Environmentally Sustainable Design (ESD) Standards for Buildings & Facilities

2025

Mildura Rural City Council

Table of Contents

Introduction

In February 2020, Mildura Rural City Council (Council) declared a state of climate change emergency requiring urgent action by all levels of government. This resulted in the development of the *Towards Zero Emissions Strategy 2021-2050* which was adopted by Council in June 2021. Council is committed to achieving zero net emissions by 2040 (excluding landfill) and 2050 (including landfill).

The Strategy includes a commitment to transition all existing buildings and facilities off fossil gas to be powered entirely by 100 percent renewable energy sources by 2030.

These Standards were developed based on existing best practice ESD policies and through consultation with relevant teams and external experts.

Many aspects of good ESD design, such as designing compact buildings with good solar orientation and improved insulation, will have minimal or positive capital and operational cost implications. For example, a well orientated and insulated building can reduce the size and capital cost of heating and cooling plant.

For higher cost energy saving and renewable energy features, life cycle costing should be employed to demonstrate financial savings over the life of the building. Life cycle costing shows the real cost of trade-offs between capital and operating costs over the operational life of the building.

The ESD allocation should be considered as an investment (not an impost) that will return benefits over the life of the building.

Image: The all-electric, solar and battery powered Red Cliffs Early Years Hub.

Purpose

This document is to be used to ensure projects/programs align with the *Environmentally Sustainable Design (CP035)*. It provides detailed requirements for key elements in the Policy. The project stages where this document should be referenced are:

- During feasibility studies;
- When developing the business case and allocating budgets;
- When preparing cost estimates;
- When developing a Sustainable Design Assessment;
- As part of the brief to Designers and Consultants (Architectural, Building Services, etc.);
- During Schematic Design and for Project Documentation;
- As part of the request for tender documentation (for the builder/contractors);
- During project construction; and
- During project commissioning, tuning and handover.

For each project a Sustainable Design Assessment should be prepared as early in the project as possible to set targets and ESD initiatives for the project.

Scope

These standards apply to:

- The design, construction and operation of all new builds, substantial renewals, renovations, and upgrades to Council buildings; and
- Council staff and all external designers, engineers, contractors and stakeholders involved in capital works projects, and lessees of council owned buildings and facilities.

Image: Solar PV system at the Mildura Sporting Precinct.

The following areas need to be addressed for ESD outcomes to be successfully delivered:

Stakeholder consultation

Stakeholder consultation regarding ESD is essential for the building scoping process. This should be undertaken before budget is determined.

Clear documentation during design

It is vital that all ESD features are documented early and included in all applicable project plans, schematics and specifications. This will help ensure that ESD features of the building are identified before the project goes to tender, helping to avoid increased costs from contractual variations, errors and project delays once the project is under construction.

Fit for purpose

ESD initiatives should be practical in their operation and robust enough to stand up to everyday wear and tear. Consideration should be given to what happens when a system malfunctions and repairs are undertaken by a tradesperson unfamiliar with the technology. Permanent signage, warnings and/or instruction plaques may need to be securely attached to any complex systems.

Consideration of Building End Users and Operators

Integration and usability of ESD components is important. This requires having to consider capacity of the occupants and training (or fully automatic systems). A stakeholder engagement process may be required.

Case Studies

The ESD process should include a structured mechanism to capture learning from past projects and apply them to new projects. This process doubles as an avenue for promotion of sustainability projects across Council and in the wider community.

Standardisation

Developing a list of standard preferred energy and water saving product options can reduce the effort that goes into the initial research of specifying suitable products each time e.g. a list of preferred toilets. It can also make it easier to incorporate ESD into smaller facilities and reduce maintenance costs as there will be less variety across different sites. Such standards require regular review to keep them current and support innovation.

Quantification of results

Council should be capturing and reporting the actual benefits achieved from ESD as compared to a Business-as-Usual (BAU) approach to reinforce the value of incorporating ESD in projects.

Balancing Sustainability with other requirements

Issues which may impact on the ability to incorporate common green building initiatives, include:

- Internal stakeholder of special use requirements;

- Fire protection and bushfire management;
- Existing conditions;
- Heritage considerations;
- OH&S;
- Privacy (visual and acoustic);
- Accessibility;
- Functionality and operations requirements;
- External noise; and
- Crime Prevention Through Environmental Design;

Where these constraints are present, they should be identified early in the project planning process to enable appropriate actions, green building targets and budgets to be established for the project.

Image: The all-electric, solar and battery powered Powerhouse Place.

Best Practice

Council is committed to minimising the environmental impacts of facilities throughout their lifecycle. Council aims to be a leader in the provision and operation of facilities that are resource efficient, enhance the natural environment and consider the broader needs and health of occupants both now and in the future. We intend to design buildings and facilities for a 100-year asset life.

The benefits of building sustainably include cost savings from reduced energy, water and waste, lower operating and maintenance costs, reduced public liability, improved storm water and biodiversity outcomes, enhanced occupant productivity and health and improving resilience to the impacts of climate change.

A review of Green Star Certified buildings[1] estimates that, on average, they achieve:

- A reduction in energy use of up to 85% against equivalent conventional buildings;
- A reduction in potable water consumption of over 60% against equivalent buildings; and
- An average of 69% of construction waste being diverted from landfill.

Best practice ESD contributes to economic, environmental and social sustainability in the following ways:

Economic Sustainability

- Utility bill savings for Council;
- Asset protection for stormwater systems;
- Longer asset life;
- Reduced lifecycle cost; and
- Reduced financial burden for the community organisations that operate/utilise the buildings and ratepayers.

Environmental Sustainability

- Reduced greenhouse gas emissions;
- Biodiversity gains;
- Stormwater quality improvements;
- Sustainable transport options; and
- Reduced materials impacts.

Social Sustainability

- Healthy buildings (less toxic materials);
- Reduced urban heat island effect;
- Better indoor environments (daylight and thermal comfort);
- Demonstrate community leadership; and
- Flexible designs.

While **minimum requirements** for building design, construction and performance are set in the National Construction Code (NCC), it is widely acknowledged that these requirements fall well short of what would be considered best practice ESD. Therefore, councils require standards to ensure that new buildings and refurbishments are designed and constructed with an ESD focus, with a particular emphasis on emissions reductions and/or carbon neutrality.

Green Star Buildings is Australia's leading sustainability rating tool. Green Star buildings can be designed and constructed with typical payback periods between three and seven years. The 'Green Budget' in the initial capital outlay for Green Star buildings is in the order of 2-10%.

[1] GBCA (2008), *Valuing Green - How green buildings affect property values and getting the valuation method right.*

Other ESD benchmarking tools like the **Built Environment Sustainability Scorecard (BESS)** – which was created and is maintained by Victorian councils through the Council Alliance for a Sustainable Built Environment (CASBE) – can achieve similar results by setting clear sustainable design goals at the planning phase of a project.

Sustainability Management Plans (SMP)

Depending on the size of the project, Council (or the Principal Consultant) will develop a Sustainability Management Plan (SMP) which documents how all ESD objectives, targets and standards will be met, and how the performance outcomes will be achieved.

The SMP must provide a schedule for implementation, ongoing management, maintenance and monitoring and how the ESD elements and practices will be maintained over time. The SMP should be used to survey available sustainable technologies and innovative approaches, and to resolve any questions around feasibility of applying ESD initiatives to the project/program. For a program of works, one regularly updated SMP will generally meet requirements.

All applicable projects/programs will be required to undertake a SMP during the preliminary phases. All projects should include an SMP comprising an ESD report and associated feasibility studies, and a Green Star (either informal or formal) will be required, appropriate to the size of the build.

Development of an SMP may need specialist input from an external ESD consultant and this must be factored into the project budget where necessary.

Building Design and Performance Requirements

The table below specifies the performance requirements for the project type and size.

Project Type	Project Size	Requirements
New Buildings	Community Hubs >800m^2 floor area	Minimum certified 5 Star under the Green Star Buildings rating tool, including achieving 15 points in Climate Positive Pathway and meeting the Water Use Credit achievement. Build design and quality to be delivered in line with Passive House methodology.
	Non-Community Hubs >800m^2 floor area	Minimum certified 4 Star under the Green Star Buildings rating tool, including achieving 15 points in Climate Positive Pathway and meeting the Water Use Credit achievement.
	<800m^2 floor area	Achieve Excellence rating in BESS tool (>70% score). Meet the Minimum Expectations of the Green Star Buildings rating tool.
Renewal / Refurbishment	Total floor area >800m^2 and over 50% of existing floor area	Minimum certified 4 Star under the Green Star Buildings rating tool
	Total floor area <800m^2 and over 50% of existing floor area	Achieve Best Practice rating in BESS tool (>50% score) Meet the Minimum Expectations of the Green Star Buildings rating tool.

Note: For non-certified buildings, it is a requirement that contractors provide a BESS report showing the building has achieved the BESS ESD requirements and a report showing the Minimum Expectations of the Green Star Buildings tool have been achieved. These reports are to be reviewed by the Design and Construct representatives and Energy and Water Innovation Officer.

Energy Performance Targets

In addition to the requirements above, modelling for specific building types (new buildings and major refurbishments) should meet the following performance targets:

Building Type	Energy Performance Targets
Community Facilities	Energy use <114MJ/m^2/pa
Sporting Facilities	Energy use including sports field lighting <149MJ/m^2/pa
Aquatic Leisure Centres	Energy use <10GJ/m^2 of pool surface area per annum Water use <12kL/m^2 of pool surface area per annum

Circular Economy Priorities

Design choices for construction and fit out materials should consider circularity and aim to minimise resource use and waste generation. The following order of priorities should be adhered to.

Order of Priority	
1. Refuse	Prevent raw materials' use
2. Reduce	Decrease raw materials' use
3. Redesign	Reshape product with a view to circularity principles
4. Reuse	Use product again (as second hand)
5. Repair	Maintain and repair product
6. Refurbish	Revive product
7. Remanufacture	Make new from second hand product
8. Repurpose	Reuse product but with other function
9. Recycle	Salvage material streams with highest possible value

Minimum ESD Requirements

In addition to the Building Design and Performance Requirements, the following table outlines the specific requirements for all new developments and renewals.

In line with Council's *Towards Zero Emissions Strategy 2021-2050*, no new gas connections and gas appliances/equipment are to be installed at council owned buildings and facilities. Existing gas appliances/equipment are to be upgraded to electric by 2030 in line with the *Gas to Electric Transition Study*.

Building Fabric	
Walls, Roofs, Floors, Glazing	• Insulation R-values to be at least 10% above current National Construction Code (NCC) requirements. • Independent of R-value requirements, all external walls, roofs and lightweight floors must have an approved radiant barrier (i.e. Reflective Foil Laminate) installed that has an NCC or an NFPA (National Fire Protection Association) flammability rating. • Retrofit insulation where possible into renovations and extensions. • All new or replacement glazing in areas with active heating and cooling to be double or triple glazed. Glazing specifications of total system (including frames) to be 10% above NCC glazing requirements. • Floors with in-slab heating or cooling systems are not permitted.
Windows and shading	North Facing Facades • Maximise northern facade length and northern glazing. A northern facade length equal to or greater than the east and west facing facade lengths is preferred. • Eaves on all north facing facades must be sized to maximise heat gain in the winter and minimise heat gain in summer. • Glazing to be double or triple glazed. • No other fixed shading, e.g. awnings or pergolas, are to be used on the northern facing facades. South Facing Facades • Glazing should be minimised on south facing facades to reduce heat loss in winter and heat gain in summer. • Glazing on the southern facade to be double or triple glazed, with the low solar gain, Low-E glass considered. East & West Facing Facades • Glazing should be minimised on the east and west facing facades with eaves or fixed shading considered to reduce heat gain in the summer months. • Glazing on the eastern and western facades to be double or triple glazed, with low solar gain, Low-E glass considered. All Facades • All window frames are to be thermally broken to minimise heat exchange.
Air Leakage	• Building must achieve <3.0m^3/hr/m^2 at 50Pa (under +ve and -ve pressure), as verified with an onsite pressure test (in both pressurised and depressurised states) to AS/NZS ISO9972.

Heating Ventilation & Airconditioning (HVAC)	
Natural ventilation and passive cooling	• Use passive design principles to avoid excessive heat gain during warmer months. • Maximise operable windows and cross ventilation considering security and HVAC settings. • Where possible, locate non-habitable rooms on the west as a buffer from heat gain. Where habitable rooms are required on the

	west, ensure solar heat gain in summer is minimised through appropriate glazing and external shading. • Use natural ventilation or a mix of natural and mechanical ventilation.
Passive heating	• Maximise passive winter heating with north facing windows, double glazing and internal thermal mass that is insulated.
HVAC technology	• No gas HVAC equipment to be installed. • Heat pump technology for heating and/or cooling to have Coefficient of Performance (CoP) of at least 3.5. • Where continuous 100% fresh air is required (e.g. gymnasiums), HVAC systems will employ closed loop heat exchange technology with conversion efficiency greater than 75%. • HVAC systems to be sized appropriately with consideration given to building layout and occupancy needs when selecting technologies. • Prioritise energy efficiency in all HVAC designs. • Any package units should contain BACnet and with Digital Scroll technology and be fitted with fresh air economy cycle and plug fans. IT to be consulted on integration of HVAC with BMS system. • Ensure careful consideration of temperature sensors. Sensors are not to be placed directly below HVAC ducts. • Adequate ceiling space to be provided for HVAC ductwork. • Maternal Health baby care rooms should include dedicated reverse cycle split systems that are linked to backend controls. • Consider Heat Recovery Ventilation systems where appropriate.
Economy features	• Motorised and fully modulating economy dampers to be fitted to all integrated HVAC systems (packaged or split ducted) with 100% outside fresh air capability. • All air handling unit fans to include Variable Speed Drive technology capable of being controlled by non-original equipment manufacturing external direct digital controllers. Fan or pump motors to be direct drive. Belts and pulleys are not to be used. • All heat pumps to employ variable refrigerant flow (i.e. Electronically Controlled variable Thermostatic Expansion valves or variable speed refrigerant flow/compressors).
Reverse cycle systems	• New or replacement systems to be highest energy star rating available for size (kW) and system required. • New or replacement systems to be fitted with passive infrared occupancy sensor. • Single rooms should ideally not contain more than one reverse cycle unit.
Refrigerants	• Refrigerants must have a global warming potential of less than 10, as per Green Star Buildings – Other Carbon Emissions credit.
Control Systems	• All HVAC systems to include control strategies that measure and respond to ambient conditions, including but not limited to: pump speeds, CO_2 and temperature sensor limits and thresholds, staging according to conditions.

	• All systems to utilise variable supply based on occupancy using CO_2 monitoring and/or occupancy detection for zone ventilation control. This includes passive infrared sensors for splits, fan coils, air handling units or variable air volume systems. • Unitary controls – where systems employ unitary controls only, supplementary control shall be available for high level interface (HLI) to BMS or other systems as required. HLI shall be open protocol per relevant industry standards. • Building Management Systems (BMS) – Any BMS deployed to provide control and / or monitoring of equipment shall be capable of HLI to existing BMS used by council for supervisory control and data acquisition. • Only use cooling and heating necessary for the area being used and the activity undertaken.

Energy	
Renewable Energy Systems	• Installation of a renewable energy system sized to match maximum modelled energy load (unless site has significant shading). • Design building to accommodate the installation of batteries and battery management system as part of the build (or at future stage). • All new family and community centres/hubs should be fitted with battery storage sized appropriately to the building's modelled energy requirements and with a minimum 10-year warranty. • Solar panels must have a minimum 25-year product warranty and have a minimum efficiency of 20%. • New buildings and major refurbishments must be designed to allow for current and future solar PV installations. • If the building has a BMS, the solar system and battery should have HLI or Low-Level Interface connection to the BMS.
Separate metering	• Electricity in all new buildings must be separately metered from existing buildings. Submeters on existing switchboards should not be used to supply and/or measure new building electricity consumption. • Install separate metering and zoning for different tenants.

Lighting	
Technology	• All lighting, including sports fields, parks and gardens, and carparks, to use light emitting diode (LED) technology.
Control systems	• Lighting controls to be linked to BMS where present and/or security system. Smart lighting controls to be installed where appropriate. • Occupancy sensors to be installed in all areas with inconsistent use such as halls, toilets, corridors, storerooms, meeting rooms, offices etc. • Only use lighting necessary for the area used and the activity undertaken.

Equipment & Appliances Fit Out	
Equipment Efficiency Standards	• Refrigeration equipment to be located so rejected heat can be expelled easily to outside or reused for heating within building. • Only high energy efficient hand dryers utilising no heat high air speed technologies along with air filters to promote hygiene are to be installed. Paper towels and paper towel dispensers are not to be used. • Highest available energy efficient ventilation systems, extraction fans etc. • Equipment (e.g. dishwasher, cooktop) to be within one star rating of best available technology for energy and water efficiency. • Cooking equipment must be electric induction cooktops and electric ovens. • No gas appliances to be installed. • Install timers on tea and coffee boilers so they switch off over weekends and overnight. • Energy efficiency of appliances can be confirmed on the website www.appliancesonline.com.au with performance ratings based on information provided on the website www.energyrating.gov.au • Minimise the number of appliances including televisions and refrigerators. Remove old appliances when new ones are purchased.

Hot Water Systems	
Hot water technology	• High efficiency electric CO2 heat pump hot water systems that can link to existing, new or future solar PV. • Hot water heat pump technology to have Coefficient of Performance (CoP) of 3.5 or greater. • No gas appliances to be installed.
Pipe insulation	• All hot water piping (flow and return) above 25mm outside diameter shall be insulated with pre-formed sectional glass wool or polyester insulation or similar, having a maximum thermal conductivity of 0.036 W/m^{2}K at 20 degrees Celsius mean temperature. All exposed pipe work insulation shall be sheathed with 0.5mm thick zinc anneal sheet metal or approved equivalent. All sheathing shall be installed in a manner which resists entry of water and UV light. • All hot water pipes (flow and return) 20mm outside diameter or less shall be fully insulated with Armaflex FR 13mm or approved equivalent. • All exposed pipe work insulation shall be sheathed in a UV protective coating i.e. foil tape or equivalent coating. All sheathing shall be installed in a manner that resists entry of water and UV light. Note: Pre-lagged (Kemlag or Polylag) pipe not to be used.
Ring main systems	• Ring main hot water systems are to be avoided wherever possible to limit unnecessary energy wastage. If they are to be installed systems must include a digital time clock control mechanism that:

	○ Prevents hot water circulation during non-occupancy hours. ○ Starts ring main at least one hour prior (or greater if required for occupational health and safety requirements) to building occupancy to circulate any accumulated bacteria through 60-degree water to kill any legionella bacteria. • Preference for connection to a BMS if present in building.

Water Sensitive Urban Design	
Rainwater tanks	• All new buildings must have rainwater tank/s installed at the time of construction. Uses for rainwater to be assessed on a site-by-site basis. Grey water re-use systems if appropriate for location/application. • Match roof capture area and tank size to expected use. The Tankulator tool (https://renew.org.au/tankulator) can help size tanks appropriately to expected use. • Tanks to have adequate filtration when connected to internal uses. Gutter guards, first flush diverters etc. need to be considered. • If building has a BMS, the rainwater tank should be connected to allow for monitoring of water levels, pump faults and operation.
Stormwater	• Prioritise passive irrigation/rain gardens/bio swale where possible in mandatory infrastructure such as carparks. • Maximise permeable areas and consider drainage during extreme storm events. This includes limiting hard surfaces as much as possible whilst adhering to OHS and accessibility requirements.
Irrigation	• All active open spaces must be irrigated using alternative water supply where available. • All canopy trees and trees in car parks to be passively irrigated as much as possible. • Comply with State Permanent Water Saving Rules and Lower Murray Water and Grampians Wimmera Mallee Water water saving restrictions. • Ensure any leaks or irrigation issues are addressed immediately or reported to Council where applicable.
Green Roofs	• Consider innovative designs incorporating green walls or green roofs where appropriate. Ongoing maintenance should be considered in any designs. • Water captured via gardens should be connected to water tanks for toilets, irrigation etc.
Open space	• Maximise green infrastructure over grey infrastructure where possible. • Utilise Water Sensitive Urban Design (WSUD) for all open spaces to minimise water run-off from site and irrigation requirements.

Materials, Finishes & Indoor Environmental Quality	

General materials	• Select materials from Good Environmental Choice Australia, Forward Thinking Design Circular or Green Building Council of Australia Green Star where possible.
	  ○ https://geca.eco/
	  ○ https://fitoutcirculareconomydirectory.spread.name/
	  ○ https://new.gbca.org.au/green-star/the-responsible-products-program/
	• Consider the life cycle of all materials – select materials with a low embodied energy, that are durable, low maintenance, have a recycled content, that can be recycled, that have take back schemes, that can be repaired or re-used etc.
	• Avoid imported products where possible and use locally sourced and manufactured products.

Timber	• All timber used to be re-used/recycled (preferred), Forest Stewardship Council or Programme for the Endorsement of Forest Certification certified. • The use of tropical hardwoods such as Merbau, Mirabow, Ipil, Kwila and Vesi are not permitted unless required for renewal of heritage sites. Consider sustainable alternatives where possible. • Avoid treated pine if possible. • If composite timber is to be used, ensure it is both made from recycled materials and recyclable. • The use of laminated timber structural members (plantation) will be given precedence over native hardwood structural members except where wood has been reclaimed / re-used.
Concrete	• All concrete to have recycled content and use recycled aggregate wherever possible. • Non-structural concrete to use alternative material (e.g. fly ash) to substitute the conventional portland cement.
Steel	• 95% of the building's steel (by mass) is sourced from a Responsible Steel Maker. For steel framed buildings, at least 60% of the fabricated structural steelwork is supplied by a steel fabricator/steel contractor certified under Steel Sustainability Australia. For concrete framed buildings, at least 60% (by mass) of all reinforcing bar and mesh is produced using energy-reducing processes in its manufacture. • Accredited steel makers can be found at the following link: https://www.steelsustainability.com.au/
External surface finishes	• Light coloured materials with Solar Reflectance Index greater than 60 are to be used for roof and external façade to reduce urban heat island effect and reduce cooling load.
Poly Vinyl Chloride (PVC)	• To reduce environmental and health impacts for building users, internal plastic materials (e.g. vinyl flooring and carpet underlays) should exclude PVC. Where PVC is used apply Best Practice Guidelines for PVC in the Built Environment by specifying eco-labels (e.g. Global-Mark certified) that comply with the Green Star PVC credit.

	https://www.gbca.org.au/uploads/156/2716/Green%20Star%20PVC%20Credit%20060511.pdf

Outdoor & Landscaping	
Rocks/logs	• Locally sourced rocks and logs are preferred where available.
Pavement and surfaces	• Recycled materials should be prioritised in all outdoor surfaces e.g. concreted with recycled content, recycled rubber/tyres, resin bond aggregate/glasses.
Plants	• Consider climate change in tree selection. Trees will reach maturity in 30-40 years and face significantly worse climatic conditions. • Prioritise indigenous species and drought tolerant native species in all landscaping and include both trees and understorey species in designs. • Maximise canopy tree planting in public realms with a minimum 30% canopy coverage. • Aim for 100% of existing native trees to be retained on site. Each native tree removal requires approval. • Ensure that the design retains and plants canopy trees and understorey, where possible to contribute to urban greening and to reduce the urban heat island effect. • Consider habitat requirements for threatened animal species that may occur in area.
Street furniture	• Prioritise standalone solar powered street furniture, e.g. solar park lighting (LED), solar powered bins, solar BBQs. • Prioritise furniture made from recycled materials which are returnable/recyclable at end of life.

Transport	
Bicycle parking	• Mix of secure on wall and on ground bicycle parking for staff and visitors in excess of planning scheme and/or to meet BESS best practice. Covered bike parking wherever possible. • Continuous and accessible travel to the bike parking area.
Electric vehicles	• Ensure electric vehicle (EV) chargers are installed at carpark spaces at new community hub facilities. Number of chargers should be based on an assessment of usage at other council facilities with EV chargers. • Ensure adequate power supply, infrastructure and outlets to 20% of parking bays are future proofed to install future EV bays.

Waste & Recycling	
Construction materials	• At least 80% of construction and demolition materials must be recycled in line with Green Star requirements. • Prioritise circular economy opportunities.
Streams	• Collection of multiple waste streams in line with Green Star requirements.

	• Divert a minimum of 70% of the demolition and construction waste by weight to recycling.
Waste Management Plan	• For new builds, a waste management plan for operations must be prepared by an independent third party (waste consultant) and provided to the Waste Services Team for review and sign off. The plan must include information on the waste streams, waste storage areas and include a swept path diagram outlining manoeuvrability within the site to the waste collection point.

Foundations	
Soil	• Consider compaction or expansion of soil and infill during periods of extreme heat and drought.

Responsible Parties

The Standards apply to all Council officers and contractors responsible for financing, planning, designing, developing, constructing, renovating and managing Council-owned buildings and facilities. Roles and responsibilities are further defined in Appendix 1.

ESD Consultation Group

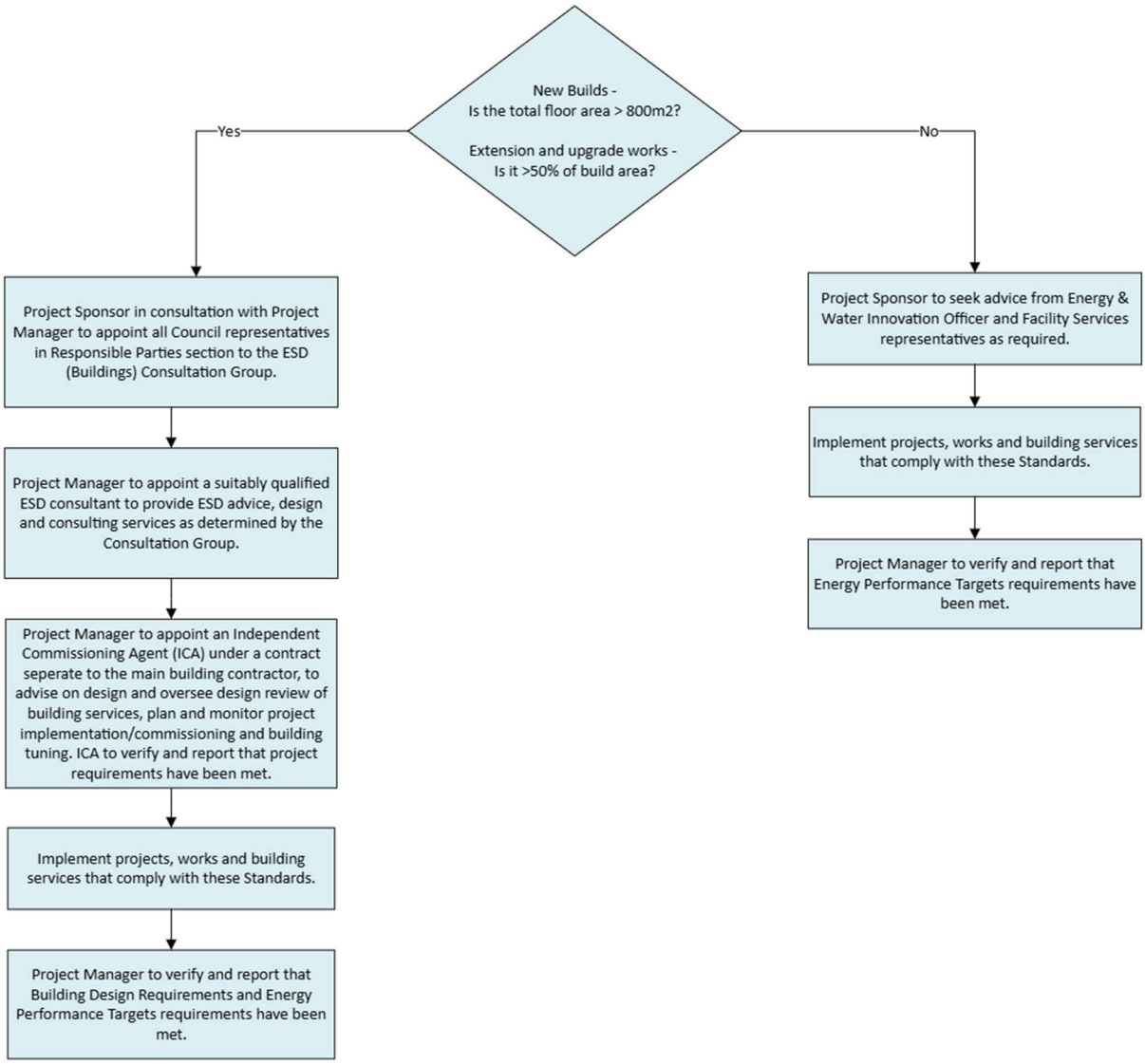
The Consultation Group is responsible for the delivery, implementation, and reporting of ESD to ensure that ESD requirements are met for all new builds greater than 800m^2. The Consultation Group will review and contribute to design concepts to achieve a high-quality design result in keeping with the ESD objectives.

The Project Manager or their nominee will appoint an Independent Commissioning Agent and Independent Environmental Sustainability Design consultant into the Consultation Group (unless otherwise agreed by the Consultation Group). The ESD Consultation Group must include representatives from the following; Project Manager, Facility Services, Environmental Sustainability, Engineering Development and Delivery, Project Development Office and an independent Environmental Sustainability Design Consultant.

At each stage of development (Concept, Design, Documentation, Project Commissioning), all representatives must be consulted. Any material changes after consultation require approval from the Consultation Group. Where agreement cannot be reached with consultation members, the decision shall default to consensus between the managers of Community Partnerships, Facilities & Assets, Engineering Development & Delivery and the Project Development Office.

ESD Building Process

The Managers of Community Partnerships, Facilities & Assets, Engineering Development & Delivery and the Project Development Office are accountable for overseeing the successful implementation of these Standards. The following is to be implemented for the delivery of all Building Planning, Construction and Maintenance Projects.



More Information

For more information, please contact Council's Energy & Water Innovation Officer on (03) 5018 8100.

Appendix 1 – Roles & Responsibilities

Roles and responsibilities for implementing these standards are outlined below.

Party	Role
Project Sponsor Responsible for developing the project concept	• When planning the project (i.e. project mandate and business case development) develop a project brief that identified all items from *Minimum ESD Requirements* that fall within the project scope. Ensure all recommended high-performance design elements are within scope of the budget bid. • Appoint the ESD Consultation Group. • For minor projects (less than 800m^2), request that the Energy & Water Innovation Officer and a Facility Services representative provide advice on the project.
Facility Services Team **Project Development Office** **Engineering Design & Development Team** For capital works implementation	• For new builds greater than 800m^2, engage an Independent Commissioning Agent and an independent Environmental Sustainability Design consultant. • For all smaller new builds, renewals, upgrades and refurbishments if required, seek advice from the nominated Environmental Sustainability and Facility Services representatives on the requirements of these standards. • Implement projects, works, and building services in compliance with these standards.
Environmental Sustainability Team **Facility Services Team** **Engineering Design & Development Team** **Project Development Office**	• Nominate a representative on request by the Project Sponsor or Project Manager. • Support the implementation of projects that comply with the ESD Policy and Standards on request by the Project Sponsor and/or Project Manager. • Support the implementation of works that comply with the ESD Policy and Standards by advising Consultation Group contractors on request.

Appendix 2 – Project Management Requirements Checklist

Requirement	Project Stage	QA and Project Notes
Demonstrate, at business case stage, how project will contribute towards achieving Council's sustainability targets.	Bidding and planning	
Ensure that the business case includes budget for items required to meet sustainability principles and that respective teams have been consulted.	Bidding and planning	
Include ESD principles in the project brief at inception, concept design, at detailed design and in tender documents.	Bidding and planning Design	
Seek specialist ESD technical advice for larger projects from project inception to delivery.	Bidding and planning Design Delivery	
Generate a SMP and refer this to Council's Energy & Water Innovation Officer prior to tendering.	Design	
Document at design stage a SMP including how the project or program will meet sustainability targets.	Design	
Ensure building SMP reports clearly summarise the projects' specific sustainable design requirements and are supported by an appropriate ESD tool.	Design	
Infrastructure SMP reports must consider sustainable construction materials procurement, construction environmental management, biodiversity enhancement opportunities, and integrated water management.	Design	
Use the SMP report to consult with other internal stakeholders responsible for ESD, WSUD engineering, transport, and biodiversity and tree canopy.	Design	
Use lifecycle costing in procurement and contracting. Target the best long-term value to Council, rather than the cheapest up-front cost. Value management must protect ESD and recognise the value of community and environmental goals.	Procurement Tendering Delivery	
Ensure that ESD objectives are included within the deliverables for tendered work.	Procurement Tendering Delivery	
Ensure that commissioning, building tuning and handover is undertaken in a comprehensive way	Delivery Occupancy	

and that it includes the management of ESD initiatives.		
Report to Council annually as part of the Capital Works program delivery report on the key achievements of the ESD policy.	Delivery	

Appendix 3 – Purchasing Standards

Item	Minimum Water Requirement	Minimum Energy Requirement
Refrigerators	N/A	5+ stars
Freezers only	N/A	4.5+ stars
Dishwashers	5+ stars	4+ stars
Washing machines	4.5+ stars	5+ stars
Ovens	N/A	Electric only
Stoves / cooktops	N/A	Electric induction only
Deep Fryers	N/A	Electric only
Taps	6 litres/min, 5+ stars, push/sensor taps	N/A
Toilets	Dual flush, 4+ stars	N/A
Urinal Equipment	1.8 litres/flush, 3+ stars	N/A
Shower	7 litres/min, 3+ stars	N/A
Hose fittings	Trigger nozzle	N/A
Microwaves	N/A	Electric
Televisions	N/A	5+ stars
Hot water systems	N/A	Electric heat pump (CO_2 refrigerant only). For urgent reactive maintenance situations where an electric heat pump solution is not practical (i.e. significant upgrades are required to water and/or electrical infrastructure or there are significant space constraints), the most energy efficient electric hot water system is to be installed (e.g. solar with electric backup, resistance electric or instantaneous electric) taking into account site conditions.
Cooling / heating		Appropriately sized reverse cycle air-conditioning system or HVAC system with fresh air intake (connect to Building Management System). Payback evaluation on price difference to determine best option. Energy efficient option for price difference payback of less than the material warranty period.

Internal lighting	N/A	Assessment of lux lighting levels required for specific spaces. Maximum use of natural light e.g. skylights, LED with motion sensors.
External lighting	N/A	LED or solar with motion sensors.
Windows	N/A	Double glazed. Tinting if required.
Window furnishing	N/A	Thermal curtains or blinds and with pelmets where applicable.
Insulation	N/A	Highest rating available.
Pumps	N/A	Central control variable speed drive. Electrical specialist to provide most efficient option for purpose.

Appendix 4 – Template for Sustainability Management Plan (SMP)

A Sustainability Management Plan (SMP) is a detailed sustainability assessment of a proposed project. An SMP is a tailored document that addresses key ESD categories and demonstrates that a holistic ESD review has been undertaken during a project's early design stages.

It identifies beneficial innovative and best practice initiatives. The nature of larger projects are that they provide the opportunity for increased environmental benefits and the opportunity for major resource savings. Hence, greater rigour in investigation is justified. It may be necessary to engage a sustainability consultant to prepare a SMP. This template is designed to provide guidance on how to prepare a SMP report. The document outlines ESD issues, response guidelines and key ESD objectives.

Project Information

The SMP should state the project's location and extent. It should outline the context that may impact on or may be impacted by the works. The SMP should describe the project's sustainable design approach and summarise the project's key ESD objectives.

Environmental Objectives

The SMP is required to address each objective and demonstrate how the design meets these requirements. Objectives should cover:

1. Greenhouse Gas Reduction
2. Water and Energy Efficiency
3. Stormwater Management and Water Sensitive Urban Design
4. Materials
5. Transport
6. Waste Management
7. Biodiversity
8. Climate Adaptation and Resilience
9. Innovation
10. Construction Environmental Management Plan
11. Commissioning, Tuning, Handover and Training

12. Ongoing Maintenance Plan and Liabilities.

Objectives

For each ESD objective the general intent, aims and purposes are explained. The SMP is required to briefly explain the benchmark applied as outlined within the chosen standard. A benchmark description is required for each environmental issue that has been identified as relevant. Any cross references to other ESD toolkits are detailed and referenced.

Issues and feasibility

This section comprises a list of topics that might be relevant within each objective. As each application responds to different opportunities and constraints, it is not required to address all issues. The list is non-exhaustive and topics can be added to tailor to specific application needs. A feasibility analysis should be included if needed for innovative approaches to cover issues such as additional costs to be budgeted for, any supply constraints, any partnerships required, and additional time to be scheduled for research and development.

Compliance with the objectives

The SMP should show how the proposed design meets the objectives of the chosen standard through making references to the design brief, drawings, specifications, consultant reports or other evidence that provides compliance.

ESD in project documentation

Engineering drawings, schematics and specifications should reflect all relevant ESD matters where feasible. In addition, any architectural / landscape or other plans and specifications need to be adjusted to be consistent with the SMP.

SMP requirements need to be clearly stated in Request for Tender and tender documentation.

Appendix 5 – Managing Costs of Green Buildings

International studies[2] clearly demonstrate that there is little correlation between environmental performance and final delivered cost.

Many aspects of good ESD design, such as designing compact buildings with good solar orientation and improved insulation, will have minimal or even positive capital and operational cost implications. For example, a well orientated and insulated building can reduce the size and capital cost of heating and cooling plant.

For higher cost energy saving and renewable energy features, life cycle costing should be employed to demonstrate financial savings over the life of the building. Life cycle costing shows the real cost of trade-offs between capital and operating costs over the operational life of the building.

The ESD allocation should be considered as an investment (not an impost) that will return benefits over the life of the building.

Incremental ESD costs are additional costs for implementing ESD measures over and above the basic cost of not implementing those measures (for example the cost difference between poor performing single glazed and high thermal performance windows beyond what is required in the building code).

For larger buildings (>$1 million) the percentage of the budget spent on ESD features will generally be a smaller proportion of the total budget, however there may also be a driver to implement innovative technologies in larger buildings which may increase capital costs.

[2] ibid.

Experience has shown that the ESD allocation needs to be specifically protected during cost saving discussions and value management sessions, as not negotiable, and not to be diverted to other building aspects.

This ESD budget may be used to fund:

- Incremental costs between conventional design and green building solutions;
- Design integration process and workshops, commissioning, incremental ESD documentation, Green Star certification and/or user training and education; and
- Building simulation and researching and trialling new or innovative technologies.

There are some trends which make ESD easier to achieve/justify including:

- Increasing energy and water prices, faster than underlying inflation, due to climate change and climate change actions;
- The possible introduction of carbon trading, grants and rebates, renewable energy targets and other incentives;
- Lowering of capital costs of technologies such as solar photovoltaic and battery storage as manufacturing processes and technologies mature; and
- Increases in competition making ESD products and services more mainstream and affordable.

While specific environmental features do have individual costs, they are not the primary determining factor in the final $/m^2 delivered cost of a building. Items that have greater impacts include the size and shape of the building, the cost of financing, project delays and mistakes, materials choices, architectural features and finishes, land value etc.

Reducing the building footprint can help reduce costs. Good design can optimise spaces and layout and remove about 10% or more of the initial building footprint to reduce costs. A more compact but well-functioning building saves materials and ongoing energy costs.

Large projects have the option of being designated as ESD showcases, where Council will deliberately trial new technologies, approaches or more ambitious targets. Where this is the case this should be identified before the project budget has been allocated so the appropriate resources can be applied to the project.

Appendix 6 – Life Cycle Costing (LCC)

Life Cycle Costing (LCC) can be defined as the total of the financial costs over the life of the building, including the costs of designing, procuring, operating and maintaining the systems. Each building will have a number of areas that can be assessed including the:

- Building fabric;
- Internal finishes;
- Structures;
- Fittings;
- Building services;
- Site-work and stormwater; and
- ESD installations such as solar, water tanks etc.

The objective of LCC costing is to assist in decision making by providing a means of comparing different option costs. Objectives for balancing:

- Capital cost;
- Reliability of the systems throughout their useful life;
- Maintenance costs of the systems throughout their useful life;
- Value for money achieved through design, construction, operation and system maintenance; and
- Achievement of the ESD principles.

Typically LCC option cost data is inputted into a decision model which considers factors such as interest rates, energy and water charges, and cost escalation (only for items or instances such as carbon trading over and above the anticipated rate of inflation). Provided inflation for all costs is approximately equal, the calculation should exclude cost escalation impacts when undertaking LCC costing.

For ESD items LCC costing should only factor in incremental costs when evaluating the cost of an item. The incremental cost is the cost premium above what would have been spent anyway in a business-as-usual scenario.

Appendix 7 – Definitions

BESS	Built Environment Sustainability Scorecard (BESS) is an assessment tool created by local governments in Victoria. It shows how a proposed development demonstrates sustainable design at the planning permit stage. http://www.bess.net.au/
BMS	Building management system (BMS) provides automated control of energy efficiency and occupant comfort from a single digital interface.
ESD	Environmentally Sustainable Design (ESD) is the design philosophy of building our environment to minimise negative impacts on our lives and landscape and improve positive effects.
Green Star	Green Star building environmental rating system administered by the Green Building Council of Australia.
HVAC	Heating, Ventilation and Cooling (building systems).
OH&S	Occupational Health and Safety.
PVC	Polyvinyl chloride is a common material used for plumbing pipes and electrical cables. The manufacture requires toxic chemicals and disposal is also toxic.
VRF	Variable Refrigerant Flow. HVAC technology where a single system supplies multiple indoor units, heating and cooling separate units at the same time.
WSUD	Water Sensitive Urban Design – a design approach which aims to create urban environments that allow the water cycle to function as it would naturally, reducing the impact of development on the water cycle.