



Bays West Stage 1

SUSTAINABILITY TECHNICAL REPORT OVERVIEW

AUGUST, 2022

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Acknowledgment

We acknowledge the Traditional Owners of country throughout Australia and recognises their continuing connection to land, waters, skies, and community.

We are inspired by and learn from knowledge and stories of Country.

Atelier Ten and Integral Group pay our respect to Traditional Owners and their cultures, and to Elders past, present, and emerging.

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Executive Summary

This report has been prepared to address the environmental sustainability requirements of the Bays West Stage 1 rezoning application. Additional outcomes from the design process are that sustainability outcomes are embedded not only in this report, but also the reference design.

It elucidates the approach to sustainability which is framed by a level of ambition that represents world's best practice, and presents a series of sustainability concepts, each of which is supported by a brief series of objectives that support its delivery, and aim to embed world's best practice in resource efficiency, ecological stewardship, adaptability, accessibility, and enabling infrastructure in both the physical fabric and ongoing operations of Bays West.

The bulk of the report addresses four key areas for ongoing detailed exploration:

- Climate change and resilience;
- Circular economy;
- Whole-of-life carbon; and
- District utilities.

In each of these sections the:

- Strategic planning context is provided;
- Sustainability objectives presented; and
- Next steps identified.

An approach to assurance is proposed based on an assessment of global peer precincts, and a comparison of Australian and global rating tools, the outcomes of which are detailed in 3.1 Performance targets.

Significant consultation in multiple forms has been undertaken with a variety of internal and external stakeholders to arrive at a series of recommendations, and ensure:

- Their sustainability concerns and objectives are captured;
- The level of ambition is consistent;
- Sustainability principles are understood;
- Sustainability initiatives are embedded in the reference design; and
- Targets and metrics are ambitious but achievable.

The recommendations which represent the outcome of this consultation process take three forms:

- Performance targets - certified ratings for development type from a series of rating tools;
- Development control provisions - considerations for the Sustainability chapter of the Design Guide.
- Further detailed technical studies.

Key sustainability outcomes for Bays West are:

- Low carbon precinct and buildings;
- Net zero precinct and buildings from day one;
- All electric operations; and
- Powered by 100% renewable energy.

Delivery of the outcomes will be assured by certification with the Green Star suite of tools. The delivery method for these outcomes will be up to delivery partners or proponents to address in future stages and represents an opportunity to deliver innovative responses.

The recommendations in this report seek to focus on embedding the requirements for delivering world's best practice sustainability outcomes, ensuring there is space provision in the design, and not to limiting how they could be delivered.

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1. Sustainability principles

1.1. Sustainability approach

The approach to sustainability for Bays West Stage 1 is guided by the draft *Bays West Sustainability Framework* developed in support of the *Place Strategy*. The draft *Bays West Sustainability Framework*:

- Identifies the scope of environmental sustainability relevant to Bays West;
- Establishes the sustainability ambition for this place;
- Identifies sustainable development opportunities specific to Bays West.

1.2. Sustainability ambition

This study is framed by a level of ambition that represents world's best practice. This is based on the key drivers for ambition:

- The competitive environment for major urban renewal precincts;
- The established level of ambition with local and international policy; and
- The sustainability expectations from the property and development industry.



The concept of world's best practice provides a goal for the precinct that can be held and developed over time. World's best practice relies on making environmental, social, and economic sustainability (aligned with international best practice) priorities for this urban development.

1.3. Sustainability concepts

Sustainability is an important consideration in making Bays West a place that attracts global talent and investment and supports its success as a knowledge and innovation hub in Sydney. For each sustainability concept applicable to Bays West, this framework identifies a level of ambition that reflects the current policy ambitions set by government as well as best practice in the property sector.

The ambitions within each sustainability concept are further described as a series of specific objectives to deliver the ambition.

The sustainability concepts have been assessed on two criteria:

- Place-based concepts that are specific to Bays West and tailored to delivering on place outcomes/ vision.
- Embedded concepts, applied across all urban renewal development precinct. These are aligned to government policy and are based on world's best practice.

1.3.1. Place-based concepts

Understanding sustainability through place and time will be one of the key considerations to build a real character for Bay west. This is captured by the following items in the strategy:



Connection with Country

The expression of the local Aboriginal culture must be a present element beyond the physical items within the public realm, integrating it at design and development stages, and ensuring participation and representation of First Nations communities.

Connection to Country underpins all of the sustainability concepts and ambitions at Bays West. Local ecological and cultural histories presented in the accompanying Draft Connecting with Country Framework inform and shape all aspects of the Sustainability Framework. The sustainability-specific issues presented are inherently linked with Connecting with Country Strategies proposed. The Sydney D'harawal stories of the Boomartjil, Parradowee and Booambilyee as well as Raiagon and the Gooraiaagon depict the richness of this immediate Country and reiterate its importance to contemporary life.



Climate risk and resilience (identified for further detailed studies)

Climate risk and resilience considerations are key in the relationship with water due to the nature of the site. Plan for expected scenarios of raising sea levels, flooding and urban heat.

This concept has been identified as an area of critical importance to global, state, and national objectives and will be studied in more detail to establish additional opportunities to be integrated in the Bays West project. See Resilience section below for more details.



Biodiversity and natural systems

Biodiversity and natural systems restoration will mitigate the impact of new construction and give relevance to green areas with high ecological value such as native gardens. Restorative & preservation elements as the focus.

The ambition for supporting biodiversity at Bays West is to have a net positive impact on biodiversity through project activities by 2030.

The objectives in support of increasing biodiversity are:

- To provide local biodiversity initiatives that mitigate the immediate impact of the program on-site and create new urban habitat for the city's ecosystems;
- To provide habitat connectivity for mobile species between key local and regional green and blue spaces;
- To establish a biophilic environment at Bays West that provides a material connection for tenants and visitors to natural systems;
- To achieve a Net Positive Impact on biodiversity through support for off-site land projects that generate biodiversity offset credits aligned with negative emissions instruments (afforestation, reforestation and soil carbon sequestration).



Specific place-based opportunities for biodiversity are:

- White's seahorse habitat preserved and expanded.
- Construct habitats for locally indigenous fauna species, with particular focus on threatened ones.
- Regeneration of Rozelle Bay mangroves and seagrass habitats.
- Restoration of Johnston's Creek Coastal Saltmarsh threatened ecological community (TEC).
- Construction of artificial reefs under piers and rocky intertidal habitat to increase local marine biodiversity and support native species.
- Extend the Inner West Council's GreenWay environmental and active travel corridor to Rozelle and White Bays.
- Protect priority habitat corridors and refuge areas to protect mobile species, and migratory birds and fish.
- Create a net increase in biodiverse vegetation and useful habitat over existing development.
- Offsite biodiversity initiatives that mitigate the immediate impact of the program on site.
- Coordinate with other relevant authorities to renaturalise White's Creek (currently a concrete-lined open channel).

The assurance for biodiversity should be developed in conjunction with the ecological needs assessment and in reference to the City of Sydney Urban Ecology Strategic Action Plan (2017).

The net positive impact on biodiversity can be achieved with consideration to the resource efficiency and circular economy during operational, maintenance and disposal phases.



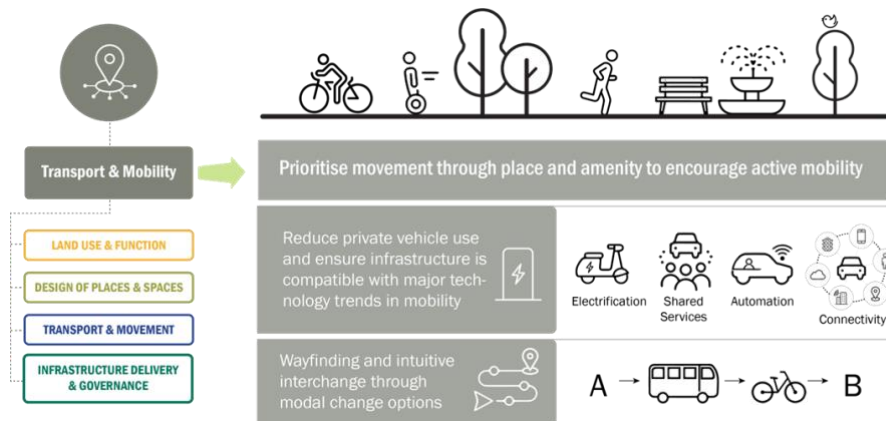
Transport & Mobility

Transport & Mobility addresses networks for active transportation and key decentralisation of basic services, prioritising walking and cycling and balancing movement and place. Transition to shared services and electrification of vehicles.

The ambition for transport and mobility is for Bays West to be a leader in sustainable transport with wider influence on the greater Sydney network.

The objectives for supporting sustainable transport options at Bays West are:

- Reduce private vehicle use in this car-dominant environment by supporting non-vehicular transport modes;
- Providing an exemplar of movement and place mutually enhancing the quality of the respective experiences;
- Prioritising and enabling active mobility to the site (pedestrian and bicycle) for improved health and wellbeing;
- Provision for the electrification of road mobility options – infrastructure to prepare for a high degree of parking to have charging capability;
- Improving the experience of customer traversing through Bays West; amenity, comfort, ease of movement, modal change options, wayfinding and safety;
- Providing an exemplar of universal, equitable access;
- Supporting future mobility transitions, including vehicles sharing, ride-sharing and connected and autonomous vehicle interfaces;
- Supporting emerging transitions in the freight network, including the electrification of logistics systems.



Specific place-based opportunities for transport and mobility are:

Establish convenient and high amenity active transport links between Bays West and neighbouring high streets and village centres, including Darling Street, Balmain Road, Victoria Road, Johnston Street, Glebe Point Road, and Harris Street.

Capitalise on the precinct's location at the convergence of multiple existing active transport routes to create the missing through-link to the CBD.

- Fully connected pedestrian and bicycle pathways serve all areas of precinct and surrounding communities.
- Investigate the reinstatement of a crossing from Bays West to Pyrmont.
- Shared micro-mobility stations located regularly throughout public realm.
- Extend the GreenWay active transport corridor to connect with other existing networks.
- Integrate wharfs and infrastructure for ferry services.
- Facilitate multiple points of water access for small-scale local recreational watercraft use.
- Establish a continuous activated pedestrianised foreshore promenade.
- Car-free zones and parking limited to shared stations.
- Safely and coherently integrate freight and service movements between port and arterial roads.



Water resources & quality

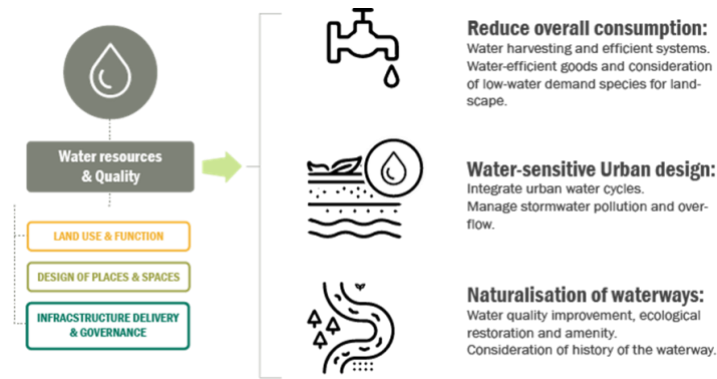
Water resources & quality should be a priority to preserve ecosystem's health. Understand water as asset for its relevance in amenity, active recreation and landscape.

The ambition for water resource management at Bays West is to preserve non-renewable water resources and to provide a net improvement to environmental water quality as a result of development.

The objectives for responsible water management at Bays West are:

- To reduce overall consumption of water resources;
- To reduce stormwater pollution flowing to Sydney Harbour significantly beyond best practice guidelines;
- To solve current flooding issues, and reduce flood and inundation risk as a result of intersecting climate change pressures of sea-level rise and increased rainfall;
- The alignment of water quality, supply source, and treatment needs to enable effective water harvesting and re-use;
- To identify mechanisms for waste-water treatment and re-use aligned with best practice utilities and implement solutions that can be sustainably operated over the full life of the precinct.

Managing water quality through green infrastructure and the rehabilitation of marine and inter-tidal ecosystems is a huge opportunity for Bays West, with multiple co-benefits.



Specific place-based opportunities for water resources and quality are:

- Conscious shaping of water as a dynamic landscape element.
- Overland flows preserved and integrated into design to reduce potential effects of flash flooding.
- Ephemeral and lost watercourses restored.
- Surface runoff from roads, roofs and other hardscapes filtered through landscape treatment before discharging to waterways.
- Encourage ground water recharge through permeable ground cover.
- On-site stormwater detention for heavy rainfall events that delay discharge.
- Prioritise indigenous drought-tolerant plant species which require little to no irrigation.
- Explore opportunities to renaturalise White's Creek (currently a concrete-lined open channel).

1.3.2. Embedded concepts

Implementing sustainable outcomes through certification and assurance is a fundamental step addressed in the following aspects of the strategy.



Energy & emissions (identified for further detailed studies)

Energy & emissions is considered within the ambition of Net Zero Emissions in construction and operation.

This concept has been identified as an area of critical importance to global, state, and national objectives and will be studied in more detail to establish additional opportunities to be integrated in the Bays West project. See Carbon section below for more details.



Circular Economy (identified for further detailed studies)

The circular economy sets the base thinking around the systems within the precinct, considering strategies at all stages of the project and upholding a strong link to the digital concept. Benchmarks for waste generation. Buildings designed for second- and third-life uses

This concept has been identified as an area of critical importance to global, state, and national objectives and will be studied in more detail to establish additional opportunities to be integrated in the Bays West project. See Circular economy section below for more details.



Public health & community wellbeing

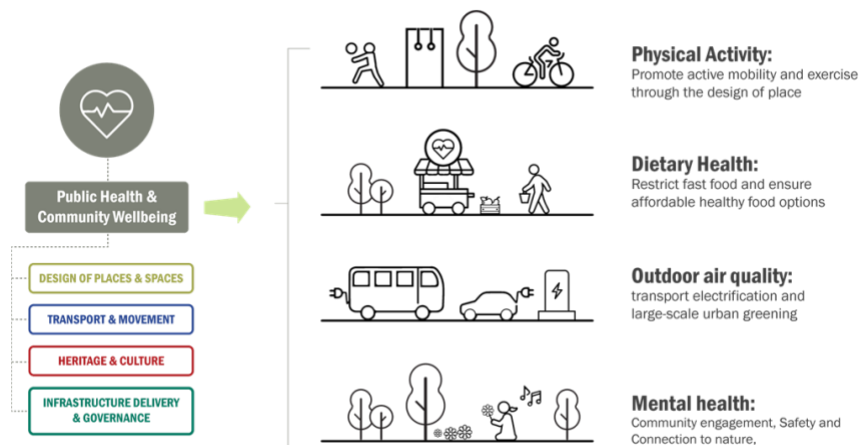
Public health & community wellbeing is embedded in the built environment through the development of healthy buildings and communities in line with current certification schemes. A key consideration is the provision of diverse outdoor/green spaces.

The ambition for public health and community wellbeing is to improve public health outcomes through urban renewal and improve wellbeing for precinct users, visitors and the wider community.

The health and wellbeing objective for Bays West is to deliver a place that addresses national health priorities through design and place-making, and improve social cohesion, social connection and strengthen the social fabric.

The design objectives in support of health and wellbeing priorities are

- Supporting diversity and inclusion by ensuring a variety of program types spread across site (residential (incl. social and affordable), commercial, retail, community and cultural offerings);
- Supporting community infrastructure for improved equitable access to services;
- Improving physical activity by encouraging active mobility and recreational exercise through the provision of diverse and high-amenity public outdoor green spaces;
- Improving dietary health by eliminating fast food or junk food from public F&B tenancies and providing healthy and affordable food options;
- Improving local air quality by transport electrification, large-scale urban greening and eliminating on-site combustion with particular focus on arterial road interfaces;
- Improving mental health through connection to sky, water and green, biophilia, safety, sense of belonging;
- Enhancing social engagement through the provision of restorative public gathering spaces.



Other health and wellbeing considerations to be addressed by individual buildings include water quality, indoor environment quality (light, acoustics and thermal comfort), and other wellness topics that improve workplace productivity and contribute to precinct property competitiveness with global peers.

The implementation of health and wellbeing should be included in all the major workflows –planning, design, construction and operation. Assurance for achieving healthy built environment can be provided through certification of buildings and the broader precinct using the WELL Community and Building rating tools.



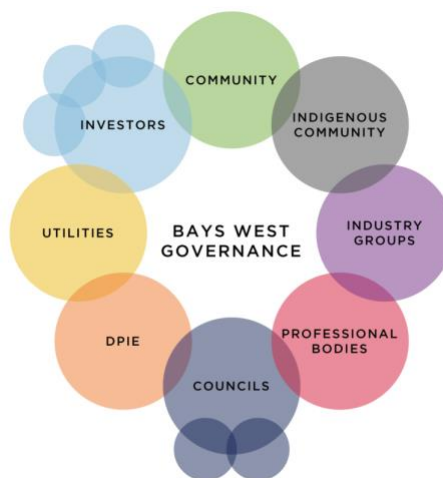
Governance & Assurance

A Governance & Assurance strategy that embeds and confirms sustainability outcomes across all project stages, evolves as needs and challenges emerge, and evidences an understanding of digital governance and data as an asset that adds value to the Place and supports the achievement and reporting of sustainability outcomes during operation.

Governance and assurance at Bays West incorporates multiple strands, including development and operational governance, digital strategy, and built environment certification. The ambition for governance is an approach that provides stakeholders unambiguous clarity of authority across all stages of the project life cycle and into the future.

The objectives for delivering clarity, stability and confidence for stakeholders are:

- Clear appointment of responsibilities at each stage of the development and operations life cycle
- Legible and transparent hierarchy of development decision processes
- Consistent staging and development program including roll out of all critical infrastructure assets
- Consider a precinct delivery authority which includes a diversity of public, private and community members (see case studies for Barangaroo, Hafen City, and Wynyard Quarter)
- Explore Living Lab opportunities in the precinct construction and operations
- Prioritise data governance, including collection, storage, security and use. This aspect of governance as a value proposition in other precincts has been a flashpoint (see case study for Toronto Waterfront) and is the least understood and most rapidly evolving aspect of a successful Place



2. Detailed studies

Throughout the master planning phase significant engagement with stakeholders and the project team uncovered several areas related to sustainability that are of critical importance to global, state, and national objectives. The consultation process enabled a series of targets and initiatives to deliver these outcomes to be embedded in the reference master plan and Development Control Provisions, as well as uncovered a number of additional opportunities.

These additional opportunities have the capacity to deliver value in innovative ways and support multiple sustainability concepts at Bays West. These four areas therefore warrant their own discrete detailed technical studies to ensure:

- Constraints, opportunities, and key issues are explored
- They are well understood in the context of Bays West
- They are adequately assessed against the reference master plan
- Implications for subsequent stages of development, implementation, and operations are understood

These four areas are summarised below including:

- Why they are important
- Strategic planning context
- Key outcomes

2.1. Resilience

Meteorological records show that since the 1950s the duration, frequency and intensity of heatwaves have increased across many parts of Australia including NSW. Australia's warmest year on record was 2019, and the seven years from 2013 to 2019 all rank in the nine warmest years¹. In parallel with rising temperatures, over the past 30 years the number of fire days has also continued to rise across NSW. Throughout the state, the fire season is starting earlier and lasting longer with fire weather often extending into spring and autumn². In addition to temperature related risks, impacts from flooding and sea level rise have the capacity for widespread damage and disruption. Across Sydney, flooding events became three times more frequent during the 20th century as a result of sea-level rise. By 2100 it is likely that today's 1-in-100 year flood will occur every day or so³.

Recognising that the impacts from climate change pose a significant risk to its business, infrastructure assets, and the communities it serves, the NSW Government is seeking to create greater resilience in communities through the planning system, to ensure that resilience and support for rebuilding/recovery are embedded at all levels, including in the legislation, strategic planning, precinct planning, and statutory planning provisions⁴.

2.1.1. Strategic planning context

National Strategy for Disaster Resilience

The National Strategy for Disaster Resilience outlines the need for a coordinated and cooperative national effort to build resilience to disasters.

The Strategy focuses on the common characteristics of disaster resilient communities, individuals, and organisations. These characteristics are:

¹ Bureau of Meteorology & CSIRO 2020, *State of the Climate 2020*, Bureau of Meteorology and CSIRO, Australia.

² Climate Council 2014, *Be Prepared: Climate change and the NSW bushfire threat*, Climate Council of Australia Limited, Sydney.

³ Climate Council 2014, *Counting the costs: Climate change and coastal flooding*, Climate Council of Australia Limited, Sydney.

⁴ NSW Department of Planning, Industry and Environment 2021, *Resilience outcomes for the planning system*, NSW Government, Sydney.

- functioning well while under stress
- successful adaptation
- self-reliance, and
- social capacity

NSW Climate Change Policy Framework

The NSW Climate Change Policy Framework outlines the NSW Government's long-term objectives to achieve net-zero emissions by 2050 and to make New South Wales more resilient to a changing climate.

This policy framework builds on the NSW Government's strong track record of expanding clean energy, helping households and businesses reduce their bills by saving energy and preparing for the impacts of climate change.

It guides the NSW Government's policy and programs.

Resilience outcomes for the planning system

The 'Resilience outcomes for the planning system' report outlines what 'resilience' means in the NSW planning system, defines resilience, and provides an overview of resilience considerations including the key shocks and stresses that places and communities across NSW may face.

Resilience for the planning system focuses on identifying a set of values (through resilience outcomes), tailored to the role that the planning system plays in building resilient people, places, and communities.

The report introduces 7 resilience outcomes, linked to relevant United Nations Sustainable Development Goals (SDGs) that show alignment between the global goals, and how resilience will be embedded within the NSW planning system.

- Outcome 1. Resilience is a foundational characteristic of sustainable places and communities
- Outcome 2. Risk is identified and addressed for sustainable and adaptable places and communities
- Outcome 3. Governance and accountable decisions are improved for the long-term benefits of the community and the place
- Outcome 4. Resilience is embedded into the regulatory framework
- Outcome 5. Settlement planning is informed by resilient social, cultural, economic, environment and built outcomes
- Outcome 6. Resilience is advanced through locally led and place-based approaches for shared responsibility
- Outcome 7. Recovery, adaptation, and transition pathways are business as usual

The report supports and guides current and future resilience related work for the department.

Planning for a more resilient NSW

The Department of Planning, Industry and Environment (the Department) has developed this guide and a supporting resource kit to help planning authorities and councils make decisions that more effectively consider natural hazard risk and build sustainable, hazard-resilient communities.

The guide aims to inform the consideration of natural hazards in the preparation of:

- regional and district plans
- local strategic plans and community strategic plans
- planning proposals
- other strategic planning activities that relate to land-use planning.

The guide outlines the Natural Hazards Package to fit into the NSW Planning Framework:

- Strategic Plans
 - Regional plans
 - District Plans
- Local Strategic Plans
 - Local strategic planning statements

Community strategic plans

- Environmental Planning Instruments

State environmental planning policies

Local environmental plans

- Development Control Plans

Resilient Sydney

This strategy sets the direction the city of Sydney must take to strengthen its ability to survive, adapt and thrive in the face of increasing global uncertainty and local shocks and stresses. This strategy calls for business, government, academia, communities, and individuals to lead and work as one city.

This strategy reflects the priorities of stakeholders in the city along five 'directions':

- people centred city,
- live with our climate,
- connect for strength,
- get ready, and
- one city.

These directions entail corresponding flagship actions and supporting actions to be taken by stakeholders, which cover areas such as inclusive economic growth, sustainability and local adaptation, improved social cohesion, disaster preparedness and risk assessment, and improved governance.

Inner West Council, Climate and Renewables Strategy

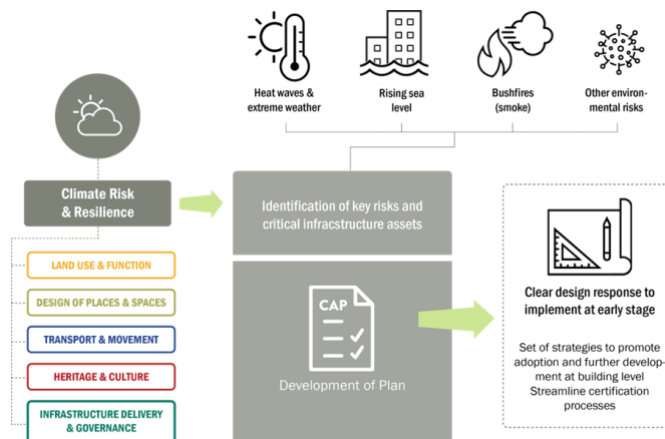
Council has adopted a Climate and Renewables Strategy to assist the Inner West to respond to the climate emergency. The strategy commits council to taking more action and places climate at the centre of all decision making. It focuses on:

- Reducing emissions from Council Operations
- Reducing emissions from the Inner West Community
- Understanding consumption emissions from the Inner West Community
- Opportunities for Community Energy in the Inner West

2.1.2. Key outcomes

The objectives for resilience at the Bays West are:

- To embed design for a future climate in all design processes using Representative Concentration Pathway (RCP) 8.5 in 2090 climate scenarios;
- To manage sea level rise and incorporate it productively into a slowly changing landscape;
- To identify mechanisms to manage heat, bushfire (and smoke), flood and storm impacts through extreme events;
- To provide community facilities that support social resilience during major shock events;
- To effectively mitigate climate risk in alignment with the Taskforce for Climate-related Financial Disclosures (TCFD);
- To enable flexible, adaptive and regenerative systems with the capacity to be changed subject to uncertain future pressures.



The detailed exploration of climate scenarios and the development of a comprehensive climate adaptation plan for the precinct are important steps to follow.

Other shocks and stresses that could be considered within the broader precinct are loneliness, pandemic response (especially in the context of COVID-19), cyber-security and anti-terror considerations.

The assurance for our approach to resilience will be through the development of a Climate Adaptation and Resilience Management Plan with ongoing reporting and disclosure.

2.2. Circular Economy

The importance of waste reduction, resource efficiency and recovery, and circular economy is enshrined at all levels of Australian government and is becoming increasingly critical to contemporary urban development of all scales.

The circular economy is a new economic model for addressing human needs and fairly distributing resources, without undermining the functioning of the biosphere or crossing any planetary boundaries. Defined like this, circularity (the infinite cycling of resources at high value), is not a goal in and of itself but a means to an end: a sustainable and fair world. A circular economy is built to be restorative and regenerative by design: materials are cycled at continuous high value, all energy is based on renewable sources, water resources are extracted and cycled sustainably, and biodiversity is supported and enhanced through economic activities. Ultimately a circular economy is balancing sustainable and regenerative resource use with economic activities aimed at the health and wellbeing of humans (and other species), the maximisation of societal value (looking beyond economic value alone).

These principles are applicable to area developments as well. To translate the principles of a circular economy to urban development, several themes are important that reflect the opportunity to assure circular resource loops. Smart spatial planning that works with the existing landscape and climate rather than against it and reinforces green and blue networks, a design of the built environment that minimises resources use throughout the buildings' lifecycle (from construction to operations to end of life), infrastructure and facilities (for example waste management) that support the preservation and cycling of resources, and applying the principles of industrial symbiosis wherever possible. Achieving the ideal of a circular city or neighbourhood therefore means applying circular design principles to all layers of the urban environment.

Circular economy takes a holistic view of whole of life material flows in the built environment and its supply chain. Beyond materials and waste it also considers:

- Heritage conservation
- Resource efficiency and avoidance
- Design, construction, and operational circularity
- Sharing economy
- Sustainability as a service
- End of life

2.2.1. Strategic planning context

Australian National Waste Policy

The *National Waste Policy* provides a national framework for waste and resource recovery in Australia. It also highlights the importance of working together and outlines the roles and responsibilities for everyone - businesses, governments, communities, and individuals.

The policy outlines the five key *principles* for waste management that will enable Australia to transition to a circular economy. These include:

- Avoid waste
- Improve resource recovery
- Increase use of recycled material and build demand and markets for recycled products
- Better manage material flows to benefit human health, the environment, and the economy
- Improve information to support innovation, guide investment and enable informed consumer decisions

The first *National Waste Policy* was published in 2009. An updated *National Waste Policy* was published in 2018.

The 2019 *National Waste Action Plan* drives implementation of seven ambitious *targets*, including:

- Regulate waste exports
- Reduce total waste generated by 10% per person by 2030
- Recover 80% of all waste by 2030
- Significantly increase the use of recycled content by governments and industry
- Phase out problematic and unnecessary plastics by 2025
- Halve the amount of organic waste sent to landfill by 2030
- Provide data to support better decisions

Infrastructure Australia

The Australian Government's 2021 *Australian Infrastructure Plan* proposes two key *Reforms* and a series of supporting *Recommendations* related to waste:

Reform 9.1 Valuing resources to enable a circular economy

9.1 Recommendation

Avoid waste, improve resource recovery and build demand and markets for recycled products by integrating the circular economy into national waste policy and infrastructure projects.

- 9.1.1. Increase understanding of the role of consumers in the circular economy through community education on responsible waste behaviour.
- 9.1.2. Reduce the impact of plastic on the environment by implementing the National Plastics Plan.
- 9.1.3 Build support for the circular economy and embed circular practices by developing a circular economy roadmap for the infrastructure sector, including annual progress reports.
- 9.1.4 Support co-location of circular economy facilities by undertaking collaborative land-use planning.
- 9.1.5. Reduce organic waste to landfill by mandating local council food organics and garden organics (FOGO) collection services.

Reform 9.2 Waste data to drive innovation

9.2 Recommendation

Encourage market development through government and industry partnerships to accelerate and extend the implementation of the National Waste Policy's data actions and bring national consistency to the household waste collection and landfill levy system.

- 9.2.1 Support coordinated policy through an integrated whole-of-life waste data strategy for priority resources.

- 9.2.2 Create a high-quality recycling system with lower processing costs by developing common benchmarks for each material stream, consolidating services and targeting infrastructure investment.
- 9.2.3. Increase landfill diversion by developing a waste levy pricing strategy and national levy protocols.

NSW Waste and Sustainable Materials Strategy 2041

The *NSW Waste and Sustainable Materials Strategy 2041* focuses on the environmental benefits and economic opportunities in how we manage our waste. Sets out targets and sub-targets for waste reduction.

- 5 Year target
 - Phase out problematic and unnecessary plastics by 2025
 - Plastic litter reduction target of 30% by 2025
- 10 Year targets
 - Reduce total waste generated by 10% per person by 2030
 - 80% average recovery rate from all waste streams by 2030
 - Introduce a new overall litter reduction target of 60% by 2030
- Sub-targets– plastics
 - Eliminate problematic and single use plastics by 2025
 - Triple the plastics recycling rate by 2030
- Sub-targets– organics
 - Halve the amount of organic waste sent to landfill by 2030
 - Net zero emissions from organics to landfill by 2030

NSW Circular Economy Policy Statement

The State of NSW and NSW Environment Protection Authority (EPA) through the *NSW Circular Economy Policy Statement: Too Good To Waste* advises the NSW Government will adopt the following circular economy principles:

- Minimise consumption of finite resources;
- Decouple economic growth from resource consumption;
- Design out waste and pollution;
- Keep products and materials in use;
- Innovate in resource efficiency, give preference to higher-order re-use and repair opportunities;
- Create new circular economy jobs.

Inner West Council

In transitioning to a zero-waste community and circular economy, the Inner West focuses on the following priorities:

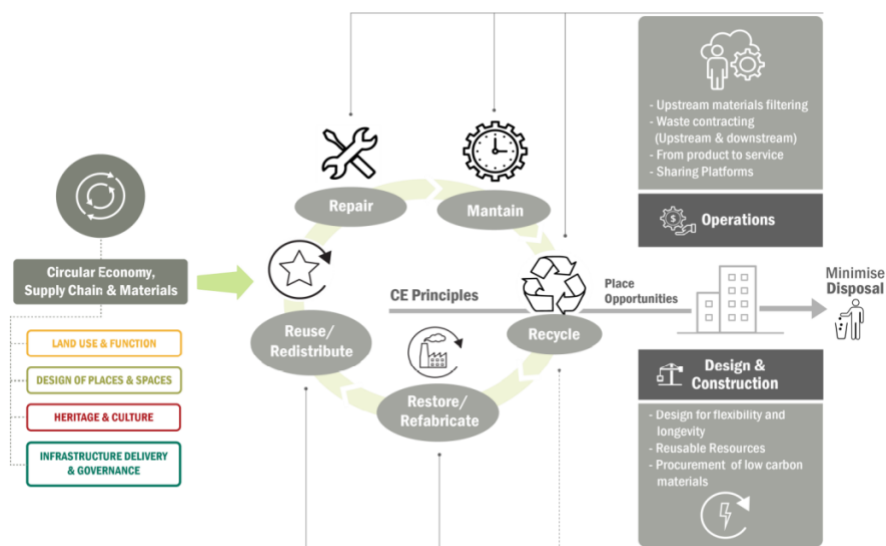
- Avoid Waste Generation. Prioritise waste avoidance (consumption), encourage efficient use, reuse and repair through opportunities and influencing individual behaviour. Target:
Reduce waste landfilled per capita by 50% by 2036
- Reduce Organic Waste. Reduce the weight of organics presented for collection and processing and manage organic streams efficiently to avoid resource loss. Target:
Reduce food and garden organic waste disposed in landfill by 60% by 2030
- Recycle and Buy Recycled. Prioritise recycling and procurement of materials with recycled content to support demand for recycling processing. Target:
Divert 60% of recyclables from the garbage bin by 2036

- **Problem Wastes.** Problem wastes are usually toxic or hazardous and safe management is essential for our health and environment. Targets:
Increase recycling of televisions and computers by 80% by 2036
Reduce the amount of hazardous waste presented in the garbage to 50% by 2036
Reduce illegal dumping by 50% by 2030
- **Collaboration and Advocacy.** Resource Recovery inputs and outputs go beyond the inner west boundary and control, requiring a collective approach to effective solutions. Targets:
To provide access to mandatory product stewardship schemes through kerbside services or drop-offs for residential wastes for our community by 2030.
To provide information for our community on Inner West Waste flows for each material stream within three months of a new contract.
- **Reduce Litter.** Reduce the amount of litter entering our environment.
Reduce litter by 60% by 2030. Reduce plastic litter by 30% by 2025.

2.2.2. Key outcomes

The objectives for resilience at the Bays West are:

- To embed design for a future climate in all design processes using RCP8.5 in 2090 climate scenarios;
- To manage sea level rise and incorporate it productively into a slowly changing landscape;
- To identify mechanisms to manage heat, bushfire (and smoke), flood and storm impacts through extreme events;
- To provide community facilities that support social resilience during major shock events;
- To effectively mitigate climate risk in alignment with the Taskforce for Climate related Financial Disclosures (TCFD);
- To enable flexible, adaptive and regenerative systems with the capacity to be changed subject to uncertain future pressures.

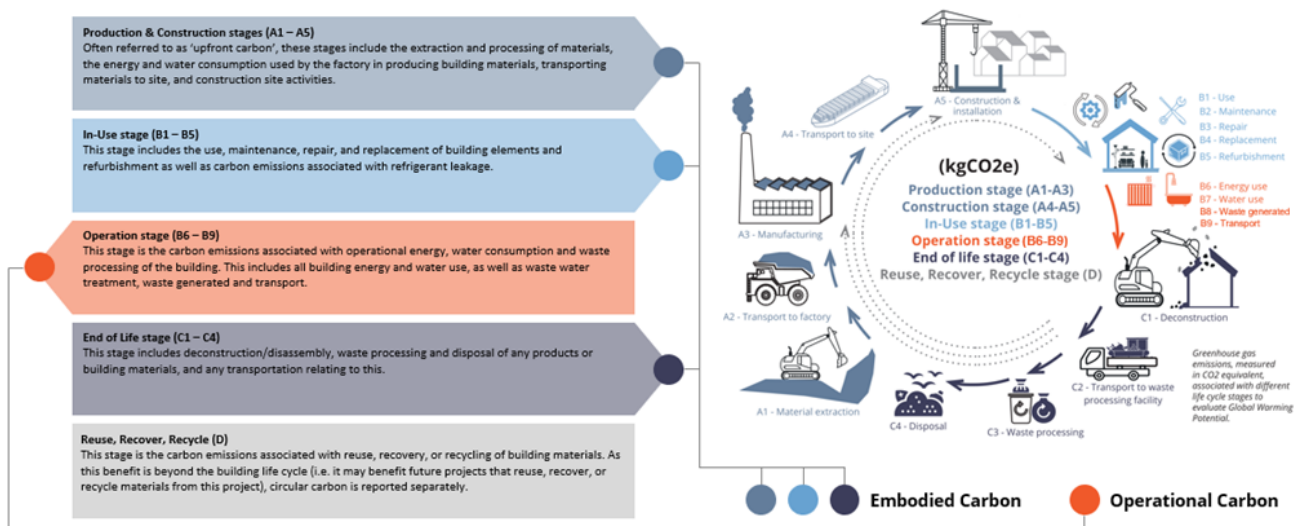


2.3. Whole-of-Life Carbon

The Bays West Precinct has a carbon target of net zero emissions for both construction and operation by 2030. The White Bay Power Station (& Metro) sub-precinct will adopt strategies to align with this target

Buildings and systems are material to the performance of the built environment which directly affect operational emissions. It is therefore crucial that appropriate strategies with clear targets and objectives are detailed from the planning and design phase. A clear net zero roadmap for the district will be mapped out to complement the masterplan with developers will be bound by clauses in the agreement contract to deliver the strategies.

Reducing carbon emissions of buildings requires a Whole Life Carbon approach that measures and minimises carbon emissions at each stage of the project life cycle. As shown in the summary below, these carbon emissions can be grouped as operational carbon and embodied carbon. Potential carbon benefits also exist beyond the life cycle of a building through use of products and materials that can be reused, recycled, or used in energy generation processes – this is known as circular carbon.



Key strategies for carbon management are:

- Reduce embodied carbon
- High performance Buildings
- Renewable energy
- District utilities
- 100% electric
- Water efficiency
- Waste management
- Green Lease
- Nature- based offsets
- Third party certification

2.3.1. Strategic planning context

Achieving net zero is a critical action on climate change with the Australian government has committed to net zero by 2050. All levels of government have been detailing the strategies that would be deployed at their level of influence to achieve the target with some councils committing to achieving net zero earlier.

Net Zero Plan Stage 1: 2020–2030 (DPIE)

The NSW government has published their plan to drive the economy towards net zero which includes the following priorities

- Drive uptake of proven emissions reduction technologies that grow the economy, create new jobs or reduce the cost of living
- Empower consumers and businesses to make sustainable choices
- Invest in the next wave of emissions reduction innovation to ensure economic prosperity from decarbonisation beyond 2030

- Ensure the NSW Government leads by example

Inner West

The Inner west council is committed to transitioning to a low carbon future with a target of 75% reduction in community emissions by 2036 and net zero before 2050.

For community carbon emissions key focus areas identified are

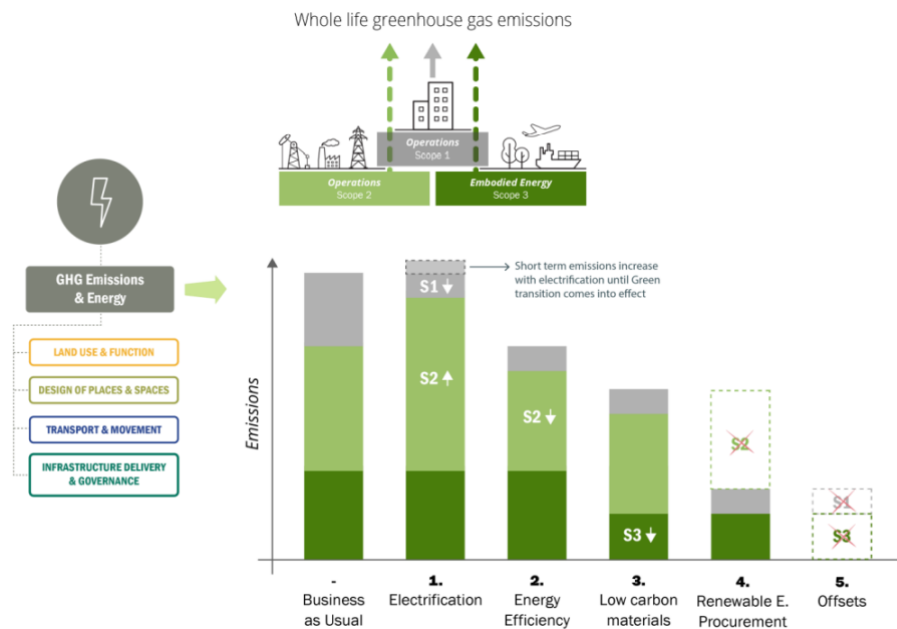
Encourage renewables	Objectives	<ol style="list-style-type: none"> 1. Large solar installations on high impact sites 2. Collective impact - support solar installations on smaller residential and commercial buildings 3. Support residents and businesses locked out to access renewable energy.
Zero carbon buildings and precincts	Objectives	<ol style="list-style-type: none"> 1. Increase the environmental performance of buildings in the Inner West. 2. Work with state agencies, private sector and the community to work towards zero-carbon precincts and neighbourhoods.
	Major action areas	<ul style="list-style-type: none"> • Increase building environmental performance standards in Inner West Council planning controls - higher BASIX benchmarks* and NABERS pre-commitments • Develop planning controls requiring solar panels on multi-unit and shop top housing • Develop innovative planning controls that support low carbon precincts (Parramatta Road, Camperdown-Ultimo Collaboration Precinct and Sydenham to Bankstown) and assess opportunities for: <ul style="list-style-type: none"> – Decentralised energy, water, waste; – Setting aside land for multifunctional place needs. – Parking policy innovations to support liveability outcomes – unbundled parking, decoupled parking, no/low parking. – Electric car charging points linked to a smart grid – 30-40km/hour streets to deliver a safe cycle and pedestrian network. • Potential future Council managed precinct developments to demonstrate highest possible environmental performance standard, e.g. target 6-star Green Star or equivalent standard. • • Develop LEP/DCP controls to protect and increase urban forests in public and private domain. • Prepare planning controls to incorporate green infrastructure within private developments (green roofs, walls, deep soil gardens/ landscaping). • Review opportunities to require all electric homes in low carbon precincts
Zero emissions mobility	Objectives	<ol style="list-style-type: none"> 1. Implement Going Places - An Integrated Transport Strategy for the Inner West (Draft 2019)
Community partnerships and support	Objective	<ol style="list-style-type: none"> 1. Support Inner West people to live low-carbon lifestyles

2.3.2. Key outcomes

Key objectives for the Carbon Strategy at Bays West are

- Prioritising passive design
- Fundamental commitment to carbon neutral built

- environments
- Mandated high energy efficiency
- Fossil fuel use eliminated
- Powered by renewable energy (on-site and off-site)
- Built with low-carbon materials
- Offset with nature



The above objectives will enable the precinct

- to achieve net zero by 2030
- be high performing while remaining cost efficient

2.4. District Utilities

All utilities and its required infrastructure will be planned at the precinct level and delivered under developer obligations to ensure that they are well integrated for optimal operation and management of the systems. District-scale utilities for energy, water, waste and digital services are recommended.

District Utilities provide a centralised system to the buildings and facilities within the designated district which are usually more efficient and more flexible to future improvement. It is recommended that the district utilities be managed by a third-party operator as the financial incentives will ensure that it is kept operational and maintained to continue providing the sustainability outcomes they have been designed to deliver for.

District utilities that are recommended based on best practice are as listed

- District heating and cooling thermal network (modular and variable speed)
A district heating and cooling can reach energy reductions by managing load diversity across the site to operate at optimum levels. With modular and variable speed, the system will be able to reduce energy consumption for part loads and retain high efficiency over a wide range of load requirements, and are more space efficient.
- On-site renewal energy generation
On-site renewable energy generation is to be maximised. Large Scale generation certificates from the onsite energy generation are to be voluntarily retired to prevent double counting.
- Embedded microgrid electricity network with energy storage
An embedded microgrid will allow for greater reliability and optimisation. It will also allow for on-site renewal energy produced to be shared within the

- | | |
|---|--|
| <ul style="list-style-type: none"> • Integrated water management | <p>precinct and contribute meaningfully to on-demand and smart grid operations. With the integration of energy storage, peak demand loads in the district can be better managed.</p> <p>A water management system that integrates a district scale water harvesting system and water recycling plant into the water sensitive urban design for the district to provide non-potable water for the whole district. All buildings are to be equipped with the third purple pipe to receive recycled water for all non-potable water uses.</p> |
| <ul style="list-style-type: none"> • District level waste separation and food waste processing | <p>Waste minimisation through the processing of food waste onsite is recommended through solutions such as commercial food waste dehydrator units or bioconversion composting units. Feasibility studies including the use of the final product onsite would need to be carried out to form a detail food waste management plan.</p> |
| <ul style="list-style-type: none"> • Smart District (IoT) | <p>Setting up of a smart district – digital plan with cloud-based IoT applications to receive, analyse, and manage data in real-time to help make better decisions that improve quality of life. This can help to improve energy distribution, streamline trash collection, decrease traffic congestion, and improve air quality.</p> |
| <ul style="list-style-type: none"> • Sustainability services | <p>Carbon and biodiversity offsetting, Green Power procurement, measurement, analytics, and performance, and supply chain support.</p> |

2.4.1. Strategic planning context

Greater Sydney Region Plan: A Metropolis of Three Cities

- **Objective 3**
Infrastructure adapts to meet future needs
- **Strategy 3.1**
Consider the adaptability of infrastructure and its potential shared use when preparing infrastructure strategies and plans.
- **Objective 34**
Energy and water flows are captured, used and re-used
- **Strategy 34.1**
Support precinct-based initiatives to increase renewable energy generation and energy and water efficiency especially in Planned Precincts and Growth Areas, Collaboration Areas and State Significant Precincts.

Eastern City District Plan

Potential pathways towards net-zero emissions in the District include:

- new public transport infrastructure, electric vehicles and autonomous vehicles to connect residents to their nearest strategic centre or metropolitan centre within 30 minutes
- a range of transport demand management initiatives including working from home, improved walking and cycling, or improved access to car sharing, carpooling and on-demand transport
- new building standards and retrofits so that energy, water and waste systems operate as efficiently as possible in residential and non-residential buildings
- **building and precinct-scale renewables**
- waste diversion from landfill.

Camperdown–Ultimo Place Strategy

Anticipated growth will require investment in energy, water, waste and transport infrastructure and new buildings. This creates an opportunity to invest in low-carbon high efficiency measures at the precinct scale, particularly as infrastructure is renewed

or replaced. New buildings should be designed as smart green assets and appropriately sized and **shared utility infrastructure** installed to lower greenhouse gas emissions from the Collaboration Area.

Precinct-wide energy, water and waste efficiency solutions can replace inefficient infrastructure to enable new utility models and technologies.

2.4.2. Key outcomes

Key objectives for District utilities at Bays West are:

- To provide the community with high performing and reliable but cost-effective utilities
- Allow effective management and optimise systems and performance within the precinct

3. Recommendations

3.1. Performance targets

Development type	Rating tool	Rating type	Target rating
Public domain	Green Star	Communities	6 Star
All buildings	Green Star	Buildings	6 Star
Commercial buildings	NABERS	Energy	5.5 Star
		Water	5 Star
	WELL	Core & Shell	Silver
Residential buildings	Livable Housing Design		Silver (30% of units)
			Gold (10% of units)

3.2. Development Control Provisions (Design Guide)

3.2.1. Climate Risk & Resilience

- Development must deliver a climate positive precinct, including:
 - All electric built environment;
 - Zero fossil fuel use for regular building operations;
- Design to Representative Concentration Pathway (RCP) 8.5 in 2090 climate scenarios;
- Design all residential buildings, including student accommodation, is to achieve thermal safety outcomes aligned with Chartered Institution of Building Services Engineers (CIBSE) Technical Memorandum (TM) 59 Design methodology for the assessment of overheating risk in homes (2017);
- Manage and allow sea level rise through design and incorporate it productively into a slowly changing landscape;
- Development must manage overland flooding by requiring:
 - All critical equipment and services to be located above Probable Maximum Flood (PMF) levels;
 - All structures below PMF must be designed to survive flooding;
- Where possible, provide space for centralised precinct thermal and power utilities;
- Include space within buildings for future energy storage (electrical and/or thermal batteries);
- Community facilities are to be designed to serve as gathering places during emergencies and interruptions in services; and
- Balance evapo-transpirative planting for local passive cooling and drought-tolerant plant species.

3.2.2. Biodiversity & Natural Systems

- Development of the precinct must ensure integration of a large public park with a strong Connection with Country framework, regional playground, green spaces, passive open space environmental habitat and amenities.
- Individual developments must demonstrate how they are contributing to an urban tree canopy that shades 30% of the total site, primarily comprised of local and endemic species – maximising habitat whilst providing amenity and shelter for the community.
- Design of private and public domain must ensure that 100% surface water runoff is filtered through landscape treatment before discharging to waterways. Captured water is to be used in terrestrial features, such as wetlands that also provides a freshwater environment for microbat foraging.
- Development must create interpreted aquatic habitats to include bioretention / water quality improvements for overland flow from the land to marine environments.
- Development adjoining the water must allow for an interpreted shoreline and using plants consistent with estuarine saltmarsh which could allow for tidal movements onto the land and considers future climate / sea level rise.

6. Protect existing and create new urban habitat for terrestrial and aquatic species at multiple scales, including ecological pockets
7. Landscaping must consist of durable, endemic, native species that also provide opportunities to share knowledge of Country and reflect communities that may have existing prior to clearing.
8. Where appropriate, development is to:
 - a. Use stormwater to provide a freshwater environment for microbat foraging
 - b. Create interpreted aquatic habitats to include bioretention / water quality improvements for overland flow from the land to marine environments
 - c. Use native species in landscaping to reflect communities that may have existed prior to clearing
9. Where appropriate, development is to enable augmented fauna habitats such as:
 - a. Use of microbat chambers where existing habitats are affected;
 - b. design and deployment of 'seahorse hotels' in the marine environment through collaboration with Aboriginal artists that also enable reuse of existing urban materials; and
 - c. design and use of marine tiles to encourage marine plants and macroalgae to colonise and grow along the edge of the sub-tidal marine environment.

3.2.3. Transport & Mobility

1. Active transport friendly - Prioritising and enabling active mobility to the site (pedestrian and bicycle);
2. All building entrances accessible by pedestrian routes and bicycle paths;
3. Micromobility station areas located in close proximity to building entrances with passive surveillance and charging capacity;
4. Continuous shade coverage along streets, and pedestrian and bicycle routes where possible (natural or constructed);
5. Slow streets with traffic calming;
6. Public transport integration - Significantly reduce private vehicle use by supporting non-vehicular transport modes and multimodal passenger transport;
7. Integration of ride share pick-up / drop-off (PUDO) bays;
8. Integration of car share parking for Mobility-as-a-Service (MaaS) operators (e.g. GoGet, Lime);
9. Provision of a centralised servicing area for last-mile connectivity/servicing/deliveries;
10. Integration of digital infrastructure/ platform partnerships to enable advanced engines for multimodal trip planners;
11. Supporting emerging transitions in the freight network, including the electrification of logistics systems;
12. Supporting future mobility transitions, including vehicle sharing, ride-sharing and connected and autonomous vehicle interfaces;
13. Full electric mobility vehicle support - Provision for the electrification of road mobility options through infrastructure;
14. Parking to have charging capacity in line with best practice expectations (including number of spaces, charging speed, and monitoring capacity);
15. Infrastructure enabling 100% parking to have EV charging capacity in future;
16. Infrastructure to facilitate future EV to grid charging;
17. Other (scooters, bikes, etc.).

3.2.4. Water Resources & Quality

1. No potable water for non-potable uses;
2. Identify mechanisms for waste-water treatment and re-use aligned with best practice utilities and implement solutions that can be sustainably operated over the full life of the precinct.
3. Capture rainwater and reuse from all non-trafficable roof surfaces;
4. To reduce total suspended solids and other stormwater pollutants in stormwater leaving site significantly beyond best practice guidelines;
5. Use landscape areas to improve quality of stormwater before infiltration or transportation off site (into Harbour);
6. Create interpreted aquatic habitats that work with landscape areas to improve quality of stormwater before infiltration or transportation off site (into Harbour);
7. Universally accessible drinking water fountains, with water bottle filling, are available in all public spaces;
8. Protect space for water recycling plant sufficient to serve Bays West;

9. Provide purple pipe non-potable water supply within all buildings to major non-potable water end uses.

3.2.5. GHG Emissions & Energy

1. All normally-operating building and precinct systems must be electrified;
2. Buildings and public realm design must achieve high levels of energy efficiency through passive design and efficient services;
3. Development must demonstrate how it has reduced embodied carbon in all construction by 30% relative to 'Business As Usual' with a stretch target of 40% using Green Star LCA methodology;
4. Development must ensure that rooftops used are for energy generation (through Photovoltaic panels) where not otherwise used for services, resident or visitor amenity, or vegetation-based habitat. Where photovoltaic panels are located, development must also explore the opportunity for vegetation to sit beneath the panels;
5. Development applications are to consider and outline where future batteries could be suitable within future development design. This could include potential adaptive reuse of former basement / parking areas.
6. Development is to consider how energy, water, or other utilities are shared between buildings or across the precinct.

3.2.6. Circular Economy, Supply Chain & Materials

1. Building forms must promote longevity by allowing easy adaptive reuse to accommodate alternative occupancies.
2. Provide spaces that facilitate sharing economy programs like GoGet cars, bicycle share services, and community tool libraries.
3. Provide ample space in buildings and public realm to facilitate collection and storage of multiple waste streams
4. Organic waste diversion or capture must be provided for all buildings and all use types
5. Development applications are to be accompanied by a Construction Management Plan demonstrating how:
 - a. recycled content is to be used in all construction in accordance with Green Star methodology or equivalent;
 - b. the majority of construction waste will be diverted from landfill to beneficial re-use (provisionally 95%, in line with Green Star benchmarks or equivalent).

3.2.7. Public Health & Community Wellbeing

1. Improving mental health through connection to sky, water and green, biophilia, safety, sense of belonging;
2. No combustion - Improving local air quality by transport electrification, large-scale urban greening and eliminating on-site combustion with particular focus on arterial road interfaces;
3. Electric vehicles;
4. Infrastructure for public transportation;
5. Shaded outdoor spaces - Improving physical activity by encouraging active mobility and recreational exercise through the provision of diverse and high-amenity public outdoor green spaces;
6. Variety of Spaces and Program - Supporting diversity and inclusion by ensuring a variety of program types spread across site (residential (incl. social and affordable), commercial, retail, community and cultural offerings);
7. Enhancing social engagement through the provision of restorative public gathering spaces;
8. Opportunities for edible landscape;
9. Improving dietary health by eliminating fast food or junk food from public F&B tenancies and providing healthy and affordable food options;
10. Power and water infrastructure in public realm to support fresh food markets and events;
11. Opportunities for lifelong learning and transfer of knowledge through the intersection of an indoor/outdoor library in line with the Connection with Country guideline;
12. Equitable access to services

3.3. More detailed studies

The areas mentioned above will require further detailed studies to understand the options available to implement the identified strategies. The detailed studies will include

- Recommended Capacity to design/plan for,
- Recommended Spatial requirements (for systems),

- Cost-benefit analysis
- Recommended Delivery strategy,
 - party responsible for the delivery/implementation
 - party responsible for the operation
 - Mechanisms to ensure that the systems/initiatives will be delivered such as its inclusion in development agreements
 - Triggers (date, GFA, etc) for staged delivery for district scale systems
 - Governance (reporting, certifications requirements etc)

Strategies should have the flexibility to evolve over time with regular reviews to ensure it continues to represent best practice and take advantage of upcoming technology to improve efficiency over time.