

DOCUMENT CONTROL

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1 Introduction

1.1 PURPOSE

The *UWA Design and Construction Standards* (the *Standards*) outline UWA's expectations for its built forms in order to achieve consistency in the quality of the design and construction of those built forms. They are aligned with the UWA's Campus Masterplan principles and UWA's requisites for aesthetic appeal, maintainability and environmental sustainability, while ensuring that there is sufficient scope for innovation and technological advancements to be explored within each project.

The Standards are intended for use by any parties who may be involved in the planning, design and construction of UWA facilities. This includes external consultants and contractors, UWA planners, designers and project managers as well as faculty and office staff who may be involved in the planning, design, maintenance or refurbishment of facilities. These Standards also provide facility managers, maintenance contractors and other service providers with an understanding of UWA services in order to assist in the maintenance and operation of facilities.

1.2 SERVICES

The *UWA Design and Construction Standards for **Building and Architecture*** (this document) are a part of *UWA Design and Construction Standards* set of documents (the Standards). The Standards are divided into the following service documents for ease of use, but must be considered in its entirety, regardless of specific discipline or responsibilities:

- A Building and Architecture (this document)**
- B Mechanical Services
- C Electrical Services
- D Communication Services
- E Hydraulic Services
- F Security Services
- G Fire Services and Fire Safety Engineering
- H Structural Works
- I Civil Works
- J Irrigation Services
- K Sustainability
- L Vertical Transport
- M As-constructed Documentation

1.3 RELATED DOCUMENTS

1.3.1 Documents

The Standards are to be read in conjunction with the following relevant University documents:

- UWA General Preliminaries Document
- UWA Specification for As-Constructed Documentation
- Relevant UWA planning and policy documents such as the *UWA Campus Masterplan*. UWA are reviewing their masterplanning documents and intend to release a set of updated documents in 2020. UWA Campus Management should be consulted to ensure the current planning documents are referenced.
- Relevant UWA operational and maintenance documents such as preferred vendors lists, room data sheets, operational and maintenance manuals, etc.
- Other documents as referenced within the *UWA Design and Construction Standards*.

1.3.2 Relevant Legislation

The planning, design and construction of each UWA facility must fully comply with current relevant legislation, including but not limited to:

- Relevant Australian or Australian / New Zealand Standards (AS/NZS),
- National Construction Code (NCC),
- Occupational Safety and Health (OSH) legislation, including the *Code of Practice Safe Design of Buildings and Structures 2008*
- Disability Discrimination Act (DDA),
- Accessibility Aspiration Design Factors, and
- Local council and authority requirements.

1.3.3 Manufacturer Specifications and Data Sheets

All installation must be carried out in accordance with manufacturer specifications and data sheets to ensure product performance over its intended life and so as not to invalidate any warranties.

1.3.4 Project Specific Documentation

Requirements specific to a particular project, campus or other variable, will be covered by project specific documentation, such as client briefs, specifications and drawings. These Standards will supplement any such project specific documentation.

The Standards do not take precedence over any contract document, although they will typically be cross-referenced in such documentation.

Extracts from the Standards may be incorporated in specifications, however it must remain the consultant's and contractor's responsibility to fully investigate the needs of the University and produce designs and documents that are entirely 'fit for purpose' and which meet the 'intent' of the project brief.

1.4 DISCREPANCIES

The Standards outline the University's generic requirements above and beyond the above mentioned legislation. Where the Standards outline a higher standard than within the relevant legislation, the Standards will take precedence.

If any discrepancies are found between any relevant legislation, the Standards and project specific documentation, these discrepancies should be highlighted in writing to the Associate Director Capital Projects, Campus Management.

1.5 DEPARTURES

The intent of the Standards is to achieve consistency in the quality of the design and construction of the University's built forms. However, consultants and contractors are expected to propose 'best practice / state of the art' construction techniques, and introduce technological changes that support pragmatic, innovative design.

In recognition of this, any departures from relevant legislation, or the Standards, if allowed, must be confirmed in writing by the Associate Director Capital Projects, Campus Management.

Any departures made without such written confirmation shall be rectified at no cost to UWA.

1.6 PROFESSIONAL SERVICES

For all works, it is expected that suitably qualified and experienced professionals are engaged to interpret and apply these Standards to UWA projects. Works cannot be carried out by unqualified and unlicensed consultants or contractors.

For all major capital works an independent commissioning agent should be engaged from the design stage through to the end of the defects liability period, as a minimum, to ensure the building is designed, commissioned and tuned in accordance with the design intent.

The independent commissioning agent or fire consultant is to be responsible for the integrated fire testing plan/matrix.

Campus Management administer the online contractor safety induction. Upon completion the contractor will be issued with a UWA Contractors Safety Induction Card which they are required to carry at all times when working for the University.

1.7 STRUCTURE OF DOCUMENT

This document is structured into 4 parts:

- Part 1** Introduction (this Section)
- Part 2** General Requirements – outlines the general requirements or design philosophies adopted at UWA
- Part 3** Checklist for project team – checklist of items for consideration at various stages of a project
- Part 4** Specifications (if applicable) – materials specifications and/or preferred lists for materials, processes or equipment used by UWA.

1.8 DEFINITIONS

For the purpose of this document, the following definitions apply:

- Can:** Implies a capability of possibility and refers to the ability of the user of the document, or to a possibility that is available or might occur.
- May:** Indicates the existence of an option.
- Shall:** Indicates that a statement is mandatory.
- Should:** Indicates a recommendation.

2 General Requirements

2.1 GENERAL BUILDING PLANNING

All building projects must comply with the *Building Code of Australia (BCA)* and all referenced Australian Standards including the most current *Disability (Access to Premises – Buildings) Standards*.

New building projects, extensions and some refurbishment work will require a development application and all building works, other than very minor works not incurring structural changes or changes to fire exiting arrangements, require a building permit.

2.1.1 Planning Considerations

Refer [Campus Plan 2010](#) and current UWA Campus Masterplan documents (available from Campus Management).

2.1.2 Architectural Style and Scale

Refer to [Campus Plan 2010](#) and current UWA Campus Masterplan documents (available from Campus Management).

2.1.3 Space Planning

Refer to *Tertiary Education Facilities Management Association (TEFMA) Space Planning Guidelines* (available from Campus Management).

2.1.4 Heritage and Conservation

Refer to [Campus Plan 2010](#) and the *Crawley Campus Conservation Management Plan* (available from Campus Management).

2.1.5 Local sourcing

Where possible, materials and services should be sourced locally. Refer [UWA Sustainable Procurement Policy](#).

2.1.6 Siting, Orientation and Sun Shading

All buildings shall be orientated to maximise the potential for passive solar design. Sun shading shall be provided, as practical, to all windows to minimise reliance on mechanical cooling and heating and to avoid

discomfort from direct glare.

Facades and windows shall be designed to maximise natural daylight within usable areas of the building. Skylights, light wells, internal atriums and courtyards shall be used to provide natural daylight and external views. Refer *UWA Design and Construction Standards – Sustainability* for façade performance.

Suitable weather protection shall be provided to all entrances.

2.1.7 Flexibility

Where possible, buildings should be designed for future flexibility and possible expansion.

2.1.8 Durability / Maintenance

University buildings must be durable and cost effective to maintain.

Selection of external building materials shall take into account whole of life costs and to minimise maintenance requirements.

All building elements and services must be easily cleaned and maintained. Safe access must be provided for all cleaning and maintenance, including any equipment replacement.

A Services and Maintainability Review should be undertaken at the Design Development phase. Refer *UWA Design and Construction Standards – Sustainability*.

2.1.9 Noise

All noisy activities shall be located so as to minimise impact to other campus activities. Particular regard needs to be taken in areas where sensitive equipment is located. The impact of both noise and vibration need to be considered.

2.1.10 Security

Refer to *Campus Plan 2010 ‘Security and Safety’* and *UWA Design and Construction Standards – Security Services*.

Planning and design shall provide a secure environment both within and around the building. Perimeter security shall be provided to all buildings.

2.1.11 Vehicular Access

Vehicular access within campus is limited to ensure safe pedestrian movement between buildings. However vehicular access will be required to buildings for service and deliveries, including waste collection and

emergency access. Ensure a safe environment for pedestrians are maintained when designing how buildings are accessed by vehicles.

2.1.12 Hazardous Materials

All building materials, not manufactured in Australia, which have the potential to contain asbestos, shall be tested for asbestos at a NATA accredited laboratory and the appropriate certification shall be provided to UWA or its representative prior to procurement.

All works in buildings where asbestos containing materials have been identified or are at risk of being present must be undertaken in accordance with the *UWA Asbestos Management Plan*.

2.1.13 End of Trip Facilities

Provision of end of trip facilities shall be considered on a building by building basis taking into account proximity of existing facilities provided on campus.

2.1.14 Accessibility

The design of all buildings shall comply with the most current *Disability (Access to Premises – Buildings) Standards* and relevant clauses of the *BCA* with regard to accessibility.

2.1.15 Functional Planning

Buildings shall have a clearly defined entry point.

Highly utilised spaces should be located on the lower levels of buildings and quieter, less populated spaces at higher levels.

Design should minimise the requirement for electronic access control.

Staircases should be located in a prominent location to encourage physical activity through their use.

2.1.16 Easements

Refer to the most current *Integrated Infrastructure Strategy* (available from Campus Management).

2.1.17 Demolition

For refurbishment work all redundant services and equipment shall be removed. Refer *UWA Design and Construction Standards – Sustainability* for recycling of demolition waste.

2.1.18 Operational Waste

The University has operational waste management guidelines for new developments for the Crawley campus and surrounds. These guidelines are provided in *Section 4.1*.

2.2 ROOM PLANNING

2.2.1 Central Teaching Facilities

Teaching spaces shall reflect current teaching philosophy.

Central teaching facilities shall be designed in a flexible manner so that they can be used by a variety of departments and for examinations.

Access to power and data is required by all users in lecture theatres.

UWA's Business Improvement and Technology Services will advise on the audio visual facilities to be provided within all teaching facilities.

2.2.2 Scientific and Engineering Laboratories

Laboratories shall comply with the following codes:

- *AS 2243 Safety in Laboratories*
- *AS 2982 Laboratory Design and Construction*

Where possible, laboratories are to be designed generically to allow for future change of use.

The choice of material for laboratory benches shall consider any potential chemical damage from the chemicals proposed to be used and any mechanical damage from the equipment proposed to be used.

PC2, PC3, PC4 Containment Laboratories

Special guidelines apply for laboratories, animal facilities, insectaries and plant houses in which some molecular biology, genetic manipulation and some infectious agents may be used.

Laboratories used for less hazardous recombinant DNA research require PC2 classification and no substantial design considerations are required.

PC3 classified laboratories involve a higher degree of design, while PC4 laboratories have the most stringent requirements.

PC2 and PC3 laboratories require inspection and approval by the UWA Institutional Biosafety Committee.

Laboratories classified as PC3 and PC4 require approval by the Office of the Gene Technology Regulator (OGTR).

2.2.3 Offices

Open plan office design should be maximised.

Open plan offices are preferred as they provide:

- Ease of communication which enables knowledge sharing
- The ability to accommodate both individual and collaborative ways of working
- More adaptable use of space
- Better air circulation and light penetration
- More cost effective solutions in terms of both capital costs and maintenance costs
- Greater flexibility to accommodate organisation change

Individual offices are to be provided on an as needed and agreed basis where high levels of privacy or confidentiality are required.

Enclosed offices should be located so as to not negatively impact on the light and views of adjacent open plan areas.

2.2.4 Meeting Rooms

Meeting rooms shall be distributed throughout buildings.

Meeting rooms shall be provided with audio visual equipment provided by UWA.

2.2.5 Tea Rooms

Where possible, tea rooms shall have the following facilities:

- Bench
- Cupboard and drawer storage including a cutlery drawer
- Sink with drainer with hot and cold water
- Boiling water unit
- Chilled water
- Space and power for a microwave
- Space and power for a fridge
- Space and services for a dishwasher (optional)
- Space for waste and recycling bins
- Space and power for other small appliances as required.
- Tea towel rack

2.2.6 Toilets

Wet areas shall be tiled floor to ceiling. Large profile rectified tiles shall be provided to all walls to reduce grout lines. Coloured grout (preferably brown or grey) shall be used to facilitate graffiti removal.

Floors to be floor tiles with slip resistance in accordance with the requirements of *AS4586 Slip Resistance Classification of New Pedestrian Surface Materials*. Tiles to be as large a format as practical taking into consideration the requirement for falls across the floor.

Shelves are to be provided in all toilets for books and/or bags.

Refer *UWA Design and Construction Standards - Hydraulic Services* for fixture details.

2.2.7 Cleaners Rooms

A cleaner's store room shall be provided on each floor of a building for the storage of cleaning materials. The room shall include a cleaner's sink, shelving, wall hooks and a power point. The minimum size for a cleaner's room shall be 5.5m².

The cleaner's store room on the ground floor of each building is to have additional storage for consumables.

2.2.8 Baby Change Facilities

Wheelchair accessible toilets are to be fitted with baby change facilities.

2.2.9 Service Access

All plant rooms, services ducts shall be accessible and roof spaces shall have permanent fixed access and adequate lighting.

2.2.10 Roof Access

All buildings shall be provided with safe and convenient access to the roof surface to facilitate maintenance, including gutter cleaning.

A fall prevention system shall be installed in accordance with the requirements of *Worksafe WA Code of Practice for the Prevention of Falls* and the relevant Australian Standards. Roof mounted plant and equipment shall be avoided where possible.

2.3 ELEMENTS

2.3.1 Termite Protection

For new buildings, termite control must be provided in accordance with AS 3660.

The use of a sheet material termite management system is preferred.

2.3.2 Roofs

Minimum roof pitches shall not be less than manufacturers' recommendations and are to allow an appropriate safety factor for the prevailing conditions.

Penetration of the roof covering shall be avoided where possible. Locate required penetrations in areas of roofs that require minimum flashing details. Flashings shall be made of the same or similar material as the roof covering.

2.3.3 Gutters and Downpipes

Gutters should be avoided where possible.

Internal box gutters should be avoided to prevent water flowing back into the building if downpipes are blocked by leaves. If unavoidable, provision must be made for controlled overflow in case of such blockage.

Material selection of gutters and downpipes shall be compatible with roof material. Gutters and downpipes shall be fabricated from copper, stainless steel or Colorbond steel.

The face of eaves gutters shall not finish higher than the back of the gutter.

Care must be taken to ensure that valleys are of generous width and designed to cater for the leaf loading that occurs on campus.

Downpipes shall be free of sharp twists and turns and properly jointed, particularly if run internally. If in certain cases this is unavoidable, a removable inspection plate shall be provided for cleaning out. Radius bends are preferred to mitres.

Shoes of downpipes must not be cemented in but shall finish 50mm above and discharge into a separate trap with grating.

Refer *UWA Design and Construction Standards - Hydraulic Services* for further details.

2.3.4 External Walls

Materials selected shall be robust and durable, resistant to mechanical damage and be low maintenance.

To minimise ongoing maintenance, external walls are not to be painted. Consideration should be given to the use of clear Graffiti coating.

Designs shall be detailed to shed water away from building to minimise any potential water damage.

2.3.5 Internal Walls

Internal walls shall be non-load bearing allowing for future planning flexibility. Internal walls shall be designed to support imposed loads from shelving and the like. Internal walls must be designed to achieve the required acoustic and fire ratings.

Wet areas are to be tiled floor to ceiling. Rectified tiles are preferred to all walls. If area is prone to graffiti, coloured grout (preferably brown or grey) shall be used.

2.3.6 Floors

Materials selected shall take into consideration the requirements for slip resistance.

All floor finishes shall have low TVOC emission levels. Refer *UWA Design and Construction Standards - Sustainability* for Table of Limits for each floor type.

Carpet

Carpet tiles shall be installed to allow for future maintenance and flexibility.

Carpet and carpet tiles shall be hard wearing and easy to clean. Carpet tiles shall be direct fixed to the substrate.

Loop pile, rubber backed carpet tiles are preferred.

Plain colours should be avoided where possible to lessen the visual impact of dust and debris and the potential for staining.

Vinyl

Vinyl shall be selected taking into account usage, slip resistance and cleaning requirements.

Skirtings to labs and wet areas shall be covered vinyl.

Door Mats

Suitable door mats shall be provided to all doors with access to the outside of the building.

2.3.7 Ceilings

Where ceilings are not accessible, access hatches must be installed to all ceiling areas containing plant and

equipment. Safe access to the hatch shall be considered within the design. Where possible, access hatches shall be provided within publicly accessible parts of the building. At a minimum, 600 x 600mm access hatches shall be provided.

Ceilings shall be white or light colours to maximise reflectance.

2.3.8 Windows

Generally, external windows are to be non-operable.

Any operable windows shall be lockable.

Provision shall be made for window cleaning and maintenance, including the replacement of glazing.

All windows shall be installed in accordance with manufacturer requirements.

2.3.9 Doors

Doors shall be of solid core construction with painted, laminate or veneer finish as appropriate.

Door stops shall be provided as required to minimise damage to adjacent walls and furniture.

Viewing panels shall be provided where there is the possibility of a collision hazard.

Door grilles shall not be used where acoustic privacy is required.

All doors shall be installed in accordance with manufacturer requirements.

Sliding Doors

Sliding door mechanisms shall be easily accessible for maintenance.

Automatic Power Operated Doors

Bi parting doors shall be installed where possible.

Single leaf doors shall only be installed where it is not possible to accommodate bi parting doors.

Doors shall be keyed to UWA master system.

Door and Window Hardware

The preferred hardware is Lockwood 1800 series with 70 series handles.

Satin chrome finish is preferred although aged brass may be appropriate in heritage buildings.

2.3.10 Keying Systems

All external doors shall be electronically locked. All electronically locked doors shall have key override.

All locks shall be grand master keyed to UWA master key system and restricted profile.

All operable windows shall be lockable on UWA master key system.

All lifts shall be on UWA master key system.

All drop and strap bolts shall be lockable on UWA master key system.

All services plant rooms, cabinets, risers, etc. shall be on the UWA master key system.

All electrical rooms and substations are to be keyed in accordance with the *UWA Design and Construction Standards – Electrical Services*.

Refer UWA Security for preparation of keying schedule. Keying schedule shall be prepared at the commencement of the construction period. All locks shall be construction keyed. Final cylinders shall be changed over prior to Practical Completion. All locks and keys shall be provided to UWA Security.

2.3.11 Electronic Access Control

Refer *UWA Design and Construction Standards – Security Services* and consult with UWA Security for electronic access control requirements.

2.3.12 Handrails/Balustrades

Painted handrails shall be avoided as they are prone to damage requiring ongoing maintenance.

2.3.13 Tactile Indicators

Tactile indicators shall be installed as per the requirements of the *BCA*. For any other TGSIs applications, including directional installations, consult with an expert during the design stage to ensure:

- The application enhances access.
- TGSIs are necessary, as other navigational cues do not provide sufficient information.
- TGSIs application does not give incorrect, superfluous or confusing information, and
- TGSIs application does not create an additional hazard, particularly to people using wheeled mobility aids.

2.3.14 Miscellaneous Bathroom Fixtures

Toilet roll holders shall be jumbo type. Double toilet roll holders shall be provided in wheelchair accessible toilets.

Hand driers shall be air blade type.

The following fittings shall be compatible with the current UWA supplier of the associated consumables:

- Soap dispensers
- Paper towel dispensers
- Toilet roll holders

2.3.15 Window Treatments

The selection of window treatments shall ensure preserve consistent visual appearance from the outside.

Consideration shall be given, based on the function of the room, to the necessity to provide black out or brown out conditions.

Refer *Section 4.2* for specification of window blinds.

2.3.16 Painting

All paint systems to be low VOC content. Product and colour specifications shall be provided to UWA as part of the handover documentation.

2.3.17 Signage

UWA has specific signage requirements which it applies to all its buildings.

UWA *Signage Specifications* are available from Campus Management.

2.3.18 Room Numbering

A standard method of room numbering is used throughout UWA. This system of numbering shall be used on all contract drawings and on room signs.

Refer UWA *Specification for As Constructed Drawings* for the procedure of assigning room numbers.

2.4 FURNITURE

2.4.1 Fixed

Fixed furniture shall be avoided where possible to allow for future flexibility. Fixed furniture will only be required in some lecture theatres, laboratories, tea preparation areas and reception areas.

All joinery units shall have backs.

No cam fittings shall be used. All furniture shall be glued and screwed.

Adjustable wall shelving shall be avoided. If wall shelving is required, then expected loads are to be confirmed.

18mm board shall be used for shelves and 25mm board shall be used for benches.

HMR board shall be used in wet areas.

Brass ferrules and pins shall be used for adjustable shelves.

Blum hinges are preferred.

E0 (lowest formaldehyde emissions) board shall be used. Refer *UWA Design and Construction Standards - Sustainability* for Table of Limits.

2.4.2 Reception Counters

Reception counters shall be designed to allow for future modification for use by a staff member with a disability.

If the counter is to be used for the purposes of filling out forms, or other paperwork, then suitable allowance needs to be made for wheelchair users. Refer to *AS1428.2*.

2.4.3 Tea Room Cabinetwork

Finish and substrate are to be moisture resistant / impervious.

2.4.4 Loose Furniture

Refer to *Preferred Vendor List* for procurement of loose furniture (available from Campus Management).

When selecting loose furniture, consideration shall be given to local manufacturers with regard to the provision of services and availability of parts.

It is essential that careful consideration is given to lead times and the implications of extended storage periods in the process of ordering furniture.

Furniture should be consistent across the floor plate of a building. Where possible, furniture should be interchangeable to allow for future flexibility.

Task Chairs

Task chairs shall be ergonomically sound and fully adjustable (height, seat tilt back and forth, back height, back tilt).

Lumber support should be an option.

Arms are optional. It is not recommended for computer intensive work.

Heavy duty commercial fabric is required.

Minimum warranty period of 3 years is required. Warranty period of 5 years is preferred.

Meeting Chairs

Minimum warranty period of 3 years is required. Warranty period of 5 years is preferred.

Visitors Chairs

Minimum warranty period of 3 years is required. Warranty period of 5 years is preferred.

Lecture Room Chairs

Where possible, chairs should be stackable.

Heavy duty commercial fabric is required.

Minimum warranty period of 3 years is required. Warranty period of 5 years is preferred.

Lecture Theatre Chairs

Heavy duty commercial fabric is required.

Minimum warranty period of 5 years is required.

Workstations

Standard modular workstations should be used to allow for long term flexibility.

Standard sizes for workstations are 2100x1800mm and 1800x1800mm.

Cam fittings shall not be used. Modesty panels shall be installed as required.

Workstation screens should be between 1200 and 1350mm above floor level to maximise natural light and views for staff. Acoustic requirements and performance shall be considered in the selection of the screen system.

Mobile Pedestals

As a minimum, one mobile pedestal shall be provided per workstation.

Pedestal shall be lockable.

50mm dual wheel castors are preferred.

Minimum warranty of 5years is required.

Sit / Stand Desks

These are to be provided on an as needs basis based on ergonomic assessment. Consideration should be given to desk top arrangements for greater flexibility.

Tables

In teaching spaces, preference is for folding tables on castors for flexibility in teaching.

Tables must be durable, easy to maintain and easily handled into multiple configurations.

Fixed Shelving

Shelving should not be fixed to walls unless the wall has been designed specifically to allow for shelf loading.

The maximum span allowable shall be 900mm.

Shelves shall be adjustable with 25mm board thickness.

Compactus

It is important to consider compactus loading before installing any compactus shelving. Structural engineering advice is required.

The runner system of any compactus shelving should not create a trip hazard.

Appliances

Consideration should be given to the Energy Ratings Labels (ERLS) and Water Efficiency Labels (WELS) when purchasing appliances. It is recommended that appliances achieve a minimum of 4 star ERLS.

All sanitary fixtures are to comply with *Design and Construction Standards – Hydraulic Services*.

All appliances shall be tested and tagged by Campus Management prior to installation and operation.

Whiteboards

Porcelain whiteboards are preferred.

Aluminium frames are preferred.

All whiteboards shall be easily cleaned.

AV Equipment and Projection Screens

The supply and installation of all audio visual equipment will be arranged by UWA's Business Improvement and Technology Services. Consult with UWA to ensure that all the necessary space requirements and services are provided and completed in adequate time for the audio visual system installation.

Upholstery Fabrics

All upholstery fabrics must be commercial grade, stain resistant and durable with a minimum of 50,000 Martindale and be fire resistant as required to meet the current codes.

Fabric used on office chairs and furniture located in student areas shall be heavy duty commercial.

3 Checklist for Project Team

The following activities should be considered by the project team during the planning of the project.

Activity	Responsibility	Stakeholder(s)	Timeframe
Development Application / Planning Approval	Architect / Project Manager	Relevant Councils / CM (Campus Planning)	Phase 2 Feasibility
BCA Compliance Issues	Architect / Building Surveyor	CM (Campus Planning)	Phase 2 Feasibility
Provisions for future re-planning or alternate occupancy/use	Architect	CM (Campus Planning)	Phase 2 Feasibility
Consider the need for specialist sub-consultants, e.g., corrosion consultant, waste management consultant, etc.	Architect / Project Manager	CM (Campus Planning)	Phase 2 Feasibility
Heritage Issues	Architect / Heritage Architect	CM (Campus Planning)	Phase 2 Feasibility
Asbestos Management Plan	Architect	CM (Safety)	Phase 2 Feasibility
Laboratory Design Compliance	Architect	CM (Safety) / OGTR	Phase 2 Feasibility
Easements and Infrastructure Provisions	Architect / Services Consultants	CM (Safety)	Phase 2 Feasibility
Transport Provisions	Architect	CM (Campus Planning)	Phase 2 Feasibility
Acoustic Issues	Acoustic Consultant	CM (Campus Planning)	Phase 2 Feasibility
Alternative Fire Solutions	Fire Engineer	CM (Campus Planning)	Phase 2 Feasibility
ESD provisions	ESD Consultant	CM (Campus Planning)	Phase 2 Feasibility
Existing Structural Restrictions	Structural Consultant	CM (Campus Planning)	Phase 2 Feasibility
AV Requirements	Architect / Electrical Consultant	University IT	Phase 3 Design
Keying Requirements	Architect	CM (Security)	Phase 3 Design
Access Control Requirements	Security Consultant / Communications Consultant	CM (Security)	Phase 3 Design
Independent Commissioning Agent	Architect / Project Manager	CM (Capital Projects)	Gate 3 Design
Building Permits	Contractor	Relevant Councils	Phase 5 Delivery

4 Specifications

4.1 WASTE MANAGEMENT GUIDELINES FOR NEW DEVELOPMENTS WITHIN CRAWLEY CAMPUS AND SURROUNDS

The Crawley campus is located within the City of Perth (the City) local government area and these Guidelines have been developed in consultation with the City to ensure they are in line with local government planning and environmental requirements. Its purpose is to ensure buildings and grounds waste collection facilities are adequately considered within the design and planning of developments and within the context of the Campus Masterplan and Landscape Strategy. It should be read in conjunction with *UWA Waste Management Strategy*, which outlines UWA's waste management targets and strategies (available from Campus Management).

Within the context of UWA's Waste Management Strategy, these Guidelines aim to:

- Ensure the long term waste management needs of each new development and redevelopment are met in an efficient and sustainable manner;
- Minimise the impact of waste services and facilities on its buildings and grounds, as well as in relation to the public realm and the frontage of the development;
- Ensure waste services and facilities do not have a negative impact on the amenity of the University particularly in terms of noise and odour;
- Maximise safety for all staff, students, contractors and visitors.
- Minimise traffic and footpath obstruction.

Definitions

Landfill Waste usually includes non-recyclable materials, such as non-recyclable plastic packaging, paper packaging contaminated with food waste and organic materials, such as garden trimmings and food waste. Batteries, hazardous waste (chemicals, paints, cleaning products, medicines or flammable liquids) should not be included in the landfill waste stream.

Comingled Recycling consists of the assortment of recyclable materials accepted by UWA's waste service provider. Materials collected for recycling may vary from time to time depending on the market demand. The UWA's waste service provider currently accepts the following materials: paper, cardboard, plastics, aluminium, steel and other metals, milk and juice cartons and glass. In the future, cardboard may become a separate recycling stream.

Other recycling streams such as electronic waste, batteries, toners are also collected at UWA campuses.

Waste Presentation Point is the location/s in which the bins containing waste and recycling from the development are presented for collection. At UWA this may include external 'bin collection points' shared between buildings, particularly where buildings are not accessibly by standard vehicles (e.g. the inner Crawley

Campus). Waste presentation points map for Crawley is available from Campus Management.

UWA's Waste and Recycling Collection Services

UWA's current facilities service provider, provides the following standard waste and recycling collection services for buildings:

- Landfill waste in 660L and 1100L (collected daily, 5 days per week)
- Comingled recycling in 660L and 1100L (collected daily, 5 days per week)
- Paper/cardboard recycling in 4.5m³ cart (collected weekly)

Waste Management Plan for New Developments

Waste management should be considered in the early stages of the development design process. An indication of the intended waste management facilities should be submitted with a major development application and a Waste Management Plan (WMP) will be required to be lodged for approval by the City prior to the submission of an application for the required building permits.

UWA encourages designers to be innovative in developing the most efficient and sustainable waste management system to meet its waste management objectives.

As a minimum, the WMP should include the following:

- Waste generation rates
- Collection method
- Bin quantities/waste stream/collection frequency
- Bin storage, including bin room size (m²)
- Waste presentation location
- Bin management

All WMPs must demonstrate (through figures and explanations) how the outcomes of these guidelines are to be achieved.

Drawings / figures should include:

- Floor plans, showing convenient and practical waste and recycling collection.
- Bin Room/s to demonstrate functionality and adequate size, including details such as:
 - Bin room/s area
 - Access to bin room, including access widths
 - Opening width
 - Any chutes/compaction equipment etc. with all associated detail where proposed.
 - Bin arrangement
 - Drop off areas (eg. Bulk waste)
 - Tap and sewer points

- Waste presentation point (hardstand or bin room) with bin arrangement and waste collection vehicle location shown, including details such as:
 - Access to bin room, including access widths
 - Operating space at the rear of the vehicle

Where it is intended that waste collection vehicles are required to collect from within the building, a plan of the access and a swept path analysis should be provided.

Internal Waste Collection

The bin room/s for storage of waste and recycling should be located in a position that is convenient for both users and collection staff and is in line with Crawley Campus landscape and precinct masterplans.

Waste and recycling streams should be separated at source and clearly labelled in appropriate receptacles.

In larger developments, dedicated areas for temporary waste storage or other solutions should be considered to ensure waste collection and storage is more efficient.

Where a waste chute system is planned, a dual chute system for both general/landfill waste and recycling should be considered.

Waste Storage

Waste and recycling bins should be stored within designated collection points in line with Crawley Campus landscape precinct masterplans. They shall be stored within the boundaries of UWA property and not fronting external boundary streets.

Sufficient space should be provided for bins and associated equipment in dedicated bin room/s to manage all waste and recyclables likely to be generated on the premises between collections. Where individual bin stores are not possible for each building or access to the building by waste collection vehicles is not possible it may be appropriate to co-locate bins within an external shared storage space/bin collection point.

Bin room/s should be able to hold a minimum of 24hrs worth of waste generation. Contingency plans should be in place if there is a delay in waste collection. UWA's service provider undertakes daily collections (5 days per week, Monday – Friday)

The design of the bin room/s should be functional, to allow all bins to be easily moved. Areas should be allocated for bin washing which can be shared but should be located within reasonable distances from the bin store of the new development. All personnel access ways should be minimum of 800mm wide.

The bin room must be large enough for the bins to sit next to each other, not behind each other as residents / cleaners may not take responsibility for rotating bins.

Larger bin sizes (660L and 1100L) should be used where practical to ensure efficient storage and collection of waste and recycling streams.

Mains water supply and sewer plumbed drainage outlets should be installed in appropriate locations where the washing of room surfaces and for the cleaning of bins as required.

Waste or recycling bin room/s should have a minimum 1100mm wide opening to allow easy removal and return of all bins. Openings (e.g., doors) should be self-closing where possible, but able to be locked open.

All bins rooms should comply with the relevant local health laws. Refer perth.wa.gov.au/council/finance-and-corporate-documents/local-laws

Bin Collection

The inner Crawley campus has restrictions on vehicle size and the areas that can be used for bin collections. Waste service collections must comply with the University five (5) tonne vehicle size limit on the inner campus.

Bin collection methods for new developments shall depend on the location of the proposed new development or refurbishment and whether it will be located within the inaccessible inner campus zone or elsewhere.

Waste collection for new developments / refurbishments within the inner Crawley campus:

- Bins are transferred to the nearest and most accessible existing external 'bin collection point' within the campus (the size of this collection point may need to increase to accommodate additional bins)

Waste collection for new developments / refurbishments in areas other than the inner campus zone (in order of preference):

- Bin room collection, where the waste vehicle would stop in an appropriate location outside the building boundaries and bins would be collected directly from the bin room.
- Hardstand collection, where internal access or bin room access cannot be achieved, bins should be presented on a hardstand area (of appropriate size) outside of the building. The hardstand area should be of appropriate size to easily move the bins to the waste vehicle and within 10 metres of the waste collection vehicle location.
- Internal collection, where the waste collection vehicle can enter and exit the development in a forward direction, with limited reversing (max 3 point turn), parking in a designated location within the property boundaries. This could be facilitated by the inclusion of a turntable. Please see vehicle dimensions for required adequate vehicle clearance.

The recommended maximum travel distance between the last bin (furthest) at the waste presentation / collection point and the waste collection vehicle, for all bin sizes and waste type, is 10m.

The waste presentation / collection point should not obstruct the public domain, and should maximise safety

and minimise traffic congestion.

Swept Path Analysis should include a minimum buffer of 300mm.

Both the driver and passenger should be able to safely alight and board the vehicle before and after collection, allowing both doors to fully open.

To allow safe operating conditions of the rear loading waste vehicle, there should be practical and convenient access for both the driver and passenger to access the rear of the vehicle (minimum 800mm), with a 3m operating space at the rear of the vehicle.

Where the waste collection vehicle is required to stop on the street it should be a minimum of 10m from any intersection.

The path for wheeling bins between the waste presentation point and the waste collection vehicle should (where possible) be a flat surface ($\leq 1:20$, no steps or dock levellers), free of obstacles and a safe distance from parking bays and vehicle ramps.

Access way / ramp width, ramp grade, change of grade and turning circles should comply with *AS 2890.2:2002 Parking Facilities: Off Street Commercial Vehicle Facilities*.

Bin Management

Responsibility for ensuring compliance with the WMP should be allocated to a person of appropriate authority (e.g. a Facility Services manager or caretaker). Responsibilities include:

- cleaning of bin room/s and facilities;
- transfer of bins within the property and to the waste presentation point (if required); should be determined when designing the system and clearly stated in the WMP.

For residential accommodation, residents should not be responsible for the presentation of bins for collection, as there is usually no individual ownership of bins. In this type of development a caretaker or equivalent should be responsible for bin management.

If a bin hardstand area is to be used, once the bins have been emptied it is the responsibility of the Facility Services personnel to take the bins back to the bin room as soon as possible.

Supporting Information

The following supporting information, based on UWA and City of Perth Guidelines is provided to assist in developing the WMP and understanding the waste and recycling requirements for each development:

- Mobile Garbage Bin Dimensions
- Waste and Recycling Generation Rates

- Waste Collection Vehicles Dimensions

Mobile Garbage Bin Dimensions

	240 Litre	660 Litre	1100 Litre
Height	1060mm	1200 mm	1330 mm
Depth	730 mm	770 mm	1070 mm
Width	550 mm	1360 mm	1240 mm

Waste Generation Rates

The waste generation rates below are generally based on rates from UWA and City of Perth guidelines and can be used as a guide for new developments. However, the minimisation of waste generation rates, through procurement practices or opportunities for re-use or recycling, to be considered within the design and operation of the development, shall be considered, in line with the *UWA Waste Management Strategy*.

The intended land uses, floor areas, etc. should be indicated, to clearly show how the waste generation of the development was calculated, with any assumptions explained.

Where specific commercial land uses are not known, ensure the development has adequate storage capacity to accommodate the frequency of collection.

The number of bins required for landfill waste and recycling streams should be clearly identified.

Premise / Land Type	Landfill Waste Generation	Comingled Recycling Generation
Special Residential Student, , Boarding House, Guest House	40L / bed / week	20L / bed / week
Licensed Club, Tavern, Small Bar	50L / 100m ² bar area / day 667L / 100m ² /dining area / day	50L / 100m ² bar and dining area / day
Function Room	200L / 100m ² /day	100L / 100m ² / day
Offices	10L / 100m ² floor area / day	10L / 100m ² floor area / day
Retail Shops other than food sales less than 100m²	50L / 100m ² floor space / day	25L / 100m ² floor space / day
Retail Shops other than food sales over 100m²	50L / 100m ² floor space / day	50L / 100m ² floor space / day
Hairdresser	60L / 100m ² floor area / day	Discretionary
Restaurants (University Club)	667L / 100m ² floor area / day	133L / 100m ² floor area / day
Delicatessen/ Takeaway	80L / 100m ² floor area / day	Discretionary
Cafe (Dine In)	300L / 100 m ² floor area / day	200L / 100 m ² floor area / day
Education buildings	Infrequent use, office rate too high – perhaps Office rate divided in half	Infrequent use, office rate too high – perhaps Office rate divided in half

Premise / Land Type	Landfill Waste Generation	Comingled Recycling Generation
Lecture theatres	Low waste	
Classrooms	Low waste	
Sport facilities	10L/ 100m ² floor area / day	10L/ 100m ² floor area / day
Pools	10L/ 100m ² floor area / day	10L/ 100m ² floor area / day
Research labs, wet and dry	perhaps Office rate divided in half plus hazardous waste	perhaps Office rate divided in half plus hazardous waste
Library	Office rate divided in half	Office rate divided in half
Recreation	10L/ 100m ² floor area / day	10L/ 100m ² floor area / day
Gyms	10L/ 100m ² floor area / day	10L/ 100m ² floor area / day

Waste collection vehicles dimensions

UWA service provider's waste collection vehicles are currently side-lift, rear-lift and front-lift loading. The following dimensions are for the typical collection vehicle and are provided for guidance only. Designers should allow for the largest possible waste collection vehicle.

Nominal Dimensions for relevant waste collection vehicles		
	Rear-lift (120, 240, 660 and 1100 Lt bins)	Front-lift (1.5m ³ , 3.3 m ³ and 4.5m ³ bins)
Overall length (m)	10	10.3
Overall Width (m) excluding mirrors	2.5	2.5
Overall height (m)	3.4	4.2
Operational height (m)	3.4	6
Weight (payload) (t)	22.5	27.5

Further details of UWA's waste service provider's waste collection fleet are available upon request.

4.2 WINDOW BLINDS

Window blinds shall be Neylor_Vertilux Double Roller Blind System.

Two options are accepted.

Option 1

Neylor_Vertilux Double Roller Blind System

- 40/47mm tube
- Blind componentry to be White
- Blinds mounted on Vertilux double bracket system – control side/s to be ascertained on site
- 15-year warranty on BGS system
- Brackets powder coated white
- Base rails – tear drop 25mm. Finish to be brushed anodised
- Chains to be No 10-stainless steel ball chain – chain length to be >50% blind drop
- Chains to have stop beads fitted for upper and lower limits to blind travel
- Vertilux 1.10 deluxe chain tensioners. Colour to be white

Screen fabric

Vertilux Status 5% – ‘Bircher’

- 30% Polyester / 70% PVC
- 100% free of formaldehyde heavy metal & Phthalate to reduce toxins
- 370 gr/m²
- Fire Classifications
 - AWTA AS1530.2 1993
 - AWTA AS1530.3 1993
 - AWTA AS3837 1998
 - German Standard: DIN 4102 – B1
- Lightfastness Tested BS EN ISO 105 B2: 8+
- VOC test US EPA 5021
- Fabric warranty = 5 years
- TS: 13%, RS: 35%, AS: 52%, TV/VLT:12%, O-F: 5%

Room Darkening Fabric

Vertilux Yang room darkening – ‘Mario’

- 100% Polyester with acrylic backing

- 100% free of PVC, Formaldehyde and lead to help reduce toxins
- 350 gr/m²
- Fire Classifications
 - AWTA AS1530.2 1993
 - AWTA AS1530.3 1993
- Lightfastness Tested AS 2001.4.21-2006: 6-7
- VOC test ASTM: D5116
- Fabric warranty 5 years
- TS: 0%, RS: 5%, AS: 95%, TV/VLT: 0%, O-F: 0%

Option 2

Neylor_Vertilux Double Roller Blind System

- 40/47mm tube
- Blind componentry to be white
- Blinds mounted on Vertilux double bracket system – control side/s to be ascertained on site
- 15-year warranty on BGS system
- Brackets powder coated white
- Base rails – tear drop 25mm. Finish to be brushed anodised
- Chains to be No 10-stainless steel ball chain – chain length to be >50% blind drop
- Chains to have stop beads fitted for upper and lower limits to blind travel
- Vertilux 1.10 deluxe chain tensioners. Colour to be white

Screen fabric:

Vertilux Euroscreen Transparent – ‘Riverstone’

- 100% Trevira CS
- 100% free of PVC, formaldehyde and halogen
- 170 gr/m²
- Fire Classifications
 - AWTA AS1530.2 1993
 - AWTA AS1530.3 1993
 - AWTA AS3837 1998
 - German Standard: DIN 4102 – B1
 - French Standard: M1
- Lightfastness Tested DIN EN ISO 105 B2: 6-7

- VOC test ASTM: D5116
- Fabric warranty 7 years
- TS: 26%, RS: 46%, AS: 8%, TV/VLT:15%, O-F: 3%

Room Darkening Fabric:

Vertilux Eurobloc room darkening – ‘Cinnamon’

- 100% Trevira CS with FR backing
- 100% free of PVC
- 350 gr/m²
- Fire Classifications
 - AWTA AS1530.2 1993
 - AWTA AS1530.3 1993
 - AWTA AS3837 1998
 - German Standard: DIN 4102 – B1
 - French Standard: M1
- Lightfastness Tested DIN EN ISO 105 B2: 5-6
- VOC test ASTM: D5116
- TS: 0%, RS: 22%, AS: 78%, TV/VLT: 0%, O-F: 0%

Abbreviations

AV	Audio Visual
BCA	Building Code of Australia
CM	Campus Management
DNA	Deoxyribonucleic Acid
ERLS	Energy Ratings Labels
ESD	Ecologically Sustainable Design
HMR	Highly Moisture Resistant
HR	Human Resources
NATA	National Association of Testing Authorities, Australia
OGTR	Office of Gene Technology Regulator
PC	Personal Containment
TVOC	Total Volatile Organic Compounds
TGSI	Tactile Ground Surface Indicator
Uni IT	University IT
UWA	The University of Western Australia
VOC	Volatile Organic Compounds
WEL	Water Efficiency Labels
WMP	Waste Management Plan

References

- AS1428.2 Design for access and mobility Part 2: Enhanced and additional requirements – Building and facilities
- AS 2243 Safety in Laboratories
- AS 2890.2 Parking Facilities: Off Street Commercial Vehicle Facilities
- AS 2982 Laboratory Design and Construction
- AS 3660 Termite Management
- AS 4586 Slip resistance classification of new pedestrian surface materials. Building Code of Australia
- Code of Practice Safe Design of Buildings and Structures 2008
- Crawley Campus Conservation Management Plan
- Disability (Access to Premises – Buildings) Standards
- National Construction Code
- Tertiary Education Facilities Management Association (TEFMA) Space Planning Guidelines
- UWA Asbestos Register
- UWA Campus Plan 2010
- UWA Campus Masterplan
- UWA Integrated Infrastructure Strategy
- UWA Landscape Strategy
- UWA Sustainable Procurement Policy
- UWA Waste Management Plan
- Worksafe WA Code of Practice for the Prevention of Falls

Change Log

It is envisaged that revisions to this document will be undertaken at intervals of not more than two (2) years. This version differs from the previous version in the following areas:

Section	Title	Description
1.3.2	Relevant Legislation	Inclusion of the Code of Practice Safe Design of Buildings and Structures 2008
1.6	Professional Services	Substantial update regarding engagement of commissioning agent. Inclusion of safety induction.
2.1.6	Siting, Orientation and Sun Shading	Inclusion of reference to UWA Design and Construction Standards – Sustainability.
2.1.8	Durability / Maintenance	Reference to a need for a Services and Maintainability Review
2.1.18	Operational Waste	Inclusion of new clause.
2.1.12	Hazardous Materials	Reference to the need for works to be carried out in accordance with the UWA Asbestos Management Plan.
2.2.6	Toilets	Additional information on floor tile size.
2.2.7	Cleaners Room	Specified minimum size of cleaners room.
2.3.6	Floors	Reference to TVOC Table of Limits for floors
2.3.10	Keying Systems	Inclusion of reference to UWA Design and Construction Standards – Electrical Services.
2.3.15	Window Treatment	Reference to new section – 4.2 Window Blinds
2.4.1	Fixed Furniture	Reference to Table of Limits
2.4.4	Loose Furniture	Inclusion of reference to UWA Design and Construction Standards – Hydraulic Services.
4.1	Waste Management Guidelines for New Developments within Crawley campus and surrounds	Inclusion of new section.
4.2	Window Blinds	Inclusion of new section.