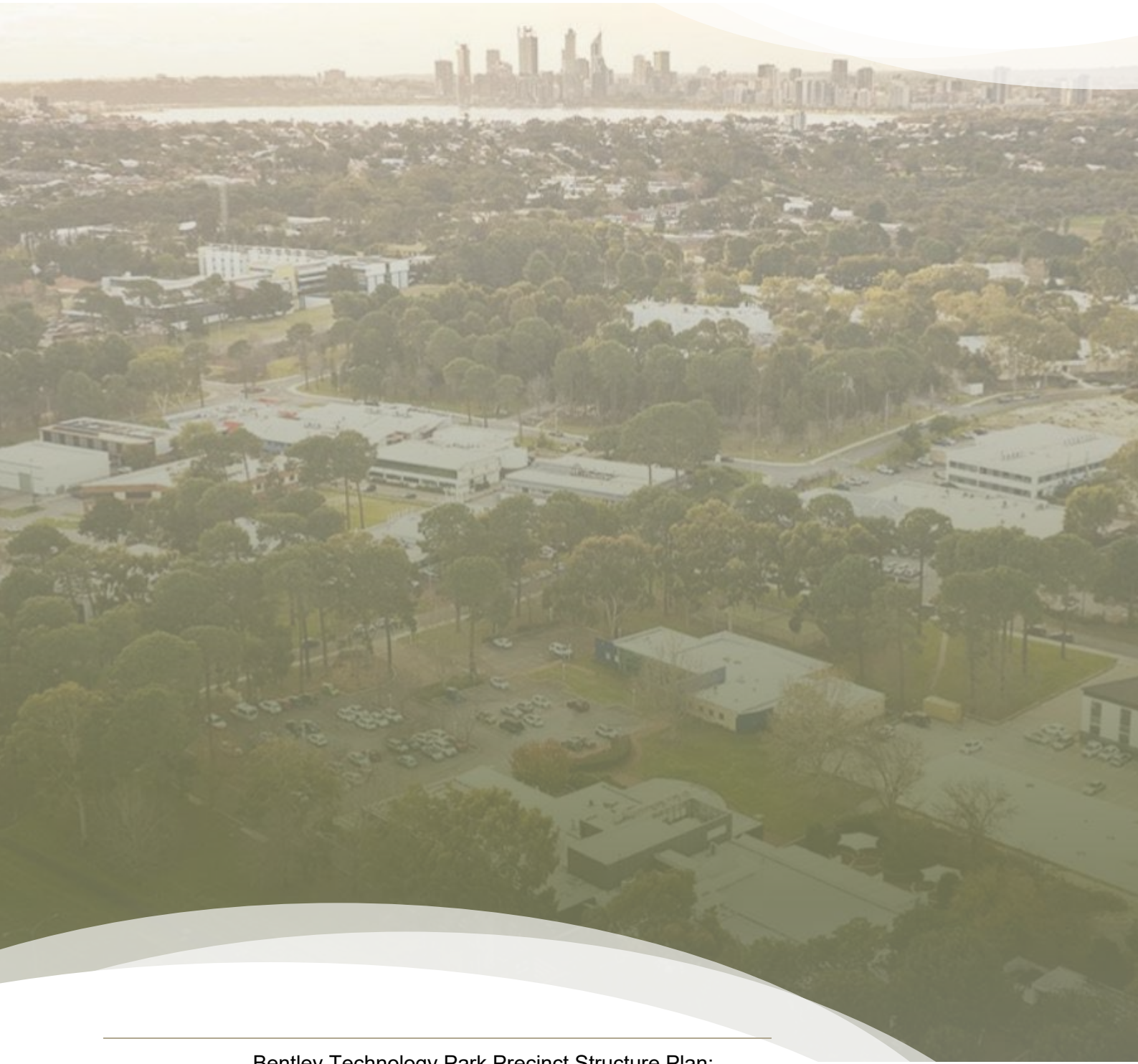
JOSH BYRNE & ASSOCIATES



Title	Bentley Technology Park Precinct Structure Plan: Sustainability Strategy
Prepared for	DevelopmentWA and TBB
Date	10/12/2025

Bentley Technology Park Precinct Structure Plan: Sustainability Strategy

Prepared by Josh Byrne & Associates

Review Process

Date	Rev. No.	Purpose	Reviewed by	Approved by
29/7/2025	Original	Draft for client review	JB	MM
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LANDSCAPE • SUSTAINABILITY • COMMUNICATIONS

ABN 20 116 221 820 **T** 08 9433 3721 **E** design@joshbyrne.com.au **W** joshbyrne.com.au

A Suite 109 Atwell Buildings 3 Cantonment Street Fremantle WA 6160 **P** PO Box 1866, Fremantle WA 6959

EXECUTIVE SUMMARY

This report provides an overarching sustainability strategy to support the Bentley Technology Park (BTP) redevelopment and Precinct Structure Plan requirements. The sustainability strategy has been informed by background policy review, site specific context and leading sustainability benchmarks, as per Green Star rating tools developed by the Green Building Council of Australia (GBCA). Sustainability guidance is provided for the whole precinct as well as for new and existing buildings. The precinct has been evaluated using the newly released Green Star Communities (GSC) v2, with a focus on climate positive pathways and responsible planning, design and construction. BTP is projected to meet minimum GSC v2 requirements, and a possible 5 Star rating (Australian Excellence), pending confirmation of initiatives. The intent is for initiatives to be further scoped and embedded as design progresses, along with identification of key stakeholders responsible for implementation. Guidance is provided to ensure new buildings are fossil fuel free, highly efficient, powered by renewables and contribute positively to urban greening and occupant health, wellbeing and experience. A priority for existing buildings will be transitioning to all-electric, with steps identified as per individual building needs.

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1. INTRODUCTION

DevelopmentWA has been tasked by the State Government to establish a vision and plan for Bentley Technology Park (BTP) to facilitate infill development that supports a contemporary innovation precinct. BTP is designated as a precinct within the Bentley-Curtin Specialised Activity Centre (BCSPAC), which is recognised as a Specialised Activity Centre under Directions 2031 and Beyond, as well as State Planning Policy 4.2: Activity Centres for Perth and Peel. The BCSPAC identified the need for more detailed planning, with BTP to be guided by a Precinct Structure Plan (PSP).

The aim for BTP is to become an internationally renowned innovation precinct that includes opportunities for investment by knowledge and innovation enterprises, as well as collaborative research and development between private entities, academic institutions and government agencies.

Sustainability is a core design principle for the BTP redevelopment, seeking to deliver and optimise positive environmental, social and economic outcomes, as well as attract businesses, researchers and start-ups. This sustainability strategy provides sustainability guidance for the proposed redevelopment of BTP and includes an evaluation of proposed design as per State Planning Policy 7.2 Precinct Design Guidelines.

Planning Requirements

Sustainability underpins all precinct design elements, however the focus of this report is to consider:

Design Element 1: Urban Ecology. Objective 1.3: To reduce the environmental and climate change impacts of the precinct development. Consideration 1.3.5: Evaluate the performance of precinct development proposals against leading Australian sustainability performance standards.

Consideration is given to achieving SPP 7.2 policy outcomes for a sustainable BTP built environment, including:

- Passive environmental design measures
- Water sensitive urban design
- Enhancement of the green network
- Harnessing opportunities for renewable energy sources and precinct-wide energy savings
- Adaptive reuse of existing structures where feasible
- Promotion of active and public transport modes.

2. BENTLEY TECHNOLOGY PARK PRECINCT OVERVIEW

Bentley Technology Park spans two local government areas, including the City of South Perth east of Kent Street and the Town of Victoria Park to the west. It is located adjacent to Curtin University, and is also bounded by residential areas, the proposed Kensington redevelopment area, and nearby Jirdarup Bushland Precinct, which includes high quality remnant Jarrah Banksia woodland.

The precinct includes mature trees and some green space amenity, however this is mostly verges and perimeter greening, rather than useable space. The road network provides sufficient access; however the precinct currently lacks walkability and mid-tier transport connections. Building stock is varied and ageing, with a limited ability to respond to future stresses that may affect operation over time.

Current land use includes anchor tenants in the pharmaceutical, data science, supercomputing, mining, and mining equipment, technology and services (METS). It also includes the Hub by DevelopmentWA, developed as a central node and shared space for events and programs.

Previous precinct development has not been guided by a clear vision, with other tenants not aligned to the core industries (Pracsys, 2025). Having a clear vision for the design of science and technology parks may lead to the emergence of innovation districts, where disparate sectors and specialisations are often combined so new ideas and technologies can develop (Katz and Wagner, 2014). The redevelopment provides an opportunity to align with the State Government economic development framework, Diversify WA, and Innovation Strategy WA, to maximise its potential as an innovation precinct. There is also the opportunity to develop and test sustainability initiatives and science within the BTP precinct and provide a place for co-creation of innovation in knowledge, products, services and infrastructure.

3. PROPOSED REDEVELOPMENT CONCEPT

Bentley Technology Park is aiming to be a successful innovation precinct, consisting of existing and new businesses, stakeholders and industry clusters. Key existing stakeholders include CSIRO, Curtin, Pawsey and NovaCina; with priority industry clusters including pharmaceutical and medical science, mining and METS, radio-astronomy, and data science. Additional facilities will support further research, development and innovation activities; as well as facilitate collaboration with anchor tenants. The precinct will be enhanced by provision of space for high quality transport options, provision of shared high amenity multi-use green spaces, enhanced pedestrian and cyclist pathways, opportunity for restaurants, cafes and shops, greater connectivity to nearby residential areas and Curtin university. Sustainable design and operation will assist in creating a vibrant urban environment.

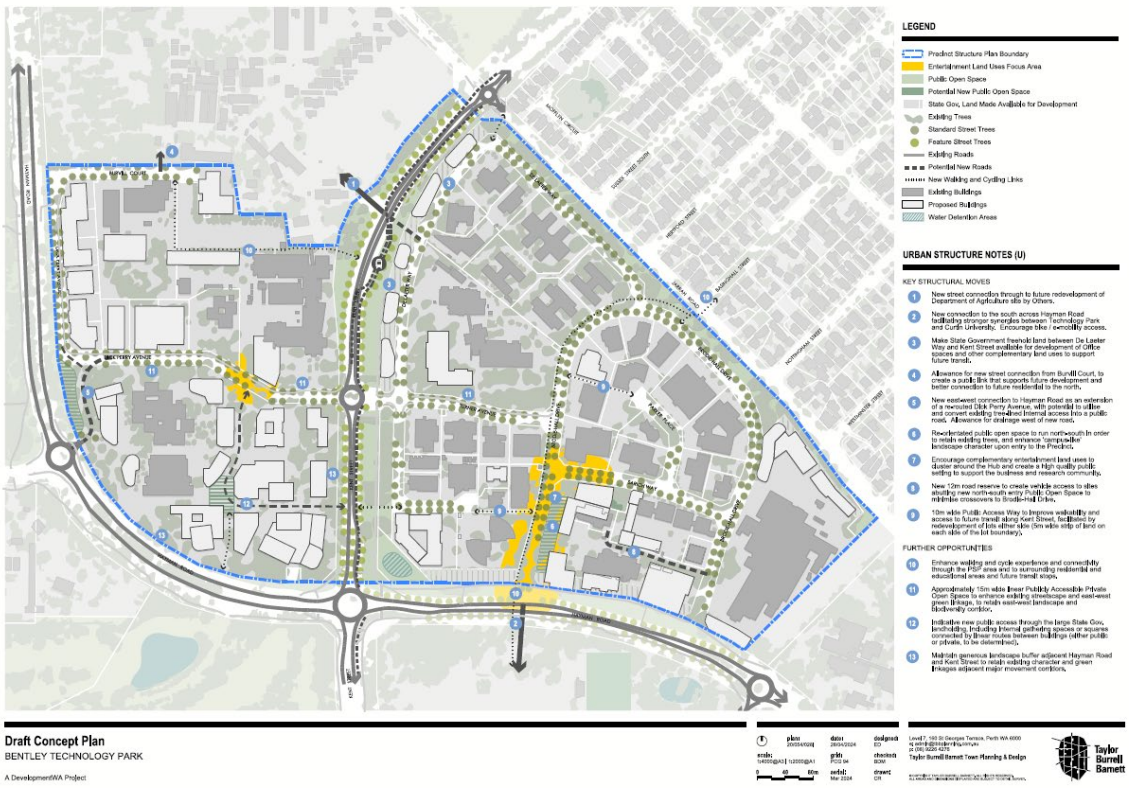

Figure 1: Draft Concept Plan for Bentley Technology Park

4. BACKGROUND REVIEW

The Sustainability Strategy is informed by background review, including:

- Site context, opportunities and constraints analysis, including physical, community and governance.
- City of South Perth and Town of Victoria Park sustainability policies, strategies, guiding principles and targets applicable to BTP.
- Design intent, process and material provided by DevelopmentWA and the project consultant team, such as design options, design workshops, and initial engagement outcomes.
- WA State Government and DevelopmentWA policies and strategies guiding sustainability initiatives and responses in urban development.
- Best practice precinct scale sustainability guidance, specifically the Green Building Council Australia's (GBCA) Green Star Communities v.2 certification framework.
- Precedence from leading innovation precincts.
- Place making design characteristics for urban knowledge precincts, including anchor tenants and projects, compact development, public open space in key locations, interconnected public open space, visual vistas, human scale, pedestrian environments, engaging lower floors and character in harmony with surrounds (Pancholi, Yigitcanlar and Guaralda, 2014).

5. CONTEXT

The following section provides an overview of the guiding sustainability policy and strategic framework at a national, state and local level.

5.1. National context

At a national level, Australia is committed to achieving net zero emissions by 2050. The Climate Change Act (2022) is the legislative framework used to address climate change, set national targets and promote accountability, ambition and transparency in emissions reduction efforts. The Annual Climate Change Statement reports progress towards meeting climate goals.

In addition to net zero targets, Australia is progressing its climate resilience and adaptation, circular economy, and nature positive initiatives via the following:

- National Climate Resilience and Adaptation Strategy (2021-2025) to guide States and Territories to build resilience and enhance ability to adapt to ensure management of climate change risks. The focus is on integrating climate risks, building adaptive capacity and providing access to reliable climate information and data.
- Nature Positive Australia, which has been developed in response to the Kunming-Montreal framework (COP 15). Approaches for implementation include *Australia's Strategy for Nature 2024-2030* and *Australia's Nature Hub* (Commonwealth of Australia, 2024). In addition, the *Nature Positive Roadmap*, developed by the Green Building Council of Australia (GBCA), provides direction on protecting nature, connecting nature, using low-impact materials, renewing nature, and bringing nature and communities together (GBCA, 2025).
- Australia's Circular Economy Framework 2024 outlines Australia's commitment to a national circular economy transition, where products are designed to be reused, repaired, and recycled, minimising waste and maximising resource efficiency, aiming to double its circularity by 2035.

- Future Made in Australia: National Interest Framework 2024 which aims to maximise opportunities as Australia moves towards net zero.

5.2. State guidance and context

At a state level, there is a commitment to achieve net zero by 2050. The WA Climate Change Policy (2020) plans for WA to become a climate resilient community and have a prosperous low carbon future. There is a commitment to work with all sectors of the economy to achieve net zero greenhouse gas emissions by 2050, as well as requirements for State Government agencies to develop and implement plans to transition towards net zero emissions by 2050. Specifically related to BTP is the aim to plan, design and deliver net zero industrial estates, including technology precincts. As the state government development agency, DevelopmentWA (2023) have a Net Zero Transition Plan 2.0, aiming for net zero between 2040 and 2050.

Sectoral emissions reduction strategy for Western Australia (2023) provides pathways and priority actions for the transition to net zero. Key for BTP is low emissions electricity as vital for net zero transition, including energy efficiency and electrification. Rapid transition to battery EVs, as well as investment in active transport options is also highlighted.

'Climate Adaptation Strategy: Building WA's climate resilient future' (2023) includes actions to manage the risks of climate change. Key to BTP is a focus on urban heat island effect of Perth's future climate to inform local adaptation planning.

WA Innovation Strategy (2022) is a 10 year vision for WA as a renowned global hub of invention, investment, innovation and impact. WA has a vibrant innovation ecosystem, with the State Government committed to supporting its expansion, such as the New Industries Fund. The Western Australian Government will accelerate efforts to enable innovation hubs, precincts and shared facilities to strengthen the innovation ecosystem across the State.

The WA Waste Authority has a Waste Avoidance and Resource Recovery Strategy 2030, with a revised strategy currently under consultation. The vision is for WA to become a sustainable, low-waste, circular economy in which public health and the environment are protected from the impacts of waste. Goals and targets include a reduction of 20% in waste generation per capita by 2030; increased material recovery to 75% by 2030; and no more than 15% of waste landfilled. New proposed targets include adopting national circular economy targets; developing avoidance measures consistent with national targets; continue to deliver household and commercial FOGO; and develop a litter prevention strategy.

WA State Waste Infrastructure Plan (2024) provides key considerations for BTP including the need to consider increased waste concentration in urban centres, opportunities for businesses to promote circular economy, increased uptake of better product design and stewardship by companies, incentivised reduced waste generation for businesses. In addition, top priorities for Perth in achieving waste strategy targets should be considered, particularly e-waste resource recovery, better source separation, community recycling centres, and development of local capacity for FOGO.

The Department of Water and Environmental Regulation (DWER) provides waterwise guidance via Kep Katitjan Gabi Kaadadjan: Waterwise Perth Action Plan 3. The current urban water vision for Perth is to become a leading waterwise city by 2030 and Kep Katitjan Waterwise Perth Action Plan 3 (DWER, 2024) builds on the first and second Waterwise Perth Action Plan (WPAP) (DWER, 2019; 2022) to set the direction for this transition. DevelopmentWA are a waterwise partner agency, committed to shaping and delivering the first WPAP and Kep Katitjan.

Water Corporation provides support for achieving waterwise developments, via the Waterwise Development Program. The program encourages developers to implement waterwise principles into projects for optimal waterwise community outcomes. Waterwise Development criteria considers water efficiency, urban cooling and public amenity outcomes. Water Corporation also provide guidance on waterwise development, urban greening and alternative water sources via the following resources[1]:

* Guide to a Waterwise Development.
* Community Bore Guide.
* WA Greywater Guide.
* Guide to Waterwise Streetscapes.

5.3. LGA guidance

BTP is positioned across two local governments: City of South Perth (CoSP) and Town of Victoria Park (ToVP), therefore sustainability direction from both LGAs must be considered. A review of local policies and strategies from both LGAs was conducted to inform approaches and targets for BTP. Both LGAs prioritise sustainability as part of their strategic direction.

Town of Victoria Park

The ToVP has a strong urban forest program (Urban Forest Strategy Implementation Plan 2019-2024), with BTP identified as an opportunity for additional urban greening and tree planting. ToVP's Climate Emergency Plan (2021), with a specific priority area to support local businesses in reducing carbon emissions. ToVP also has specific waste targets as part of their Strategic Waste Management Plan (draft 2025-2030).

City of South Perth

CoSP has a focus on management of the natural environment and restoration projects to improve its natural areas, bush land and foreshore reserves. CoSP have recently endorsed an updated Urban Greening Strategy 2025-2050, with approaches to protect and enhance urban greening a priority for the City. In addition, they provide guidance on sustainable design and waste management for proposed developments (multi-dwelling).

6. SUSTAINABILITY PRINCIPLES

Sustainability principles for BTP have emerged from an opportunities and constraints analysis; contextual mapping of geology, hydrology, vegetation communities and ecological linkages; site visit; project team workshops; and current sustainability thought leadership including nature positive, climate positive, circular economy, climate resilience and data driven.

Environment

- Integrated water cycle
    - Manage water sustainably and efficiently, using fit-for-purpose sources.
    - Apply WSUD for stormwater and manage groundwater at precinct scale.

[1] https://www.watercorporation.com.au/Help-and-advice/Waterwise-business-programs/Waterwise-Council-Program/About-our-program

- Climate positive and Net Zero Precincts
    - Design for climate responsiveness and thermal comfort.
    - Eliminate fossil fuels and prioritise all-electric, highly efficient buildings and systems.
    - Generate more renewable energy than consumed and include storage and/or export control for optimised grid integration.
    - Reduce emissions and offset only as a last resort with high biodiversity value schemes.
- Materials and waste
    - Project-specific waste management from pre-construction to completion.
    - Tenant waste management, including separation, recycling, and education.
    - Use low-carbon, prefabricated and recycled materials, and prioritise materials with Environmental Product Declarations (EPDs).
    - Apply Life Cycle Analysis during design to reduce embodied carbon.
- Nature positive
    - Protect and enhance site ecology, topography, soil and water systems.
    - Reduce urban heat through cool materials, canopy cover and green corridors.
    - Use native and productive species, support biodiversity and habitat creation.

Sustainable transport and movement

- Deliver strong transport connectivity, active travel infrastructure and accessible pedestrian networks.
- Provide quality, diverse public transport options, including mid-tier transit.
- Enable smart street lighting, efficient traffic flow and shared mobility.
- Use data to continually improve transport systems.

Governance

- Clear vision to be developed and shared for BTP.
- Leadership and marketing promoting BTP as innovation hub.

Liveability

- Cultural understanding
    - Respect and promote cultural heritage through design and engagement.
- Public realm
    - Design inclusive, safe and socially active spaces.
    - Plan for resilience to climate extremes and disasters.
- Built form
    - Activate buildings to foster people-focused, community-based design.
    - Retrofit for energy efficiency and explore multifunctional rooftop solar.
    - Integrate sensitively with neighbouring residential areas.

Economic prosperity

- Support site-appropriate commercial uses and activation.

- Enable start-ups, local research and innovation.

Innovation

- Incorporate smart city systems and biophilic design for resilience.
- Trial circular economy technologies.
- Promote sustainability innovation through partnerships and experimentation.

7. SUSTAINABILITY BENCHMARKS

The chosen sustainability benchmark to guide BTP is Green Star by the Green Building Council of Australia (GBCA). Green Star is an internationally recognised rating system setting the standard for healthy, resilient, positive buildings and places. Green Star tools and supporting guidance material provide thought leadership and clear direction on how to achieve best practice outcomes. Therefore, Green Star tools, benchmarks and guidance have been selected as leading sustainability performance standards to assist with guiding the BTP precinct and buildings from design through to completion and operation. Initiatives should be considered as part of delivering a best practice sustainable precinct, despite whether a formal Green Star Communities rating is pursued. Green Star Buildings and Green Star Performance ratings also ensure buildings within the precinct are guided by net zero, circular economy and health and wellbeing outcomes.

Green Star certifications could be later progressed to assist with implementation of best practice sustainability. This would require additional costs and reporting, however there is demonstrated experience of improved compliance and performance when a certification process is in place. There is precedence of other industrial estates, business parks and innovation precincts having achieved Green Star Communities certification, with the tool able to accommodate for site specific requirements. In addition, certification would align BTP with Curtin University (a 6 Star Green Star Community) and could assist with developing collaborative partnerships in line with the vision of an emerging innovation precinct.

8. PRECINCT EVALUATION

Green Star Communities by GBCA provides an overall precinct evaluation framework to meet the requirements of State Planning Policy 7.2 Precinct Design Guidelines: Design Element 1: Urban Ecology, Consideration 1.3.5 Evaluate the performance of the precinct development proposals against leading Australian sustainability performance standards.

Green Star Communities (GSC) is a versatile rating tool designed to support diverse precinct typologies and delivery models including greenfield residential, urban infill, brownfield, business parks, campuses, airports and industrial parks. This flexibility across typologies makes it a good fit for Bentley Technology Park. The tool provides guidance on developing healthy and resilient precincts that are also positive places to work, visit and live in. Adjacent Curtin University is Green Star Communities certified, having achieved a 6 Star Green Star Communities recertification v1.1 in 2020, setting a strong sustainability precedence for the area.

GBCA released Version 2 of the GSC rating tool in early 2025, providing a new future focus standard. The GSC v2. framework has been used for a preliminary assessment. All proposed initiatives are guidance only at this stage, requiring further consideration and discussion if they are to be progressed.

Green Star Communities V.2

The rating tool is structured into eight categories:

Star rating scale

Three levels of achievement are recognised in Green Star Communities v2. The minimum requirements for each star rating are outlined below.

4 Star – Best practice. Achieved by meeting all Minimum Expectations, the Climate Positive Pathway, Nature Positive Pathway and earning at least 10 points.

5 Star – Australian Excellence. Achieved by meeting all Minimum Expectations, the Climate Positive Pathway, Nature Positive Pathway and earning at least 35 points.

6 Star – World Leadership. Achieved by meeting all Minimum Expectations, the Climate Positive Pathway, Nature Positive Pathway and earning at least 70 points.

There is a total of 100 points available within the rating tool, excluding additional points available through the leadership category.

Preliminary Assessment

The Green Star Communities submission planner scorecard was used to evaluate BTP. Preliminary review indicates that the precinct has potential to achieve a 5 Star Green Star Communities v2 certification (Australian Excellence) with minimum requirements and climate positive pathway requirements met, and 39 core points targeted (Table 1). The preliminary score does not include leadership points or points from credits not yet targeted (in grey). Minimum requirement credits and targeted core points are detailed in the table below. Further discussion will determine additional credits, where initiatives can be progressed beyond minimum requirements and whether market transformation or leadership challenges would be best to achieve additional outcomes for BTP, which could potentially increase the GSC score.

Table 1: Green Star Communities v2 for Bentley Technology Park

GSC v2 Credits	BTP requirements
Responsible: Ensures that the precinct is planned, designed and constructed to a high standard.	
1. Industry development	• **Green Star Accredited Professional:** A Green Star Accredited Professional is appointed and contributes to the submission. • **Sustainability Awareness:** The sustainability features and planned outcomes of the project are communicated to relevant stakeholders, with appropriate supporting resources.
2. Responsible construction practices	• **Environmental Management System:** Principal/Head contractor(s) have an Environmental Management System in place to manage environmental impacts on site. • **Environmental Management Plan:** Principal/Head contractor(s) have an Environmental Management Plan to cover the scope of construction activities. • **Sustainability Training:** Training on the sustainability targets of the project is provided to all Principal/Head contractors. • **Site Waste Reduction:** At least 80% of site waste from Principal/Head contractors' construction and demolition work is diverted from landfill.
3. Responsible procurement	•**Risk and Opportunity Assessment:** A risk and opportunities assessment is undertaken for key items identified in the project's supply chain. •**Responsible Procurement Plan:** A responsible procurement plan is developed to mitigate risks and implement opportunities for at least 10 items identified in the assessment. • **Hazardous Material Management:** A process is in place for the identification, removal and management of any existing hazardous materials on site as well as a process to ensure banned or highly toxic materials are not brought on site.
4. Responsible services infrastructure	• **Good Practice Products:** 10% of all services infrastructure materials and products (by cost) meet a Responsible Product Value of at least 10.
5. Responsible civil works	• **Good Practice Products:** 10% of all civil works products (by cost) meet a Responsible Product Value of at least 10.

6. Responsible public realm hardware	• **Good Practice Products:** 10% of all hardware products (by cost) meet a Responsible Product Value of at least 10.
7. Efficient waste management	• **Operational Waste Minimisation Strategy:** A strategy is developed and implemented to reduce operational waste across the precinct.
8. Sustainable buildings	• **Certified Sustainable Buildings:** A percentage of new buildings in the precinct are verified through a third-party independent sustainability certification scheme.
Healthy: Promotes initiatives that improve the physical and mental health of the community	
9. Outdoor comfort	• **Open Space Assessment:** An assessment of expected outdoor user exposure to the elements in key locations within the precinct is conducted. • **Comfort Improvement**: Strategies or interventions (natural or built) that optimise the quality and comfort of the outdoor environment in the public realm are implemented. In addition to Minimum Expectation: •**Outdoor Thermal Comfort:** The precinct is designed to provide outdoor user comfort from high heat for most of the year.
10. **Healthy communities**	• **Community Health Assessment:** An assessment is completed to identify current and future community health needs. • **Health Initiatives Implementation:** At least four initiatives are implemented to support the long-term health and wellbeing of precinct users.
11. Healthy buildings	• **Certified Healthy Buildings:** A percentage of buildings in the precinct are verified through an independent third-party rating scheme that addresses occupant health and wellbeing.
Resilient: Strengthens the community's capacity to mitigate, adapt and respond to shocks and long-term stressors	
12. Resilience readiness	• **Resilience Assessment**: A resilience assessment is conducted over the site, identifying potential shocks and stressors to the community.

13. Climate resilience	• **Min req:** Climate Change Risk and Adaptation Assessment: An assessment is undertaken to establish a risk profile for the precinct. • **Min req:** Responding to Extreme Risks: Risks identified as extreme are addressed. In addition to Credit Achievement: • **Impacts from Climate Change:** Impacts from identified climate change risks are considered as part of an overall project risk assessment. • **Responding to High Risks:** Risks identified as high are addressed.
14. Operational resilience	• **Operational Resilience Plan**: A plan is developed to ensure the precinct's infrastructure and services can respond to identified shocks and stresses effectively. • **Responding to Extreme Risks:** The precinct's infrastructure is built to ensure extreme risks of impact are minimised. • **Ongoing Management and Review:** A process is in place to ensure effective handover of the plan once the precinct is in operation.
15. Community resilience	• **Community Resilience Assessment:** Analysis is conducted on how identified shocks and stresses could impact the precinct's ability to service the community. • **Community Resilience Plan:** A plan is developed and implemented to improve community resilience.
16. Heat resilience	• **Urban Heat Mitigation**: A combination of solutions are implemented to mitigate the urban heat impacts of the development.
17. Energy resilience	•**Impact Assessment:** An assessment of the potential impact of identified shocks and stressors on energy stability and availability in the precinct is conducted. •**Renewable Energy Transition Assessment:** An assessment of the precinct's capacity to transition to 100% renewable electricity is conducted. •**Resilient System Design:** A review of the precinct energy system is conducted ensuring the energy infrastructure is designed to support current needs and adapt to future requirements. •**Grid Risk and Resilience Plan:** A plan is developed to mitigate grid-related risks, ensuring the precinct can support the grid's transition to 100% renewables and maintain functionality during blackout or brownout events.
18. Water resilience	• **Water Risk and Resilience:** Analysis is conducted to establish the precinct's exposure to drought and flooding, and based on the resilience assessment how other shocks and stresses could impact water quantity and quality.

	• **Potable Water Availability:** Initiatives (such as design responses or operation plans) are in place to improve resilience to a decline in potable water availability.
Positive: Provides a pathway for precincts to minimise carbon emissions from materials and energy consumption	
19. Fully electric	• **Fossil Fuel Free Buildings and Infrastructure**: All new buildings and infrastructure are fossil fuel free. • **Zero Carbon Action Plan**: Existing buildings and infrastructure transition to fossil fuel free between 2035 and 2040. Note: required as part of climate positive pathway.
20. Powered by renewables	• **Precinct Renewable Energy**: 100% of the energy used in buildings and infrastructure operated by the precinct developer is from renewable sources. Note: required as part of climate positive pathway.
21. Efficient infrastructure	• **Energy Efficient Infrastructure Design**: All new lighting is designed for LED sources and new data, water, sewer, and stormwater infrastructure is 20% more efficient than a typical precinct. • **Existing Infrastructure Pla**n: Existing infrastructure systems are energy efficient. Note: required as part of climate positive pathway.
22. Upfront carbon reduction	• **Reducing Upfront Carbon** Emissions: The precinct's upfront carbon emissions are at least 10% less than those of a reference precinct. Note: required as part of climate positive pathway and upfront carbon reduction additional credit criteria must be achieved as of 2027 onwards.
23. Upfront carbon compensation	• **Remaining Upfront Carbon Emissions:** Remaining emissions from upfront carbon emissions are measured and compensated for with nature based solutions.
24. Life cycle impacts	• **Life Cycle Assessment:** The project demonstrates a 15% reduction in life cycle impacts when compared to standard practice.
25. Positive buildings	• **Efficient Buildings:** Community and display buildings demonstrate an improvement on energy efficiency and have lower upfront carbon.

	• **Design Guidelines**: Guidelines addressing cool roofs, water and energy efficiency apply to the design of all buildings developed within the precinct. Note: required as part of climate positive pathway.
Places: Supports the creation of accessible, safe, and vibrant places that respect connections to Country.	
26. Density and amenity	• **Place Analysis:** An analysis is conducted to understand and define the local character of the precinct and its context. • **Density Planning:** Proposed densities are supported by adequate existing or planned infrastructure and amenities. • **Urban Design Principles:** Principles are developed to ensure context-sensitive, robust urban design.
27. Safe places	• Min req: **Safe Design Guidelines**: Safe design guidelines are developed to apply to the design of public spaces in the precinct. • Min req**: Safe Public Space Design Response:** Public spaces are designed to align with the guidelines. In addition to Minimum Expectation: • **Co-design for Safety**: A co-design process is undertaken to directly inform the design of public spaces.
28. Design with Country	• **Co-design with First Nations Peoples**: A co-design process with First Nations Peoples is integrated into the design of the precinct. • **Cultural and Intellectual Property Protections**: A Cultural Knowledge Protection Plan is developed for the project.
29 Streets for people	• **Street Hierarchy and Use:** The street hierarchy and uses are established to prioritise pedestrian users. • **Streetscape Design:** The streetscape design supports a range of activities to enhance the pedestrian user experience.
30. Active transport	• **Min req: Active Transport Network:** A network of connected, direct and comfortable walking and cycling routes between key destinations throughout the precinct is provided. • **Min req: Bicycle Facilities:** Public bicycle parking facilities are provided in key locations. In addition to Minimum Expectation: • **Enhanced Active Transport Network:** An enhanced network of connected, direct and comfortable walking and cycling routes between key destinations throughout the precinct is provided. • **Connection Beyond the Precinct:** Connections between adjacent precincts/neighbourhoods is provided.

31. Public transport	• Min req: **Transport Plan:** A transport plan is prepared by a qualified professional. • Min req: **Transport Solutions**: Transport services are available to precinct users. In addition to Minimum Expectation: • **Transport Access:** 70% of habitable buildings are located within walking distance of public transport.
32. Low emissions transport	• **Electric Vehicle Infrastructure:** The precinct provides infrastructure to support electric vehicles. • **Low-Emission Transport**: Low-emission transport solutions are provided.
People: Embraces the diversity of people, experiences and perspectives that contribute to the community.	
33. First Nations inclusion	• **Cultural Capability**: Key project personnel undertake training to ensure the design process is grounded in respect and understanding of local cultural protocols and Traditional Knowledge. • **Site Analysis:** An analysis of the project's historical and cultural contexts is conducted.
34. Design for equity	• **Inclusive Design Guidelines:** Inclusive design guidelines are developed to apply to the design of public spaces within the precinct. • **Inclusive Public Space Design Response:** Public spaces are designed to align with the guidelines.
35. Inclusive site practices	• **Facilities and Equipment**: Gender inclusive facilities and protective equipment are provided onsite. • **Policies and Training**: Onsite policies and training are implemented to increase awareness and reduce instances of discrimination, racism, and bullying. • **Physical and Mental Health Programs:** Programs are implemented to reduce key physical and mental health impacts to workers and contractors onsite.
36. Procurement and workforce inclusion	• **Social Procurement Plan:** A plan is developed and implemented to generate employment opportunities for disadvantaged or under-represented groups in the development and construction of the precinct. • **Initiatives**: Opportunities are provided to facilitate workforce participation of disadvantaged or under-represented groups.
37. Economic inclusion	•**Economic Inclusion Program:** Programs are developed and implemented to provide underrepresented groups, individuals and diverse enterprises opportunities for economic participation.

38. Affordable housing	•**Affordable Housing Supply:** A percentage of total residential dwellings are made up of affordable housing managed by a recognised provider.
Nature: Safeguards ecosystems by protecting, restoring and enhancing nature.	
39. Sensitive site protection	For all projects: • **Light Pollution:** Light pollution from the precinct is minimised. • **Sensitive Sites and Species Assessment:** An assessment is conducted to identify sensitive sites or sensitive species within or adjacent to the precinct. • **Ongoing Monitoring and Management**: An ongoing monitoring process is established to regularly review and identify potential significant impacts to sensitive sites or sensitive species.
40. Impacts to nature	• **Ecological Assessment and Biodiversity Planning**: An assessment is conducted to evaluate and inform strategies to protect and retain biodiversity and ecological values of the site. • **Biodiversity and Ecosystem Management Strategies:** Strategies are implemented to protect and manage fauna and ecosystems during development.
41. Integrated water management	• **Design for Integrated Water Management**: A multidisciplinary design process is in place for integrated water management approach when delivering the precinct. • **Operational Plan**: An operational plan is developed to manage the water management systems onsite.
42. Biodiversity enhancement	• **Baseline Biodiversity:** The site ensures an amount of biodiverse area. – The precinct demonstrates a 10% biodiversity net gain over the site prior to development.
43. Design for wildlife	• **Wildlife Enhancement Plan:** A plan is developed to establish protection and enhancement activities for native wildlife identified within the precinct. • **Implementation and Reporting:** Initiatives are in place to protect and enhance native wildlife habitat and local populations.

44. Nature connectivity	• **Wildlife Assessment**: A qualified ecologist identifies and prioritises species to be supported by connectivity measures. • **Habitat Connectivity**: The precinct facilitates habitat connectivity through the site, and to adjacent areas for identified species.
45. Nature Stewardship	• **Protection and Restoration Activities:** The precinct owner, as part of the project's development, and beyond legislated/mandated requirements, undertakes activities that protect and restore biodiversity at scale.
Leadership: Recognises projects that set a strategic direction, build a vision for industry, or enhance the industry's capacity to innovate.	
Market transformation	**TBC**
Leadership challenges	**TBC**

9. GUIDANCE FOR NEW BUILDINGS

New buildings will be fossil fuel free, highly efficient, powered by renewables and contribute positively to urban greening and occupant health, wellbeing and experience.

Green Star Buildings is a rating tool developed to rate the design and construction of any new building, as well as major refurbishments. It provides a holistic framework to guide best practice and achieve sustainability performance for new buildings constructed at BTP. Proponents may wish to achieve a formal Green Star Buildings certification, with recognition ranging from 4 Star – Best Practice, 5 Star Australian Excellence and 6 Star World Leadership.

Green Star Buildings categories align with the Green Star Communities v2 categories and aim to address key issues such as climate change, resource efficiency, biodiversity and health and wellbeing: Responsible; Healthy; Resilient; Positive; Places; People; Nature; Leadership. Criteria respond to global commitments such as the Paris Agreement and United Nations Sustainable Development Goals, as well as net zero carbon commitments for operational and embodied carbon emissions, via the Climate Positive Pathway.

Green Star Buildings have a set of minimum expectations that must be achieved to achieve a Green Star Rating. These minimum expectations, as well as Climate Positive Pathway requirements are recommended for new buildings in BTP and detailed in Table 2.

Table 2: Sustainability guidance for new buildings

Category	Best Practice Benchmark	Reference
Responsible: Recognises activities that ensure the building is designed, procured, built, and handed over in a responsible manner.		
Responsible construction	The site must have an environmental management plan. The builder must have an environmental management system (large builders will need to be ISO14001 accredited). 80% of construction and demolition waste must be recycled. Sustainability training is provided to construction workers.	Green Star Buildings (minimum expectation)
Verification and handover	The building must be commissioned and tuned. Appropriate metering must be present to ensure optimum ongoing management, and environmental performance targets sets to guide energy, water and indoor air quality. Operational and maintenance information developed and accessible.	Green Star Buildings (minimum expectation)
Responsible resource management	The building must have appropriate spaces for waste management and an appropriately sized loading dock.	Green Star Buildings (minimum expectation)
Healthy: Promotes actions and solutions that improve the physical and mental health of occupants.		
Clean air	The ventilation system must have appropriate filtration. Point source pollutants must be exhausted directly outside (printers, kitchens). The building must be provided with at an adequate amount of outside air.	Green Star Buildings (minimum expectation)
Light quality	Glare must be managed. Light fittings must be of good quality. Lighting levels must be appropriate. A daylight strategy must be developed.	Green Star Buildings (minimum expectation)
Acoustic comfort	Internal noise levels from services and the outside are limited through an acoustic comfort strategy.	Green Star Buildings (minimum expectation)

Exposure to toxins	All the paints, adhesives, sealants, and carpets must have low levels of Volatile Organic Compounds. Engineered wood must be low formaldehyde. There must be no lead, asbestos, and PCBs in the building.	Green Star Buildings (minimum expectation)
Resilient: Encourages solutions that address the capacity of the building to bounce back from short-term shocks and long-term stresses.		
Climate Change Resilience	The project has done a pre-screening assessment to identify climate-related risks facing the building.	Green Star Buildings (minimum expectation)
Positive: Encourages a positive contribution to key environmental issues of carbon, water, and the impact of materials.		
Upfront carbon emissions	The building has 10% less upfront carbon emissions compared to a standard building from materials.	Green Star Buildings (minimum expectation)
Energy use	The building has at least a 10% lower energy consumption than a reference project. NABERS Star Rating	Green Star Buildings (minimum expectation)
Energy source	The building provides a Zero Carbon Action Plan.	Green Star Buildings (minimum expectation)
Water use	The building has at least a 10% or 15% reduction in potable water usage when compared to a reference building (depending on building class) or has installed water efficient fixtures and appliances.	Green Star Buildings (minimum expectation)
Places: Supports the creation of safe, enjoyable, integrated, and comfortable places.		
Movement and place	There are showers, lockers, and change rooms in the building.	Green Star Buildings (minimum expectation)
People: Encourages solutions that address the social health of the community.		

Inclusive construction practices	There are provisions for providing gender appropriate facilities and personal protective equipment.	Green Star Buildings (minimum expectation)
Nature: Encourages active connections between people and nature and rewards creating biodiverse green spaces in cities.		
Impacts to nature	Ecologically sensitive sites are protected.	Green Star Buildings (minimum expectation)
Leadership: Recognises projects that set a strategic direction, build a vision for industry, or enhance the industry's capacity to innovate.		

10. GUIDANCE FOR EXISTING BUILDINGS

The variety of existing building types, uses and ages suggests that some buildings may be nearing the end of usable life, and are likely to be redeveloped in the near future, as opposed to others that have a longer usable life and are worth renovating or retrofitting. Further investigation is required to understand the best practice sustainability standard that would be applicable for an individual building. Despite this, some preliminary guidance is provided below that will be relevant for almost all existing buildings.

Electrification of existing buildings is a priority. GBCA (2022) have produced 'A practical guide to electrification for existing buildings', which provides a step by step process to assist with retrofitting existing buildings to become all-electric and ensure they are future proofed for a decarbonised world. A first step is developing a zero-carbon action plan that includes target dates to be fossil fuel free, a review of fossil fuel consumption, identification of who is responsible for actions, feasibility assessment, delivery of actions and continuous improvement.

Actions for the transition to all-electric may include:

- Engaging with Western Power to assess capacity and upgrades.
- Installation of smart meters and sub-metering.
- Switching from gas to electric HVAC and hot water systems.
- Integration of on-site renewables.

Green Star Performance v2 provides a framework to assess current overall sustainability performance, as well as create benchmarks and pathways to deliver healthy, resilient and positive places for people and nature. Green Star Performance categories align with Green Star Communities and Green Star Buildings. Level of recognition include: 4 Star Best Practice, 5 Star Australian Excellence and 6 Star World Leadership.

Expectations for a 4 Star best practice rating align with Green Star Buildings minimum expectations, with a focus on reducing energy, water and waste. Categories have been included in Table 3, as well as other best practice guidance. Higher star ratings in Green Star Performance (5 or 6 Star) require additional requirements to be met such as engaging with Indigenous Australians, addressing biodiversity, reducing waste, including transparent recycling, working with tenants to reduce fit-out waste, providing amenity for activities and reducing impacts to nature.

Another key consideration is building end of life and cost/benefit of retrofitting or demolition/new build. This presents opportunities for adaptive reuse and application of circular economy principles for material recovery and reuse.

Table 3: Sustainability guidance for existing buildings

Category	BAU	Best Practice Benchmark	Reference
Responsible: Recognises activities that ensure the building is managed in a responsible manner.			
Responsible operations	Building operation only.	Management systems include environmental performance targets.	Green Star Performance
Ongoing verification	No verification.	Metering and monitoring systems in place. Outcomes evaluated and used to improve performance.	Green Star Performance
Responsible resource management	Often no source separation in commercial and industrial waste management.	Responsible resource management plan and actions for waste reduction, diversion from landfill. Documentation/records of waste.	Green Star Performance
Healthy: Promotes actions and solutions that improve the physical and mental health of occupants.			
Clear air	Ventilation.	NABERS Indoor Environment: 4 Star High Performance	NABERS Indoor Environment https://www.nabers.gov.au/ratings/our-ratings/nabers-indoor-environment
Resilient: Encourages solutions that address the capacity of the building to bounce back from short-term shocks and long term stresses.			
Climate change resilience	Not considered.	Asset resilience to projected climate change impacts and associated risks.	Green Star Performance

Positive: Encourages a positive contribution to key environmental issues of carbon, water, and the impacts of materials.			
Upfront carbon	Not addressed.	Upfront carbon emissions calculated.	Green Star Performance
Energy use	No NABERS or outdated minimum NCC requirements as per building class.	Green Star encourages buildings to achieve higher levels than mandated NCC. Best practice will need to be determined for each building and its intended use, however some indicative guidance includes: Class 2 and 3: NCC minimum is 4 Star NABERS Energy. Class 5: NCC minimum 5 Star NABERS Energy. Class 6: NCC minimum 4.5 Star NABERS Energy. Consider space heating, hot water heating, cooking, electric vehicles and other systems.	NCC 2022 Volume One Building Code of Australia Class 2 – 9 buildings. NABERS Energy https://www.nabers.gov.au/ratings/our-ratings/nabers-energy
Energy source	Mixed legacy system: electricity and gas, older HVAC and hot water systems	All-electric systems, highly efficient.	GBCA (2022) A practical guide to electrification: existing buildings
Waste reduction	Waste avoidance, separation, reuse and recycling.	NABERS Waste Platform NABERS Waste Verification NABERS Waste Rating > 4 stars (high performance)	NABERS Waste https://www.nabers.gov.au/ratings/our-ratings/nabers-waste
Water use	Standard plumbing, minimal efficiency (depending on building).	NABERS Water > 4.5 Water-efficient fixtures and fittings, smart metering, leak detection, smart irrigation systems, alternate water sources/reuse.	NABERS Water https://www.nabers.gov.au/ratings/our-ratings/nabers-water Water Corporation Waterwise Business

			Program https://www.watercorporation.com.au/Help-and-advice/Waterwise-business-programs/Waterwise-Building-Program/How-to-become-a-Waterwise-Building
Leadership: Recognises projects that set a strategic direction, build a vision for industry, or enhance the industry's capacity to innovate.			
Carbon neutral	No certification or offsets.	Certification via Climate Active for buildings with NABERS Energy ratings of 4 stars and above.	Climate Active https://www.climateactive.org.au/

11. RECOMMENDATIONS

BTP must demonstrate sustainability leadership if it is to become a successful innovation precinct. This includes consideration of regenerative design, climate positive and net zero approaches at scale, creating healthy and equitable places, using nature positive and biodiversity sensitive urban design, and prioritising the circular economy and adaptive reuse. It is recommended that sustainability initiatives are progressed for the whole precinct, as well as new and existing buildings, drawing on best practice frameworks and the identified requirements in this report. Precinct planning must require all buildings (new and existing) to demonstrate commitment to improved operational performance.

New Buildings

New buildings in BTP should lead by example in environmental performance, climate resilience, and occupant wellbeing. New buildings should be encouraged to achieve a minimum 5 Star Green Star Buildings certification. If any Green Star Building rating is to be progressed then the minimum requirements must be included for all new buildings.

Existing Buildings

Existing landowners could be encouraged to achieve Green Star Performance certification. In addition, existing buildings should be individually assessed and a transition plan for electrification developed. If formal certification is not progressed, then existing buildings must demonstrate commitment to improved operational performance through NABERS Water, Waste, Energy, Embodied Carbon and Indoor Environment ratings. Incentives should be considered to support current building owners and tenants with sustainability upgrades and electrification transition.

12. REFERENCES

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