STRATEGIC PLANNING

DRAFT Randwick Development Control Plan

B3 Sustainability and resilience

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Randwick City Council
a sense of community

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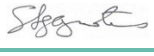
Manager Review	Stella Agagiotis	October 2025	

Contents

1. Introduction

At the heart of Randwick's vision for a resilient and connected community is a deep commitment to environmental sustainability. Achieving meaningful change requires collective action – where individual decisions, and behaviours contribute to long term environmental, social and economic benefits.

Sustainable development is fundamental to shaping functional, liveable and future-ready urban environments. Embedding precinct-wide sustainability principles and performance standards supports the physical, mental and social well-being of residents, workers and visitors, while supporting climate resilience and ecological integrity

Sustainable buildings are purposefully designed to incorporate environmentally responsible materials and fittings, optimise energy and water efficiency and provide healthy, comfortable indoor environments. These design principles not only support environmental outcomes but also deliver long-term cost savings for property owners and tenants.

This section sets out the objectives and development controls that establish a framework for embedding sustainability principles into the design, construction, and operation of buildings throughout Randwick City. A key focus of the Randwick City Environment Strategy 2022, the draft Resilience Strategy and the Randwick Local Strategic Planning Statement 2036 is to enhance both the natural and urban environment. This is achieved by ensuring that new developments- alongside economic and social initiatives - supports ecological health, strengthens community resilience and actively reduces and mitigates the impacts of climate change.

Buildings are a major contributor to greenhouse gas emissions and energy consumption in Australia, accounting for around 19% of total energy use and 18% of direct carbon emissions (Department of Climate Change, Energy, the Environment and Water, Buildings | energy.gov.au 2023). These impacts stem from the materials and resources used in building construction, as well as the energy and water consumed during both development and ongoing operation. Therefore, improving building performance is critical to achieving sustainability outcomes.

In this DCP, sustainable development refers to the design and delivery of buildings and infrastructure that minimise environmental impact and optimise resources efficiently across their entire life cycle, and promote resilience, health and well-being for both people and the natural environment.

Key environmental, economic and social benefits of sustainable development include:

- Lower energy and water bills for households and businesses and reduced operating costs for commercial and other non-residential premises
- More resilient buildings with improved indoor comfort, air quality and better regulation of temperature and moisture
- Reduced reliance on potable (drinking) water through efficient water use and reuse
- Increased energy efficiency and reduced greenhouse gas emissions
- Reduced demand on utility infrastructure and services
- Greater reuse and recovery of resources
- Improved stormwater quality and increased opportunities for water harvesting and reuse.

Sustainable development is a core principle of Randwick's planning framework, guiding decisions relating to land use, development and environmental management. The integration of sustainability measures is most effective - and cost effective - when considered from the earliest stages of the design and development process.

This Part applies to all developments in Randwick City and should be read in conjunction with:

- Part A – Introduction,
- Part B - General Controls, and
- Other sections of the DCP for specific development types, locations or sites, if relevant to the application.

Overarching objectives

1. Ensure new development - including the construction of new buildings and external alterations to an existing building - meets the requirements of Clause 6.11 of the RLEP with a focus on design excellence, particularly sustainable design principles, renewable energy integration and mitigation of the urban heat island effect
2. Promote positive environmental outcomes through design, construction and operation of development that enhances both the natural and built environment
3. Maximise resource efficiency and minimise waste generation by encouraging the use of construction materials with high recycled content or from recycled or reused sources
4. Encourage innovative design of buildings that exceeds minimum sustainable standards to deliver long term benefits for residents, the community and future generations
5. Improve the quality of life, health and wellbeing for residents and building occupants through sustainable design
6. Support the uptake and integration of renewable energy technologies in both new and existing developments
7. Mitigate the urban heat island effect through thoughtful design, landscaping and material selection
8. Enhance resilience of new development in response to the predicted impacts of climate change.
9. Reduce greenhouse gas emissions associated with the construction and operation of buildings
10. Minimise energy and water consumption in new developments and alterations or additions
11. Restore and protect ecosystem health and resilience, supporting biodiversity and natural systems

Guiding principles

The following guiding principles are key considerations which should be used to guide the developments design to ensure that they are tailored to the specific local requirements:

1. **Country-led**: Development celebrates the environmental and social well-being of the area by upholding a meaningful engagement with Country in built form, public domain, landscape and relationships between human and natural constituents
2. **Accessibility and equity:** Ensure agency and dignity for all users, visitors and operators, eliminating barriers to inclusion and promoting accommodation for all user groups
3. **Adaptation and reuse:** Prioritise the reuse existing buildings and promote design adaptability and materials and structures to extend their lifespans.
4. **Integrated nature:** Natural ecosystems and productive landscapes must be integrated within urban development to protect and enhance biodiversity. Development must not reduce the amount of green space, vegetation or tree canopy
5. **Amenity and well-being:** Improve the environmental quality of all indoor spaces, focusing on light, sound and air quality, enhancing the physical and psychological needs of users
6. **Material**: When sourcing materials for construction, prioritise local, renewable materials and material reuse, instead of virgin mineral resources
7. **Waste**: Aim for no waste in the construction process and, in operation, manage and recycle waste effectively, with as much on-site regeneration as possible
8. **Energy:** Refine passive design attributes and the performance of building envelopes and systems to reduce energy demand. Harness available energy, and use only renewable energy sources and energy efficient appliances and lighting
9. **Water:** Every activity throughout construction and operation phases must have a positive impact on water ecosystems and water supply. Maximise the harvesting, storage, treatment and reuse of all water on site
10. **Carbon:** Work towards ensuring that carbon capture of a project exceeds the carbon footprint of all construction activities and operational processes.

Note

A checklist to assist with the implementation of these principles has been provided in Appendix A.

2. Design excellence

Explanation

Design excellence is a guiding urban design principle that supports the creation of high-quality, vibrant and sustainable built environment.

The Randwick Local Environmental Plan 2012 (RLEP 2012) includes overarching aims to promote ecological sustainability and resilience in the planning and development process. These aims reinforce the importance of design excellence as a mechanism to deliver built environments that are adaptable, resource-efficient, and responsive to environmental challenges.

Clause 6.11 of the Randwick Local Environmental Plan 2012 (RLEP 2012) requires consideration of design excellence for:

- Buildings over 15 metres in height;
- Sites over 10,000 square metres in area; or
- Land where a site-specific Development Control Plan is required.

In strategic locations, development proposals are encouraged to demonstrate a higher benchmark in architectural quality and sustainability.

The RLEP 2012 outlines height and floor space ratio (FSR) controls for these centres. Where design excellence is demonstrated, as judged under an architectural design competition and the provision of social infrastructure, bonus height and FSR provisions may apply, along with potential exclusion of social infrastructure floor space from gross floor area calculations.

Objectives

1. Achieve outstanding architectural, urban and landscape design outcomes across Randwick City
2. Enhance the character, aesthetic quality, functionality, and amenity of the public realm
3. Encourage improved energy, water, and waste performance in new developments
4. support the delivery of resilient and ecologically sustainable development outcomes aligned with the strategic aims of the RLEP.

Holistic site design provisions

Development proposals should adopt a holistic and integrated approach to site design addressing the following key considerations:

1. **Connecting to Country**: Site layout, built form and open space design are sensitive and responsive, embodying a Country-led approach, that celebrates First Nations heritage and strengthens connections to place
2. **Site planning and lot layout:** Efficient site planning and thoughtful lot layout should optimise access, visual connection, circulation, spatial amenity and ecosystemic connections to the public domain while minimising adverse impacts on neighbouring properties
3. **Landscape design, site amenity and public domain interface**: Landscape design should enhance user amenity, external experience and habitat enhancement. Strong integration between built form and the public domain should reinforce local character
4. **Side setbacks, rear gardens and interstitial spaces:** Strategic use of setbacks to prioritise views, usable landscape spaces, accessibility, vegetation and privacy. These

spaces should contribute to amenity, habitat creation and reduced impacts on adjoining properties

5. **Access and mobility:** Development should support diverse and inclusive movement options, including safe, accessible and efficient movement of pedestrians, micromobility and vehicle access. Provision for vehicle parking and charging should be efficient and integrated, avoiding excessive inert storage spaces, while promoting active transport
6. **Built form, massing and general arrangement:** Built form should be composed to enhance internal amenity, mediate micro-climate conditions and contribute positively to the local streetscape. Massing should respond to the local character, scale, materials and environmental context
7. **Amenity, atmosphere and generosity:** Spatial design of internal and external spaces should maximise natural light, spatial quality and views. Public and private circulation spaces should be welcoming, functional and adaptable to diverse user needs.
8. **Materials and construction:** Materials selection and construction methods should reflect local character and environmental conditions. Architectural elements should integrate with the streetscape, local materials and support long term durability and sustainability
9. **Sustainability**: Design should incorporate passive and active strategies to reduce energy, water and resource consumption. Site designs should promote healthy lifestyles with equally healthy buildings
10. **Resilience:** Development should be designed to withstand and adapt to increasing environmental, social and economic stresses. This includes protection from extreme weather events and design of structures and systems to safeguard residents and properties
11. **Adaptation:** projects should be future-ready incorporating a range of measures to accommodate demographics/generational shifts, resource availability and energy transitions. Flexibility in design should allow for building modifications over time to suit future changing needs and household composition.

Note

A checklist to assist with the implementation of these holistic site design principles has been provided in Appendix B.

3. Building materials and finishes

Explanation

The selection of materials for construction, renovation and/or refurbishment plays a critical role in shaping both environmental outcomes and/or the health and well-being of building occupants. Materials with high embodied carbon, poor durability, or harmful chemical content can negatively impact the environment and indoor air quality.

A key principle underpinning sustainable material use is the circular economy, which aims to minimise waste and resource consumption by keeping materials in use for as long as possible. This involves designing for durability, reuse, repair, refurbishment, and recycling—ultimately reducing the environmental footprint of the built environment.

Objectives

The objectives for sustainable building materials and finishes are to:

1. Promote the reduction, reuse, and recycling of building materials and components through the construction lifecycle
2. Prioritise durable, low impact construction materials and finishes that are easy to maintain, repair or upgrade and are suitable to local environmental conditions
3. Promote the use of sustainable, non-toxic materials that support healthy indoor environments, contain high recycled content and have low embodied carbon to minimise environmental impact and enhance occupant wellbeing
4. Mitigate urban heat through passive design strategies and nature-based solutions that enhance thermal comfort year-round
5. Facilitate end-of-life material recovery by selecting products that can be reused, repurposed or recycled, supporting a circular economy

Controls

a) Prioritise the use low embodied carbon materials such as concrete with recycled content and minimise the use of high emission materials such as conventional steel and concrete by selecting lower emission alternatives including sustainably sourced timber, natural grass and permeable surfaces over steel, concrete, hard paving or synthetic grass

b) Development must specify light-coloured roofing materials to reduce building heat load/absorption and cooling energy demand in warmer months. Potential glare impacts on neighbouring properties must be assessed and appropriately mitigated

c) Development must incorporate cool paving materials, with high solar reflectance (SR) greater than 50% or use porous paving to support deep soil infiltration with near-surface water retention. A minimum of 50% of the site's hard landscaped surfaces must apply one or a combination of these treatments

d) Design buildings to enable the adaptive re-use of existing building facades, structures and fittings where feasible, supporting circular economy principles and reducing construction waste

e) A schedule of materials must be submitted with the DA demonstrating the use of the following:
   i. Durable, low maintenance materials
   ii. Materials with low embodied energy content
   iii. Products with high recycled content
   iv. Locally sourced products and materials

v. Salvaged, recycled content or reused materials
vi. FSC-Certified timber from plantations or sustainably managed regrowth forests
vii. Low volatile organic compounds (VOC) paints, adhesives and floor covering
viii. Materials certified as sustainable or 'environmentally friendly' by a recognised third party certification scheme e.g. GECA

f) Development applications for non-residential projects proposing over 1,000 m^2 of additional gross floor area must include an embodied emissions assessment that details:
   i. estimated quantities and associated emissions of key materials (e.g. concrete, structural steel, masonry, aluminium) based on the proposed design;
   ii. measures to reduce embodied emissions through material selection and construction techniques; and
   iii. strategies to minimise operational embodied emissions across the building's lifecycle.

Note

1. Examples of building materials that should be minimised include:

- Chrome, cadmium, lead, mercury, cyanide and formaldehyde, PFAS
- Materials, sealants and adhesives containing volatile organic compounds (VOCS)
- PVC
- Wood treated with Copper Chrome Arsenate (CCA)
- Solvents.

2. Examples of common building materials that can contain recycled content include: concrete, steel, insulation, composite timber products, carpet, underlay and many cladding materials. Consideration should be given to recycling and re using bricks within a development

3. Renewable natural materials encouraged for interior finishes and furnishings include: bamboo, jute, sisal and, cork. Applicants should also consider using low VOC/plant-based paints and plant-based oils for floor boards

4. Low PVC products in compliance with 'Green Star Best Practice Guidelines for PVC in the Built Environment' are supported

5. The Forest Stewardship Council (FSC) is an international, independent, not-for-profit organisation that provides standards for responsible forest management and an accreditation system for sustainable forest products. Further information is available at www.fscaustralia.org

6. Good Environmental Choice Australia (GECA) is an independent, not-for-profit organisation that runs an internationally recognised Ecolabelling Program that certifies products in line with ISO 14024. Further information is available at www.geca.org.au

7. Further information on the use of environmentally friendly materials in the design, construction or renovation of homes is available at www.yourhome.gov.au

MECLA (Materials & Embodied Carbon Leaders' Alliance) is a collaboration of organisations working together to drive reductions in embodied carbon in the building and construction industry that provide industry and government with guidance on embodied carbon https://mecla.org.au/

All new development must have regard to the NSW guide to food-waste recovery in multi-unit dwellings (NSW EPA) 2022

4. Design for disassembly

Explanation

Design for Disassembly (DfD) is a sustainable building approach that enables future reuse, recycling, or relocation of building components by ensuring they can be easily separated without damage. It supports circular economy principles, reduces construction and demolition waste, and extends the lifecycle of materials and systems.

DfD is increasingly recognised in Australia through:

- The National Construction Code (NCC), which allows for performance-based design and modular construction methods
- The Circular Design Guidelines for the Built Environment (NSW Climate and Energy Action), which promote modularity, reversibility, and material transparency
- The Prefabricated, Modular and Offsite Construction Handbook (Australian Building Codes Board), which outlines compliant methods for modular and disassemblable construction.

Key principles of DfD include:

- Reversible Connections: Use screws, bolts, and clips instead of adhesives or welds to allow easy disassembly
- Modular Design: Design components and systems in standardised modules that can be replaced or reused
- Material Labelling and Documentation: Include documentation of materials used and their disassembly instructions
- Use single-material components where possible to simplify recycling
- Accessible Fixings: Ensure that fasteners and joints are visible and accessible for future removal
- Design for Maintenance and Upgrades: Allow for easy replacement of parts during the building's life cycle
- End-of-Life Planning: Include a disassembly plan or checklist as part of the development application.

Objectives

1. To reduce construction and demolition waste and support circular economy principles by enabling future reuse and recycling of building components.

Controls

a) Buildings should be designed, where feasible, to allow for future disassembly, reuse, or recycling of major components
b) Construction methods should prioritise reversible connections (e.g. screws, bolts) over permanent fixings (e.g. adhesives, welds), where appropriate
c) Materials should be selected, where practical, to facilitate separation and reuse, avoiding composite or bonded materials
d) A Disassembly Plan is encouraged for large-scale, public, or commercial developments, and should be submitted with the development application outlining key components, materials, and methods for future disassembly
e) Where modular systems are used, documentation must be provided to support future upgrades or replacement.

5. Passive design

Explanation

Passive design is a building approach that harnesses natural climate conditions such as sunlight, shade, airflow and thermal mass to maintain a comfortable indoor environment. By reducing reliance on mechanical heating, cooling, and lighting systems, passive design improves energy efficiency, lowers operational costs and enhances environmental sustainability.

Passive design contributes to a more resilient built environment, reduces greenhouse gas emissions and supports occupant health and well-being. It is most effective when considered from the earliest stages of site planning and architectural design.

Objectives

The objectives for passive design are to:

1. Plan and design buildings and spaces to maximise orientation to sunlight and winter warmth, while minimising unwanted heat gain in warmer months
2. Optimise thermal mass in buildings by using materials that absorb, store, and gradually release heat to regulate indoor temperatures
3. Enhance the building envelope performance through appropriate insulation that reduces heat loss in cooler months and heat gain in warmer months
4. Promote natural ventilation through cross-ventilation and airflow strategies to cool the building naturally and reduce reliance on mechanical cooling
5. Integrate effective shading solutions that block excessive summer sun during hot days while allowing winter sun to penetrate and warm interior spaces during cooler months.

Controls

a) Residential flat buildings and shop top housing subject to the NSW Apartment Design Guide (ADG), must meet the requirements for solar access and cross ventilation

b) All development must incorporate passive and low-tech design solutions to manage solar access and heat load and cross ventilation including:

   i. Fixed external shading devices on the building's windows (e.g. overhangs, awnings, balconies, wider eaves)
   ii. Shading blades for north and east facing facades
   iii. Limited openings on west-facing facades of buildings
   iv. Structural building components, including the structural framing, roofing and facade cladding designed for longevity, adaptability, disassembly, re-use and recycling
   v. Internal walls and partitions must be positioned to facilitate natural airflow through the building
   vi. Operable natural ventilation strategies beyond windows used solely for light ingress or privacy purposes
   vii. Ceiling or wall mounted fans should be considered in all habitable rooms (main living areas and bedrooms) and clearly indicated on DA and CC plans
   viii. External finishes must be selected to reduce heat absorption:
   - Wall and roof finishes are to have a solar absorptance of < 0.475
   - Terracotta roofs are to have a solar absorptance of < 0.70
   - Paving must have a solar absorptance of <0.50

c) All development must respond to the physical and environmental characteristics of the site, including:
    i. Topography, aspect and slope
    ii. Adjacent buildings or structures that may affect solar access or ventilation
    iii. Relationship of the site to the street, including key features such as views and orientation
    iv. Overshadowing caused by existing buildings
    v. Orientation to true solar north, and a range of 30 degrees east and 20 degrees west of true north
    vi. Existing trees and vegetation including location, type, size and condition
    vii. Prevailing seasonal winds, sun paths and shade characteristics
    viii. Incorporate trees and shrubs as natural additional shading elements for outdoor surfaces, facades and windows
    ix. Ensure development does not unduly impact passive design or solar access of neighbouring properties
    x. A high standard of insulation in external walls and roofs is strongly encouraged to reduce heat loss in winter and heat gain in summer to maintain comfortable indoor temperatures year round

d) Natural ventilation strategies are strongly encouraged to evacuate heat from roof or underfloor cavities in summer, and to retain warmth in winter. Development should consider incorporating the following design elements:
    i. cross - ventilation or stack-ventilation to minimise the use of mechanical ventilation.
    ii. green roofs and green walls to reduce heat absorption and provide thermal mass to a development is strongly encouraged. Refer to Part B4 Landscape and Biodiversity for further guidance
    iii. trees and vegetation additional shading for roofs, windows and external surfaces is strongly encouraged.

6. Energy efficiency and renewable energy

Explanation

Buildings that are energy efficient offer substantial benefits including savings on the running costs of heating, cooling, lighting, and equipment, as well as reducing greenhouse gas emissions.

In NSW energy and water efficiency measures for most residential development is regulated under the Sustainable Buildings State Environmental Planning Policy (SEPP) which requires a BASIX certificate (the Building Sustainability Index). The BASIX tool assesses proposed developments against location-specific targets for energy and potable water consumption. Developments that meet these targets are issued a BASIX certificate which must be submitted with a DA prior to assessment.

For guidance on generating a BASIX certificate, refer to the BASIX tool.

The controls in this Section apply to buildings not affected by BASIX.

Minimum energy efficiency standards for buildings are also set out in Section J of the Building Code of Australia (BCA), which applies to non-residential and certain residential developments.

Note

BASIX certificates required under the NSW Sustainable Buildings SEPP does not apply to residential alterations and additions valued < $50,000, swimming pools with a capacity of 40,000 litres or less or visitor accommodation.

Objectives

The objectives for energy efficiency and renewable energy are to:

1. Promote energy and water efficiency in the design, construction and operation of buildings
2. Minimise greenhouse gas emissions across the lifecycle of development, including construction and ongoing use
3. Reduce the reliance on mechanical heating and cooling by encouraging passive design
4. Lower energy and water bills and reduce the whole of life cost of building energy services
5. Encourage the use of renewable energy to power buildings and reduce peak energy demand
6. Support development designed for low or zero carbon emissions, including buildings powered entirely by renewable energy.

Controls - All residential development

Solar photovoltaic system and battery

a) The installation of photovoltaic panels with battery storage is strongly encouraged in all residential developments to support energy self-sufficiency and reduce grid reliance.

Note
Recommended swimming pool heating systems should align with energy efficiency objectives and support the transition to renewable energy sources. Acceptable systems include:

- Solar thermal only
- Solar thermal boosted with electric heat pump.
- Electric heat pump

These systems are preferred due to their high energy efficiency and capacity to reduce greenhouse gas emissions compared to gas heating.
Swimming pool heating systems should comply with the energy efficiency principles outlined in the NSW BASIX (Building Sustainability Index) requirements and the National Construction Code (NCC) – Section J for energy efficiency. Use of gas heating is discouraged unless provision is made for future conversion to electric or renewable systems. All systems should be appropriately sized and installed to ensure optimal performance and minimal energy use.
Further guidance on energy-efficient pool heating can be found in:
AS/NZS 4234: Solar water heaters – Domestic and heat pump systems, which outlines performance-based assessment methods.

Cooking and space heating

Objective

1. To promote healthier indoor environments and reduce greenhouse gas emissions through the use of electric appliances.

Controls

a) Electrical appliances are encouraged for cooking and space heating in all new residential developments
b) Gas cooktops ovens and space heating systems should be avoided unless clear justification is provided demonstrating that the proposed gas appliance is the most energy-efficient option available at the time of development.

Note

Why gas is discouraged in new developments
Gas appliances such as cooktops, space heaters and hot water systems are increasingly discouraged in new developments due 5o their environmental, health and long-term economic impacts.
Greenhouse gas emissions
Natural gas is a fossil fuel that contributes significantly to carbon emissions during extraction, distribution and use. Transitioning to electric appliances powered by renewable energy supports climate goals and helps reduce the carbon footprint of buildings.
Indoor air quality
Gas cooking can release harmful pollutants such as nitrogen dioxide (NO), carbon monoxide (CO) and particulate matter. These pollutants can negatively affect indoor air quality and pose health risks, particularly in poorly ventilated or confined spaces.
Future-Proofing and Cost Efficiency
Electric appliances, including induction cooktops and heat pump systems, are more energy-efficient and compatible with renewable energy sources. Avoiding gas infrastructure reduces the need for costly retrofits as the energy grid transitions to clean electricity.

Protection of solar infrastructure

Objective

1. To ensure continued solar access to photovoltaic energy systems and support renewable energy uptake.

Controls

a) Development must be designed to minimise overshadowing of existing photovoltaic solar panels and solar hot water systems on adjacent or nearby properties
b) Shadow diagrams must be submitted for developments that may impact solar infrastructure, demonstrating compliance with this control
c) Shading from proposed buildings and structures must not reduce solar access to existing solar panels below 3 hours of direct sunlight between 9am and 3pm on the winter solstice
d) While canopy trees are generally exempt from solar access controls, applicants are encouraged to consider tree placement and species selection to avoid excessive shading of solar infrastructure.

7. Design guidelines – Future proofing electric hot water systems

Objectives

1. To ensure new dwellings are designed to allow easy retrofitting of electric hot water systems, supporting long term sustainability and energy transition.

Controls - Class 1 buildings (Single dwellings)

a) Where gas instantaneous or gas storage domestic hot water system is proposed, the following provisions must be included to facilitate future installation of an electric hot water system:
   i. A suitable location to place the future electric hot water system, compliant with relevant setback requirements in Part C1 Low Density Residential
   ii. Installation of a dedicated electrical circuit and breaker for an electric hot water system rated at a minimum of 20 Amps for the future electric hot water system, located at the switchboard
   iii. Provision of appropriate electrical cabling from the existing electrical switchboard to the designated location for the future electric hot water system.

Controls - Class 2 building (Multi-unit development)

a) If multiple gas instantaneous hot water systems or a centralised gas storage hot water system is proposed then the following inclusions shall also be provided, so that an electric hot water system can be easily retrofitted in the future:
   i. A suitable location and sufficient space for the future electric hot water system(s) to meet the hot water demand of the residents. This must meet all current Australian Standards for electrical and plumbing installation
   ii. The existing capacity of the electrical switchboard can meet the electrical demand of the future hot water systems
   iii. Appropriate electrical cabling is in situ from the existing electrical switchboard to the future electric hot water systems.

Note

Green gas and biomethane in Randwick

Jemena and Sydney Water are working together to produce biomethane (biogas) at the Malabar Headland Wastewater Treatment Plant. It is Australia's first biomethane-to-gas--network project demonstrates how homes and businesses can use renewable gas, sourced from biowaste and blended with natural gas, for cooking, heating and hot water. The Malabar Biomethane Injection Plant is certified by Green Power - the government managed renewable energy certification program. Green Power Renewable Gas Certification means renewable gas certificates will be issued for gas produced at the Plant certifying that the gas is low-emission renewable gas.

The Malabar facility produces biomethane (by volume) equivalent to the gas usage of approx. 6,300 homes per year and will scale up to around 200TJs each year – equivalent to the natural gas usage of approx. 13,300 NSW homes per year,

The Climate And Clean Air Coalition confirmed in a study that that biogas reduces fine particle air pollution (PM2.5) levels, with a reduction of around 36% reduction in exposure and 88% reduction in kitchen concentrations. The study concludes that biogas can help address household air pollution.

In 2024 The Malabar Biomethane plant is supplying 100% biomethane to the MasterChef Australia kitchen with contestants cooking with renewable gas.

With the look and functions of natural gas, biomethane can reduce carbon emissions while still offering all the advantages of cooking on a gas stove.

8. Water conservation

Council is committed to conserving water, enhancing water quality at our beaches, and strengthening water security in response to projected climate change impacts. Development must minimise reliance on potable water consumption while maximising use of non-potable water sources. Residential water conservation measures are mandated under the State Environmental Planning Policy (Sustainable Buildings) 2022.

Objectives

The objectives of water conservation are to:

1. Promote the sustainable use of water across the City of Randwick
2. Reduce reliance on mains-supplied potable water through conservation, reuse and alternative sources
3. Support us of non-potable water systems, including rainwater, stormwater and greywater, where appropriate
4. Improve long-term operational cost efficiency through reduced water consumption and increased system sustainability.

Controls

a) All developments must install water-efficient fixtures and fittings (e.g. WELS-rated taps, toilets, showers) in accordance with current Australian Standards
b) All developments must include rainwater tanks sized appropriately for site conditions and intended use (e.g. irrigation, toilet flushing, laundry)
c) Rainwater systems must be plumbed to non-potable uses where feasible
d) Stormwater reuse systems must be integrated where practical, particularly in large-scale or public/institutional developments
e) Greywater reuse systems are encouraged for large -scale developments particularly for irrigation and toilet flushing
f) Landscaping must be designed to minimise water demand, using drought-tolerant native species and efficient irrigation systems (e.g. drip irrigation, smart controllers)
g) All developments must incorporate Water Sensitive Urban Design (WSUD) principles to manage water sustainably, including permeable surfaces, swales, bio-retention systems, and green infrastructure
h) Water conservation systems must be maintained to ensure ongoing performance. Large developments may be required to submit a water management plan
i) For residential development:
    i. Compliance with BASIX water targets is mandatory
    ii. Dual plumbing for rainwater reuse is encouraged in multi-unit developments
j) For commercial/industrial development:
    i. Cooling towers and process water systems must be designed for water efficiency and reuse
    ii. Developments must demonstrate water conservation outcomes in sustainability assessments
k) For public/institutional development:
    i. Public buildings are encouraged to include rainwater harvesting and WSUD features.
    ii. Educational signage promoting water conservation should be included in public/institutional developments.

Note

Refer to Section B8 Water Management in the Randwick DCP for further details relating to rainwater tanks and greywater recycling and reuse.

References:

State Environmental Planning Policy (Sustainable Buildings) 2022

AS/NZS 3500 Plumbing and Drainage Series

Water Efficiency Labelling and Standards (WELS) Scheme

Water Sensitive Urban Design (WSUD) Guidelines – NSW Government

NABERS Water and Green Star Rating Tools (optional)

9. Natural refrigerants

Explanation

Refrigerants are substances used in air conditioning, refrigeration, and heat pump hot water systems to absorb and release heat, enabling cooling or heating to occur. They are essential components of HVAC systems (Heating, Ventilation, and Air Conditioning), which are widely used across residential, commercial, and industrial developments.

Natural refrigerants are compounds that occur naturally in the environment. Common examples include ammonia (NH_3), carbon dioxide (CO_2), and hydrocarbons such as propane (R-290) and isobutane (R-600a). These substances were widely used until the 1930s, when synthetic refrigerants, particularly fluorinated gases (F-gases), became more prevalent.

Today, synthetic refrigerants known as Hydrofluorocarbons (HFCs) are commonly used in air conditioning systems, refrigerators, and hot water systems. However, leakage and improper disposal of these systems contribute significantly to global warming due to the high Global Warming Potential (GWP) of HFCs. In response, the Australian Government is phasing down bulk HFC imports under the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989, in line with international commitments under the Montreal Protocol (see Refrigeration and air conditioning - Consumers - DCCEEW).

In contrast, natural refrigerants have low or negligible GWP and are considered environmentally preferable. They are often more energy-efficient, cost-effective to produce, and readily available, making them a sustainable alternative to synthetic refrigerants. Their use can reduce operating costs, improve system performance, and support long-term climate goals.

Definition:

Global Warming Potential (GWP)

GWP is a measure of how much heat a greenhouse gas traps in the atmosphere over a specific time period, usually 100 years, compared to carbon dioxide (CO_2). Carbon dioxide has a GWP of 1, serving as the baseline. Gases with a higher GWP contribute more to global warming because they trap more heat. A GWP of 10 means the gas has ten times the impact of CO_2 in terms of contributing to global warming.

A comparison of the global warming potential of various natural and synthetic refrigerants is shown in Table 1 below:

Table 1: Comparison of the global warming potential of various natural and synthetic refrigerants

Refrigerant	Global Warming Potential
Ammonia (R717, NH3) commercial/industrial	0
Carbon dioxide (R744, CO2)	1
Hydrocarbons, e.g. propane (R290) or isobutane (R600a)	3
Hydrofluorocarbons R134a	1430

Source : DCCEEW GWP Reference Table

Objectives:

The objectives for refrigerant use in development are to:

1. Minimise the use of refrigerants with high Global Warming Potential (GWP)
2. Promote the adoption of low-impact, natural refrigerants (e.g. CO_2, ammonia, hydrocarbons)
3. Ensure refrigerant systems are designed, installed, and maintained to reduce leakage and environmental harm
4. Support pathways toward carbon neutrality and climate resilience across development types.

Controls:

a) All new developments must use refrigerants with a GWP of ≤150, unless technically unfeasible
b) Preference must be given to natural refrigerants (e.g. R-744, R-717, R-290) where safe and practical
c) Heating, Ventilation and Air Conditioning and refrigeration systems must meet or exceed minimum energy performance standards (e.g. NABERS or MEPS)
d) Refrigerant systems must be designed to minimise refrigerant charge and maximise efficiency
e) Leak detection mechanisms must be included in large-scale or high-risk systems (e.g. central HVAC, commercial refrigeration)
f) Smaller systems (e.g. residential split systems) must be maintained per manufacturer specifications and serviced by licensed technicians
g) All refrigerant systems must comply with maintenance standards under the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989
h) Maintenance logs must be kept and made available for inspection
i) Refrigerant recovery and recycling must be undertaken during decommissioning
j) Disposal must comply with EPA and DCCEEW guidelines.

Further reading:

https://iifiir.org/en/news/the-australian-refrigeration-sector-decreased-emissions-transition-to-natural-refrigerants-and-a-growing-workforce

https://www.dcceew.gov.au/sites/default/files/documents/refrigerants-guide.pdf

10. Non-residential development

Energy efficient buildings offer substantial benefits including reduced operational costs for heating, cooling, lighting and equipment, as well as lower greenhouse gas emissions.

Energy efficient provisions for non-residential buildings, are governed by Section J of the National Construction Code (NCC 2022) Volume One. These provisions are designed to improve thermal performance, future proofing for renewable energy systems and electric vehicle charging infrastructure and water efficiency through efficient fixtures and reuse systems.

Objectives

The objectives for energy and water efficiency for non-residential development are to:

1. Promote energy and water efficiency in the design, construction and operation of buildings
2. Minimise greenhouse gas emissions through improved building performance
3. Reduce reliance on mechanical heating and cooling by enhancing passive design strategies
4. Lower energy and water consumption and reduce the whole of life cost of building services
5. Ensure new development is resilient to climate change impacts, including heatwaves and potential disruptions to electricity supply
6. Support operational cost savings through efficient building systems and technologies.

Controls

a) All non-residential development must comply with the energy efficiency provisions of Section J, of the National Construction Code (NCC) Volume One which apply to Class 3 to Class 9 buildings. These provisions cover building fabric, glazing, insulation, ventilation thermal performance, building services and renewable energy readiness

b) Non-residential development must incorporate solar PV systems where feasible. Specifically, developments with:
   i. a gross floor area (GFA) of 2,000m^2 or more, including alterations and additions
   ii. a roof area of 1,000m^2 or more,

   must install a solar PV system covering a minimum of 30% of available roof space, excluding areas used for plant equipment, green roofs, or required open space

c) The building's main electrical switchboard must be designed to accommodate solar and battery integration, including at least two empty three-phase circuit breaker slots, and four DIN rail spaces, clearly labelled for solar PV and battery systems. Electrical infrastructure must be sized to support the maximum output of a solar PV system covering at least 30% of the roof area, ensuring scalability and system efficiency

d) Where practical, renewable energy systems (e.g. solar PV, heat pumps) must be installed and integrated into the building design to enhance energy performance and reduce reliance on non-renewable sources

e) Heating and cooling systems must be designed to target only occupied spaces which require heating or cooling at any one time, avoiding unnecessary energy use across the whole building

f) All new or replacement electrical appliances must achieve the highest available energy rating at the time of installation, in accordance with the Energy Rating Label scheme

g) Energy efficient LED lighting, dimmers, motion detectors and/or automatic turn off switches must be installed where appropriate. Lighting systems should be zoned to

illuminate only required spaces during “off-peak” time or low occupancy periods, not the whole building

h) Openable windows are to be installed in common areas (e.g. staff rooms, bathrooms etc) to enhance natural ventilation and reduce reliance on mechanical systems
i) Internal walls and partitions should be positioned to facilitate cross-flow ventilation throughout the building, improving indoor air quality and thermal comfort
j) Lighting for streets, parks and any other public domain spaces provided as part of a development must use energy efficient lighting technologies such as LED lighting
k) All new water fittings and fixtures such as showerheads, taps, urinals and toilet cisterns in non-residential development, public domain areas, and public and private parks must achieve the highest Water Efficiency Labelling Scheme (WELS) star rating available at the time of installation
l) Rainwater tanks must be installed for all non-residential developments, including major alterations and additions where roof forms allow flexible collection and plumbing to appropriate end uses (e.g. irrigation, toilet flushing).

Note

Performance verification: Large developments may be required to submit a NCC Section J Report or sustainability assessment demonstrating compliance with NCC energy efficiency standards.

10.1. NABERS

Explanation

This section establishes minimum environmental performance requirements for large-scale developments to ensure new buildings contribute to sustainable urban growth, resource efficiency, and climate resilience. It applies to developments with significant operational footprints, such as large commercial premises, hotels, and serviced apartments.

NABERS (the National Australian Built Environment Rating System) is a nationally recognised rating tool which measures the environmental performance of buildings, focussing on energy and water consumption, indoor environment quality and waste impact.

Objectives

1. Encourage the use of nationally recognised benchmarking tools to promote best practice environmental performance
2. Promote energy and water efficiency in new developments
3. Ensure buildings are designed and constructed to meet recognised sustainability standards
4. Reduce greenhouse gas emissions and operational resource consumption
5. Support the delivery of high-performance buildings aligned with Council’s strategic sustainability goals.

Controls

a) **Applicability**
These controls apply to:
   i. Offices, retail, industrial and health services facilities with a net lettable area of 1,000 square metres or more
   ii. Hotels, serviced apartments, Co-Living and aged care with more than 100 rooms

b) **Performance Requirements**
Development applications must include documentation demonstrating that the proposed building will meet one of the following environmental performance standards:

i. NABERS Commitment Agreement
Evidence that the building will enter into a NABERS Commitment Agreement for Energy and Water, in accordance with the schedule committing to 5.5-star energy and 4-star water as outlined in Table 2 below

ii. Green Star Certification
Certification that the building will achieve a minimum 5 Star Green Star – Design & As Built (Best Practice) rating, as administered by the Green Building Council of Australia (www.gbca.org.au)

Table 2: Minimum NABERS Commitment Agreement Requirements

Building Type	Energy NABERS commitment	Water NABERS commitment	NCC classification
Boarding House, hotels, Co-Living, Serviced apartments >50 rooms	5.5 Star Energy	4 star water	Class 3 Buildings
Office Buildings >1000sq GFA area	5.5 Star Energy	4 star water	Class 5 Buildings
Retail centres >1000sqm GFA area	5.5 Star Energy	4 star water	Class 6 Building
Industrial Warehouse/storage >1000sqm GFA	5.5 Star Energy	3 star water	Class 7 Building
Aged Care >50 rooms	5.5 Star Energy	4 star water	Class 9c Building
Health Services Facility > 1000sqm GFA	5.5 Star Energy	4 star water	Various depending on the type of facility (refer to NCC Classification)

c) **Timing of Agreement**
NABERS Commitment Agreements must be entered into prior to the issue of any Construction Certificate for the approved development

d) **Submission Requirements**
NABERS Commitment documentation must be submitted via the NSW Planning Portal in accordance with Clause 79A of the Environmental Planning and Assessment Regulation

e) **Heritage Considerations**
Where the development involves a heritage item or is located within a heritage conservation area, and the performance standards in Table 2 cannot be achieved without unacceptable heritage impacts, variations may be considered if supported by:

i. A Heritage Impact Statement prepared by a suitably qualified heritage consultant
ii. Energy modelling prepared by a suitably qualified consultant

f) **Exemptions**
A NABERS Energy Commitment Agreement may not be required where the consent authority is satisfied that compliance is not feasible due to site-specific constraints or heritage impacts, subject to appropriate supporting documentation

g) **Verification and Reporting**
A NABERS Commitment Agreement must be supported by a valid Commitment Agreement certificate and Section J Deemed-to-Comply Report (where applicable), submitted with the development application
Post construction, the applicant must provide evidence of as-built NABERS or Green Star Certification prior to occupation certificate process.

Note

Environmental Rating Systems compared:

NABERS Commitment Agreement

The National Australian Built Environment Rating System (NABERS) Commitment Agreement is a formal undertaking to achieve a specific NABERS rating for Energy and/or Water post-construction. It focuses on actual operational performance, verified through independent assessment after the building is occupied.

Green Star Certification

Green Star – Design & As Built is a comprehensive sustainability rating administered by the Green Building Council of Australia (GBCA). It assesses performance across multiple categories including energy, water, materials, indoor environment quality, and innovation. A 5 Star rating represents Australian Best Practice and is based on design and construction documentation.

Note

Encouragement of 6 Star Green Star rating

While the minimum requirement for Green Star certification under Council's planning controls is a 5 Star Green Star Design & As Built rating (Best Practice), Council strongly encourages applicants to pursue a 6 Star Green Star rating, which represents World Leadership in sustainable building design and construction.

Achieving a 6 Star rating delivers significant benefits:

- Enhanced environmental performance, including lower energy and water consumption, reduced greenhouse gas emissions, and improved waste management.
- Improved occupant health and wellbeing, through better indoor air quality, thermal comfort, and access to natural light.
- Long-term operational cost savings, due to reduced utility bills and maintenance costs.
- Increased asset value and marketability, as sustainability credentials are increasingly valued by tenants, investors, and the community.
- Alignment with Council's strategic sustainability goals, including climate resilience, net zero emissions, and resource efficiency.

Council recognises that higher sustainability standards contribute to a more resilient, liveable, and future-ready built environment. Applicants are encouraged to engage early with the Green Building Council of Australia and sustainability consultants to explore pathways to achieving a 6 Star rating.

10.2. Dual reticulation water systems

Explanation

Dual reticulation refers to properties supplied with both standard potable drinking water and recycled water via separate pipe systems. 'Dual' indicates the presence of two distinct systems while 'reticulation' refers to the network of pipes that distribute water throughout a development. These controls apply to large scale residential, shop-top housing and non-residential developments subject to Clause 6.12 of the Randwick LEP where feasible. The controls also encourage adoption of dual reticulation in smaller developments where feasible to support sustainable water management and future-proof infrastructure for recycled water integration.

Objectives

1. Increase resilience and water security by providing an alternative water supply for non-potable water uses
2. Reduce technical and financial barriers to future connection of non-potable water supply infrastructure
3. Promote sustainable water management practices across a broad range of developments.

Controls

a) Large scale residential sites requiring a development control plan under Clause 6.12 of the Randwick LEP 2012 must investigate the feasibility of installing a dual water or reticulation system to support immediate or future recycled water network connection

b) Where dual reticulation is not proposed, the applicant must provide a written justification demonstrating why it is not feasible, including consideration of:
   i. site constraints
   ii. cost implications
   iii. technical limitations
   iv. any other constraints

c) Where feasible, the dual reticulation system must be designed to allow future recycled water supply to be achieved without significant civil or building work, disruption or cost. The dual reticulation system should be designed to clearly separate potable and non-potable water uses, and facilitate connection to a recycled water network. The system should include:
   i. One system for drinking water uses connected to the potable water supply
   ii. One system for non-drinking water uses (e.g. toilet flushing, irrigation, car washing, laundry) delivered through purple-coloured pipes, fittings and clear signage at the tap point indicating that the water is non-drinkable

d) The non-drinking potable recycled water system must:
   i. be connected to an on-site rainwater tank with potable water supply backup, until an alternative non potable water supply connection is available
   ii. be provided with a connection point adjacent the street boundary for easy connection to any future district recycled water supply

e) Water services must be metered in accordance with the latest version of the Sydney Water Multi - Level Individual Metering Guide (currently August 12, March 2025). Individual metering of the non- drinking water service is optional

f) All other residential, shop-top housing, mixed-use, commercial and industrial developments exceeding:

i. 30 dwellings, or 1,000 m^2 gross floor area are encouraged to incorporate dual reticulation systems where feasible.

Note

Developers are encouraged to consult with Sydney Water early in the design phase to assess feasibility and serviceability

Futureproofing residential development to climate change

A futureproofing residential development to climate change report prepared by WSP in 2021 for Randwick, Waverley and Woollahra Councils looked at predicted energy and water use for new residential developments in 2030 and 2070 climate change scenarios.

This report concluded that the increasingly warm ciliate and its impacts on rainfall and increased rates of evapotranspiration rates (the combined effects of evaporation losses and uptake of moisture by vegetation from the soil) means more water will be needed to keep landscaping alive in 2030 and 2070.

This report recommended that NSW would need to plan for greater water demand from the residential sector due to the projected warmer climate. Given the uncertainties in rainfall under future climate scenarios, rainwater tanks may not be as reliable to reach the BASIX Water target in future. Alternative water supplies may play a role in meeting the Water targets, with consideration of treated storm water and recycled water reticulation suggested as two possible solutions.

Notes

1. Details on type and location of renewable energy systems and water heaters must be clearly marked on relevant plans and specifications. Details on energy and water efficient appliances must be provided with the DA.

2. The Small-scale Renewable Energy Scheme is an Australian Government initiative that encourages investment in small-scale renewable energy. It provides incentives to households and businesses to install small-scale renewable energy systems like rooftop solar, solar batteries, solar water heaters and air sourced heat pumps.

3. The Federal Government's website www.energyrating.gov.au lists the Minimum Energy Performance Standards (MEPs) and Energy Rating Labels (ERLs) on a range of products and appliances including refrigerators, washing machines, televisions, air conditioners etc.

4. The Federal Water Efficiency Labelling and Standards Scheme (WELs) labels a range of products for water efficiency, helping households to save water and money. Further information is available at www.waterrating.gov.au

5. The National Australian Built Environment Rating System (NABERs) managed by the NSW Office of Environment and Heritage, measures the environmental performance of buildings and/or tenancies during their operation.

For the purposes of Section 10.1b (i), owners and/or occupiers are required to sign a NABERS – Energy Commitment Agreement to deliver the required rating and submit a copy to the Principal Certifier prior to the issue of a Construction Certificate. Further information on the NABERs rating system including a list of accredited professionals to prepare the ESD Statement is available at (www.nabers.gov.au).

6. The Green Star rating system, managed by the Green Building Council of Australia, is a voluntary environmental rating system that evaluates the environmental design and construction of building (www.gbca.org.au)

7. Passivhaus (or Passive House) is an internationally recognised building standard focused on creating ultra-low energy buildings that are comfortable, healthy and resilient. It achieves this through a "fabric-first" approach - optimising insulation, airtightness, thermal bridge minimisation, high performance windows and mechanical ventilation with heat recovery (MVHR). In NSW, the **Passive House Standard** Method is an approved pathway for BASIX thermal performance compliance in eligible locations. To use this method, applicants must:

- Engage a Certified Passive House Designer
- Complete a building simulation using the Passive House Planning Package (PHPP)
- Achieve airtightness of ≤ 0.6 ACH@50Pa
- Submit the PHPP verification report alongside the BASIX certificate
- Obtain endorsement from a Passive House Certifier

Certified Passive house buildings create healthy, comfortable, and low-energy resilient buildings. This method sets performance benchmarks that exceed standard BASIX metrics, offering a robust pathway to high-performance, low-carbon buildings. For more information, visit the Australian Passivhaus Association website.

11. Sustainable building management

Explanation

Education plays a vital role in ensuring that all occupants understand and engage with the sustainable design features of a development. By promoting awareness of and encouraging responsible environmental practices, developments can achieve long-term sustainable outcomes and empower occupants to make informed choices that reduce environmental impacts, improve resilience and improve health and well-being.

Objectives

The objectives for sustainable education are to:

1. Reduce the use of potable water
2. Reduce energy consumption across all developments
3. Ensure all occupants are informed about the sustainability features of the development
4. Encourage the ongoing use, care and maintenance of water and energy efficient systems and design features of the development.

Controls

a) An Environmental Building Management Plan (EBMP) must be submitted with all DAs for new residential, shop top housing, co-living and mixed use development containing 5 or more dwellings, and commercial and industrial development with a floor area of more than 1,000m2

b) The Environmental Building Management Plan must clearly detail the sustainability features of the development and their maintenance requirements. This includes but is not limited to:
   i. Rainwater tanks.
   ii. Total water cycle management (including water conservation devices and stormwater treatment)
   iii. On site renewable energy systems (e.g. solar panels, battery storage systems)
   iv. Lighting, energy and water efficient appliances, fixtures and fitting ratings.
   v. Electric Vehicle Charging infrastructure (specifications, maintenance and usage)
   vi. Composting systems (location and maintenance requirements)
   vii. Landscape irrigation systems (timers and sensors)
   viii. Dual reticulation water system (design, maintenance and usage)
   ix. Waste management and recycling systems (operation and maintenance)
   x. Any other site-specific initiatives

c) Maintenance instructions must physically be attached to each system where practical (e.g. rainwater tank, solar panel, EV Charger) to ensure visibility and ease of reference

d) The EBMP may be supplemented with Randwick City Council publications (such as the Local Native Plants for Sydney's Eastern Suburbs brochure) and/or other materials

e) The EBMP must be retained by building management with copies made readily accessible to:
   i. residents and tenants and strata committees
   ii. building managers and maintenance personnel
   iii. commercial occupants (where relevant)

f) Sustainability information should be included in occupant welcome packs, displayed in common areas and integrated into building induction processes to ensure ongoing awareness and engagement.

Appendix A: Guiding principles checklist

Guiding Principle	Intent	Checklist / Assessment Questions
1. Country-led	Honour Country and strengthen environmental and cultural identity.	☐ Has the proposal integrated Indigenous cultural values and narratives? ☐ Does design celebrate the site's natural and cultural history? ☐ Are Country-led design principles visible in landscape and built form?
2. Accessibility and equity	Promote dignity, inclusion and universal access.	☐ Are all public and private spaces accessible to people of all abilities? ☐ Are wayfinding and circulation designed for ease and safety? ☐ Does the proposal address gender, age, and cultural inclusivity? ☐ Are adaptable housing and equitable access provided?
3. Adaptation and reuse	Extend the life of existing buildings and resources.	☐ Are existing structures or materials reused where feasible? ☐ Has adaptive reuse been considered before demolition? ☐ Are materials selected for future recovery or recycling?
4. Integrated nature	Protect and enhance green infrastructure and biodiversity.	☐ Are green corridors and canopy cover maintained or increased? ☐ Are native ecosystems restored and connected? ☐ Does the project contribute to biodiversity, urban cooling and habitat creation? ☐ Has tree loss been avoided or offset with on-site planting?
5. Amenity and well-being	Enhance environmental quality and human comfort.	☐ Do spaces optimise light, sound, and air quality? ☐ Does the design provide quiet, thermally comfortable environments? ☐ Are outdoor areas safe, shaded and restorative? ☐ Is mental and physical wellbeing a key design consideration?
6. Material	Promote low-impact, local and circular material use.	☐ Are materials locally sourced and renewable? ☐ Has embodied carbon been assessed and reduced? ☐ Are reclaimed or recycled materials incorporated? ☐ Does the specification avoid virgin mineral extraction where possible?

Guiding Principle	Intent	Checklist / Assessment Questions
7. Waste	Strive for zero waste outcomes.	☐ Are construction and demolition waste minimised and segregated for reuse? ☐ Is on-site composting or material recovery provided? ☐ Are waste storage and collection systems designed for user convenience and recycling efficiency?
8. Energy	Achieve energy efficiency and transition to renewables.	☐ Are passive design measures maximised to reduce energy demand? ☐ Are renewable energy systems incorporated (e.g., solar, wind, heat recovery)? ☐ Are building envelopes and systems optimised for efficiency? ☐ Does operational energy use achieve or exceed best-practice benchmarks?
9. Water	Protect water systems and enhance reuse.	☐ Does the project harvest and reuse rainwater or greywater? ☐ Are WSUD measures incorporated to manage stormwater quality and quantity? ☐ Does design reduce demand on potable water supply? ☐ Are natural waterways protected and enhanced?
10. Carbon	Achieve net-positive carbon outcomes.	☐ Has a whole-of-life carbon assessment been undertaken? ☐ Are construction materials and processes low-carbon or carbon-neutral? ☐ Does the project include carbon sequestration through vegetation or materials? ☐ Does operational performance exceed emissions reduction targets?

Appendix B: Holistic site design checklist

Holistic Site Design Checklist Table

Category	Objective	Checklist / Assessment Questions
1. Connecting to Country	Ensure design is responsive to Country and celebrates First Nations heritage.	☐ Has consultation occurred with Traditional Custodians or local Aboriginal knowledge holders? ☐ Does the proposal acknowledge Country through design expression, materials, or landscape integration?☐ Are cultural narratives, topography, vegetation, and water systems respected and embedded in the design? ☐ Does the design strengthen physical and visual connections to place?
2. Site planning and lot layout	Deliver efficient and contextually sensitive site planning.	☐ Does site planning optimise orientation, natural light, ventilation, and views? ☐ Are pedestrian, cycle, and visual links to the public domain maximised? ☐ Has ecosystem connectivity (habitat corridors, permeability) been maintained or enhanced? ☐ Are privacy, overshadowing, and amenity impacts on neighbouring properties minimised? ☐ Are lot sizes and layouts adaptable to changing use or demographics?
3. Landscape design, site amenity and public domain interface	Integrate landscape and built form to enhance amenity and local character.	☐ Does the landscape design enhance user experience, comfort, and biodiversity? ☐ Are plantings native, drought-tolerant, and climate-responsive? ☐ Does the design provide shaded, comfortable outdoor areas and promote cooling? ☐ Does the development contribute positively to the public domain and reinforce local identity?
4. Side setbacks, rear gardens and interstitial spaces	Use setbacks strategically to enhance liveability and environmental outcomes.	☐ Are side and rear setbacks designed to support vegetation, deep soil planting and usable landscape areas? ☐ Do these spaces provide privacy, visual relief, and ecological benefits? ☐ Are setbacks and interstitial spaces designed for accessibility and passive surveillance? ☐ Do these areas contribute to reduced heat island effects and improved microclimate?
5. Access and mobility	Promote inclusive, efficient and low-impact movement systems.	☐ Are pedestrian and cyclist movements prioritised and safe? ☐ Are pathways universally accessible and legible? ☐ Are EV charging points and bicycle facilities integrated within design? ☐ Is vehicle access efficient and visually unobtrusive? ☐ Are car parks designed to be adaptable or convertible to other uses in future?

Category	Objective	Checklist / Assessment Questions
6. Built form, massing and general arrangement	Ensure built form responds to context, climate and character.	☐ Does the building massing respond appropriately to topography, character and views? ☐ Is the form composed to minimise bulk and enhance solar performance? ☐ Are façade treatments, materials, and articulation consistent with local context? ☐ Does the design contribute positively to streetscape rhythm and scale? ☐ Is microclimate (shade, wind, light) considered through building arrangement?
7. Amenity, atmosphere and generosity	Maximise comfort, adaptability and spatial quality.	☐ Do interiors and external spaces maximise daylight, cross-ventilation and outlook? ☐ Are communal and private spaces generous, flexible and well-proportioned? ☐ Are internal circulation and public areas welcoming and easy to navigate? ☐ Does the design foster inclusivity, wellbeing and social interaction?
8. Materials and construction	Select materials that reflect place, durability and sustainability.	☐ Are materials locally sourced, renewable, and of low embodied carbon? ☐ Is material reuse or recycling prioritised in the design? ☐ Are finishes compatible with climatic conditions and designed for longevity? ☐ Do materials and details reinforce local identity and craftsmanship?
9. Sustainability	Achieve high environmental performance and promote healthy living.	☐ Are passive solar design principles optimised? ☐ Are renewable energy systems (solar PV, batteries) integrated? ☐ Are water harvesting and reuse systems incorporated? ☐ Are energy-efficient systems, lighting, and appliances specified? ☐ Does the design enhance occupant health, comfort and connection to nature?
10. Resilience	Ensure long-term durability and ability to withstand stresses.	☐ Is the development designed to cope with climate risks such as heat, flood, and wind? ☐ Are critical services and structures safeguarded during extreme weather events? ☐ Are WSUD and flood mitigation measures integrated on site? ☐ Does the landscape support cooling, shading, and biodiversity resilience?
11. Adaptation	Embed flexibility for future change.	☐ Can spaces and structures adapt to changing household or community needs? ☐ Are building systems modular and upgradable? ☐ Does the design anticipate shifts in demographics, energy systems and mobility? ☐ Are construction methods adaptable for reuse or repurposing?

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