



# University of Wollongong

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Ecologically Sustainable Development Commissioning Standard  
Version 2 – 5 March 2012



## QUALITY SYSTEM

Reason for Issue:	Client Issue
Client:	University of Wollongong
Director Responsible:	Bruce Flint
Director's Signature:	
Engineering Approval:	
Issue:	Version 2 – 5 March 2012

## VERSION CONTROL SYSTEM

Section Modified	Description of Modification	Version	Organisation	Representative	Date
All	Document created	V1	Asset Technologies Pacific	Donny Yap	15/12/2011
All	Document updated to reflect name change from Buildings & Grounds (B&G) to Facilities Management Division (FMD) and rebranding logo	V2	University of Wollongong	Yvonne Butcher	5/3/2012

## 1. ESD COMMISSIONING MATRIX

Item	Category	Design Reference	1 <sup>st</sup> Preference	2 <sup>nd</sup> Preference	3 <sup>rd</sup> Preference	Design selection (1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , other)	Design Intent Satisfied (Y/N)	ESD Intent Satisfied (Y/N)
<b>Building Location</b>								
1	Land Impact	Green Star	Remediate Contaminated Land for new Building	Re-use existing developed land	Use new land			
2	Land Impact	Green Star	Provide native garden (>40% of site area)	Provide native garden				
3	Land Impact	Green Star	Retain topsoil on site	Utilise topsoil for other UOW sites	-			
4	Integration with Existing Environment	Green Star	<b>Mandatory:</b> Provide a pedestrian route to/from the building					
5	Integration with Existing Environment	Asset Technologies Pacific	Avoid obstruction of other buildings	Position buildings in east-west orientation	-			
<b>Building Fabric</b>								
1	Building Form	Legislation	<b>Mandatory:</b> Building must be within local height constraints					
2	Building Form	Asset Technologies Pacific	Design floor plate to be <50% of site area	-	-			
3	Building Form	Green Star	Design >60% floor area within 8m of a window	Design >60% floor area within 8m of a window or naturally lit atrium	-			
4	Construction Elements	Green Star	Incorporate > 60% of existing structure in refurbishment	-	-			
5	Construction Elements	Green Star	Re-use existing structure / shell	Utilise concrete with >60% recycled material; pre-cast concrete with > 40% recycled material and stressed concrete with > 30% recycle material	Utilise concrete with >30% recycled material; pre-cast concrete with > 20% recycled material and stressed concrete with > 15% recycle material			

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6	Construction Elements	Green Star	Re-use existing structure / shell	Utilise Australian steel with >90% recycled content	Utilise Australian steel with >60% recycled content			
7	Construction Elements	Green Star	Steel should be permanently marked with its strength grade. A minimum of 60% of steel used should be sourced from accredited provider.	-	-			
8	Construction Elements	Green Star	95% of the building structure and shell to be designed for disassembly	50% of the building structure and shell to be designed for disassembly	-			
9	Construction Elements	Building Code of Australia	Air-conditioned fully insulated with minimum total R-value of 4.0 for roof and 3.2 for walls	Air-conditioned fully insulated with minimum total R-value of 3.2 for roof and 2.8 for walls	-			
10	Construction Elements	Asset Technologies Pacific	Utilise concealed fixing roofing with high reflectivity, high emissivity coating	-	-			
11	Construction Elements	University of Wollongong	Centralise roof plant to maximise space for solar system					
12	Construction Elements	Green Star	Utilise windows to provide natural light and views and avoid skylights	Supplement windows with skylights or light wells	-			
13	Construction Elements	Green Star	<b>Mandatory:</b> Provide fixed external louvres to control glare					
14	Construction Elements	Asset Technologies Pacific	Provide windows with safety rated performance glazing	-	-			

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15	Construction Elements	Green Star	Remove all existing asbestos, PCBs and lead-based paint	Encapsulate hazardous materials that are not able to be removed.	-			
16	Construction Elements	Green Star	Existing formaldehyde-treated timber to be reduced. New timber should be formaldehyde free	-	-			
<b>Building Interior Construction &amp; Amenity</b>								
1	Building Amenity	University of Wollongong	Share an existing external shared waste area	Allocate a new external shared waste area	-			
2	Building Amenity	Green Star	25% of car spaces to be for small cars 10% of car spaces near building entrance to be for car pool participants, hybrid or alternative fuel vehicles	-	-			
3	Building Amenity	Green Star	Provide secure bicycle storage for 10% of peak number of students and 10% of building staff	Provide secure bicycle storage for 5% of peak number of students and 10% of building staff	Provide secure bicycle storage for 5% of peak number of students and 5% of building staff			
4	Building Amenity	Asset Technologies Pacific	Provide drinking water fountains in ground floor foyer					
5	Interior Construction	Building Code of Australia	<b>Mandatory:</b> Plant rooms and service rises should be acoustically insulated and achieve sound levels within AS/NZS2107					
6	Interior Construction	Green Star	Achieve minimum 45 sound reduction index between functional areas	-	-			

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7	Interior Construction	Green Star	Remove all existing asbestos, PCBs and lead-based paint	Encapsulate hazardous materials that are not able to be removed.	-			
8	Interior Construction	Green Star	Existing formaldehyde-treated timber to be reduced. New timber should be formaldehyde free	-	-			
9	Interior Construction	Building Code of Australia	<b>Mandatory:</b> Safe access must be available to all equipment requiring maintenance					
10	Fit-out	Green Star	Re-use existing joinery	Specify modular joinery with minimum 50% (by mass) designed for disassembly	Specify joinery with minimum 20% Eco-Preferred Content (by mass) and minimum 50% (by mass) designed for disassembly			
11	Fit-out	Green Star	Re-use existing furniture	Specify furniture with minimum 50% (by mass) designed for disassembly, from an ISO14001 accredited manufacturer willing to take back the furniture at the end of its life	-			
12	Fit-out	Green Star	Reduce PVC utilisation by 60% (by cost)	-	-			
13	Fit-out	Green Star	All new timber should be Forest Stewardship Council (FSC) certified	-	-			
<b>Services - Electrical</b>								
1	Control Gear &	Green Star	<b>Mandatory:</b> Sub-meters to be installed and logged by smart metering					

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	Metering							
2	Control Gear & Metering	Green Star	Co-locate substations and/or main switch rooms for adjacent buildings					
3	Control Gear & Metering	Asset Technologies Pacific	Install gross interval meter in gross-metered configuration for solar PV systems	Install gross interval meter in net-metered configuration for solar PV systems	Install net interval meter for solar PV system			
4	Energy Efficiency	Green Star	<b>Mandatory:</b> Lighting to be controllable by local switching					
5	Energy Efficiency	Green Star	<b>Mandatory:</b> External lighting should have minimum efficiency of 50 lumens/ watt and be controlled with daylight sensors and time clock control.					
6	Energy Efficiency	Asset Technologies Pacific	Utilise LED downlights in lieu of halogen dichroic downlights	Utilise CFL downlights in lieu of halogen dichroic downlights	Utilise halogen dichroic IRC lamps with reduced wattage			
7	Energy Efficiency	Asset Technologies Pacific	Utilise ultrasonic occupancy sensors	Utilise passive infrared sensors where low risk of incorrect deactivation of lighting	-			
8	Energy Efficiency	Asset Technologies Pacific	Utilise energy efficient LED exit signs	Utilise energy efficient cold cathode fluorescent exit signs	-			
9	Energy Efficiency	Green Star	<b>Mandatory:</b> Zero light pollution from direct light permitted.					
10	Demand-side Management	Green Star	Identify equipment whereby the operation can be scheduled to occur outside of peak periods					



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11	Demand-side Management	Green Star	Identify equipment that is distributed in nature and can be scheduled to operate on a time share basis					
12	Demand-side Management	Green Star	Identify opportunities for local generation					
13	Electromagnetic Fields	Asset Technologies Pacific	Limit exposure to 50Hz EMF					
14	Electromagnetic Fields	Asset Technologies Pacific	Design switchboards and cabling to be positioned in dedicated services risers and locations					
<b>Services - Mechanical</b>								
1	Energy Efficiency	Green Star	<b>Mandatory:</b> Central A/C to be controlled through BMS					
2	Energy Efficiency	Green Star	Local devices to monitor and control individual plant eg VSDs	Plant and equipment to be controlled on a multi zone basis	Areas to be isolated (resulting in reduced demand)			
3	Energy Efficiency	Asset Technologies Pacific	Major central plant to be selected for low/medium and high load efficiency eg chillers.	Equipment to be selected for high/low load operation eg high load chiller/low load chiller.	Distributed HVAC system to target selected areas requiring enhanced space conditions.			
4	Demand-side management	Asset Technologies Pacific	Implement load shedding control strategy	Implement time limit controls during peak	Implement manual control procedure			
5	Emissions	Green Star	<b>Mandatory:</b> Select low impact refrigerant					
6	Emissions	Green Star	Select equipment that stores refrigerant in an air tight, reinforced container and a monitoring system is installed.	Select equipment that stores refrigerant in an air tight, reinforced container				

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7	Demand-side management	Asset Technologies Pacific	Implement load shedding control strategy	Implement time limit controls during peak	Implement manual control procedure			
8	IEQ	Green Star	Implement natural ventilation	Implement mixed mode ventilation	Implement outside air greater than AS1688.2 requires			
9	IEQ	Green Star	Implement mechanically heated naturally ventilated	PMV are calculated in accordance with ISO 7730	Implement mixed mode operation			
<b>Hydraulic and Gas Services</b>								
1	Occupant Amenity Water	Green Star	<b>Mandatory:</b> Reduce potable water consumption for sanitary use against best practice					
2	Water meters	Green Star	<b>Mandatory:</b> Install water meters for major water uses					
3	Landscape irrigation	Green Star	Reduce water usage by 30% - 90%	Install a Xeriscape garden	Minimise landscaping to 1% of the area			
4	Heat rejection water	Green Star	Water based heat rejection is not used	Reduce water based heat rejection by 90%	Reduce water based heat rejection by 50%			
5	Fire services water	Green Star	Sprinkler drain points should feed into building rainwater tank	Sprinkler layout should incorporate multiple drain points to minimise wastage				
6	Laboratory water usage	Green Star	Cooling is achieved through non-potable water means	Reduce water based heat rejection by 90%				
7	Hot water	University of Wollongong	Utilise solar thermal hot water	Utilise gas hot water				
8	Rain water	University of Wollongong	Capture rainwater from roof and store at ground level for irrigation and water features					
9	Gas meters	Green Star	<b>Mandatory:</b> Install gas meters for major water uses					

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10	Gas monitoring	Green Star	<b>Mandatory:</b> Install monitoring devices to monitor consumption and leakage					
11	Efficiency	Asset Technologies Pacific	<b>Mandatory:</b> Major central plant to be selected for low/medium and high load efficiency					
<b>Enviros</b>								
1	Footpaths & Hardstand	Green Star	Minimise footpaths and hardstand	Utilise permeable materials to construct footpaths and hardstand	-			
2	Landscaping	Green Star	Construct swales and/or water features to minimise stormwater runoff	-	-			
3	Outdoor Furniture	Green Star	Utilise furniture comprising recycled timbers	Timber should be Forest Stewardship Council certified	-			
4	Outdoor Furniture	Green Star	A minimum of 60% of the steel used should be sourced from a contractor accredited by the Environmental Sustainability Charter of the Australian Steel Institute	-	-			
<b>Management of the ESD Process</b>								
1	Management	Green Star	Consider the appointment of an ESD Manager					
2	Management	Green Star	Design documentation must reference the commissioning specification that calls for ASHRAE (or higher) standard.					
3	Management	Green Star	Design documentation must clearly define the design intent and quality standard for as installed documentation, operations and maintenance manuals, commissioning report and training					
4	Management	Green Star	Design documentation must clearly define the tuning process for building services, including the procedure, frequency, integration with regular maintenance etc.					

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5	Management	Green Star	Design documentation must contain a maintenance plan which integrates the monitoring of efficient operation with regular maintenance					

*Table A-1 - UOW ESD Solution Reference Matrix*