor prior to commencing construction and demolition activities.

The area will be accessible by workers and waste collection vehicles, and allow sufficient space for storage of segregated waste and recycling. The waste storage area will be flexible to the changing waste volumes throughout the construction and demolition phases of the development.

The waste storage location must consider the health and safety of the workers, and the amenity impacts on the staff and students using facilities at the university. Screening will be provided to keep waste storage areas out of view from the public and to provide a barrier to capture windblown dust and litter.

Any stockpile locations must take into account slope and drainage factors to avoid contamination of storm water drains during rain events. Storm water control measures preventing sand, soil and waste from entering drains will be implemented and inspected prior to large rain events.

All bins, skips or stockpiles of waste materials will have covers available (i.e. secured lids and/or tarpaulins). Lids/covers will be secured over waste storage areas on windy or rainy days to mitigate windblown effects and potential contamination of storm water drains.

The Building Contractor will ensure waste storage areas are kept clean, and skips and/or stockpiles are inspected on a regular (daily) basis to prevent contamination and overflow of waste materials. The site will be inspected and cleaned at the end of each day for litter to prevent this from becoming a source of windblown litter.

WASTE STORAGE AREAS

The estimated frequency of waste removal will be specified by the Building Contractor prior to commencing construction and demolition activities.

Bins/skips nearing 80% to 85% capacity will be removed and replaced within 24 hours.

All bins/skips/waste materials leaving the site will be covered with a suitable tarpaulin or lid to ensure that the spillage of wastes during transit is eliminated.

All collection of waste and resources for construction and demolition works will be conducted during approved hours as per Council requirements.

All waste collected from the site will be deposited at an approved and appropriately licensed recycling centre, transfer station or landfill site. Refer to Section 6 for record-keeping requirements.

COMMUNICATION

Inductions

All personnel employed for construction and demolition activities at the site will undergo induction training in relation to waste and resource management at the site. The following minimum requirements will be covered:

- Legal obligations (including fines for littering of waste items and cigarette butts, illegal dumping, and environmental incidents)
- Emergency response procedures
- Locations and correct use of spill kits
- Waste storage locations and sorting of waste and resources
- Responsibilities and reporting requirements.

All personnel using vehicles should be made aware that any member of the public can now report 'littering from a vehicle' via the EPA's online reporting phone app.

More information is available here: www.epa.nsw.gov.au/litter/from-vehicle.htm

Tool Box Talk Reminders

All staff and contractors will be reminded of their legal obligations with regard to littering, waste management and daily site inspection responsibilities, and encouraged to save materials.

Signage

Standard signage is available and will be used to clearly signpost waste and resource bins/skips/receptacles.

This signage uses images and colour coding to facilitate sorting of waste and resources on site. Examples are provided below in Figure 2.

Figure 2 Standard Signage for Construction and Demolition Sites



These are available for printing at: www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm

INCIDENT RESPONSE

- All environmental incidents must be responded to in a prompt manner.
- An incident register must be maintained on site at all times.
- The contact details of the EPA 24 hour Pollution hotline should be placed in a visible location and must be easy for personnel to read.

ROLES AND RESPONSIBILITIES

All personnel have a legal responsibility for their own environmental performance and compliance with waste legislation. Roles and responsibilities are outlined in Table 5.

Table 5 – Roles and responsibilities

Site Manager (some responsibilities may be dedicated to an appropriately trained officer)	• Implementation of this WMP or equivalent measures to those contained within this WMP • Training of personnel • Ensuring plant and equipment are well maintained • Ordering materials on an 'as required' basis • Ensuring waste and resources are appropriately sorted to maximise resource recovery • Monitoring and tracking of performance against State resource recovery targets • Record-keeping • Daily inspections of bins/skips/stockpiles, litter and storm water controls • Investigation and establishment of local reuse opportunities where reuse of materials on-site cannot be undertaken • Approval of off-site recycling and disposal locations • Checking of off-site disposal site licensing requirements
Employees / Contractors / Subcontractors / Visitors	• Compliance with site procedures and the measures contained within this WMP (or equivalent document) • Compliance with legal requirements in relation to litter and illegal dumping, and reporting of environmental incidents • Compliance with workplace health and safety requirements



SUBMISSION REQUIREMENTS PRIOR TO CONSTRUCTION AND DEMOLITION WORKS COMMENCING

At the time of reporting, a Building Contractor has not been decided upon for detailed planning of construction and demolition waste and resource management. Council will be notified prior to demolition work commencing.

The Demolition and Building Contractor will provide a Waste Management Plan (WMP) for all construction and demolition waste arising at the site.

Detail and drawings will also be supplied to Council at this time identifying the nominated locations and methods for the sorting, storage and collection of waste materials on site during the construction and demolition phase for:

- Excavation materials
- Landfill waste (garbage)
- Recyclable waste
- Reusable materials

Planet Ark's 'Recycling Near You' directory will be referred to where possible to locate sites that can reuse and recycle construction and demolition materials. This organisation provides a list of local reuse and recycling options for a wide number of construction and demolition materials. The following website can be used as the resource: www.recyclingnearyou.com.au/demolition/SydneyNSW.

The measures in this WMP will be complied with and incorporated into the Building Contractors' documentation where equivalent measures are not available.

8 OPERATIONAL WASTE MANAGEMENT

CURRENT MEASURES

As outlined in Section 2.1, the Facilities Management Department (Environment Unit) of the UOW has developed a Waste Management Action Plan.

The operation of the Western Building will need to contribute to the objectives of the UOW Waste Management Action Plan, which are:

- To continue to reduce in solid waste to landfill per EFTSU (equivalent full-time student unit) each year
- To continue to achieve university's overall recycling rate of 70% of total waste (by 2020)
- To achieve 75% of waste diverted from landfill by 2020
- To work towards zero waste to landfill

Actions of the Waste Management Action Plan 2015 - 2018 as relevant to this WMP are as follows:

- Building design standard to include waste system
- Consolidate waste collection points and have options for all streams and volumes
- Reduce the number of waste bins serviced by cleaners from desks
- Achieve an increase in the volume of composting units on campus
- Collect more recyclables by stream, including plastic bags, plastic wrap and polystyrene
- Extend the Green Labs program to additional UOW laboratories
- Set up and support reuse programs (e.g. for furniture, electronics and office materials)
- Ensure waste management is part of induction processes

PROPOSED ADDITIONAL MEASURES

The following additional measures should also be investigated and implemented where appropriate and not currently in place:

- Implementation of double-sided, black and white printing defaults and other office paper use minimisation measures should be investigated to reduce paper and confidential paper recycling generation rates.
- Food organics composting to be implemented in staff kitchens / tea rooms as per the Waste Management Action Plan 2015 – 2018. Composting of paper towels from bathrooms to be implemented.
- Recycling of electronic waste (or e-waste) through return to suppliers or collection by an appropriately licensed contractor.
- Recycling of hazardous wastes such as batteries, printer toners and ink cartridges (free recycling options available via planet ark) and fluorescent tubes / light bulbs through available schemes.
- Recycling of coffee pods where applicable in kitchen areas (free return to supplier arrangements available).
- Education of staff on the use of compostable packaging and promotion the use of reusable kitchenware, reusable water bottles, reusable coffee cups and reusable or compostable takeaway containers.
- Compositional waste audits undertaken for Western Building to track progress against resource recovery targets, and determine further areas for improvement.
- Visual audits of bin use / bin capacities utilised prior to collections should also be undertaken, particularly once Western Building becomes operational, to determine potential cost savings and cleaning contractor / staff education requirements.
- Education of staff on recycling options available (co-mingled, soft plastics, coffee pods, print toner), polystyrene, CDs and DVDs.



- Review signage, audit data and surveys of staff and students to determine awareness of reuse and recycling measures, and to pin point any confusing messaging around recyclable items.
- Encourage Faculties to implement a policy or ban on the provision of single use plastic cups, plates and cutlery for university seminars / events (incorporating Waste Wise principles) and within staff common areas and water dispensers.

WASTE STORAGE AREA AND SERVICING

Access to the existing Western Building, and waste collection point, will be via the Ring Road. Waste will be separated into general and chemical waste streams as follows:

- General waste (collected daily);
- Mixed recycling and paper (collected weekly);
- Organics (collected weekly);
- Confidential paper (collected fortnightly).

The following waste streams are note applicable to this Building, however Campus wide collection process detailed for information:

- Liquid waste (dilution pits bi-annually and grease traps quarterly); and
- Hazardous waste – clinical/chemical (collected fortnightly).

All building related waste will be collected and held with a waste enclosure, located to the south east of the proposed facility as illustrated in Figure 3. Waste will be collected at this point, via an access road, for collection by UOW Waste Contractors.

Figure 3: Proposed location for waste collection



In accordance with UOW Waste Management Plan, it is intended that the new facility will feature initiatives to improve overall recyclable waste targets in line with current policies and recommendation. The incorporation and location of waste minimisation initiatives will be developed in further stages of the Western Building design.

MONITORING AND REPORTING

Regular compositional and/or observational waste audits, staff and student surveys, and inspections of waste storage areas and procedures should be undertaken as per UOW's Waste Management Action Plan 2015 - 2018 requirements.

The waste handling and holding areas, and the loading dock and waste enclosure area will be closely monitored during the first few weeks of operation and peak operation to ensure space provisions are adequate during collections and to incorporate any efficiencies or reduced number of backup bins where possible.

As a guide for carrying out density conversions for reporting by weight, the volume of each material within a bin must be taken into account excluding the unused "air" component of the bin (i.e. do not divide by the volume of the total bin capacity, use density conversion factors taking compaction or no compaction into account). Using the material density conversion factor (kg/m³):

$$\text{Weight of material (kg) / volume of the material within the bin (m}^3\text{)}$$

The material density conversion factors for a range of common waste streams are provided below:

- garbage (dry, excluding organics) - 70 kg/m³
- mixed container recycling – 60 kg/m³
- paper – 115 kg/m³
- secure (confidential) paper – 300 kg/m³
- food waste – 350 kg/m³
- toner cartridges – 190 kg/m³

ROLES AND RESPONSIBILITIES

All personnel have a legal responsibility for their own environmental performance and compliance with waste legislation. Proposed roles and responsibilities are outlined overleaf in Table 6.

Table 6 – Roles and responsibilities

Facilities Management Division (Environment Unit) / Building Manager	• Roll out of compliant and consistent waste management systems across UOW • Implementation of this WMP (or equivalent measures to those contained within this WMP) for general office and staff common areas, as well as outdoor areas • Training of personnel • Ensuring plant and equipment, and signage are well maintained • Ensuring building wastes are appropriately sorted to maximise resource recovery • Monitoring and tracking of performance against UOW and State resource recovery targets • Engaging and liaising with waste collection contractors • Approval of off-site recycling and disposal locations • Checking of off-site disposal site licensing requirements • Record-keeping and inspection of waste bins/receptacles and waste storage areas • Investigating and establishing further waste avoidance, and local reuse and recycling opportunities
Employees / Visitors	• Compliance with site waste management procedures and signage • Compliance with legal requirements in relation to litter and illegal dumping, and reporting of environmental incidents • Compliance with workplace health and safety requirements – untrained staff and students are not to handle hazardous wastes (WHS Lab).

SUBMISSION REQUIREMENTS PRIOR TO OCCUPATION CERTIFICATE

Prior to occupation of the new Western Building, UOW will order required bins/receptacles, and establish appropriate waste storage and collection arrangements, as well as develop contingency measures in case greater than anticipated waste volumes are generated.

Training and awareness of waste transfer and collection arrangements for the new facility will commence prior to and within the first week of occupation.

A Waste Management Plan addressing any refurbishment and/or fit-out wastes will also be prepared as relevant to ensure space provisions for the storage of refurbishment wastes (such as furniture, electronic waste, housekeeping wastes) are adequate for the number of bins/receptacles required during this time.