

Batemans Bay Community Health

Batemans Bay Community Health

Sustainability Strategy – Part 4 Developed Design

To Support the Batemans Bay Community Health Development



27th August 24

Report prepared for Health Infrastructure NSW
by **Climatewise Design** ABN: 69 240 776 166



Report Summary

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01	Issued for Part 4 Developed Design record	28/8/24	
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Project	
Project Name:	Batemans Bay Community Health (BBCH)
Building Owner	Health Infrastructure NSW / Southern NSW Local Health District (SNSWLHD)
Head Contractor:	TBC
Client	Health Infrastructure NSW
Sustainability Certifications Required	
<ul style="list-style-type: none"> • HI NSW DGN 058: NCC 2019 Section J +10%, and • 60 points under ESD Framework (DGN 058 Appendix C). Rev C. 	

Climatewise Design

ABN 69 240 776 166 (The KMH Family Trust t/a Climatewise Design)

52C Palmer St., Cammeray (Cameraygal land) NSW 2062

0404 025 747 | digbyhall@climatewisedesign.com | www.digbyhall.com

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1. Executive Summary

This report describes the sustainability strategy for the Batemans Bay Community Health (BBCH) project. The strategy has been developed by Climatewise Design to support the development of design initiatives during Part 5 of the program.

Initiatives in this report focus on the capital works scope for the project. There are a range of additional initiatives and opportunities that lie outside this boundary which might be delivered by the operator, and where relevant to the capital works these have also been referenced within.

The sustainability objectives are summarised in the diagram below.

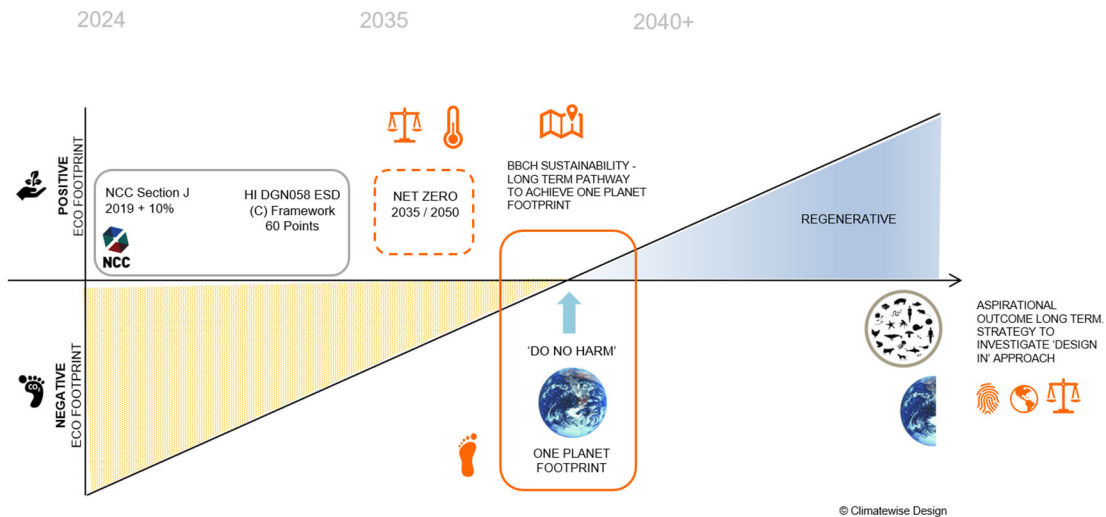


Figure 1 Sustainability Masterplan Objectives

The following sustainability themes are recommended to provide a framework through which these sustainability objectives might be achieved:

1. **Net Zero 2035** – working towards the NSW Government Net Zero targets
2. **Circular Materials** – addressing supply chain & procurement, waste reduction, and Net Zero
3. **Green Infrastructure** – enlisting and embedding Nature to support healing and mitigate climate risks
4. **Water Resilience** – maximising water efficiency to reduce costs and support vibrant landscape

A suite of detailed sustainability initiatives are currently being developed which, when combined, position the BBCH to be able to achieve these objectives and themes over time. These are each described in Section 6-15 of this report.

Sitting underneath the *BBCH Sustainability 2035 Strategy* is the HI DGN-058 Environmentally Sustainable Design framework (Rev C) which is a required reporting deliverable. At the conclusion of Part 4 the project has 29 points confirmed (included in scope & commitments) and 43 points TBC.

For commentary on the cost and risk of each initiative refer to the **BBCH ESD Framework** (Appendix A) which functions as the working document for the initiatives described in this document.

2. Sustainability Alignment

This Sustainability Strategy is built on a specific definition of ‘sustainability’ and related terminology. It is important that all stakeholders have an equivalent understanding of the terminology used. This section of the report provides the key definitions.

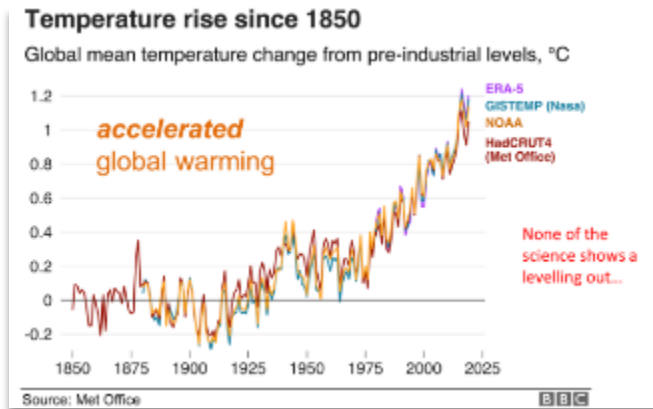


Figure 2 Met Office, BBC. Used in AHCR Sustainability Workshop #1

1.1. Global Warming

Global warming directly correlates with the amount of carbon dioxide (and its equivalents, expressed as CO₂-e) in our atmosphere.

CO₂ is highly effective at trapping the Sun’s energy in our biosphere. The more CO₂ there is, the more of the Sun’s energy is trapped in our atmosphere and oceans.

As the amount of energy in our biosphere increases the natural weather events that occur will also have more energy, including winds and storms, hurricanes, hot days, and the amount of rain that falls at one time.

The term global warming is used interchangeably with several other variations, each being favoured differently by countries, knowledge communities, business, and the media. Examples include global warming, global heating, the Climate Emergency, and climate change.

For the purposes of this study we will continue by adopting the term ‘climate change’ because this also expresses the consequences of global warming.

1.2. Ecological Footprint

Our global scientific community unanimously agree (over 97% of climate change scientists agree¹) that human activity is accelerating the natural phenomenon of the greenhouse effect, i.e. the mechanism whereby CO₂ traps the Sun’s energy in our atmosphere.

The way in which we burn fossil fuels for energy, extract and process raw materials, manufacture goods, construct buildings, grow food, make clothes and equipment etc. all emit CO₂ in some form, to varying degrees.



Figure 3 Eco-Footprint: Climatewise Design, AHCR Sustainability Workshop #1

¹ Scientific Consensus: Earth’s Climate is Warming, in Global Climate Change, Vital Signs of the Planet, NASA. <https://climate.nasa.gov/scientific-consensus/>

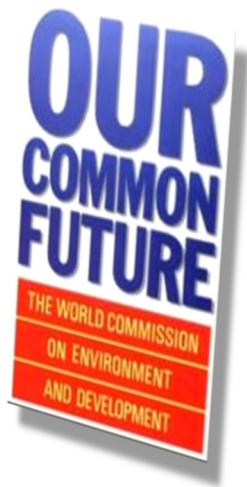


Figure 4 Our Common Future coined the term 'Sustainable Development' in 1987.

1.3. ESD

In 1987 the Brundtland Commission released *Our Common Future* which coined what has become the most often-quoted definition of 'sustainable development' as development that

“...meets the needs of the present without compromising the ability of future generations to meet their own needs”².

In Australia the Brundtland definition has been adopted by the private sector as the basis of Ecologically Sustainable Development or 'ESD'. Since 1987 the use of the term 'ESD' in Australia has evolved to mean anything from minimum compliance with construction codes, to building physics modelling, to development that is aiming for a sustainable outcome.

The term ESD remains un-qualified, un-defined and un-regulated in the Australian property sector and will not be referred to in this report unless specifically referencing the ESD Framework.

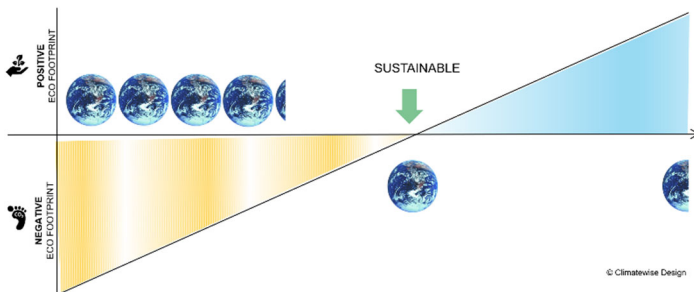


Figure 5 Sustainable is defined in this report as having achieved a one planet footprint.

1.4. Sustainable

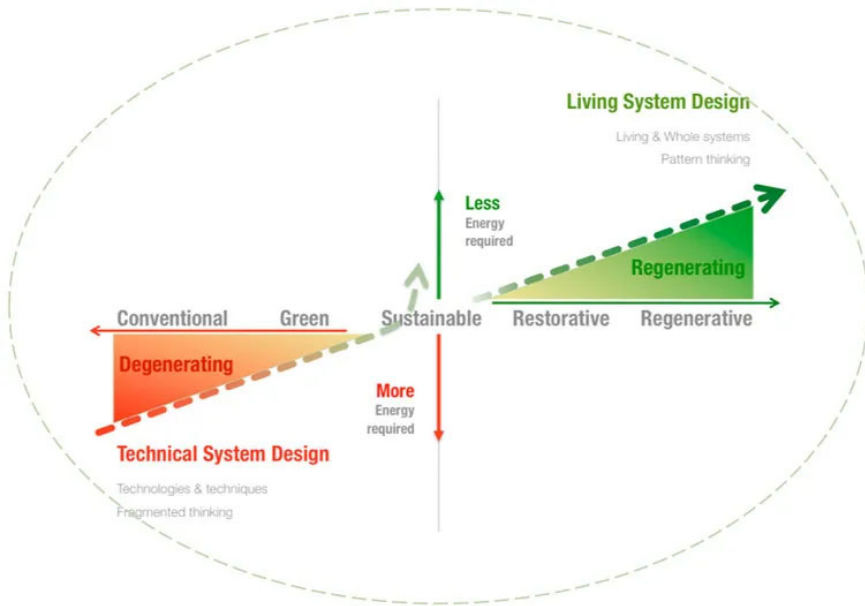
Similarly to the term ESD, the word 'sustainable' has been applied in Australia to any number of activities, from a company claiming itself to be sustainable because it recycles its plastic bottles, through to organisations that are continuing to strive towards a sustainable balance with nature.

Recently ASIC (Australian Securities and Investment Commission) has escalated its warnings to corporate Australia regarding 'greenwash' and making claims about climate action that are not supported by detailed climate action plans.³

For the purposes of this report the term sustainable refers to an overall outcome (project development or organisational activities) that is achieved within its fair share of Earth's resources.

² World Commission on Environment and Development, Brundtland Report, 1987. This definition has never been adopted by the Commonwealth of Australia.

³ ASIC Corporate Finance Update 2021, Issue 4, online, accessed 15/6/21. <https://asic.gov.au/about-asic/corporate-publications/newsletters/asic-corporate-finance-update/corporate-finance-update-issue-4/>



1.5. Regenerative

The term regenerative design is a relatively new language in the Australian property sector and should be treated with some care in that it has the potential to be interpreted as widely as has the term ESD.

As a principle regenerative design is about ‘humans participating as nature’, which includes concepts such as restoring biodiversity and nurturing all forms of life, reversing climate change, ending waste and pollution etc.⁴

For the purposes of this report the term regenerative is used to indicate an outcome that is beyond sustainable and contributes to the healing of people, communities and all forms of life.

Figure 6 Regenerative Design trajectory





⁴ Bill Reed (2007) Shifting from ‘sustainability’ to regeneration, Building Research & Information, 35:6, 674-680, DOI: 10.1080/09613210701475753

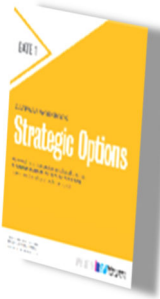


3. Policy Context




The following policies, frameworks, guides and supporting documents contain various sustainability requirements or guidance that may be applicable to the BBCH project. The table below summarises current understanding of policies with our preliminary interpretation of their applicability to the project.

Table 1 Policies to inform minimum sustainability requirements.

Policy	Measurable Target / Outcome Relevant to Albury Wodonga Regional Hospital	Applicability
NSW Government Resource Efficiency Policy (2019) 	<ul style="list-style-type: none"> Energy: achieve aggregate energy savings of at least 10% by 2023-2024 (against 2012-13) Office buildings to have and maintain 5 Stars NABERS Energy by June 2020 (without GreenPower) Meet 5 Star <i>Green Star Design & As-Built</i> (v1.3) and 5 Star <i>Green Star Interiors</i> (v1.3) equivalence Water: set targets for reduction Office buildings >1000m² to have NABERS Water rating of 4 stars. Interior finishes & materials to have low VOC emissions (to meet Green Star requirements) 	GREP does not apply to project delivery in lieu of DGN058, approved by DPIE. NSW Health Resource Efficiency Strategy 2016-2023 is assumed to override the GREP, with 4.5 star NABERS Energy ratings required for office buildings. NOTE: <ul style="list-style-type: none"> DGN058 does not reference Green Star Interiors, and ESD Evaluation Tool does not capture FF&E. ESD Evaluation Tool does not make low VOC emissions mandatory ESD Evaluation Tool does not make the setting of water efficiency targets mandatory
NSW Government DPIE Net Zero Plan Stage 1: 2020-2030 (2020) 	<ul style="list-style-type: none"> Objective to achieve 35% emissions reduction on 2005 levels by 2030 Net Zero emissions from organic waste by 2030 	Applicable to project although the Net Zero Plan does not appear to put in place specific targets as a policy but rather as the result of other NSW Government activities. The designing out of organic waste emissions is a measurable target and represents a considerable opportunity to deliver sustainability outcomes.
NSW Government DPIE Waste and Sustainable Materials Strategy 2041 	<ul style="list-style-type: none"> Reduce total waste generated by 10% per person by 2030 Have an 80% average recovery rate from all waste streams 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. 	The targets set out in this Strategy apply to all NSW Government operations, hence their direct applicability to Albury Hospital requires confirmation. The Strategy places specific emphasis on reducing FOGO waste (Food Organics and Garden Organics).

Policy	Measurable Target / Outcome Relevant to Albury Wodonga Regional Hospital	Applicability
NSW Government DPIE NSW Climate Change Policy Framework (2016) 	<ul style="list-style-type: none"> Aspirational objective of net-zero emissions by 2050 Climate change resilience 	This Policy is intended to guide the development of future NSW Government policies relating to climate change. No direct targets are prescribed however we are seeing the first outcomes of this Policy with the release of the NSW <i>Waste and Sustainable Materials Strategy 2041</i> (June 2021) and the NSW Government's <i>Electric Vehicle Strategy</i> (June 2021)
NSW DPIE SEARs (Standard Secretary's Environmental Assessment Requirements) (2015) 	<ul style="list-style-type: none"> Identify how ESD principles (as defined in clause 7(a) of Schedule 2 of the EP&A Regulation) would be incorporated in the design and ongoing operation of the development. Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards. Demonstrate how the development incorporates measures to minimise carbon emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of resources, water (including water sensitive urban design) and energy. 	Applicability of SEARs TBC
Southern NSW LHD Strategy 2026 	<ul style="list-style-type: none"> Net Zero by 2030 is referenced Develop a District Environmental Sustainability Plan. Establish and implement solar projects. Implement a plan to reduce food waste and improve patient experience. Apply a 'reduce, reuse, recycle' approach across the District. Plan transition to an electric vehicle fleet. Reduce staff and patient travel through use of virtual platforms. 	Generally applies to The BBCH project.
Southern NSW LHD Environmental Sustainability Plan 2023-2028 	<ul style="list-style-type: none"> 15% reduction in energy consumption by 2028. 10% reduction in water use by 2028 15% reduction in waste to landfill by 2028 30% of SNSWLHD Fleet vehicles to be electric or hybrid by 2028 	Generally applies to The BBCH project. Baseline figures are unknown, hence compliance with the stated percentage improvements is unable to be measured. Fleet vehicles are not included in project scope.
Infrastructure NSW Gate 1 Gateway Workbook – Strategic Options (v2, 2018)	No quantitative sustainability targets provided. Social, Economic and Environmental Sustainability requirements: Understanding the long-term impacts, opportunities and obligations created by the project... Ensuring the project	Generally applies to The BBCH project. Meeting DGN058 and Green Star equivalence demonstrates compliance generally with Part C

Policy	Measurable Target / Outcome Relevant to Albury Wodonga Regional Hospital	Applicability
	<p>delivers a positive legacy for the community. Areas explored include:</p> <ul style="list-style-type: none"> • Socio-economic equity; • Resilience to climate change; • Effective place making; • Integration with broader asset networks; • Asset adaptability (including technological change); • Interface with heritage; and • The robustness of the project’s planning approvals processes. 	<p>(sustainability / environmental rating) of the Workbook.</p>
<p>NSW Health Resource Efficiency Strategy 2016 to 2023 (2016)</p> 	<ul style="list-style-type: none"> • Implement energy efficiency projects at sites that represent 90% of billed energy use by 2023 • Achieve 4.5 star NABERS ratings for office buildings and data centres • Purchase energy efficient electrical equipment • Achieve a minimum 4.5 star NABERS rating for all new buildings • Explore options to increase renewable energy production by all LHDs • Purchase light vehicles to comply with the latest Euro and US EPA emissions standards • Purchase 6 % Greenpower for all non LHD facilities • Achieve a minimum 4 Star water NABERS rating for all health office buildings to demonstrate water efficiency 	<p>Applies generally to BBCH.</p> <p>Identify any Class 5 Office buildings that meet the NABERS rating requirements (>1,000m²)</p> <p>[Confirm procurement method for FF&E.]</p> <p>Fleet vehicles to be addressed by Albury Hospital.</p>
<p>NSW Health Infrastructure Corporate Strategy 2021-2025</p> 	<ul style="list-style-type: none"> • S.7.1 Develop and implement a Sustainability Framework, embedding a core set of sustainability principles in our projects. • S.7.2 Assess our projects for climate risk readiness. • S.7.3 Embed climate change considerations into infrastructure design and the asset framework to identify and support communities vulnerable to climate change health impacts. • S.7.4 Consider opportunities to retrofit existing infrastructure, rather than always build new, to create additional value for the community, reduce cost and environmental impact. • S.7.5 Develop and implement a Social Impact Framework to embed social sustainability principles into our project processes and define how we get the best social outcomes to meet the needs specific to local populations. 	<p>A sustainability framework for the Albury Hospital Redevelopment is provided within this report.</p> <p>Initiatives to building social value are recommended throughout this report. Measurement of social impact lies outside the scope of this report.</p>
<p>Health Infrastructure NSW 20-Year Health Infrastructure Strategy (2020)</p>	<p>No quantitative sustainability targets provided.</p> <p>The Strategy does place strong emphasis on existing assets; retaining, maintaining, making better use of, and repurposing.</p>	<p>Generally applicable to the BBCH project with reference to retaining existing assets.</p>

Policy	Measurable Target / Outcome Relevant to Albury Wodonga Regional Hospital	Applicability
	<ul style="list-style-type: none"> • Improve on NCC Section J by 10% (NCC 2019 assumed) • Achieve 60 points using the HI ESD Framework • 100% Electrification 	<p>Applies to the project.</p> <p>Refer Chapter 4 Project Brief for commentary on Section J.</p>
<p>NSW Health Infrastructure Design Guidance Note (DGN) No. 058 (Revision C, November 2023)</p> 	<p>No quantitative sustainability targets provided.</p> <p><i>Key Principles</i> includes no.7 'Is adaptive, resilient and environmentally sustainable'.</p>	<p>Applies to the BBCH project.</p>
<p>NSW DPIE (Government Architect NSW) Better Placed – Design Guide for Health, 2023</p> 	<p>No quantitative sustainability targets provided.</p> <p>General objectives include;</p> <ul style="list-style-type: none"> • reducing greenhouse gas emissions in operation and embodied (up front carbon) • reducing water consumption • long term ease of maintenance, durability, adaptability • adapted for climate change 	<p>Applicable to the project.</p> <p>The initiatives laid out in this report (if actioned) will meet the Better Placed sustainability requirements.</p>

4. Project Sustainability Strategy – Goals & Targets

The BBCH Project has a number of minimum sustainability targets that have been included in the original project brief.

4.1. Project Brief Sustainability Targets

4.1.1. Exceeding Section J by 10%

The BBCH project brief includes a requirement to meet the targets and objectives outlined in Health Infrastructure’s Design Guide Note (DGN) 058 ‘Environmentally Sustainable Development’ (Rev C), which states:

“A minimum 10% improvement in energy efficiency compared to a baseline of National Construction Code (NCC) Section J compliance applicable to the development” (DGN058 p3of12)

4.1.2. HI ESD Evaluation Tool

DGN058 lays out an ESD Evaluation Tool (Attachment C – HI ESD Framework.xlsx, Revision C dated November 2023) which is an in-house tailored version of the GBCA’s Green Star Design & As-Built v1.3 rating tool (tool version and revision assumed, not referenced in DG058).

The *Green Star Design & As-Built* rating tool has been in widespread use in the Australian property sector for a decade and was phased out at the end of 2020 in favour of Green Star Buildings v1.0. We note that whilst the ‘Green Star equivalence’ approach is in common use by industry this is not endorsed nor supported by the GBCA. DG058 clearly states that the ESD Evaluation Tool is not a version of Green Star and has undergone various reductions & exclusions.

The project is required to achieve a minimum of 60 points under this framework.

4.2. BBCH Sustainability 2035 Strategy

In addition to the minimum brief requirements, and to align the project with the current generation of HI delivery projects throughout NSW, it is also recommended that the development should have no more than a one planet footprint, which we could describe as ‘a development that is achieved using no more than its fair share of Earth’s resources’⁵, that is – sustainable.

The diagram below describes the long-term transition pathway towards a one planet footprint.

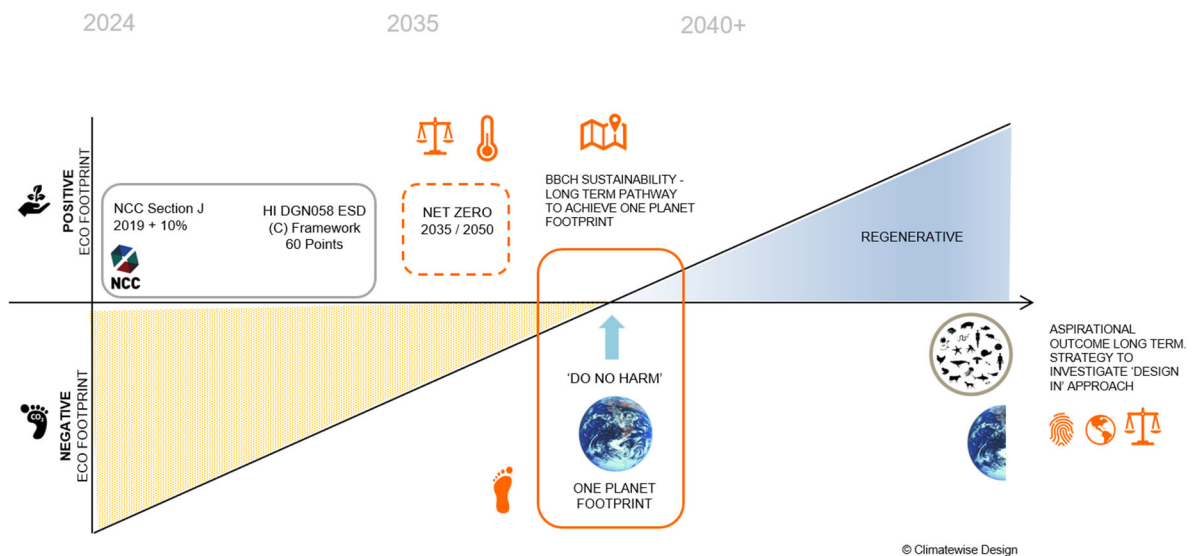


Figure 7 Regenerative Design Transition Pathway

⁵ One Planet Living Framework, Bioregional UK

4.2.1. One Planet Footprint

A one planet footprint for the project is recommended as a minimum sustainability goal.

This aspirational target should be considered in two parts:

- 1) The development of a set of definitions and metrics that allow the project to define a 'one planet footprint' as it applies to the project; and
- 2) The establishment of viable timelines that allow the Hospital to achieve these targets in a way that is affordable, achievable, and attractive. It is distinctly *not* the intention to attempt to achieve a one planet footprint at the completion of the redevelopment project. A draft timeline of 2035 is proposed, for further development during Part 5 of the project.

4.2.2. Net Zero 2035

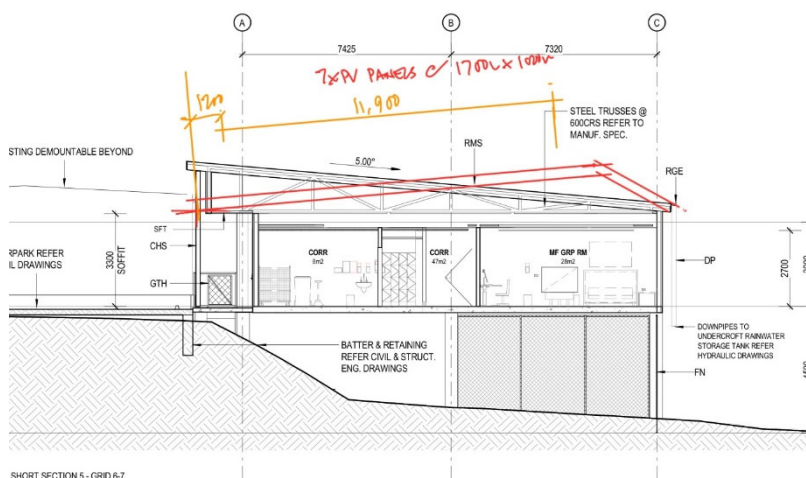
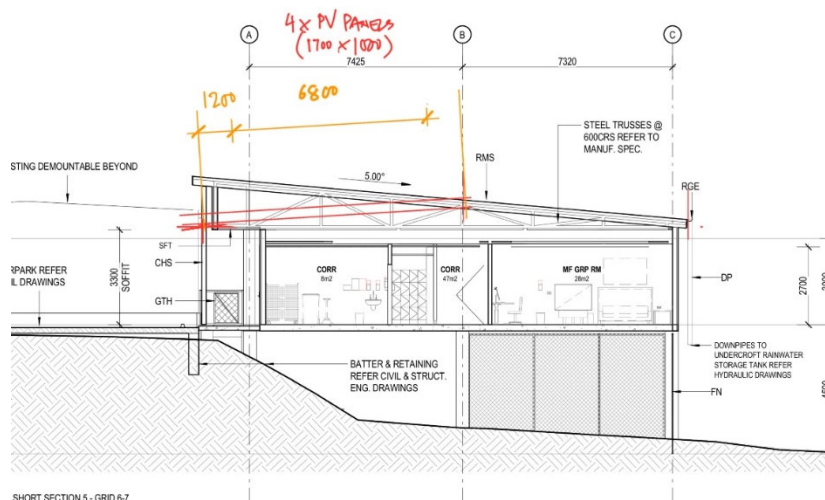
Net Zero 2035 is also recommended as an objective. Design initiatives to date have been guided towards supporting a future Net Zero outcome. A deliverable for the project includes a 'Net Zero Ready Statement' which outlines the approach BBCH might adopt in order to achieve a future Net Zero position.

4.3. Key Design Initiatives Studied During Part 4 Concept Design

During Part 4 the following feasibility studies have been commenced. All of these initiatives support the DGN-058 (C) targets and the aspirational 'one planet' future outcome and have been included in early editions of sustainability budget analysis. These are each included in Section 5-13 of this report.

Table 2 Key Sustainability Strategy Initiatives

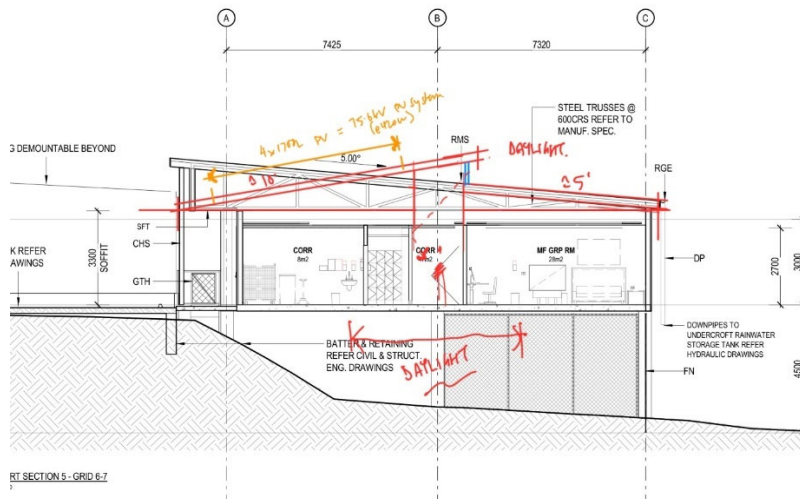
Initiative (from this Strategy)	Description	Status
1. Simplified Roof Form for PV	<p>Revert to traditional pitched roof</p> <ol style="list-style-type: none"> Increases possible PV system size up to 82kW Facade area reduced by c.70sqm, nominally less roof framing steel Nominal cost saving of \$23,000 in envelope construction costs Improved shading to north and west facade 	Detail to be analysed in Part 5.
2. Modified Pitched Roof	<p>Revert to off-centre pitched roof</p> <ol style="list-style-type: none"> Cost saving approximately similar to Option 1 above (\$23,000 through avoidance of higher north façade (70m² reduction), net reduction of roof steel, net simplification of PV installation Increases potential PV system size to 141kW, which would be sufficient to run all operations by free energy during daytime hours, potentially exporting to community 	Detail to be analysed in Part 5.



3. Daylight Roof

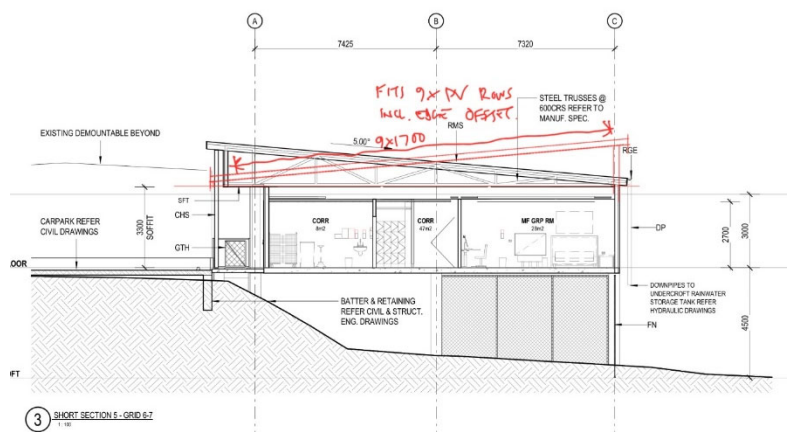
1. This configuration would reduce total potential PV system size, with approx. 75kW system size. Keep the larger roof panel sloping north, with south-facing clerestory glazing avoiding most heat loads.
2. This approach splits roof drainage, however the undercroft should make it relatively easy to address
3. Requires additional internal linings for the higher corridor, but from a wellbeing perspective it's a good investment [ESD budget could contribute]

Detail to be analysed in Part 5.



4. Solar Roof

1. Flipping the current roof design to face north, without any other changes, allows a future system size of approx. 170kW which would allow the building to export energy throughout the site, and allow zero energy costs during sunlight hours.
2. Flipping roof would reduce cost of PV system if it stays same size [avoids tilt-up framing].
3. Flipping roof would allow potential extension over pedestrian pathway, providing better shelter
4. Maximising future PV array area best supports NSW Net Zero policy. [battery costs continue to fall, so a future addition of battery storage would possibly allow this building to run off-grid]



5. Nature Setting & Driveway Alignment

Retaining existing driveway alignment places significant limitations on landscape, outlook from waiting room, and wayfinding. Consider re-alignment of driveway to solve multiple issues;

To be studied in Part 5.

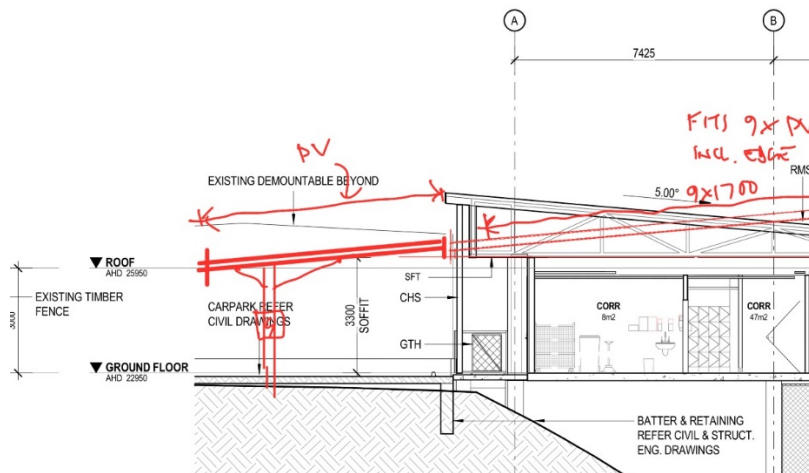
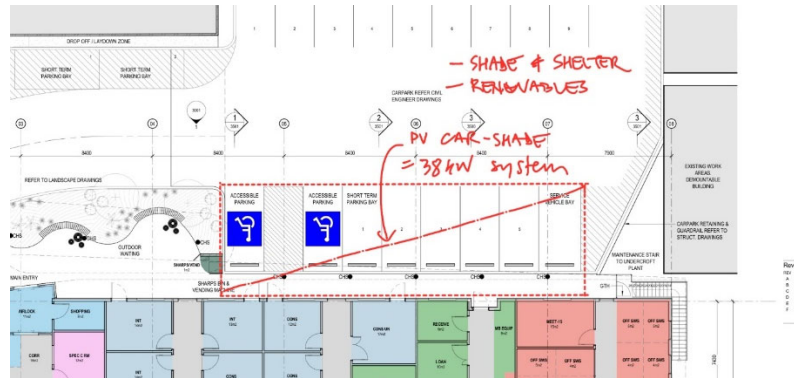
1. Creates approx. 3-fold increase landscape area at front-of-house, supporting good user experience, increasing nature restoration and reducing heat island risks
2. Simplifies wayfinding and footpath grid
3. Driveway appears to fit neatly between existing building to north and transformer.
4. Replace street car spaces from alternate driveway entry to the current design driveway entry
5. Allows simplification of built form & roof etc. 'Curves' as viewed from streetscape can still be achieved via landscape planting / walls & retaining / seating & paths
6. Could include a short section of bioswale in the north section of garden



7. PV Car Park Shelter

1. Potential to combine solutions to address heat risk from car park & demonstrate green credentials, generate renewable energy etc. with PV-shelter to portion of car park
2. Provides sheltered parking for patients [better user experience / customer journey], reduces risk to operator [climate liability]
3. Addresses glare impacts from parked cars [referred further below]
4. Highly visible installation of renewables ['healthy planet']
5. Could be supported by ESD budget [approx. 3 x cost of roof-mounted PV]
6. Could cater for EV charging with frame-mounted chargers... all off-the-shelf kit. Install now or as future addition.

Detail to be developed in Part 3.



5. DGN-058 Compliance

For the purposes of reporting on project progress the balance of this report refers to DGN-058 Environmentally Sustainable Development, Rev C, dated November 2023.

For ease of interpretation and comparison with other HI capital works projects the DGN-058 scorecard is used to measure progress, and all initiatives contributing to delivery of the *BBCH Sustainability 2035 Strategy* are nested within this scorecard.

The sustainability themes of DGN-058 are as follows.

1. Management
2. Indoor Environment
3. Energy & Carbon
4. Climate Risk & Resilience
5. Transport
6. Water
7. Materials & Waste
8. Land Use & Ecology
9. Discharge to Environment
10. Innovation

6. Management

6.1. Introduction

DGN-058 ESD Framework (Appendix C) Points achieved to date: 10 from a possible 12

The following initiatives encourage the adoption of practices and processes that enable and support best practice sustainability outcomes throughout the different phases of the project’s design, construction and ongoing operation. Many of these initiatives are time-sensitive in that they must be enacted at key points in the procurement program in order to maximise their benefit. This category also promotes practices that ensure a project will be sued to its optimum operational potential.

6.2. Management Initiatives Included (Part 4)

The following sustainability initiatives have been confirmed as being included at the end of Part 4 of the project program. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 3 ESD Framework Compliance

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
1.0	Accredited (ESD) Professional	Not achieved	Third party overview of sustainability strategy and value for staff and patients	-
2.0	Environmental Performance Targets	Documented environmental targets. Achieved through <i>BBCH Sustainability 2035 Strategy</i>	Provides clear communication of the project’s environmental credentials and achievements	Included in budget.
2.1	Services and Maintainability Review	Comprehensive maintainability review of building fabric and services carried out prior to construction.	Helps to ensure final project outcome can be efficiently maintained	HI delivery cost (ICA) or Internal cost to BBCH (FM)
2.2	Building Commissioning	Commissioning Specification and Plan are developed	Provides detailed commissioning plan and reporting to ensure that delivered systems are working as designed	Included in budget with the exception of air permeability testing.

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
2.3	Building Systems Tuning	12 months tuning carried out following completion, to tune building systems across all seasons	Provides regular fine tuning of building services during first year of occupancy, to ensure systems are functioning as designed. Supports cost savings for energy and water.	Included in budget.
2.4	Independent Commissioning Agent	ICA is appointed to act on behalf of BBCH and monitors the commissioning and tuning process.	May be internal staff member not involved in design process.	Generally provides additional verification at handover.
4.1	Building Information	Providing simple description of the project's sustainability attributes and their operational needs, e.g. waste management, openable windows, water efficiency.	Provides common-language description of the project's sustainability attributes, helping BBCH staff successfully interact with the building.	Included in budget. [ROI depends on ongoing governance]
5.1	Environmental Building Performance	Setting minimum performance targets for energy, water, indoor environmental quality and waste. This Strategy plus the ESD Framework meet these requirements.	Provides clear messaging for the project's sustainability credentials; supports staff and public engagement.	Included in budget. [ROI depends on ongoing governance]
5.2	End of Life Waste Performance	Recognises tenancy leases of 10+ years to increase lifespan of fitouts	Extends lifespan of interior finishes, reduces waste to landfill	Nil cost.
6.0	Metering	Sub-metering is provided to all major uses of energy and water	Enables accurate identification of energy and water wastage, and supports ongoing staff engagement and cost savings	Included in budget. Rapid ROI
6.1	Monitoring Systems	An active monitoring system is in place to provide data on the sub-meters, enabling ongoing improvement of building performance	As above	Included in budget. Rapid ROI
7.0	Environmental Management Plan	Project construction is carried out under the NSW EMP standards, managing environmental impacts. Included in GC21 contract	Delivery meets high standards of environmental management during construction; governance value	Included in budget.
7.1	Formalised Environmental Management System	Head contractor has ISO 14001 certification. To be included in head contract.	Delivery meets high standards of environmental management during construction; governance value	Included in budget.
8A	Operational Waste Management Plan	BBCH Waste Management Plan to outline how resources are to be diverted from landfill	Governance value for HI & strong alignment with BBCH mission.	Not part of capex budget. Operator cost.
8B	Operational Waste – Waste Facilities	Provision of sufficient space to support maximised avoidance of landfill waste. Base design makes sufficient allowance to cater for future waste reduction operations. Includes exploration of food waste composter.	Supports Net Zero target , staff engagement, potential reduction in waste management costs	Included in budget.

6.3. Management Initiatives Under Consideration (Part 5)

In addition to the above included initiatives, the following opportunities have been nominated for further exploration during Part 5.

Table 4 Potential Initiatives in Addition to ESD Framework Compliance

ESD Code	Initiative	Description	Part 5 Investigation	Cost / Value
7.2	High Quality Staff Support	Contractor provides mental and physical wellbeing support and training to delivery team.	Governance value for HI & strong alignment with BBCH mission.	Head contractor initiative. Cost TBC

7. Indoor Environment

7.1. Introduction

DGN-058 ESD Framework (Appendix C) Points achieved to date: 7 from a possible 17.

The following initiatives enhance occupant comfort and well-being for staff, patients and visitors. Many of these initiatives also improve the occupants’ experience of the space and are thus important to achieve as a balance against the drive to maximise energy efficiency, e.g. providing minimum standard lighting levels might maximise energy efficiency but would not provide a high-quality working or healing environment.

A watershed study conducted in the early 1980s by Roger Ulrich, ‘View through a Window May Influence Recovery from Surgery’⁶ demonstrated that patients with a view to nature (trees in the case of this study) had shorter postoperative hospital stays, fewer negative evaluative comments from nurses, took fewer moderate and strong analgesic doses, and had slightly lower scores for minor postsurgical complications. Another study conducted in 2005 found that patients exposed to higher levels of sunlight (compared to those in dimmer rooms) perceived less pain, took 22% less analgesic medications per hour, and accumulated 21% less in pain medication costs for the length of their stay⁷. A study in the US concluded that 10% of employee absences can be attributed to architecture with no connection to nature⁸.

Studies have continued to demonstrate that we as humans have a positive limbic or biophilic response to nature, from hospital patients to office workers and school children. In a hospital setting the benefits of healing nature extend not only to patients but to hospital staff, contributing to alertness, better concentration and a better sense of wellbeing, often referred to in the literature as Attention Restoration Theory

This field of design has developed to include the natural setting or context, landscape design and the selection and application of natural materials and motifs. This section describes a range of design opportunities that if met can embed this biophilic benefit into the DNA of the project.

7.2. IEQ Initiatives Included (Part 4)

The following sustainability initiatives have been confirmed as being included at the end of Part 4 of the project program. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 5 ESD Framework Compliance

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
9.1	Ventilation System Attributes	Air intake in Accordance with ASHRAE Standard 62.1:2013. Access to clean components; contractor to keep all ductwork clean and sealed. Item 2.1 Services & Maintainability Review considers cleanability of ductwork.	Provides clean air conditioning / HVAC systems at handover, and supports ongoing clean air delivery by enabling regular duct cleaning. Supports Energy efficiency.	Included in budget

⁶ Ulrich R S 1984, “View through a window may influence recovery from surgery”. *Science Vol. 224*, pp420–421

⁷ Walch, Jeffrey M., Bruce S. Rabin, Richard Day, Jessica N. Williams, Krissy Choi, and James D. Kang. “The Effect of Sunlight on Postoperative Analgesic Medication Use.” *Psychosomatic Medicine* 67:156-163. 2005

⁸ Elzeyadi, I. “Daylighting-Bias and Biophilia: Quantifying the Impacts of Daylight on Occupants Health.” In: *Thought and Leadership in Green Buildings Research*. Greenbuild 2011 Proceedings. Washington, DC: USGBC Press. 2011

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
9.3	Exhaust or Elimination of Pollutants	Exhaust from print / photocopy rooms, and kitchens is directed outside without ability to recirculate. Photocopy equipment may be specified with low emissions in lieu of dedicated exhaust	Supports cleaner indoor air quality.	Included in budget. Nil extra cost.
9.4	Low VOC Paints, Adhesives, Sealants and Carpets	Low or zero VOC paint, adhesives and sealants. Generally Max TVOC 50g/L	Supports clean indoor air quality	Included in budget
9.5	Engineered Wood Products	Low formaldehyde emission MDF, LVL, HPL, compact laminate, decorative overlaid wood panels. Assumes exclusion of furniture / FF&E.	Supports clean indoor air quality	Included in budget
10.1	Internal Noise Levels	Design to achieve internal ambient noise levels < 5dB(A) above Table 1 AS/NZS2107:2016. Aligns with ESG.	Provides acoustic comfort for occupants	Included in budget. Nil extra cost.
10.2	Reverberation	Below maximum stated in Recommended Reverberation Time in Table 1 of AS/NZS2107:2016. Aligns with ESG.	Provides acoustic comfort for occupants	Included in budget. Nil extra cost.
11.0	Minimum Lighting Comfort	Flicker-free lights, generally achieved by using LED lighting, high frequency ballasts	Provides visual comfort inside building	Included in budget. Nil extra cost
11.1	General Illuminance and Glare Reduction	Achieve lux levels in Table 11.1.1 Standards for Best Practice General Illuminance (Green Star Design & As-Built v1.3). Luminaire schedule with diffusers or similar to hide bulbs for all lighting.	Provides visual comfort inside building. Supports energy efficiency.	Included in budget. Nil extra cost
12.0	Glare Reduction	Glare from windows is controlled via any combination of fixed external shades, screens, blinds, or other means	Provides improved visual comfort for staff and patients; contributes to thermal comfort; contributes to energy efficiency and carbon emissions reductions	Internal blinds included in budget. Review on balance with fixed external sunshades during part 5.

7.3. IEQ Initiatives Under Consideration (Part 5)

In addition to the above included initiatives, the following opportunities have been nominated for further exploration during Part 5.

Table 6 Potential Initiatives in Addition to ESD Framework Compliance

ESD Code	Initiative	Description	Part 4 Investigation	Cost / Value
9.2	Provision of Outdoor Air	(TBC) Outside air provided 50% higher than minimum in AS 1668.2:2012	Provides improved levels of fresh air.	To be costed / tested in Part 5.

ESD Code	Initiative	Description	Part 4 Investigation	Cost / Value
11.2	Surface Illuminance	Provides uniform lighting, with 30% illuminance on ceilings compared with the working plane; surface reflectance of 0.75 to ceilings (generally matt flat white ceiling)	Provides visual comfort inside building.	Included in budget. Nil extra cost
11.3	Localised Lighting Control	Occupants have the ability to control the lighting in their immediate environment	Provides visual comfort inside building. Allows staff to tailor their own lighting conditions. Supports energy efficiency.	Included in budget. Nil extra cost
12.1	Daylight	At least 40% of habitable spaces achieve good quality daylight.	Access to good quality daylight has been proven to boost staff wellbeing and productivity, reduce errors, and improve the patient experience & healing.	Nil cost
12.1	Access to Daylight [recommended]	At least 60% of patient and staff areas have direct line of sight to natural light	Apply to any location where patients and staff spend at least 2hrs per day. Solutions might include proximity to windows, atria, skylights.	Nil cost until higher façade: floor ratio is triggered.
14.1	Thermal Comfort	Predicted Mean Vote (PMV) levels are between -1 and +1. NCC 2019 JV3 requires a PMV assessment to be undertaken. Compliance to be verified during Part 3	Improved occupant comfort	TBC. Likely nil additional cost.
14.2	Advanced Thermal Comfort [recommended]	Predicted Mean Vote (PMV) levels are between -0.5 and +0.5	Carry out PMV assessment. Review against façade design, glazing selections, external sun shading, thermal insulation. Enhanced energy efficient envelope may also support enhanced thermal comfort.	TBC. Possibly nil additional cost. If achieved via enhanced energy efficiency the whole-of-life value is superior.
-	Natural materials [recommended]	Decreased diastolic blood pressure Improved comfort	Include extensive use of natural materials and elements such as wood and stone.	Identify current budget allowance for natural materials.

8. Energy & Carbon

8.1. Introduction

DGN-058 ESD Framework (Appendix C) Points achieved to date: **9** from a possible 26.

To support a Net Zero 2035 target a comprehensive long-term strategy is necessary. This section focuses on the components of a carbon neutral strategy that can be targeted by the BBCH project, providing key components of an eventual carbon neutral outcome. Note that the BBCH is able to deliver only a portion of the final carbon neutral outcome, with the majority of initiatives being operational and the responsibility of the BBCH.

The BBCH project can contribute in the following ways;

1. Superior passive design through building form & shape and green infrastructure, and
2. Through energy efficient building services design, including a renewable energy ecosystem, achieved by harnessing existing off-the-shelf technologies that are tried and proven, that when combined and connected can distribute 'green electrons' throughout the campus.
3. 100% electrification of building services and central plant. This is required under DGN-058 Rev C.

8.2. Energy (Carbon Emissions) Initiatives Included (Part 4)

The following sustainability initiatives have been confirmed as being included at the end of Part 4 of the project program. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 7 ESD Framework Compliance

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
15E.0	Conditional Requirement: Reference Building Pathway	NCC Section J compliance +10%. Meets requirements for DGN 058.	Supports energy efficiency	Included in budget
15E.1	Comparison to a Reference Building Pathway	Various initiatives to exceed Section J +10%. Subject to ongoing design development, on-site renewables and potential Net Zero initiatives. Significant gains available from enhanced thermal insulation, roof overhangs, window sunshades, efficient central plant, and 100% electrification.	Supports energy efficiency and contributes to Net Zero outcome. Supports compliance with NSW Net Zero Plan Stage 1: 2020-2030 ⁹	All initiatives contribute to reducing running costs. Sunshades cost TBC, requires Part 5 feasibility.
15E.5.1	Conditional Requirement: Net zero plan ['Transition Plan']	Preparation of Net Zero Ready Plan, to outline optimised pathway to achieve Net Zero.	Provides road map to support continuous reduction of carbon emissions, entraining reductions in procurement and waste management costs, and improving staff engagement.	Included in ESD budget, delivered during Part 4
15E.5.2	100% electric in operation ['Fuel Switching']	All new services to be electric, including central plant, heating and hot water, cooking, and CSSD	Reduced operating costs, supports Net Zero obligations and GREP reporting, improves grid resilience (through inclusion of on-site renewables)	Mandatory, included in base budget.
16A(ii)	Solar or Renewable energy generation	On site photovoltaic (PV) system of 10.4kW included	Reduced operating costs, improved grid resilience, supports Net Zero	Portion included in budget. To be costed / tested in Part 5.

9. Climate Risk & Resilience

9.1. Introduction

DGN-058 ESD Framework (Appendix C) Points achieved to date: **2** from a possible 2.

To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters. Climate risk assessment is a complex process that requires multiple stakeholder inputs.

The Plan has been reviewed by SNSWLHD.

The *Climate Risk Assessment & Adaptation Plan* REV 02 is included in Appendix B.

9.2. Climate Adaptation Initiatives Included (Part 4)

⁹ NSW Department of Planning, Industry and Environment, Stage 1: 2020-2030 and the NSW Climate Change Policy Framework that outlines the long-term objective of achieving net-zero emissions for NSW by 2050.

The following sustainability initiatives have been confirmed as being included at the end of Part 4 of the project program. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 8 ESD Framework Compliance

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
3.1	Climate Risk Assessment	Carry out site and project-specific climate risk assessment. [Location-specific risk assessment has been completed.]	Identifies primary climate risks applicable to built assets. Provides the first plank of a comprehensive climate risk assessment for campus operations, supply chain, and transition risk etc.	Included in budget.
3.2	Implementation of a Climate Adaptation Plan	Prepare necessary risk mitigation via adaptation plan. REV 2 of the Plan has been completed.	Supports the integration of climate adaptation into the design and delivery, helping to mitigate climate risk.	Portion included in budget. To be finalised in detail during Part 5.

10. Sustainable Transport

10.1. Introduction

DGN-058 ESD Framework (Appendix C) Points achieved to date: **3** from a possible 5

The emergence of a more sophisticated awareness of ‘place making’, coupled with a rapidly evolving e-mobility and electric vehicle market have made sustainable transport a rich and complex field. The sustainable transport initiatives described below provide benefits that relate to carbon emissions reductions and also to staff wellbeing.

10.2. Transport Initiatives Included (Part 4)

The following sustainability initiatives have been confirmed as being included at the end of Part 4 of the project program. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 9 ESD Framework Compliance

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
17B.1	Access by Public Transport	The project has reasonable proximity to public transport. Part 3 to prepare detailed site planning to support pedestrian connections	Well-designed connections to public transport support equitable transport and staff wellbeing	Nil cost / included in landscape / civil budgets
17B.4	Active Transport Facilities	Provision of bicycle storage racks / cages, change rooms with showers and lockers, for % of staff	Encourages sustainable mobility, cost savings, and staff wellbeing.	Included in cost plan. Specific quantities TBC in Part 5
17B.3	Low Emission Vehicle Infrastructure	DGN-058 requires electric car charging to be installed in 5% of car spaces. Part 4 is meeting compliance with NCC 2022 J9D4, i.e. at least 20% of total car spaces are EV-ready.	De-carbonised fleet will support NSW Net Zero 2035 goal.	ESD budget allocation TBC in Part 5.

11. (Potable) Water

11.1. Introduction

DGN-058 ESD Framework (Appendix C) Points achieved to date: 6 from a possible 6

The development of a sustainable water ecosystem for the BBCH would support a number of the other sustainability concepts outlined in this strategy. For example a well-designed green infrastructure strategy that included the harvesting of rainwater for irrigation would support the growth of a healthy tree canopy, helping to reduce heat stress for people moving about the campus during hot weather or heat events.

The harvesting and re-use of water in a clinical environment presents some specific challenges in relation to health and hygiene.

A sustainable water ecosystem will provide a number of benefits for the BBCH campus;

1. Reduced carbon emissions footprint from the contribution of expanded tree canopy (which is supported by sufficient irrigation capacity)
2. Reduced stormwater runoff and risk of water pollution. The potential target of reducing stormwater runoff to match pre-development flows would be a significant contribution to a regenerative outcome.
3. Reduced costs of potable water, sewerage costs and trade waste costs
4. Increased water resilience in the case of grid failure, drought, water restrictions or grid contamination
5. Improved stakeholder engagement and reputation

The diagram below shows how a sustainable water ecosystem might be developed

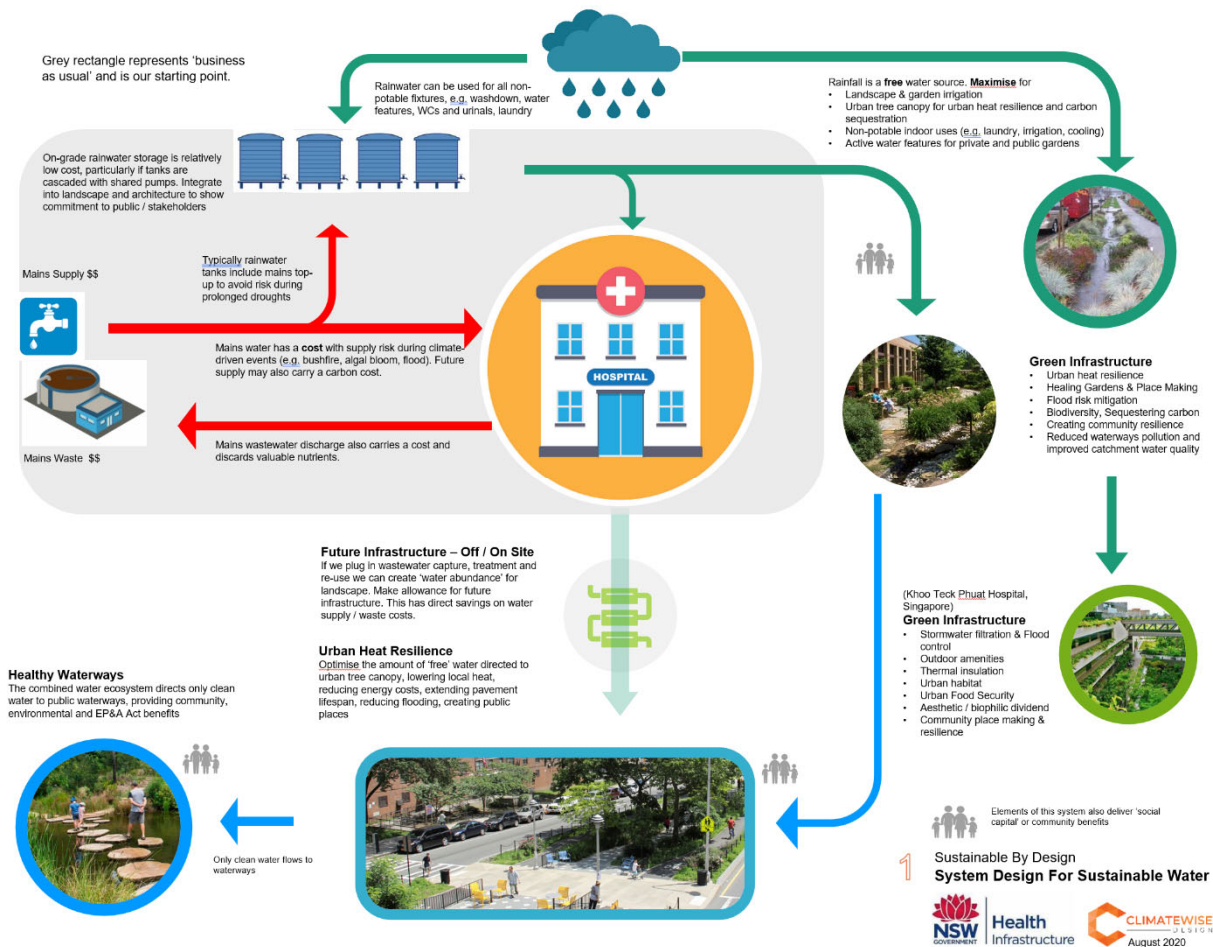


Figure 8 Water Ecology System Diagram, prepared for Health Infrastructure 'Sustainable by Design' project, 2020

11.2. Water Initiatives Included (Part 4)

The following sustainability initiatives have been confirmed as being included at the end of Part 4 of the project program. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 10 ESD Framework Compliance

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
18B.1	Sanitary Fixture Efficiency	High WELS ratings for all bathroom fixtures whilst meeting fit-for-purpose. Includes shower heads, basin taps, WCs, and urinals	Reduces water costs and wastewater costs	Included in cost plan
18B.2	Rainwater harvest & Reuse (irrigation)	Include water efficient irrigation systems for all landscape, connect with rainwater storage (20kL).	Reduced potable water costs. Improved water resilience. Improved landscape quality and survivability.	Included in cost plan
18B.4	Landscape Irrigation	Sub-soil irrigation in lieu of surface irrigation, supported by moisture sensors to avoid over watering, and/or plants that do not require irrigation once established	Reduced potable water costs. Improved water resilience. Improved landscape quality and survivability.	Sub-soil irrigation not included in cost plan. Planting included.
18B.5	Fire System Test Water	The use of fire system test water tanks for closed loop testing (commonplace in commercial developments)	Reduced operating costs.	Included in budget. Detail to be developed Part 3.

12. Materials & Waste

12.1. Introduction

DGN-058 ESD Framework (Appendix C) Points achieved to date: **5** from a possible 19.

The materials used in the construction of buildings can account for around a third of the building’s overall carbon emissions footprint, which we call ‘up front carbon’ or embodied carbon. The way in which raw materials are sourced, then manufactured and processed into building products and ultimately brought to and installed on site can have a negative or positive impact on the environment and on the people involved in the process. The extent to which the construction process can avoid generating landfill waste also contributes to this impact. These impacts include greenhouse gas emissions, the consumption of finite resources, and the pollution of air, soil and waterways that occurs through the manufacturing process.

This section addresses the key environmental impacts of materials used in construction, and includes design considerations that will support the BBCH’ ongoing management of resources and waste reduction;

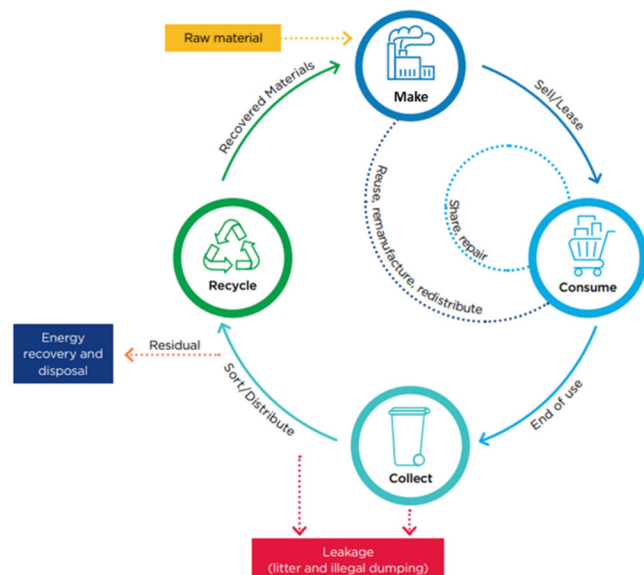


Figure 9 Circular Economy diagram, from NSW Waste and Sustainable Materials Strategy 2041

- The avoidance of waste and working towards a ‘circular economy’ where all resources are cycled within a system.
- The minimisation of up-front or embodied carbon in construction materials through engagement with the supply chain, design and construction, and sustainable procurement
- Sustainable Procurement.

12.2. Materials Initiatives Included (Part 4)

The following sustainability initiatives have been confirmed as being included at the end of Part 4 of the project program. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 11 ESD Framework Compliance

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
19B.1	Concrete	30% reduction of Portland Cement by using alternative materials. Achievement is subject to supply of materials at the time of construction.	Reduced up-front / embodied carbon	Included in cost plan (subject to availability)
20.1	Structural and Reinforcing Steel	Steel is sourced from a responsible steel maker (ISO 14001 certification plus WSA Climate Action Program))	Sustainability governance	Nil cost implication
20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	PVC products are sourced from a responsible PVC manufacturer	Sustainability governance	Nil cost implication
22B	Construction and demolition waste	At least 90% of demolition and construction waste is diverted from landfill	To be included in head contract.	Cost TBC

12.3. Materials Initiatives Under Consideration (Part 5)

In addition to the above included initiatives, the following opportunities have been nominated for further exploration during Part 5.

Table 12 Potential Initiatives in Addition to ESD Framework Compliance

ESD Code	Initiative	Description	Part 3 Investigation	Cost / Value
19B.2	Steel	Reduction in total steel mass compared to reference building (structural and reinforcement)	Total steel tonnage to be evaluated through part 5	Included in cost plan
20.2	Timber Products	Timber is sourced from FSC or Australian plantation timber	Pending approach to FF&E procurement.	Nil cost implication (subject to supply)
21.1	Product Transparency and Sustainability	Construction materials carry a % of sustainability credentials including post-consumer recycled content; product stewardship; and eco-certifications	Pending approach to FF&E procurement.	Nil cost implication

ESD Code	Initiative	Description	Part 3 Investigation	Cost / Value
-	All organic waste diverted from landfill	100% of organic waste is composted on site, with soil by-product returned to on-site green infrastructure. This target also captures NSW Gov. 'zero organic waste emissions by 2030' and exceeds '50% organic waste reduction by 2030'.	Organic waste composter to be nominated against projected food waste flows, pending confirmation of catering model. Supports alignment with the NSW Net Zero Plan Stage 1: 2020-2030 ¹⁰ , specifically the 'zero emissions from organic waste by 2030'	To be assessed under ESD budget during part 5.

Recommended Client Initiatives (outside project scope)

-	Zero Non-Hazardous Waste	Zero non-hazardous waste to landfill. (accounts for approx. 85% of waste stream) + Aligns with 'one planet' outcome. Highly engaging and empowering for staff.	Requires detailed waste audit then staged reduction targets for each waste stream. Sits under Planetary Health Plan	TBC
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13. Land Use & Ecology (Green Infrastructure)

13.1. Introduction

DGN-058 ESD Framework (Appendix C) Points achieved to date: **2** from a possible 6

Worldwide and within Australia, rapid urbanisation is putting pressure on ecosystems and threatening biodiversity. Research and evidence demonstrating the positive impacts of green space and biodiversity on people and urban space is significant and continues to grow.

The category is built on five distinct principles:

1. Protect ecological and biodiversity value, by encouraging development on land of limited value;
2. Minimise impacts to on-site ecology and biodiversity during and after construction;
3. Enhance ecological and biodiversity value by improving the site;
4. Connect natural networks by creating links between native or built corridors; and
5. Create and manage off-site natural spaces to restore the impact to nature from development.

These principles shift the focus of the built environment from a passive observer seeking to minimize impacts to one that is actively bringing nature and biodiversity back into cities. It also ensures the built environment considers impacts beyond its boundary and takes responsibility for rebuilding our natural environment.

Within a project boundary the ecology can be tasked with delivering 'ecological services', that is, nature provides a function beyond being aesthetically pleasing. We often refer to this as Green Infrastructure, which can be defined as

"Green infrastructure is the network of green spaces, natural systems, and semi-natural systems that support sustainable communities and includes waterways; bushland; tree canopy and green

¹⁰ NSW Department of Planning, Industry and Environment, Stage 1: 2020-2030 and the NSW Climate Change Policy Framework that outlines the long-term objective of achieving net-zero emissions for NSW by 2050.

ground cover; parks; and open spaces that are strategically planned, designed, and managed to support a good quality of life in an urban environment.” (Government Architect NSW 2020¹¹)

13.2. Land Use & Ecology Initiatives Included (Part 4)

The following sustainability initiatives have been confirmed as being included at the end of Part 4 of the project program. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 13 ESD Framework Compliance

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
23.0	Endangered, Threatened or Vulnerable Species	The redevelopment project does not harm any endangered or threatened flora or fauna on site. A Biodiversity Management Plan is to be prepared to manage the ongoing health of the site’s biodiversity.	Sustainability governance. Healthy natural setting on site. Community engagement	Included in cost plan
23.1	Ecological Value	Achieved via nature-based healing and landscape setting. The design team has gone to considerable effort to protect and enhance the site’s existing natural ecology. Part 3 will explore further restoration and inclusion of landscape within the new works.	Sustainability governance. Healthy natural setting on site. Community engagement	Included in cost plan
24.2	Contamination and Hazardous Materials	Existing site contamination in the form of asbestos, lead and PCBs is to be removed from site as part of the redevelopment works. Addressed via JBS&G Hazmat report and recommendations, dated 27/11/19	Safe working environment. Good environmental stewardship. Sustainability governance.	Included in cost plan

Land Use & Ecology Initiatives Under Consideration (Part 5)

In addition to the above included initiatives, the following opportunities have been nominated for further exploration during Part 5.

Table 14 Potential Initiatives in Addition to ESD Framework Compliance

ESD Code	Initiative	Description	Part 4 Investigation	Stakeholder Responsible	Cost / Value
25.0	Heat Island Effect Reduction	A combination of initiatives to minimise the heat island effect on the campus. Roofing to have SRI >64, hard paving SRI >39, plus soft landscaping & shade elements	Safer working environment. Improved heat risk mitigation	Included in cost plan	25.0

¹¹ Greener Places – an urban green infrastructure design framework for NSW, DPIE 2020

14. Discharge to Environment

14.1. Introduction

DGN-058 ESD Framework (Appendix C) Points achieved to date: **1** from a possible 5

This category aims to assess and manage environmental impacts of ‘point source’ pollution generated by projects. Negative impacts associated with buildings include damage to the environment through refrigerant leaks or disturbances to native animals. The following outcomes are targeted:

- The reduction of impacts to wildlife from light pollution
- The best practice application of microbial controls within air conditioning systems
- The reduction of impacts from refrigerant use and leaks

14.2. Emissions Initiatives Included (Part 4)

The following sustainability initiatives have been confirmed as being included at the end of Part 4 of the project program. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 15 ESD Framework Compliance

ESD Code	Initiative	Description	Benefit to BBCH	Cost / Value
26.1	Stormwater Peak Discharge	Peak ARI stormwater discharge is not increased as a result of the development. Requires blend of rainwater storage and reuse, permeable pavements, soakage, bioswales etc.	Reduces flood risk. Supports planning compliance. Supports thriving landscape.	Included in cost plan
26.2	Stormwater Pollution Targets	Stormwater is cleaned to a specified level through a combination of built and/or natural infrastructure	Supports thriving landscape. Prevents waterway pollution.	Included in cost plan
27.0	Light Pollution to Neighbouring Bodies	Light spill into neighbouring properties is avoided	Sustainability governance	Included in cost plan
27.1	Light Pollution to Night Sky	No upward outdoor lighting is used unless light is directed onto buildings	Protects nocturnal fauna. Energy efficiency.	Included in cost plan

Emissions Initiatives Under Consideration (Part 5)

In addition to the above included initiatives, the following opportunities have been nominated for further exploration during Part 5.

Table 16 Potential Initiatives in Addition to ESD Framework Compliance

ESD Code	Initiative	Description	Part 3 Investigation	Cost / Value
-	Nature Based Stormwater – bioswales [recommended]	Reduced stormwater runoff Reduced flooding risk Improved groundwater recharge for tree canopy Improved amenity	Study to be finalised Part 5, with ESD budget allocation TBC.	To be assessed Part 5.

15. Innovation

15.1. Introduction

DGN-058 ESD Framework (Appendix C) Points achieved to date: **TBC** from a permissible 10

This sustainability category describes initiatives that are not currently included in the DGN 058 ESD Framework, but that can still deliver sustainable outcomes at either a project level or more broadly through BBCH initiatives. No Innovation points have been assumed during Part 4. This category is to be developed in more detail in Part 5.

15.2. Innovation Initiatives Under Consideration (Parts 5)

The following client-side opportunities have been nominated for exploration during Part 5.

In particular this section includes a range of built environment attributes relating to the ecological footprint of food and its link with planetary health and human health. An authentic climate action strategy includes food security and organic waste. The ecological footprint of our food systems represents approximately 30% of our personal ecological footprints. The methane emissions from food decomposing in landfill is over 100 times^{12 13} more potent than carbon dioxide and is a major contributor to global warming. In Australia poor dietary habits and obesity are now the two leading preventable risk factors contributing to the burden of disease in Australia, with 67% of Australian adults overweight or obese. The direct and indirect costs of obesity, heart disease and Type-2 diabetes cost Australia close to \$60Bn in 2019¹⁴.

Table 17 Potential Initiatives in Addition to ESD Framework Compliance

ESD Code	Initiative	Description	Benefit to BBCH	Stakeholder Responsible	Cost / Value
30D	Occupant Engagement - Occupant Survey (Innovation Challenge)	Pre and post-occupancy surveys to be carried out.	Supports (expected) identification of improved staff wellbeing / productivity / retention, and improved patient experience.	HI – pre-occupancy survey BBCH – post-occupancy survey.	TBC
30E	Green Cleaning (Green Star Performance v1.2, Credit 6.2)	A Green Cleaning Policy is established and all areas are cleaned in accordance with this policy	BBCH to provide details of existing cleaning policy, ESD to review gaps to meet ESD Framework requirements	BBCH	Unlikely to require additional cost. Internal to BBCH
30E	Ergonomics Strategy (Green Star Interiors v1.3, Credit 15.1)	Ergonomics Strategy is developed, with all work settings addressing ergonomic needs of the user, with info provided to user.	ESD to review existing WHS process / criteria and assess gaps against ESD Framework.	BBCH	Unlikely to require additional cost. Internal to BBCH
30E	Indoor Pollutants - Indoor Plants (Green Star Interiors v1.3, Credit 12.3)	Indoor plants are distributed across non-clinical floor areas.	BBCH already has some indoor plants located in non-clinical spaces, with strong desire to continue / increase where suitable.	BBCH, Architect	Internal cost allocation by BBCH

¹² Goldsmith CD Jr, Chanton J, Abichou T, Swan N, Green R, Hater G. Methane emissions from 20 landfills across the United States using vertical radial plume mapping. *J Air Waste Manage.* 2012;62(2): 183–97. pmid:22442934

¹³ Thiel CL, Park S, Musicus AA, Agins J, Gan J, Held J, et al. (2021) Waste generation and carbon emissions of a hospital kitchen in the US: Potential for waste diversion and carbon reductions. *PLoS ONE* 16(3): e0247616. <https://doi.org/10.1371/journal.pone.0247616>

¹⁴ Dietitians Association of Australia 2019, *Nourish not Neglect: Putting health on our nation's table.* Canberra, ACT: Dietitians Association of Australia.

ESD Code	Initiative	Description	Benefit to BBCH	Stakeholder Responsible	Cost / Value
30E	Amenity and Comfort (Green Star Buildings v1.3, Credit 14)	Building includes one or several rooms designed to promote either inclusivity, mindfulness or exercise for staff or occupants. i.e. Parent room, relaxation/ meditation / prayer room; Exercise room. Calculated at 1m ² per every 10 occupants or staff. BBCH advise that some of these amenities are already provided.	Staff wellbeing and productivity	Architect	Included in budget
30E	Groundskeeping Practices (Green Star Performance / Buildings v1.2, Credit 25)	Best practice process put in place to maintain landscaped areas and hard surfaces to protect sensitive landscapes and improve ecological value	Reduced environmental and governance risk Improved landscape resilience	BBCH, ESD	May be nil cost, or internal cost to BBCH. Provides District-wide benefit.
30C	Reduce demolition and construction waste by 98%	98% of total waste generated is diverted from landfill to other uses	Achievement relies in part on Early Contractor Engagement to identify possible solutions. The high volume of demolition may prohibit achievement of this item.	HI	TBC
30D	Local Procurement - Products and Materials (Innovation Challenge)	Use of products or materials that are manufactured regionally or nationally. Must demonstrate a significant % improvement over industry standard.	Governance value in supporting local communities	HI to include clause in head contract, with specific line-item response from tenderers.	TBC if applicable
30D	Local Procurement - Services and Skilled Labour (Innovation Challenge)	Services and skilled labour employed by the project come from the local area surrounding the site. Must demonstrate a significant % improvement over industry standard.	Governance value in supporting local communities	HI, as above	TBC if applicable
30C (26.2)	Stormwater Pollution Targets	Meets Column B of Table 26.2 Pollution Reduction Targets in Green Star Design & As-Built v1.3. Provides superior stormwater cleansing prior to leaving site.	Civil engineer to investigate potential to achieve the more stringent stormwater quality requirements, adopting built and/or nature-based infrastructure.	Civil	TBC. May not trigger additional cost if solutions can be incorporated into Green Infrastructure
30E	Indoor Pollutants - Low VOC (Green Star Interiors v1.3, Credit 12)	50% of paints (by cost) have max VOC of 5g/L.	To be assessed in Part 3.	Architect	TBC. May be minimal or nil cost. Provides District-wide benefit.

ESD Code	Initiative	Description	Benefit to BBCH	Stakeholder Responsible	Cost / Value
30D	Reconciliation Action Plan (Innovation Challenge)	A RAP is developed by BBCH, with the BBCH project being the key instigator. RAP must be endorsed by Reconciliation Australia	BBCH to identify existing initiatives that might contribute to a formal RAP; BBCH to advise if RAP is to be developed for the BBCH	BBCH	Internal cost to BBCH. Provides District-wide benefit.
30E	Procurement and Purchasing (Green Star Performance / Buildings v1.2, Credit 21)	Sustainable Procurement Framework is in place for ongoing purchasing of consumables, services, and materials post-completion	BBCH to identify existing sustainability-related procurement requirements. ESD to then review gap and advise if compliance is possible.	BBCH, ESD	May be nil cost, or internal cost to BBCH. Provides District-wide benefit.
30E	Indoor Pollutants – Mattresses (Green Star Interiors v1.3, Credit 13.1)	All new mattresses installed emit a reduced amount of indoor pollutants (Greenguard emission criteria)	BBCH to provide details on existing procurement requirements for new mattresses. ESD to review gap and advise if compliance is possible	BBCH, ESD	TBC Provides District-wide benefit.

15.3. Delivery

The following diagram outlines the process by which the initiatives described in this report are to be included in the final built works. All ESD performance requirements and deliverables have been described in the ESD Specification.

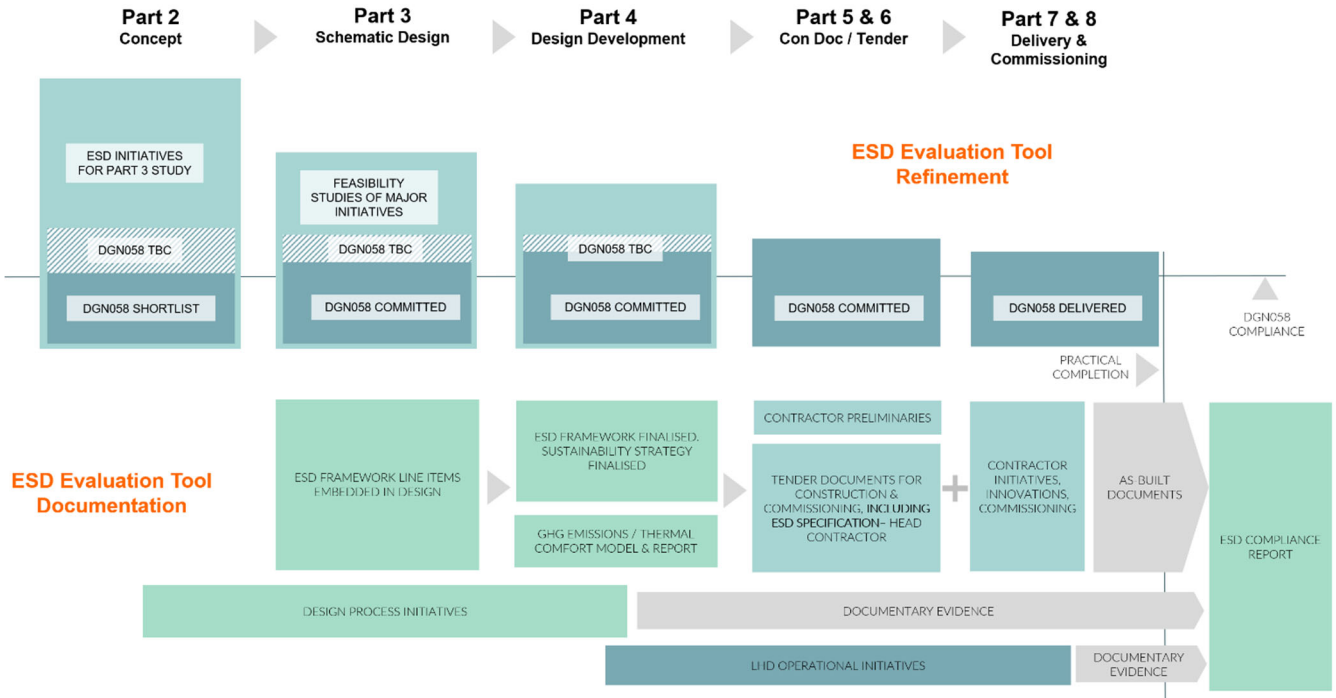


Figure 10 Typical DGN-058 ESD Framework Delivery

16. Summary

This report summarises the *BBCH Sustainability 2035 Strategy* and outlines the initiatives being adopted or under investigation for compliance with DGN-058 Environmentally Sustainable Development (C).

The following key sustainability initiatives have been nominated for further development and appraisal during Part 5. Typically it is unlikely that all initiatives are able to be included within budget, and effort during Part 5 will identify the most feasible and highest value options within budget, for inclusion in the contract.

1. Simplified Roof Form for PV
2. Modified Pitch Roof Form
3. Daylight Roof
4. Solar Roof
5. Nature Setting and Driveway Alignment
6. Solar PV Car Park Shelter

For commentary on the cost and risk of each initiative refer to the **ESD Evaluation Tool 2023 BBCH REV D** which functions as the working document for the initiatives described in this document. Included in Appendix A. At the conclusion of Part 4 the project is tracking with **29** points confirmed (included in scope & commitments) and 43 points TBC.

For a summary of the initiatives contributing to DGN-058 compliance refer to the following Roadmap diagram.

SUSTAINABILITY ROADMAP Rev 1

Reduces Environmental Impact Supports Net Zero 2035 / 2050 Goal Supports Reduced Operating Costs Supports Wellbeing & Patient Experience

PROCUREMENT & DELIVERY

Included in DGN-058 (C) ESD Framework Compliance (min.60pts)

- 1.0 Accredited Professional
- 7.0 Environmental Management Plan
7.1 ISO 14001
- 2.2 Building Commissioning
- 2.3 Building System Tuning
- 3.1 Climate Adaptation Plan
- 20.2 Sustainable Timber Products
- 20.3 Responsible PVC
- 21.1 Product Transparency
- 2.4 Independent Commissioning Agent
- 19B.1 Reduced Portland Cement
- 2.1 Services & Maintainability Review

To Be Reviewed in Part 5

- 24.2 Contamination & Hazardous Materials
- 30D Local Procurement: Skilled Labour
- 22B 90% (or 98%) Construction & Demolition Waste Diversion
- 7.2 High Quality Staff Support
- 30D Local Procurement: Products & Materials

Outside Scope

BUILT WORKS

- 100% Electrification
- 15E.1 Section J +10%
- 8B Operational Waste Facilities
- 17B.4 End of Trip Cyclist Facilities
- 10.1 Internal Noise Levels
- 13.1 Low VOC Paints, Adhesives, Sealants and Carpets
- 13.2 Engineered Wood Products
- 14.1 Thermal Comfort ±0.5
- 12.0 Glare Reduction
- 14.1 Thermal Comfort ±1
- 10.2 Reverberation
- 26.1 Stormwater Discharge
- 26.2 Stormwater Pollution Targets (Col.A)
- 20.1 Structural & Reinforcing Steel
- 27.0 Light Pollution to Neighbouring Bodies
- 28.0 Legionella Impacts from Cooling Systems
- 30E Biodiversity Enhancement
- 19B.2 Reduced Steel Mass
- 27.1 Light Pollution to Night Sky
- 18B.1 Sanitary Fixture Efficiency
- 18B.4 Landscape Irrigation
- 6.1 Monitoring Systems
- 18B.2 Rainwater harvest & reuse
- 6.0 Metering

- 9.3 Exhaust or Elimination of Pollutants
- 9.2 Provision of Outdoor Air
- 9.1. Ventilation System Attributes
- 11.0 Minimum Lighting Comfort
- 11.1 General Illuminance & Glare Reduction
- 11.2 Surface Illuminance
- 11.3 Localised Lighting Control
- 10.3 Acoustic Separation
- 13.1 Low VOC Paints, 5g/L
- 26.2 Stormwater Pollution Targets (Col.B)
- 23.1 Ecological Value
- 29.0 Refrigerant Impacts
- 25.0 Heat Island Effect Reduction
- 17B.3 EV Charging
- Roof Design for Maximum PV
- PV Car Park Shelters

- Greywater Treatment & Reuse
- 30E Amenity & Comfort
- 30E Impacts to Nature
- EV Emergency Vehicle Charging
- Battery Storage
- E-Mobility parking & charging

BBCH OPERATIONS

- 2.0 Environmental Performance Targets
- 4.1 Building Information
- 5.1 Environmental Building Performance

To Be Reviewed in Part 5

- End of Life Waste Performance
- 30D Occupant Engagement Survey
- 30E Green Cleaning Policy
- Low VOC Greenguard Mattresses
- 30E Movement & Place (Sustainable Transport Plan)
- 30E Ergonomics Strategy
- Procurement & Purchasing
- 30E Green Groundskeeping
- Reconciliation Action Plan

- Heat Resilience Strategy
- Zero Organic Waste to Landfill
- 30E Indoor Plants

17. Appendix A – ESD Framework (DGN 058 Appendix C)

Project Name:	Batemans Bay Community Health	Update by:	Digby Hall	Points Currently Achieved	48	Total Points Available	103
HI Delivery Part:	4	Date Last Updated:	18/06/2024	Points TBC	29	Total - Minimum requirements	12
Revision D Notes: 1. This revision has been prepared for the purposes of Tender only. Requirements have not been coordinated with other design disciplines, with line items and points being selected for the purpose of achieving a minimum of 45 points. The Contractor may submit alternative line items for review, on the basis that 45 points is still achieved.						Total - Recommended	32

Budget notes: Base Build Capex Budget any DGN

HI Environmentally Sustainable Development (ESD) Evaluation Tool

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders in	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes	
Management				12										
ESD Consultant (Accredited Professional)	To recognise the appointment and active involvement of an Accredited Professional in order to ensure that the ESD tool is applied effectively and as intended.	1.0	Accredited Professional	1		0		L	Minimum requirement	ESD	HI / SNSWLHD, ESD, Head Contractor		ESD consultant not appointed until end of Part 4. Compliance TBC pending final design outcomes. 100724: due to late appointment of ESD consultant (end-Part 4) this is unable to be met.	
Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2	Environmental Performance Targets	-				L	Minimum requirement	HI	ESD		Met via preparation and adoption of BBCH Project Sustainability Strategy	
		2.1	Services and Maintainability Review	1	1			L	Recommended	HI	SNSWLHD FM Manager		By SNSWLHD FM Manager, can also be internal HI specialist not directly involved in project design. HI to nominate reviewer.	
		2.2	Building Commissioning	1	1			L	Recommended	CONTR				Include in head contract
		2.3	Building Systems Tuning	1	1			L	Recommended	CONTR				Include in head contract
		2.4	Independent Commissioning Agent	1	1			L	Optional	HI	HI / SNSWLHD, Project Manager		By SNSWLHD FM Manager. [This approach endorsed by HI on previous projects]. HI to confirm acceptable pathway, AND nominate stakeholder.	
Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance and sustainable outcomes.	4.1	Building Information	1	1			L	Recommended	CONTR	Façade, Mechanical, Electrical, V. Transport, Fire, Hydraulics, Landscape, Structural, Head		Typically produced by head contractor under their as-built deliverables. ESD to check with HI / SNSWLHD - is there a preferred mode for the information? Desire to have this prepared outside of head contract (e.g. by design team, internally?)	
Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance	1	1			L	Recommended	SNSWLHD	HI / SNSWLHD		Met generally via GREP reporting CWD to provide gap analysis & additional reporting requirements [energy, water, waste, IEQ]	
		5.2	End of Life Waste Performance	1	1			L	Recommended	SNSWLHD	HI / SNSWLHD		Requires commitment to reduce demolition waste at end of fitout life. ESD to liaise with SNSWLHD.	
Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6	Metering	-				M	Minimum requirement	MECH	Mechanical, Electrical, Hydraulics,			
		6.1	Monitoring Systems	1	1			M	Minimum requirement	MECH	Mechanical, Electrical			
Construction Environmental	To reward projects that use best practice formal environmental management procedures during	7	Environmental Management Plan	-					Minimum requirement	CONTR	Head Contractor		ESD Spec	

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes
Management	construction and support staff sustainability awareness and education.	7.1	Formalised Environmental Management System	1	1				Recommended	CONTR	Head Contractor		ESD Spec
		7.2	High Quality Staff Support	1		1			Recommended	CONTR	Head Contractor		Construction related credit for contractor to consider. Included in ESD Spec as PC item.
Operational Waste	Performance Pathway To encourage project to apply waste hierarchy through the design	8A	Performance Pathway - Specialist Plan	1	1				Recommended	HI	HI / SNSWLHD, Waste Consultant		Subject to OWMP approach - included in ESD scope [part 5]
		8A(i)	Operational Waste Management Plan	-					Minimum requirement	WASTE	HI / SNSWLHD, Waste Consultant		
		8B	Prescriptive Pathway - Facilities	0	0				Optional	ARCH			NOTE: The project can target EITHER 8A or 8A(i) plus 8B. Architect to allocate sufficient area / room sizes
Total				12	10	1							

Indoor Environment				17									
Indoor Air Quality	To recognise projects that provide high air quality to occupants and safeguard occupant health through the reduction in internal air pollutant levels.	9.1	Ventilation System Attributes	1	1			M	Recommended	MECH	Mechanical		
		9.2	Provision of Outdoor Air	2		1		H	Recommended	MECH	Mechanical	ESG requirements request 2.0 ACH to IPU spaces.	
		9.3	Exhaust or Elimination of Pollutants	1	1			M	Recommended	MECH	ARCH, Mechanical		
		9.4	Paints, Adhesives, Sealants and Carpets	1	1			M	Recommended	ARCH	ARCH, Façade, Mechanical, Electrical, V. Transport, Fire, Hydraulics, Acoustics, Head Contractor		HI to confirm: is loose furniture included in capex / main works, or procured separately by SNSWLHD? [loose furniture is captured by this item]. In-principle direction is that any procurement under control of 'the project' is captured by this item.
		9.5	Engineered Wood Products	1	1			M	Recommended	ARCH	ARCH, Structural, Head Contractor		HI to confirm: is loose furniture included in capex / main works, or procured separately by SNSWLHD? [loose furniture is captured by this item]. In-principle direction is that any procurement under control of 'the project' is captured by this item.
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels	1	1			H	Recommended	ACOUS	ARCH, Façade, Mechanical, Acoustics		

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders in	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes
		10.2	Reverberation	1	1			L	Recommended	ACOUS	ARCH, Acoustics, Structural		
		10.3	Acoustic Separation	1		0		L	Optional	ACOUS	ARCH, Mechanical, Acoustics, Structural		Acoustic engineer or architect to advise internal partition specs compared to minimum requirements.
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11	Minimum Lighting Comfort	-				L	Minimum requirement	LIGHT	Electrical, Lighting	Artificial lighting initiatives can also utilise typical	
		11.1	General Illuminance and Glare Reduction	1	1			L	Recommended	LIGHT	Electrical, Lighting		
		11.2	Surface Illuminance	1		1		L	Recommended	ARCH	ARCH, Electrical, Lighting		
		11.3	Localised Lighting Control	1		1		L	Recommended	LIGHT	Electrical, Lighting		Dispensations often required due to clinical functions in some enclosed spaces. May be achievable via predominantly small functional areas.
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12	Glare Reduction	-					Minimum requirement	ESD	ARCH, Façade		
		12.1	Daylight	2		1			Recommended	ESD	ARCH, Façade, ESD	Modelling of typical spaces for the daylighting initiative is acceptable, provided a sensible coverage of spaces is accounted for. Issues such as	Deep floor plan currently precludes project from meeting compliance requirements. DTS method of measurement is acceptable for claiming 1 point. 240613: re-introduction of central clerestory window may achieve 1 point
		12.2	Views	1		0			Recommended	ARCH	ARCH	Views can also be assessed using typical spaces.	Requires measurement to confirm compliance. All work-points / workstations, beds within 8m of view to external or internal landscape. 180624: windows sills to consulting rooms are 1800 AFFL, hence point cannot be achieved
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	1		1			Recommended	MECH	Mechanical	NCC 2022 JV3 requires a PMV assessment to be undertaken	Can be met via JV3 PMV model. Temperature sensors not required when adopting PMV model approach.
		14.2	Advanced Thermal Comfort	1		1			Recommended	MECH	Mechanical		Requires Section J / JV3 thermal comfort output to confirm compliance
Total Line				17	7	6							

Energy & Carbon				26									
Greenhouse Gas Emissions	To encourage and recognise projects to reduce their carbon footprint through design and construction and to ensure projects are net zero	15E.0	Conditional Requirement: Reference Building Pathway	-				M	Minimum requirement	MECH	Façade, Mechanical, Electrical,		
		15E.0 (i)	10% energy performance beyond NCC requirement, or GREP	1	1			M	Minimum requirement	ELEC	Mechanical, Electrical		note that 10% improvement on NCC Section J is a mandatory requirement under Green Star (0 points awarded).
		15E.1	Comparison to a Reference Building Pathway: GHG Emissions Reduction: Building Fabric	4	2			H	Recommended	ARCH	Façade, Mechanical,		2 points assumed for improvements to building fabric over legislated requirements. This approach also supports Climate Adaptation Plan.

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders in	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes	
		15E.2	Comparison to a Reference Building Pathway: GHG Emissions Reduction	16	4	3		H	Minimum requirement	MECH	Façade, Mechanical,		4 & 3 points assumed.	
		15E.3	Off-site Renewables					M	Optional					For every point achieved under 15E.2 1.5 points are awarded for offsite renewables. Assumed not to be targeted.
		15E.4	District Services						Optional					Only available to projects connecting into district energy services. Not adopted.
		15E.5.1	Conditional Requirement: Net zero plan ['Transition Plan']	-				M	Minimum requirement	ESD				Net Zero Ready statement by CWD (Part 5) SNSWLHD inputs required
		15E.5.2	100% electric in operation ['Fuel Switching']	1	1			H	Minimum requirement	ELEC	Mechanical, Electrical		Aligns with Sustainable Buildings SEPP - A Net Zero Statement describes how a project will avoid dependence on fossil fuels and be capable of operating at net zero emissions by 2035.	
		15E.6.0	Measurement of Embodied Carbon	1	1			L	Minimum requirement	ESD	ARCH, Structural, Head Contractor, Façade		Aligns with Sustainable Buildings SEPP - use the Embodied Emissions Materials Form in line with the Embodied Emissions Technical Note	Embodied Emissions Materials Form (NABERS) requires completion. Typically requires input from ALL disciplines. Will be populated by CWD however requires data inputs from structural & architectural (BOQ would be useful)
		15E.6.1	Target reduction in upfront carbon emissions	1		1		L	Minimum requirement	ELEC	Mechanical, Electrical			
Peak Electricity Demand Reduction	To encourage projects to consider Peak electricity reduction through energy efficiency or on-site energy generation	16A(i)	Solar or Renewable energy assessment	-				M	Minimum requirement	ELEC	Mechanical, Electrical		PV applications to be developed. 1) on-roof 2) over car parking Via 'Net Zero Ready' statement [by CWD]	
		16A(ii)	Solar or Renewable energy generation	1	1			H	Recommended	ELEC	Mechanical, Electrical		As above	
		16B	Performance Pathway - Reference Building	2					Optional	ELEC	Mechanical, Electrical			
Total Line				26	9	4								
Climate risk and resilience				2										

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders In	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes
Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Climate risk assessment	1	1			H	Minimum requirement	ESD	ARCH, Façade, Mechanical, Electrical, Fire, Hydraulics, Civil, Landscape, Structural, SNSWLHD		REV A being prepared for SNSWLHD inputs.
		3.2	Implementation of a Climate Adaptation Plan	1	1			H	Recommended	ESD	ARCH, MECH, LA, CIVIL	SEARS condition: Credit can be used to demonstrate CSIRO project climate impacts	REV A being prepared for SNSWLHD inputs. Typical high to extreme risks on east coast include: - higher hot day temps and hotter & more frequent heat events - increased rain and storm intensity
Total Line				2	2	0							

Transport	Points available	5											
Sustainable Transport	To encourage projects to consider sustainable transport options through design	17A.1	Performance Pathway	9					Optional				
		17B.1	Access by Public Transport	1	1			L	Optional	ESD			
		17B.2	Reduced Car Parking Provision	1		1		L	Optional	ARCH, Travel Planner			
		17B.3	Low Emission Vehicle Infrastructure	1	1			H	Minimum requirement	ARCH, Electrical	Consistent with DGN 46 and NSW Government Fleet Strategy requirements	NCC 2022 EV-ready infrastructure: 20% of existing fleet. Provide in-ground conduit for ALL on-grade parking spaces. Spatial allowance for DBs. Assume 7.2kW chargers. Requires input from SNSWLHD.	
		17B.4	Active Transport Facilities	1	1			M	Optional	ARCH		SNSWLHD to advise current and desired cyclist facilities	
		17B.5	Walkable Neighbourhoods	1		0				Optional	ESD		Site does not achieve sufficient points in Walk Scor (46)
Total Line				5	3	1							

Water	Points available	6											
Potable Water	Prescriptive Pathway	18A.1	Potable Water - Performance Pathway	0					Optional				
		18B.1	Sanitary Fixture Efficiency	1	1			L	Recommended	ARCH	Architectural FF&E	AusHFG Requirements limit use of RW systems	

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes
		18B.2	Rainwater Reuse	1	1			M	Optional	HYDR	Hydraulics, Landscape	AusHFG Requirements limit use of RW systems	20kL tank at undercroft level [HY 0100-P02], for landscape irrigation
		18B.3	Heat Rejection	2	2				Optional	MECH			No water used in heat rejection?
		18B.4	Landscape Irrigation	1	1			H	Recommended	LAND	Hydraulics, Landscape		
		18B.5	Fire System Test Water	1	1			M	Recommended	FIRE	Fire		Assume closed-loop test water
Total Line				6	6	0							

Materials & Waste				14									
Life Cycle Impacts	Prescriptive Pathway - Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment	6					Optional				Life Cycle Assessor (additional consultant) required
		19A.2	Additional Life Cycle Impact Reporting	4					Optional				Life Cycle Assessor (additional consultant) required
		19B.1	Concrete	3	2			L	Optional	STRUC	Civil, Structural		Applies to all concrete including in-situ & precast. 30% cement reduction can be specified, plus water & aggregates reduction (0.5 points each). Higher risk assigned pending contractor confirmation.
		19B.2	Steel	1		1		L	Optional	ARCH	Civil, Structural		
		19B.3	Building Reuse	4	0	0			Optional				
		19B.4	Structural Timber	4		0		L	Optional	STRUC	ARCH, STRUC		
Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1	Structural and Reinforcing Steel	1	1			L	Recommended	STRUC			Include in structural specification
		20.2	Timber Products	1		1		L	Recommended	ARCH	ARCH, BD		HI to advise extent to which FF&E is included in main works contract and/or able to be influenced by delivery team. This item includes all loose items installed with FF&E.

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1			L	Recommended	HYDR MECH ELEC ARCH STRUC			
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	3		2		L	Optional	CONTR			Is typically achievable however given program constraints this may need to be included in head contractor's scope.
Construction and Demolition Waste	Fixed Benchmark	22A	Fixed Benchmark					L	Optional	CONTR			
		22B	Percentage Benchmark	1	1			L	Recommended	CONTR			90% C&D waste diversion typically achievable
Total Line				19	5	4							

Land Use & Ecology				6									
Ecological Value	To reward projects that improve the ecological value of their site.	23	Endangered, Threatened or Vulnerable Species	-				L	Minimum requirement	ECO	Project Manager, ESD		
		23.1	Ecological Value	3	1	1		L		LA	ARCH, Landscape		Hospital sites are usually mainly buildings with minimal landscape area. Point/s claimed subject to extent of landscape [refer CLWD-GCOR-000002]
Sustainable Sites	To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land.	24	Conditional Requirement	-					Minimum requirement	ESD			
		24.1	Reuse of Land	1	1			L		ESD			
		24.2	Contamination and Hazardous Materials	1		1		L		HI	Project Manager, Head Contractor		HI / BD advise if existing site had hazmat survey and if anything found it was removed?
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	25.0	Heat Island Effect Reduction	1		1		H	Recommended	ARCH	ARCH, Landscape		Achievable if on-grade car park can meet SRI requirements. Also refer CLWD-GCOR-000002 for potential car park PV-shelter opportunity
Total Line				6	2	3							

Discharge to Environment				5									
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge	1	1			M	Recommended	CIVIL	Hydraulics, Civil, Landscape		Advise if compliance achievable?
		26.2	Stormwater Pollution Targets	1	1			M		CIVIL	Civil, Landscape		Civil to develop option for harnessing GI to cleanse stormwater, in lieu of (or to augment) in-line infrastructure (e.g. eco-so)
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies	-				M	Minimum requirement		Electrical, Lighting		Neighbouring buildings are usually the

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders in	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes
		27.1	Light Pollution to Night Sky	1	1			M	Recommended		Electrical, Lighting		hospital buildings. Consider impacts to surrounding residential if any.
Microbial Control	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	28.0	Legionella Impacts from Cooling Systems	1	1			H	Recommended	MECH			Mech to advise if Legionella risk management requirements can be met?
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.0	Refrigerants Impacts	1		0		H		MECH			Mech to advise if achievable based on nominated air handling systems?
Total Line				5	4	0							

Innovation				10									
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process	10									HINSW to advise if Innovation points are able to be self-awarded.
	Thermal Comfort	30A.1	Individual Comfort Control	1				L	Optional				Provide individual comfort control in all primary spaces
	Greenhouse Gas Emissions	30A.2	On-site Renewable Energy	2				H	Optional	ARCHI	Electrical		Installing on-site renewable energy sources Potential to assign 1 point for PV-shade structures to car parking (CWD support this approach).
	Greenhouse Gas Emissions	30A.3	Building Integrated PV	1				L	Optional				When BIPV contribute to GHG reductions of at least 15% (can be awarded in addition to above). Unlikely to achieve 15% contribution unless extensive PV are installed.
	Potable Water	30A.4	Heat Rejection Systems in Equipment Requiring Process Cooling	1		1		M	Optional	HI			Potable water use from heat rejection in process cooling is reduced, for new equipment purchases only. HI Advise who procures this equipment? Could be recognised under DGN-058 even if not under this contract.
	Potable Water	30A.5	Passive Design	1		0		M	Optional	HYD			Projects that use passive water treatment systems (e.g vegetation) to achieve at least 1 point in potable water calculator. Unlikely to adopt potable water calculator?
	Microbial Control	30A.6	Microbial control in Warm Water Systems	1				M	Optional	HYD			Warm water systems have been designed to manage the risk of microbial control
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.	30B	Market Transformation										
	Commissioning and Tuning	30B.1	Soft Landings	1				M	Optional	HI			Designed, built, commissioned and tuned by adopting Soft Landings approach. Include as PS item in ESD Specification?
	Greenhouse Gas Emissions	30B.2	Passive Design	1				H	Optional				For projects that achieve more than 15 points through passive design / without energy generation / without offsets or Green Power in the GHG Emissions credit
	Life Cycle Impacts - Concrete	30B.3	Sustainable Sourcing of Concrete Aggregates	1		1		L	Optional	CONTR			Concrete aggregates have chain of custody or come from responsible source/s
Improving on Benchmarks	The project has achieved full points in a credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Benchmarks										

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders In	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes
	Commissioning and Tuning	30C.1	Supplementary or tenancy fitout systems review	1				M	Optional	HI	HI, MECH, SNSWLHD		Comprehensive services and maintainability review of supplementary or tenancy fitout systems
	Commissioning and Tuning	30C.2	Building Air Permeability Rates	1				M	Optional				Achieve rates from the 'normal' column
	Commissioning and Tuning	30C.3	Building Air Permeability Rates	1				M	Optional				Achieve rates from the 'best practice' column, or where it can be demonstrated that project has met requirements of JV4 Section J NCC 2019
	Greenhouse Gas Emissions	30C.4	Reference Building Pathway - 15% Improvement	1				H	Optional				On-site renewable energy systems produce 5% more energy than what is required by the building. Energy must be exported or stored on site.
	Greenhouse Gas Emissions	30C.5	Reference Building Pathway - 30% Improvement	1				H	Optional				On-site renewable energy systems produce 5% more energy than what is required by the building. Energy must be exported or stored on site.
	Sustainable Transport	30C.6	No New Car Parks on Site	1				L	Optional	ARCH			Includes all car parking regardless of ownership / operation
	Potable water	30C.7	Discharge to Sewer	1				M	Optional				90% or greater reduction in flow to sewer. Greywater system may contribute to this.
	Life Cycle Impacts	30C.8	Comparative Life Cycle Assessment +20%	1				L	Optional				Cumulative impact reduction is increased by 20% to 150% total.
	Life Cycle Impacts	30C.9	Comparative Life Cycle Assessment +40%	1				L	Optional				Cumulative impact reduction is increased by 40% to 170% total.
	Sustainable Products	30C.10	Product Transparency and Sustainability +3%	1				L	Optional				Percentage of compliant products is increased by 3% to 12%
	Sustainable Products	30C.11	Product Transparency and Sustainability +6%	1				L	Optional				Percentage of compliant products is increased by a further 3% to 15%
	Construction and Demolition Waste	30C.12	Reduction of Construction and Demolition Waste	1				L	Optional				Meets fixed benchmark of 5kg waste / sqm of GFA
	Stormwater	30C.13	Stormwater Pollution Targets	1		0		M	Optional	CIVIL			Meets Column B. Achievable via green infrastructure? [refer CLWD-GCOR-000002 re potential for bioswale] Only indicate extra-over compared to current civil design [CI-00008-P01]
	Stormwater	30C.14	Stormwater Pollution Targets	1				M	Optional	CIVIL			Meets Column C
Innovation Challenge	Where the project addresses a sustainability issue not included within any of the above Credits.	30D	Innovation Challenge										
		30D.1	Community Benefits	1				M	Optional				Conduct community needs analysis, develop strategy for community benefits, implement plan
		30D.2	Culture, Heritage and Identity	1				M	Optional				Applies to buildings that are Burra Charter listed, retained, refurbished and celebrated through info / displays etc.
		30D.3	High Performance Site Offices	1				L	Optional				Where at least 75% of 'site office checklist' is achieved.
		30D.4	Integrating Healthy Environments	1				H	Optional				Conduct community health needs analysis, prioritise strategies to address needs, develop monitoring plan
		30D.5	Local Procurement - Products and Materials	1				M	Optional				Significant improvement in comparison to industry standard'. Can include as PS item in ESD Specification?

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes
		30D.6	Local Procurement - Services and Skilled Labour	1				M	Optional				Significant improvement in comparison to industry standard' Can include as PS item in ESD Specification?
	Occupant Engagement	30D.7	Occupant Engagement - Occupant Survey	1				M	Optional				SNSWLHD scope, not included in ESD Specification.
	Occupant Engagement	30D.8	Occupant Engagement - Connection to Nature	1				L	Optional				Provide ongoing feedback to Biophilic research by RMIT
	Pathways to Carbon Positive	30D.9	Powered by Renewables	1				H	Optional				15% improvement on rating requirements & no fossil fuels on site, publicly commit to 100% renewable electricity
	Pathways to Carbon Positive	30D.10	Responsible Carbon Impacts	1				L	Optional				At least 3 points achieved under 19A and climate change impact category reduces by 10%, and Climate Active Carbon Neutral offsets purchased for remaining embodied carbon
		30D.11	Responsible Carbon Impacts	1				L	Optional				20% reduction in the climate change impact category and Climate Active offsets for residual as above
		30D.12	Responsible Carbon Impacts	1				L	Optional				Above, plus at least 5% of embodied carbon reduction in climate change category from carbon neutral certified products
	Pathways to Carbon Positive	30D.13	Carbon Positive - New Buildings	1				L	Optional				Requires whole-building Climate Active Carbon Neutral Standard registration, maintained for 6 years, plus 10% of embodied carbon in addition to 100% of operational carbon OR transport emissions are offset
	Reconciliation	30D.14	Reconciliation Action Plan	1				H	Optional	SNSWLHD			SNSWLHD develops a Reconciliation Action Plan. BBCH roject must play central role in development of RAP SNSWLHD to provide details on existing Action Plan, ESD to review against RAP requirements.
		30D.15	Incorporation of Indigenous Design	1				H	Optional				From the Australian Indigenous Design Charter, follow 1) Indigenous Led, 2) Community Specific, 3) Impact of Design, and 4) Shared Knowledge
		30D.16	Social Return on Investment	1				H	Optional				Complete analysis of direct and indirect costs and benefits
		30D.17	Universal Design	1		0		H	Optional	ARCH			Review Design for Dignity Guidelines, perform needs analysis, develop accessibility plan, implement accessibility plan
Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this rating tools.	30E	Global Sustainability										The Global Sustainability Credits shown are limited to relevant Credits from other Green Star tools only (Performance, Communities and Interiors). Credits from other international tools are also recognised, e.g. from BREEAM, DGNB, LEED, LBC, IWBI and Passive House.
	Indoor Air Quality [From Green Star Performance V1.2 Credit 6.2]	30E.1	Green Cleaning	1		1		M	Optional	SNSWLHD			Green Cleaning Policy is established and all areas are cleaned in Acordance with this policy. SNSWLHD to provide details of existing cleaning policy, ESD to review gaps to meet ESD Framework requirements

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders in	Overlaps HI ESG, AusHFG, NCC, SSSA, Design Guide	CWD Notes
	[From Green Star Buildings v1.3, Credit 13]	30E.2	Exposure to toxins	1		1		M	Optional	CONTR			Requires on-site tests verify the building has low Volatile Organic Compounds (VOC) and formaldehyde levels.
	[From Green Star Performance / Buildings v1.2, Credit 21]	30E.3	Procurement and Purchasing	1		1		H	Optional	SNSWLHD			Sustainable Procurement Framework is in place for ongoing purchasing of consumables, services, and materials post-completion
	[From Green Star Performance / Buildings v1.2, Credit 25]	30E.4	Groundskeeping Practices	1		1		M	Optional	SNSWLHD			SNSWLHD: best practice process put in place to maintain landscaped areas and hard surfaces to protect sensitive landscapes and improve ecological value.
	[From Green Star Interiors v1.3, Credit 15.1]	30E.5	Ergonomics Strategy	1		1		H	Optional	SNSWLHD			Ergonomics Strategy is developed, with all work settings addressing ergonomic needs of the user, with info provided to user. ESD to review existing WHS process / criteria and assess gaps against ESD Framework.
	[From Green Star Interiors v1.3, Credit 12.3]	30E.6	Indoor Pollutants - Indoor Plants	1		1		H	Optional	SNSWLHD			Indoor plants are distributed across non-clinical floor areas. Include allowance for ongoing plant maintenance contract. SNSWLHD already has some indoor plants located in non-clinical spaces, with strong desire to continue / increase where suitable. Cost allocation TBC (is this capex, FF&E or operational cost?)
	[From Green Star Interiors v1.3, Credit 13.1 INNOVATION]	30E.7	Indoor Pollutants - Mattresses	1		1		H	Optional	SNSWLHD			All new mattresses installed emit a reduced amount of indoor pollutants (Greenguard emission criteria) SNSWLHD to provide details on existing procurement requirements for new mattresses
	[From Green Star Interiors v1.3, Credit 12 INNOVATION]	30E.8	Indoor Pollutants - Low VOC	1		1		H	Optional	ARCHI			50% of paints (by cost) have max VOC of 5g/L. To be assessed in Part 3. Can also include as PS item in ESD Specification
	[From Green Star Buildings v1.3, Credit 14]	30E.9	Amenity and Comfort	1		0		H	Optional	ARCHI			Building includes one or several rooms designed to promote either inclusivity, mindfulness or exercise for staff or occupants. i.e. Parent room, relaxation/ meditation / prayer room; Exercise room. Calculated at 1m ² per every 10 occupants or staff. Some amenities are already provided? ESD to liaise with ARCHI to review details schedule of areas to confirm allocation.
	[From Green Star Buildings v1.3, Credit 28]	30E.10	Enjoyable Places	1				M	Optional	SNSWLHD			Deliver an Activation Strategy to facilitate initiation of placemaking activities. SNSWLHD to provide details on policy for managing public events on site. ESD to review allowance in site design / landscape design.
	[From Green Star Buildings v1.3, Credit 27]	30E.11	Movement and Place, credit achievement (offers up to 3 points)	1				M	Optional	SNSWLHD			Develop a Sustainable Transport Plan that encourages walking and walkability, public transport use, and reduced reliance on car travel. Plan may be produced prior to OC, however this can't be relied upon as a compliant outcome.

Category/Credit	Aim of the Credit / Selection	Code	Credit Criteria	Points available	Points Targeted	Points TBC	Risk Ranking	Value Ranking (L/M/H)	Type [per DGN-058]	Lead Input	Stakeholders	Overlaps HI ESG, AusHFG, NCC, SSDA, Design Guide	CWD Notes
	Biodiversity Enhancement (Green Star Buildings)	30E.12	Biodiversity Enhancement	1				M	Optional				The landscaping includes a diversity of species and prioritises the use of climate resilient and indigenous plants;
	Biodiversity Enhancement (Green Star Buildings)	30E.13	ecologist / landscape:	1				L	Optional				The project team develops a site-specific Biodiversity Management Plan and provides it to the building owner or building owner representative
	Biodiversity Enhancement (Green Star Buildings)	30E.14	landscape:	1				L	Optional				The landscaping includes critically endangered and/or endangered plant species
	Impacts to Nature (Green Star Buildings)	30E.15	Impacts to Nature	1				M	Optional				The building's design and construction conserves existing natural soil, hydrological flows and vegetation elements; and If deemed necessary by an Ecologist, at least 50% of existing site with high biodiversity value is retained.
Total Line				10	0	10							
Project Score				48									

18. Appendix B – Climate Risk Assessment & Adaptation Plan (Rev02)

Batemans Bay Community Health

Batemans Bay NSW 2536

Climate Risk Assessment & Adaptation Plan

To Support the Batemans Bay Community Health Development



21st August 24

Report prepared for Health Infrastructure NSW
by **Climatewise Design** ABN: 69 240 776 166



Report Summary

Revision:	02	Date:	27/08/24
Author:	Digby Hall		
Checked By:	-		
Revision	Description	Issue Date	
01	Draft Issue for client discussion	21/6/24	
02	Coordinated issue	27/8/24	
Project Status:	Part 4 Developed Design		

Project	
Project Name:	Batemans Bay Community Health (BBCH)
Building Owner	Health Infrastructure NSW / Southern NSW Local Health District (SNSWLHD)
Head Contractor:	TBC
Client	Health Infrastructure NSW
(Sustainability) Certifications Required	
<ul style="list-style-type: none"> • HI NSW DGN 058: NCC 2019 Section J +10%, and • 60 points under ESD Framework (DGN 058 Appendix C). Rev C. 	

Climatewise Design

ABN 69 240 776 166 (Climatewise Design)

52C Palmer St., Cameraygal Land, Eora Nation (Camberay) NSW 2062
0404 025 747 | digbyhall@climatewisedesign.com | www.digbyhall.com

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1. Executive Summary

This Climate Risk Assessment & Adaptation Plan has been developed for Health Infrastructure NSW to assess the impacts of climate change on the Batemans Bay Community Health (BBCH) Project, Batemans Bay NSW, and to provide recommendations on remedial actions that can be taken to address ‘extreme’ and high’ risks in accordance with AS 5334:2013 *Climate Change Adaptation for Settlements and Infrastructure*.

Climate projection modelling data sourced from the Intergovernmental Panel on Climate Change (IPCC) endorsed Global Circulation Models including CSIRO projections (Climate Change in Australia) and NSW climate projections (Adapt NSW, NARClIM 2.0) were used to develop climate change scenarios for the development for the timescales 2050 and 2090 compared to the baseline climate (1986-2005).

The result of the risk assessment showed that generally the proposal is subject to low to extreme acute risks associated with climate change, namely relating to the following:

- Increased surface and ambient temperatures, including increased maximum temperatures, and increased heat event (heat wave) frequency, duration, and intensity
- Increased storm intensity with associated increases in rainfall intensity
- Increased prevalence and duration of drought conditions

This Climate Adaptation Plan should be reviewed by the building owner every 5 years to ensure that appropriate operation and maintenance measures are in place to retain a resilient and safe building.

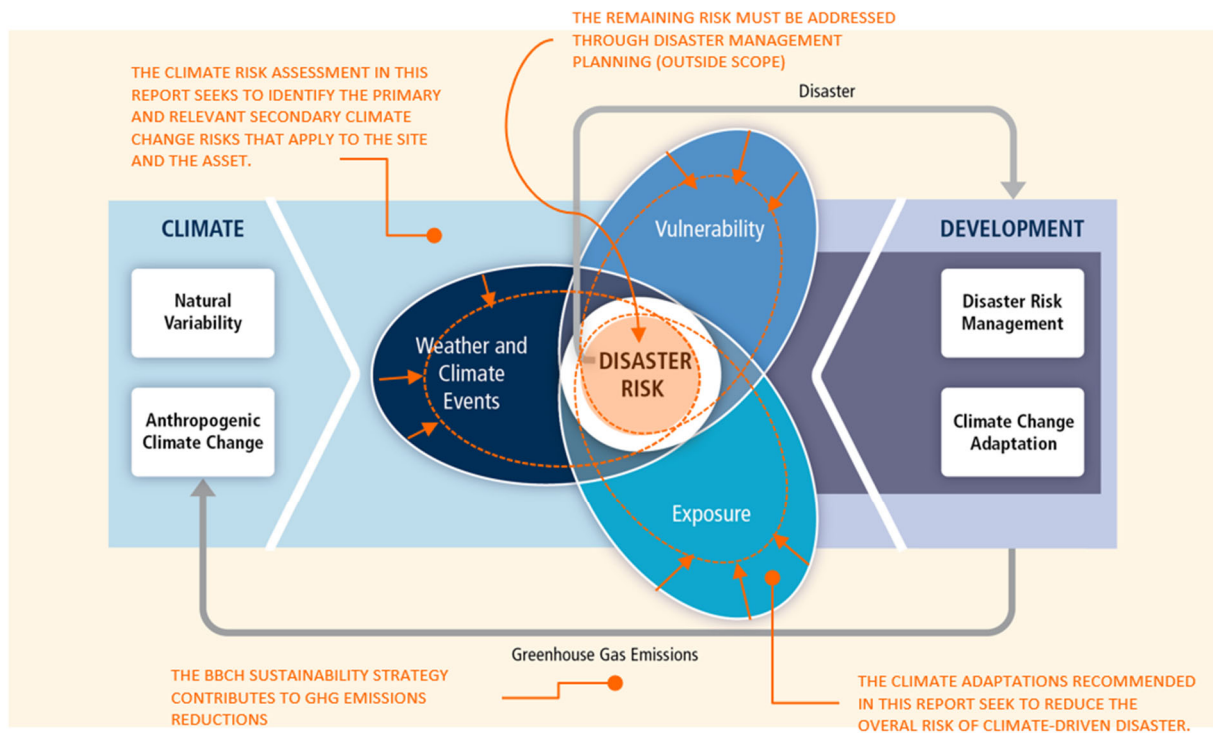


Figure 1 This report identifies primary and some secondary climate risks, then recommends adaptations to lessen those risks.

1.1. Important Notes

Climate modelling used in this report is based on IPCC ‘AR5’ (Assessment Report no.5) scenarios for Global Circulation Models for region-scale impacts, and the CSIRO’s NARClIM 2.0 modelling for Regional Downscaled Models (RDMs) for the 10km x 10km grid in which the project site sits. This modelling was released in August 2024. This climate risk assessment is based on the RCP8.5 pathway (Representation Concentration Pathway) which assumes a high emissions scenario. Throughout the 2010s emissions rose by 1.9% annually on average and rose 1.1% during 2023. At the time of writing, global CO₂ ppm (parts per million) sits at 427ppm, significantly above the

safe level of 350ppm and the highest level since modern humans evolved – in fact the highest value in the past 4 million years.

Atmospheric CO₂ values are directly and linearly linked with global temperatures. Until such time as data shows a reduction in atmosphere CO₂ ppm we adopt the RCP8.5 scenario.

This report is appropriate for the scale of the risk and the nature of decisions to be made and is consistent with the quality and amount of data and information available. It is limited to identifiable and predictable direct physical risks associated with a warming climate, applicable to physical building assets only.

Our qualitative assessment and recommendations do not thoroughly extend to secondary and tertiary impacts that may for example relate to business continuity, disaster preparedness or operational processes, social or community impacts or the like. We have for example not assessed the likelihood of Princes Highway access being severed by storm surge or sea level rise. Such impacts often have a critical influence on the business case for various climate resilience asset upgrades, insurability, and liability. It is recommended that the building owner carry out a detailed risk assessment for secondary and tertiary climate risks.

This report does *not* satisfy all requirements of Australia's AASB S2 Climate-related Disclosures, brought into effect in August 2024. Requirements in relation to this Standard fall outside the scope of this report.

2. Climate Change Literacy

The following key topics and definitions provide the foundations for language relating to climate change and adaptation.

Temperature rise since 1850

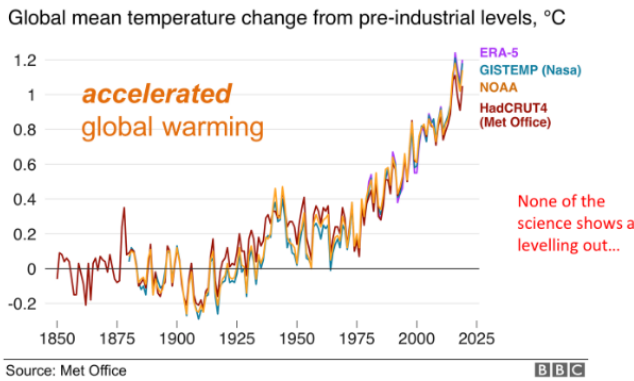


Figure 2 Met Office, BBC.

2.1. Global Warming

Global warming directly correlates with the amount of carbon dioxide (and its equivalents, expressed as CO₂-e) in our atmosphere. CO₂ is highly effective at trapping the Sun’s energy in our biosphere. The more CO₂ there is, the more of the Sun’s energy is trapped in our atmosphere and oceans.

As the amount of energy in our biosphere increases the natural weather events that occur will also have more energy, including winds and storms, hurricanes, hot days, and the amount of rain that falls at one time.

The term global warming is used interchangeably with several other variations, each being favoured differently by countries, knowledge communities, business, and the media. Examples include global warming, global heating, the Climate Emergency, and climate change.

Global warming has already led to a 1.5°C increase in Australia’s average temperature since 1910, with a further 1.5°C warming predicted by 2100 from emissions that have already been released.

For the purposes of this study, we will continue by adopting the term ‘climate change’ because this also expresses the consequences of global warming.

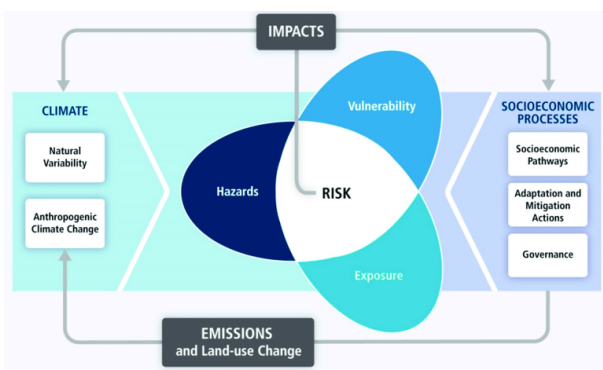


Figure 3 IPCC AR5 Conceptual risk Framework

2.2. Climate Risk – The IPCC Definition

The IPCC (2020) defines risk in the context of climate change as¹;

“The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems... risks can arise from potential impacts of climate change as well as human responses to climate change. Relevant adverse consequences include those on lives, livelihoods, health and wellbeing, economic, social and cultural assets and investments, infrastructure, services (including ecosystem services), ecosystems and species.” Importantly the IPCC applies the term ‘risk’ to both *impacts of* and *responses to* climate change. This study addresses both, by a) identifying the physical risk then b) making response recommendations.

¹ Reisinger, Andy, Mark Howden, Carolina Vera, et al. (2020) The Concept of Risk in the IPCC Sixth Assessment Report: A Summary of Cross-Working Group Discussions. Intergovernmental Panel on Climate Change, Geneva, Switzerland. pp15



Figure 4 Even minor storm damage or flooding can stop a hospital from functioning



Figure 5 Chronic risks can contribute to acute risks, and event consequences can overload hospital services

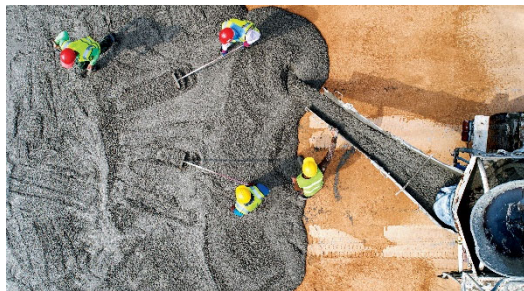


Figure 6 The introduction of a carbon price on raw materials could raise the cost of construction



Figure 7 Meyers Paediatric Hospital, Florence, Italy. Green Roofs provide flood control plus therapeutic benefits

2.3. Climate Risk - Acute

Acute climate risk refers to direct physical impacts from extreme climate or weather-driven events such as droughts, floods, extreme precipitation, heat events and bushfires. These risks have direct financial, investment, insurance and legal consequences when realised. Acute risks are generally predictable to a high degree of accuracy over the near to medium term and can be mitigated to some extent through design responses and asset adaptations.

2.4. Climate Risk – Chronic

Chronic climate risks are attributed to longer-term shifts in climate patterns and include risks such as rising temperatures, sea level rise, the expansion of tropical pests and vector borne diseases into temperate zones, and an accelerating loss of biodiversity. These risks can have compounding and non-linear impacts on liveability, workability and productivity, food systems, physical assets, and infrastructure services.

2.5. Climate Risk - Transitional

Transitioning to a lower-carbon economy may entail extensive policy, legal, technology, and market changes to address mitigation and adaptation requirements related to climate change. Depending on the nature, speed, and focus of these changes, transition risks may pose varying levels of financial and reputational risk to organizations.²

2.6. Climate Adaptation

Adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change³.

² TCFD (Task Force on Climate-related Financial Disclosures), Final Report – Recommendations of the Task Force on Climate-related Financial Disclosures

³ United Nations Framework Convention on Climate Change 2021, What do adaptation to climate change and climate resilience mean?

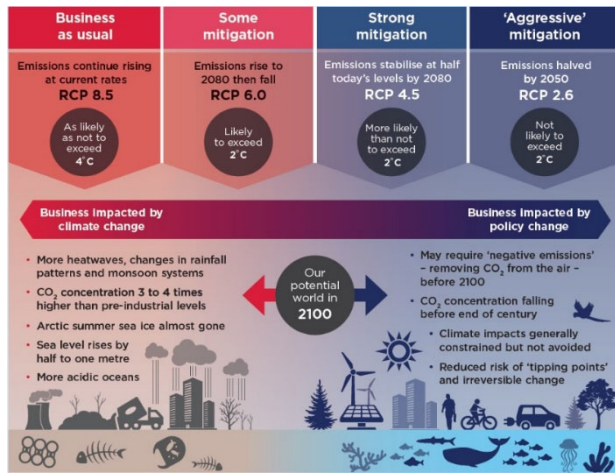


Figure 8 The four Representative Concentration Pathways (University of Cambridge 2013)

2.7. RCPs

Representative Concentration Pathways (RCPs) are a measure used to describe the level of ‘radiative forcing’ or energy flux in our atmosphere. The IPCC (Intergovernmental Panel on Climate Change) uses a series of RCP scenarios to model how severe climate change might be, based on escalating levels of energy in our atmosphere. RCP2.6 is considered the most desirable or optimistic outcome, whilst at the other end of the scale RCP8.5 reflects a very high emissions pathway where our global increase in emissions continue as they have been and where emissions reduction policy is not acted upon. In the just released update of the IPCC’s report (AR6) the RCPs will for the first time be accompanied by the SSPs (see below).

Climate scientists emphasise that RCP8.5 was not intended as and should not be considered a ‘business as usual’ emissions scenario. RCP8.5 is generally adopted by the insurance industry as a high emissions worst-case scenario.

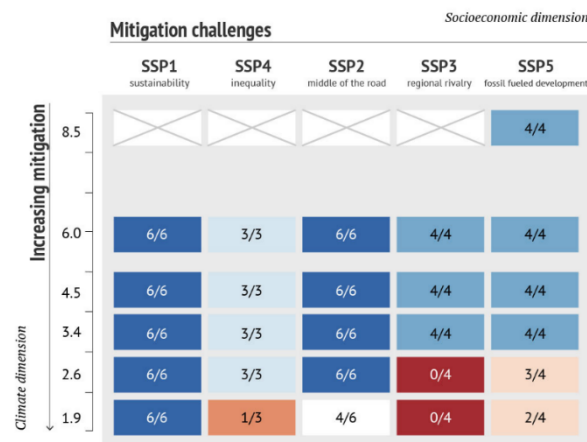


Figure 9 SSPs assessed against RCPs

2.8. SSPs

Shared Socioeconomic Pathways (SSPs)⁴ are a new measure used by the IPCC to examine how global society, demographics and economics might change over the next century under the various RCP scenarios. Whilst the RCPs set pathways for greenhouse gas concentrations and, effectively, the amount of warming that could occur by the end of the century, the SSPs set the stage on which reductions in emissions will – or will not – be achieved.

Whilst the SSPs may become material and critical for accurate climate risk forecasting, at present they are not included in current climate risk modelling engines and not included in the NSW Climate Risk Ready framework, hence will not be addressed in this report.

⁴ <https://www.carbonbrief.org/explainer-how-shared-socioeconomic-pathways-explore-future-climate-change>

3. Introduction – The Context

3.1. Process

This study has followed the recommended process outlined in the *Climate Risk Ready NSW Guide – Practical guidance for the NSW Government sector to assess and manage climate change risks*, published by the NSW Department of Planning, Industry & Environment (2020). The Guide outlines steps to consider the potential climate risks to an enterprise, program or project and encourages integration of these risks into enterprise risk management frameworks and procedures.

Table 1 Climate Risk Ready risk assessment and management process

Process Step	Actions	Reference	Notes
Step 1. Establish the Context			
Understand your organisation’s climate risk management maturity	Completed Climate Risk Maturity Health Check Tool	-	<i>Not included in scope</i>
Establish the reason for a climate change risk assessment and secure approvals	Briefing paper to secure an executive sponsor.	Scope outlined in Consultancy Agreement between HI & Climatewise Design, dated 6/6/24, HI24113	Climate risk assessment and adaptation plan scope has been included in the BBCH ESD consultancy scope
Identify stakeholders and establish an assessment team	List of stakeholders and assessment team members.	Section 3.5	
Determine the scope of the climate risk assessment	An agreed climate risk assessment scope	Scope outlined in Consultancy Agreement between HI & Climatewise Design, dated 6/6/24, HI24113	Project scope applies to the BBCH new capital works only. Risk scope is limited to acute risks and primary consequences, with some secondary risks being identified where relevant.
Step 2. Identify, Analyse and Evaluate the Risks			
Understand past and recent climate hazards and trends	A list of climate variables relevant to your context	Section 4.6 Table 5	<i>This version updated to include AR6 data via NARCLiM 2.0</i>
Consult relevant climate projections	An understanding of projected climate change impacts	BBCH Climate Risk Assessment Tool Rev02	Preliminary impacts outlined in risk assessment tool.
Identify risks and opportunities	A list of climate change risk statements	BBCH Climate Risk Assessment Tool Rev02	Preliminary risks outlined in risk assessment tool.
Analyse and evaluate risks	Priority climate risks with agreed risk ratings	BBCH Climate Risk Assessment Tool Rev02	Risk is a combination of the likelihood of an event compounded by the consequence of that impact taking place. SNSWLHD have reviewed Consequence via bdin-GCOR-000303
Step 3. Treat the Risks			
Identify and prioritise adaptation actions	A resourced adaptation plan including actions to improve climate change risk maturity	Section 5	Recommended adaptations have been included in this report.
Develop and implement an adaptation plan		Section 5.	<i>This revision provides recommended adaptation actions only. Deployment of adaptations is to be by the LHD.</i>
Step 4. Monitor and Review			

Process Step	Actions	Reference	Notes
Develop a monitoring and evaluation plan	A plan to track adaptation implementation, and monitor climate risks	Section 6	Adaptation Plan requires alignment with SNSWLHD Asset Management plan. To be completed by SNSWLHD
Integrate monitoring, review and learning into existing systems	An updated risk register	Section 6.2	Section 6.2 Figure 18 provides a draft review plan for further development.

3.2. Scope of This Report

This report is organised into two parts, being climate risk identification and assessment, followed by recommended adaptations to a portion of those risks.

3.2.1. Climate Risk Assessment

The first phase is to assess and identify the acute or primary climate change impacts that pose a direct risk to the BBCH, in accordance with the following standards:

1. 'Climate change impact and risk management – A guide for business and government (2006), Sections 4-6', Australian Government, Dept. of the Environment and Heritage, Australian Greenhouse Office (AGO); [This task is site-specific]
2. *Climate Risk Ready NSW Guide*, 2021. NSW Department of Planning, Industry & Environment's (DPIE). This Guide is aligned to the NSW Treasury *Internal Audit and Risk Management Policy (TPP20-08)* and *Risk Management Toolkit (TPP 12-03)*.

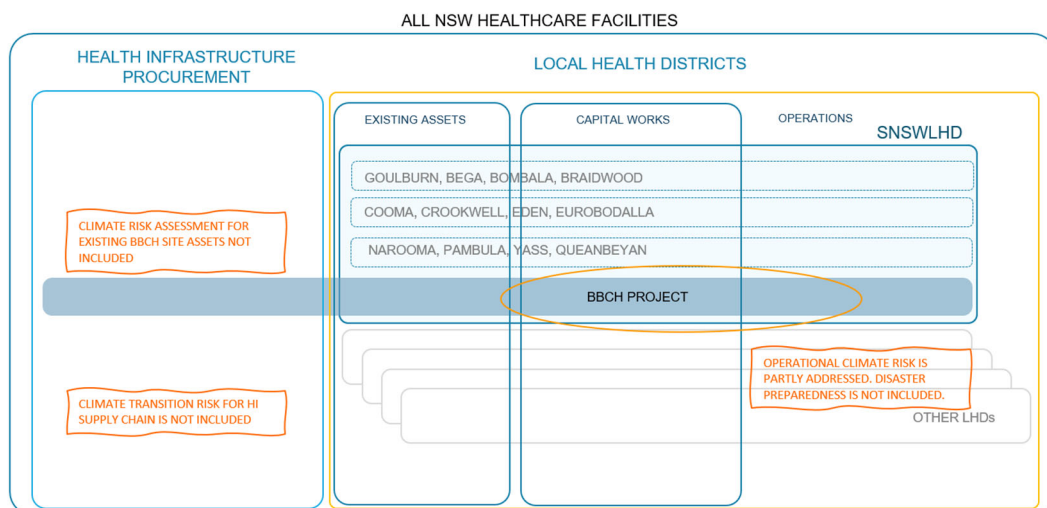
3.2.2. Climate Adaptation Plan

Having identified and prioritised the relevant climate risks we then develop recommended adaptations. These adaptations may be immediately incorporated in the BBCH design program or might be captured within the longer-term Strategic Asset Management Plan and Asset Management Plan for BBCH. This phase of the work:

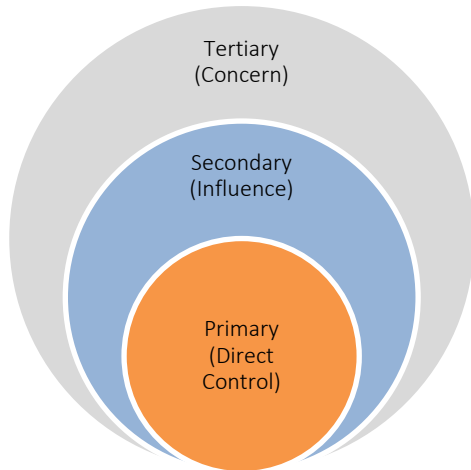
1. Addresses 'extreme' and 'high' risks identified in accordance with AS 5334:2013 Climate Change Adaptation for Settlements and Infrastructure, (for reference this also meets the requirements of Green Star Design & As-Built v1.3 '03 Adaptation & Resilience'); and
2. Presents adaptation recommendations using the Climate Risk Ready NSW Climate Risk Assessment Tool 'Appendix C Climate Risk Assessment Tool_2021.xlsx'.

3.3. Scope of Risk Assessment

This climate risk assessment has been carried out over the BBCH Project scope of works to assess site-based climate risks for proposed new works under the BBCH program. The assessment therefore makes recommendations for inclusion in the design program for the Redevelopment project.



In carrying out climate risk assessment there remains a degree of uncertainty and unpredictability. This Climate Adaptation Plan has its focus on risks that have the highest degree of predictability and on impacts that we have the highest degree of control over (i.e., primary risks). For example, in the event of ongoing extreme heat events in the Batemans Bay Region, we have direct control over the building’s ability to withstand those heat impacts (primary impacts), some control over the impacts from widespread grid failure (secondary impacts), and little control over the impacts from heat-driven crop failures and economic / social fallout (tertiary impacts).



Tertiary Risk; A wide range of issues of importance to the organisation and the community. Awareness / understanding are important. Difficult or impossible to have direct influence on the risks themselves, however the organisation (and building) can develop strategies to cope with the risks should they manifest.

Secondary Risk; Areas of partial or shared responsibility or influence. Advocacy, lobbying, education, and communication are possible in collaboration with other organisations and local government and authorities.

Primary Risk; Core business, statutory responsibilities, service provision. Direct risks relating to climate-driven events and natural disaster preparedness. Direct decision-making and action is possible and necessary to address risk.

Figure 11 Different levels of risk and control

Using the Adapt NSW Climate Risk Ready risk and adaptation tool as a communication format, the scope of this report is to identify climate risks and recommend adaptations that reduce that risk, with the result being a reduced overall level of risk.

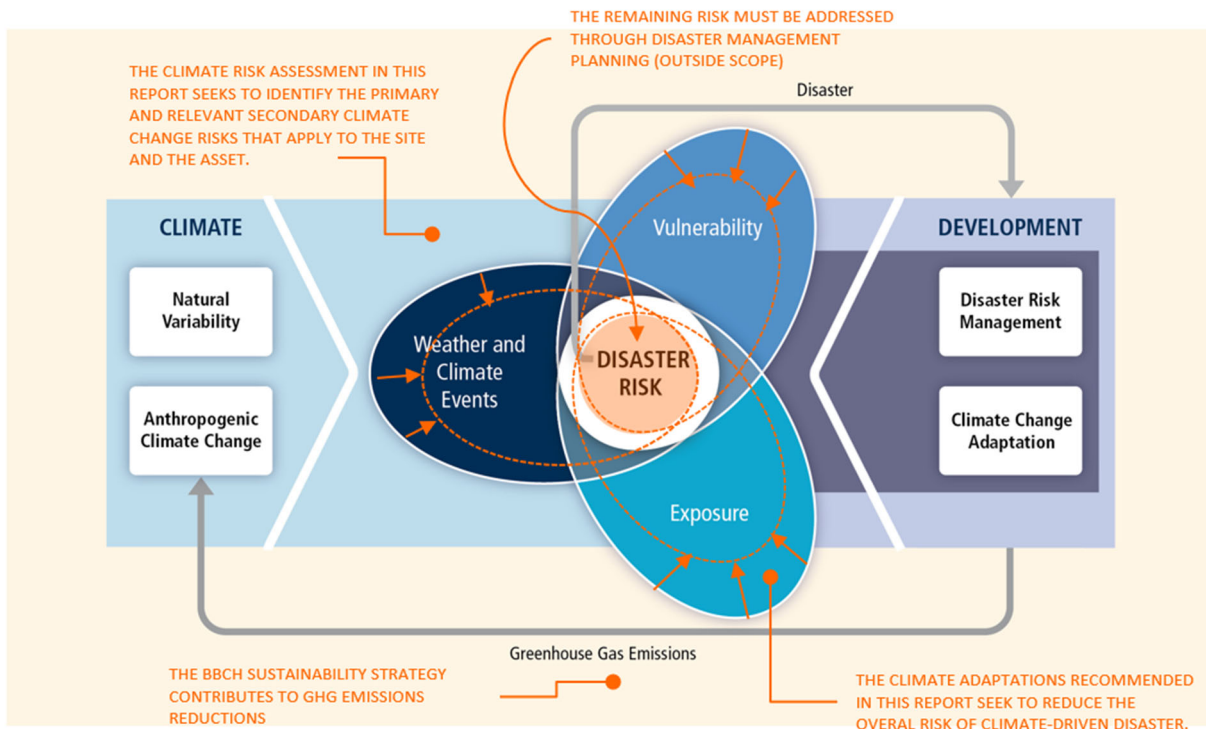


Figure 12 This report aims to reduce the degree of climate-driven risk through adaptation measures. (image from IPCC-SREX(2012))

In preparation of this Climate Adaptation Plan, the following questions were asked:

- Will the building be able to withstand climate-driven physical impacts in the future?
- Will the building adversely impact the safety and wellbeing of the occupants?
- Will there be an impact to the business of the building owner and tenant/s due to future climate impacts?
- Will the surrounding environment be harmed due to climate change impacts on the building?

3.4. What is Not Covered

As indicated in the diagram above, a climate adaptation plan is not able to guarantee that all climate-related risks have been mitigated. Rather the intent of the work is to minimise the risk as far as is reasonable, with the residual risk to be managed through Disaster Preparedness. Disaster Preparedness is outside the scope of this report and this report should be read in conjunction with applicable disaster management plans, emergency response plans, area structural plans and the like.

This report also does not address Transitional Risk⁵. Examples of a transition risk might be;

- A carbon emissions price is re-instated by a State or Commonwealth Government, leading to an increase in the price of concrete, leading to an increase in the capital cost of the project works; or
- The property insurance industry responds to a string of natural climate-driven events (such as bushfires followed by storms and floods) by ceasing to provide cover for such events – which might for example move a range of currently ‘medium’ climate risks for the asset into the ‘high’ risk category given that the consequences of a failure have now increased.

3.5. Stakeholders

Key stakeholders that have been considered as part of this Climate Adaptation Plan are listed in the table below

Table 2 Project Stakeholders

Stakeholder	Responsible Party	Objectives
Head Contractor	TBC	Construct a quality building structure to last at least 80 years, including robust thermal insulation and envelope, and storm-prepared rainwater and stormwater systems.
Building Owner	NSW Treasury	Provide world class healthcare facilities, designed to withstand climate shocks and disasters, and prepared to function as disaster recovery centre during climate-driven events.
SNSWLHD Risk Manager	Jen Spain [Director Governance, Risk and Audit]	Align ongoing climate risk assessment with SNSWLHD risk management framework, conduct / support regular reviews of climate risk and update this Plan accordingly
SNSWLHD Climate Resilience Officer	Unknown	To monitor IPCC climate change data and recommendations, review and update the Adaptation Plan as required
Building Operator	Southern NSW LHD	Incorporate climate adaptations into asset management plan and procedures
Architect	Architectus, Conrad Gargett	Design a building with long term climate resilience, maintainability, ability to be upgraded to respond to a warming climate.
Structural Engineer	GHD	Design a resilient structure to last 50+ years, specifically adapted to respond to potential climate risks
Mechanical Engineer	GHD	Design climate-adapted mechanical systems capable of reliable operation during extreme heat events and peak temperatures
Building Occupants	Southern NSW LHD	Occupy safe and comfortable workplaces, learning areas and living accommodation.
Asset Insurer	TBA	Make clear the insurers’ policy towards climate related risks

3.6. Project Characteristics

The Batemans Bay Community Health project is located at 7 Pacific Street, Batemans Bay NSW 2536.

⁵ The BBCH Sustainability Strategy, also prepared by Climatewise Design, anticipates a range of transitional risks such that the recommendations put forward in that Strategy go some way to mitigating the more easily anticipated transitional risks. This aspect should not however be considered as comprehensive.

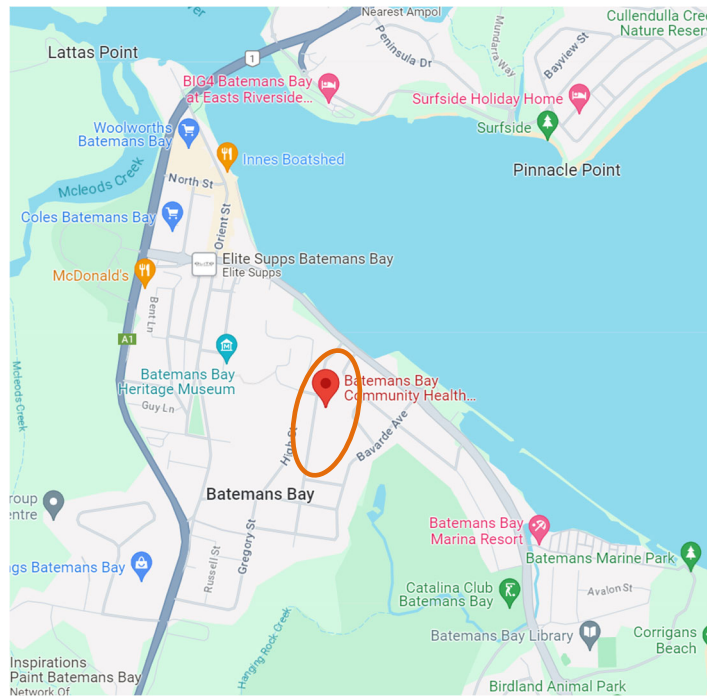


Figure 13 The Batemans Bay Community Health campus

3.7. Site Characteristics

The characteristics of the site are described below for the site locality, construction and building system details. These details have been used for the climate risk assessment modelling. Wherever inputs have not been available the default values have been used.

Table 3 Site characteristics and town planning

Site Inputs	Description
Land Zoning	Eurobodalla DCP 2011 R3 Medium Density Residential
Heat Threshold (C)	42°C
Wind Speed Design Threshold	1 in 500 (default)
Bushfire protection	The site is not on designated Bushfire Prone Land
Foundation design	High strength rigid grid assumed
Asset lifetime [from now]	Assumed as 2090
Floor height above ground (m) (lowest habitable floor / ground floor, or point of ingress to basement)	RL 18.45 AHD Basement / undercroft housing essential services
Elevation above Sea level (m) ((lowest habitable floor / ground floor)	RL 22.95 AHD

3.8. Building Elements

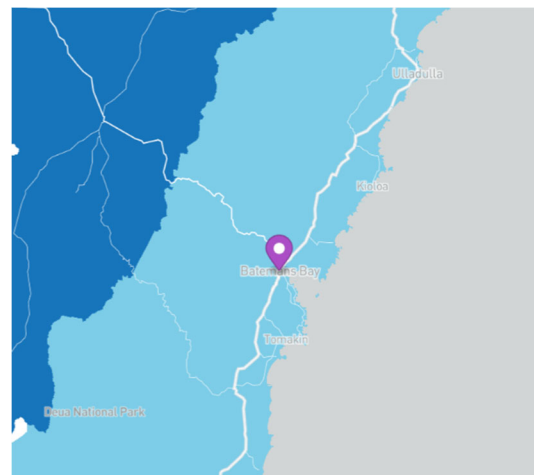
The characteristics of the site are described below for the site locality, construction and building system details. These details have been used for the climate risk assessment for existing and proposed assets.

Table 4 Building Element Details

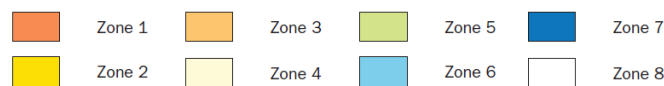
Building Details	Description – Existing Assets	Description – Redevelopment
Building condition	n/a	New construction (completion c.2026)
Roof details	n/a	Metal cladding on structural steel frame
Guttering	n/a	Eaves gutters with overflow.
External walls	n/a	New; steel framed, glazing, metal sheet / composite paneling.
Internal walls	n/a	Plasterboard / panelised system with paint or vinyl coverings
Windows	n/a	Aluminium framed double-glazed units. Façade system TBA
External doors	n/a	Glazed aluminium frame (assumed)
Air Conditioning System	n/a	(assumed) Central chilled and heating hot water plant, split system mechanical units
Lighting	n/a	100% LED lighting
Rainwater System	n/a	20kL Rainwater harvest, storage and reticulation
Alternative Energy	n/a	10.4kW PV system

3.9. Climate Region

The site lies within the Climate Zone 6 as identified by the Building Code of Australia (BCA), Australian Building Codes Board (ABCB) as seen below. Climate Zone 6 relates to a mild, temperate climate with low diurnal temperature range near coast to high diurnal range inland, four distinct seasons. Summer and winter can exceed human comfort range, spring and autumn are ideal for human comfort, mild to cool winters with low humidity, hot to very hot summers, moderate humidity.



Climate Zones



3.10. Referenced Documents

In carrying out this climate risk assessment and adaptation planning the following documents have been referred to;

- Climate Risk Ready NSW Guide – Practical guidance for the NSW Government sector to assess and manage climate change risks, published by the NSW Department of Planning, Industry & Environment (2020)
- Guide to Climate Change Risk Assessment for NSW Local Government, 2019 Revision, Department Of Planning, Industry & Environment
- AS 5334-2013 Climate Change Adaptation for Settlements and Infrastructure – A Risk Based Approach
- Climate Change in Australia; <https://www.climatechangeinaustralia.gov.au/en/>
- Climate change impact and risk management – A guide for business and government (2006) Australian Government, Dept. of the Environment and Heritage, Australian Greenhouse Office;
- Heatwaves Climate Change Impact Snapshot (2024) NSW Government, Environment and Heritage, Adapt NSW;
- Adapting for Climate Change – A long term strategy for the City of Sydney, City of Sydney 2017

4. Climate Risk Assessment

4.1. Timescales

This Climate Adaptation Plan was developed in accordance with the Australian Greenhouse Office (AGO), *Climate Change Impacts & Risk Management, A Guide for Business and Government* Guide (2006). The climate change scenarios were assessed at two timescales (**2050** and **2090**). These time scales were chosen to assess the likely building lifespan and to understand and pre-empt possible impacts of the building towards end of life.

4.2. Justification of Timescale

The **2050** timescale has been selected to provide a near-term projection of climate change risks within some 12-13 years following practical completion of the BBCH Project, assuming completion during 2026 followed by 1-2 years of building commissioning and tuning.

The **2090** timescale approximates the full lifespan of the new works to be delivered under the Redevelopment Project. Whilst the climate conditions in 2090 are less certain and less predictable, the potential consequences of climate change are also significantly higher based on current trajectories, hence the 2090 timescale allows us to address the potential escalation of climate risk against the longer-term degradation of the asset.

It remains the asset owner's responsibility to be aware of the future insurability and liability risks associated with the impacts of climate change and associated events. This may include increased insurance premiums and/or reduced insurance coverage.

4.3. Climate Modelling

Climate modelling reviewed by the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) were used to assess future climate projections for Global Circulation Models (GCMs) which uses Representation Concentration Pathways (RCP) to determine climate change projection scenarios at a very broad regional scale across Australia – for example Southern Slopes (Victoria East). The CMIP5 datasets are the latest ensemble for the IPCC AR, released in 2013.

The CSIRO and AdaptNSW have recently released updated modelling for NSW, NARCLim 2.0 [NSW and Australian regional climate modelling], which provides updated Regionally Downscaled Models (RCM) at a 4km x 4km pixel grid. Where these RCMs do provide updated data these have been used. NARCLiM brings together globally recognised science and multidisciplinary expertise to deliver regional climate projections for south-eastern Australia. NARCLiM data and products are co-designed with end-users and stakeholders to ensure the data are fit-for-purpose for a range of user groups.

The different types of climate scenario modelling have been described to assist with justifying the climate change and emission scenarios chosen for the development of the project Climate Adaptation Plan.

4.4. Representation Concentration Pathways

Four RCP scenarios are applicable to CMIP5 modelling including RCP2.6, RCP4.5, RCP6.0 and RCP8.5 which represents the amount of radiative forcing (W/m^2) that is likely to occur at the end of the 21st Century, i.e., the amount of extra heat (energy) the atmosphere will retain as a result of additional greenhouse gas emissions on Earth by the year 2100. Each scenario provides a climate response to a set of greenhouse gas, aerosol, and land use predictions in line with socio economic assumptions anticipated for the future.

The image below⁶ shows how the RCP scenarios are ‘themed’ scenarios that represent different levels of global emissions and temperature impacts based on multiple global climate models.

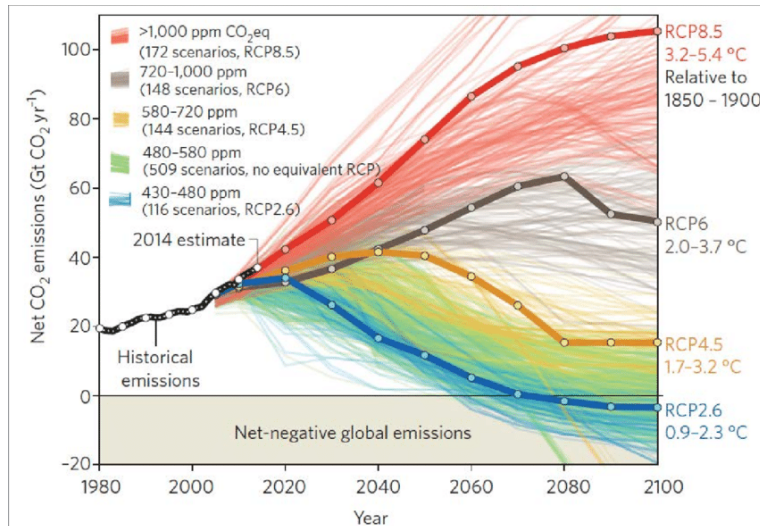


Figure 14 RCP emissions and temperature scenarios, (Fuss et al. 2014)

The consensus amongst climate change scientists is that the RCP2.6 scenario is highly unlikely as immediate drastic climate change policy and reforms would be required on a global scale in order to limit the peak of radiative forcing of $3W/m^2$. Conversely, RCP8.5 represents the worst-case option and assumes a highly energy intensive scenario where the total global fossil-fuel based energy consumption continues to grow throughout the century, reaching well over 3 times current levels.

RCP6.0 and RCP4.5 are intermediate scenarios that assume mitigation strategies developed on a global scale are likely to lessen the impact due to climate change by the end of the 21st Century.

Whilst at present the adoption of RCP scenarios is evenly adopted between RCP4.5 and RCP8.5, until there is observed (i.e., measured) evidence of a downward trend in global Greenhouse Gas Emissions we adopt a risk-averse and conservative approach by using the RCP8.5 scenario. This represents an equivalent range of anthropogenic warming of between $3^{\circ}C - 5.5^{\circ}C$. The NSW/ACT average annual temperature has already warmed by $1.4^{\circ}C$ since 1910.

4.5. Climate Variables

Climate variables considered when undertaking climate adaptation plans are those impacted due to global warming, also known as primary effects including precipitation, humidity, wind, air temperature and sea surface temperature. Secondary effects are the climate impacts derived from the primary variables including relative humidity, coastal inundation, sea level rise, bushfires, cyclones, flood, heat wave and drought.

The table below assesses the applicable climate variables and the associated projections for the site (Southern Slopes (Victoria East) Sub-Cluster for the chosen assessment time-periods.

⁶ Fuss, S., Canadell, J., Peters, G. et al. Betting on negative emissions. *Nature Clim Change* **4**, 850–853 (2014). <https://doi.org/10.1038/nclimate2392>

4.6. The Southern Slopes (Victoria East) Sub-Cluster

The Southern Slopes sub-cluster is within the ‘midlatitudes’ of the global climate system, falling between the subtropical ridge of high pressure (at about 30 °S) and the so called ‘Roaring Forties’ (at 40-50 °S).

The region receives rainfall from a variety of weather systems, including cold fronts and troughs coming from the west as well as cutoff lows and other systems.⁷ The following projections are applied to this region;



Figure 15 Southern Slopes Victoria East Sub-cluster

- Average temperatures will continue to increase in all seasons (very high confidence).
- More hot days and warm spells are projected with very high confidence. Fewer frosts are projected with high confidence.
- Generally less rainfall in the cool season is projected with high confidence. Changes to summer and autumn rainfall are possible but less clear. For the near future, natural variability is projected to dominate any projected changes.
- Increased intensity of extreme rainfall events is projected, with high confidence.
- Mean sea level will continue to rise and height of extreme sea-level events will also increase (very high confidence).
- A harsher fire-weather climate in the future (high confidence).
- On annual and decadal basis, natural variability in the climate system can act to either mask or enhance any long-term human induced trend, particularly in the next 20 years and for rainfall.

Urban heat island effects describe the warming influence on urban regions from their built environment. They operate in all seasons, and are usually greater at night (Trewin, 2010). Their global impact is relatively small. They may, however, have significant local impacts, and must be considered for urban projections. Stations that have experienced the urban heat island effect have been removed from the temperature record for detection and attribution purposes.

Table 5 Site-specific climate change data

Climate Effect	Associated Projections (Southern Slopes (Victoria East)) compared with baseline climate data (1986-2005)		
	2050	2090	Source
Mean Temperature Change (°C)	SS Cluster: Warmer 0.50 to 1.50 Predicted by 56% of models Hotter 1.50 to 3.00 Predicted by 44% of models EC Cluster Hotter 1.50 to 3.00 Predicted by 73% of models Warmer 0.50 to 1.50 Predicted by 27% of models	SS Cluster: Much Hotter >3.00 Predicted by 58% of models Hotter 1.50 to 3.00 by remainder of models EC Cluster Much Hotter >3.00 Predicted by 79% of models Hotter 1.50 to 3.00 Predicted by 21% of models	Climate Change in Australia CMIP5, RCP8.5 climate modelling
Additional Heat Days (single day over 35°C)	(2030) +0.85 additional days, primarily during Summer	(2090) +3.79 additional days, primarily during Summer	NSW and ACT Regional Climate Modelling (NARClm 2.0)

⁷ Climate Change in Australia, Projections for Australia’s NRM Regions, ‘Southern Slopes (Victoria East)’

Climate Effect	Associated Projections (Southern Slopes (Victoria East)) compared with baseline climate data (1986-2005)		
	2050	2090	Source
	[NOTE: figures apply to Cluster level rather than sub-cluster, hence include data for Southern Victoria and all of Tasmania. BBCH site sits at northern-most tip of Cluster. East Coast Cluster figures have been included for comparison / overlay.]		
Increase in Heatwave events per annum (3 consecutive days over 35°C) ⁸	(2030) +1.0 to 1.5	(2070) +2.5 to 4.5	NSW and ACT Regional Climate Modelling (NARCLIM) CMIP3, SRES A2 climate modelling (dynamic downscaling) (comparable to RCP8.5 at a regional scale)
Annual Humidity %	SS Cluster: Small decrease -10.00 to -1.00 (Predicted by 53% of models) No change -1.00 to 1.00 (44% of models) Small Increase 1.00 to 10.00 (3% of models) EC Cluster: Small decrease -10.00 to -1.00 (Predicted by 59% of models) No change -1.00 to 1.00 (21% of models) Small Increase 1.00 to 10.00 (21% of models)	SS Cluster: Small decrease -10.00 to -1.00 (Predicted by 88% of models) No change -1.00 to 1.00 (9% of models) Small Increase 1.00 to 10.00 (3% of models) EC Cluster: Small decrease -10.00 to -1.00 (Predicted by 56% of models) No change -1.00 to 1.00 (24% of models) Small Increase 1.00 to 10.00 (21% of models)	Climate Change in Australia CMIP5, RCP8.5 climate modelling
Mean Rainfall Change (Annual)	SS Cluster: Little Change -5.00 to 5.00 (Predicted by 51% of models) Drier -15.00 to -5.00 (Predicted by 41% of models) EC Cluster: Wetter 5.00 to 15.00 (predicted by 16% of models) Little Change -5.00 to 5.00 (Predicted by 31% of models) Drier -15.00 to -5.00 (Predicted by 33% of models) Much Drier <-15 (predicted by 17% of models)	SS Cluster: Drier -15.00 to -5.00 (34% of models) Much Drier <-15.00 (Predicted by 31% of models) Little Change -5.00 to 5.00 (27% of models) EC Cluster: Much Drier <-15 (predicted by 37% of models) Drier -15.00 to -5.00 (Predicted by 23% of models) Little Change -5.00 to 5.00 (Predicted by 21% of models) Wetter 5.00 to 15.00 (predicted by 13% of models)	Climate Change in Australia CMIP5, RCP8.5 climate modelling

⁸ Heatwaves – Climate Change Impact Snapshot, Adapt NSW, NSW Office of Environment & Heritage

Climate Effect	Associated Projections (Southern Slopes (Victoria East)) compared with baseline climate data (1986-2005)		
	[NOTE: figures apply to Cluster level rather than sub-cluster, hence include data for Southern Victoria and all of Tasmania. BBCH site sits at northern-most tip of Cluster. East Coast Cluster figures have been included for comparison / overlay.]		
	2050	2090	Source
Annual 1-in-20year Rainfall (%)	SS Cluster: Small Increase 10 to 30% (Predicted by 48% of models) Little Change -10.00 to 10.00 (48% of models) EC Cluster: Small Increase 10 to 30% (Predicted by 48% of models) Little Change -10.00 to 10.00 (43% of models)	SS Cluster: Small Increase 10 to 30% (Predicted by 60% of models) Large Increase >30.00 (30% of models) EC Cluster: Small Increase 10 to 30% (Predicted by 45% of models) Large Increase >30.00 (40% of models) Little Change -10.00 to 10.00 (15% of models)	Climate Change in Australia CMIP5, RCP8.5 climate modelling
Sea Surface Temperature	No Data Available	No Data Available	
Annual Wind Speed %	SS Cluster: No Change -1.00 to 1.00 (Predicted by 29% of models) Small Increase 1 to 3.09 (Predicted by 29% of models) Small Decrease -3.09 to -1.00 (24%) Large Increase >3.09 (Predicted by 12% of models) EC Cluster: Small Decrease -3.09 to -1.00 (21%) No Change -1.00 to 1.00 (Predicted by 26% of models) Small Increase 1 to 3.09 (Predicted by 29% of models) Large Increase >3.09 (Predicted by 24% of models)	SS Cluster: (Low consensus amongst models) Large Decrease <-3.09 (18%) Small decrease -3.09 to -1.00 (predicted by 18% of models) No Change -1.00 to 1.00 (24%) Small Increase 1 to 3.09 (Predicted by 29% of models) Large Increase >3.09 (12%) EC Cluster: Large Decrease <-3.09 (21% of models) No Change -1.00 to 1.00 (Predicted by 26% of models) Small Increase 1 to 3.09 (Predicted by 24% of models) Large Increase >3.09 (Predicted by 26% of models)	Climate Change in Australia CMIP5, RCP8.5 climate modelling
Annual 1-in20year Windspeed (%)	SS Cluster: Little Change -5.00 to 5.00 (Predicted by 87% of models) EC Cluster: Little Change -5.00 to 5.00 (Predicted by 80% of models)	SS Cluster: Little Change -5.00 to 5.00 (Predicted by 73% of models) Small Increase 5.00 to 10.00 (27% of models) EC Cluster: Small Decrease -10.00 to -5.00 (20% of models) Little Change -5.00 to 5.00 (Predicted by 73% of models)	Climate Change in Australia CMIP5, RCP8.5 climate modelling
Cyclones	Not applicable	Not applicable	
Fire Weather Number of days a year Forest Fire Danger Index (FFDI) >50	(2030) 0.0 to 1.0 [weighted in Summer]	(2090) +0.91 [weighted across Summer and Spring]	NSW and ACT Regional Climate Modelling (NARClm 2.0)

Climate Effect	Associated Projections (Southern Slopes (Victoria East)) compared with baseline climate data (1986-2005)		
	[NOTE: figures apply to Cluster level rather than sub-cluster, hence include data for Southern Victoria and all of Tasmania. BBCH site sits at northern-most tip of Cluster. East Coast Cluster figures have been included for comparison / overlay.]		
	2050	2090	Source
Time in Drought (%)	SS Cluster: Large increase >30.00 (Predicted by 53% of models) Small Increase 10-.00 to 30.00 (18% of models) Small Decrease -30.00 to -10.00 (18% of models) EC Cluster: Large increase >30.00 (Predicted by 41% of models) Small Increase 10-.00 to 30.00 (24% of models) Little Change 10.00 to 10.00 (12% of models) Small Decrease -30.00 to -10.00 (12% of models) Large Decrease <-30.00 (12% of models)	SS Cluster: Large increase >30.00 (Predicted by 67% of models) Little Change 10.00 to 10.00 (13% of models) EC Cluster: Large increase >30.00 (Predicted by 53% of models) Small Increase 10-.00 to 30.00 (13% of models) Little Change 10.00 to 10.00 (13% of models) Small Decrease -30.00 to -10.00 (10% of models) Large Decrease <-30.00 (10% of models)	Climate Change in Australia CMIP5, RCP8.5 climate modelling
Sea Level Rise	Not applicable	Not applicable	
Coastal Inundation	Not applicable	Not applicable	
Fluvial Flooding	Not applicable	Not applicable	

The risk assessment framework developed for this Climate Adaptation Plan comprises the following three elements:

- Consequence: what will be the effect of the development should the impact occur?
- Likelihood: how likely is it that the impact will occur?
- Risk Rating: what is the associated risk of the development when the likelihood of it happening is measured against the possible consequence of the impact?

4.7. Risk Rating – Consequence Scale

The following consequence scale has been considered for the project. Various scales of potential impact have been correlated with four key factors associated with the success of the development.

Table 6 Risk Consequence Scale

Ratings	Health and Safety	Environmental	Financial	Functionality
Catastrophic	Large numbers of serious injuries or loss of lives	Major widespread loss of environmental amenity and progressive irrecoverable environmental damage	Costs expected to bankrupt the organisation	Complete inability to deliver care
Major	Isolated instances of serious injuries or loss of lives	Severe loss of environmental amenity and a danger of continuing environmental damage	Costs cause financial stress to the organisation resulting in redundancies or asset sales etc.	High degree of remedial action / management required to maintain delivery of care
Moderate	Small number of injuries and or general	Isolated but significant instances of environmental damage	Extent of maintenance/repair	Some remedial actions required to

	discomfort for extend periods of time	that might be reversed with intensive efforts	costs expected to increase noticeably	maintain delivery of care
Minor	Serious near misses or minor injuries	Minor instances of environmental damage that could be reversed	Maintenance costs expected to increase noticeably	Minor disruptions to delivery of care
Insignificant	Minor discomfort for short periods of time but no perceived threat	No environmental damage	No change in costs expected	No significant disruptions to delivery of care

4.8. Risk Rating – Likelihood Rating

The likelihood scale rating table as seen below was established to set the context of the possibility of the potential climate scenario occurring

Table 7 Risk Likelihood Rating *prefilled based on Table 11 of Climate change impact and risk management - A guide for business and government (Australian Greenhouse Office 2006)

Rating	Recurrent risks	Single events
Almost certain	Could occur several times per year	More likely than not – probability greater than 50%
Likely	May arise about once per year	As likely as not – 50/50 chance
Possible	May arise once in 10 years	Less likely than not but still appreciable – probability less than 50% but still quite high
Unlikely	May arise once in 10 to 25 years	Unlikely but not negligible – probability low but noticeably greater than zero
Rare	Unlikely during the next 25 years	Negligible – probability very small, close to zero

4.9. Risk Priority Levels

The Risk Priority Matrix as referenced in the Section 4.5.3 of the AGO *Climate Change Impacts & Risk Management: A Guide for Business and Government* was used to carry out the risk assessment for the project, where the level of priority is associated with each combination of *consequence* and *likelihood*.

Table 8 Risk Priority Level Matrix

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Medium	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	Medium
Rare	Low	Low	Low	Low	Medium

The interpretation of the risk levels is as follows:

- **Extreme** risks demand urgent attention at the most senior level and cannot be simply accepted as a part of routine operations without executive sanction
- **High** risks are the most severe that can be accepted as part of routine operations without executive sanction, but they will be the responsibility of the most senior operational management and reported upon at the executive level
- **Medium** risks can be expected to form part of routine operations, but they will be explicitly assigned to relevant managers for action, maintained under review and reported upon at senior management level
- **Low** risks will be maintained under review but it is expected that existing controls will be sufficient and no further action will be required to treat them unless they become more severe

4.10. Risks Identified

All Extreme and High risks are to be addressed through the Adaptation Plan. Based on the climate projections at site level (per Table 5 above) and the preliminary risks review per the BBCH Climate Risk Register Rev1 dated 21/6/24 the following High and Extreme risks have been identified. All risks require further detailed analysis in collaboration with BBCH asset managers who are required to take a final view on ‘consequence’ which thus determines ‘risk’, with recommended adaptations to form the next revision of this report.

Table 9 Key Risks Identified

Climate Hazard	Potential Risks
Ongoing increases in maximum temperatures. Modelling indicates daily maxima are likely to reach 50°C and beyond in inland NSW by 2040.	<ul style="list-style-type: none"> • Decreasing performance of mechanical equipment, in particular air conditioning. • Degradation of building fabric including façade sealants. • Heat stress to landscape, including loss of landscape. • Heat stress for building users outdoors, reducing the safety of outdoor spaces, pedestrian connections and places of respite. • High risk of heat-related illness, heat-stress and fatality during compound events such as high heat event combined with energy grid failure.
Increased frequency of heat events (three or more days over 35°C), increased peak temperatures during heat events, and increased duration of heat events.	
Increased rainfall intensity	<ul style="list-style-type: none"> • Physical damage to assets, interruption of building functions and services. • Physical risks posed to building users.
Increased frequency of droughts	<ul style="list-style-type: none"> • Damage to building footings and structures. • Loss of landscape.

5. Climate Adaptations

5.1. Process

Adaptation pathways are an effective way for an organisation to document agreed thresholds and triggers for management across a suite of adaptation options. They support a management approach that is flexible enough to ensure risk exposure is being managed whilst avoiding path dependency and locked-in responses.

Pathway planning is a useful approach to guide adaptive management. They help address the inherent uncertainty in planning for, and responding to, climate change. Clear responsibilities and procedures for overseeing, managing and monitoring climate risk are required for this approach to be effective. The approach has been successfully applied in adaptation planning for infrastructure and water management projects, and broader cross-sector adaptation planning.

NOTE: adaptations are yet to be developed in collaboration with BBCH asset managers. The next revision of this report will describe recommended adaptations in more detail.

5.2. Adaptation Plan

This adaptation plan addresses the ‘extreme’ and ‘high’ climate risks identified in the BBCH Climate Risk Assessment Tool (based on Adapt NSW 2021 version). The recommended adaptations are founded on five principles⁹ to ensure that they are:

1. Resilient and long-term: politically sustainable, economically efficient, and socially inclusive
2. Flexible and dynamic: able to evolve and respond to unexpected trends and consequences
3. Based on the most up-to-date data
4. Able to harness natural environmental systems
5. Delivered via a comprehensive and effective communication strategy.

Recommended adaptations are outlined below.

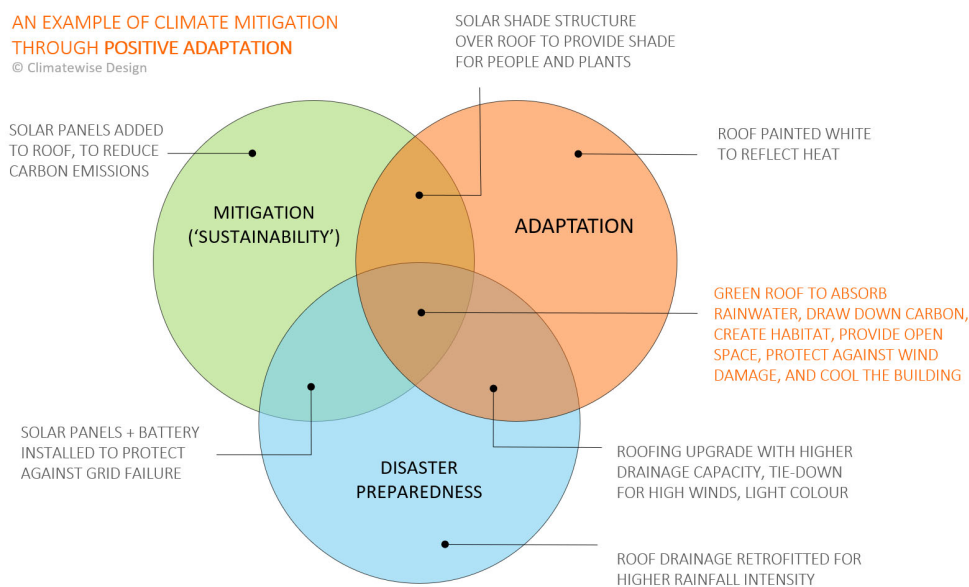


Figure 16 An example of Positive Adaptation (Roof Design)

⁹ Referenced from the Sydney Climate Adaptation Strategy, City of Sydney 2017

5.3. Priority Adaptations

The following adaptation strategies and approaches are recommended.

Table 10 Priority Adaptations

Climate Hazard	Adaptation Response	Adaptation (and Mitigation) Benefit
Increased peak heat & heat events	Site Heat Resilience strategy to address outdoor heat risk. Outcomes include potential addition of indoor or controlled environment landscape within buildings.	Improved protection from heat in outdoor spaces Improved weather protection between buildings
Increased peak heat & heat events	Additional shade structures over exposed areas, such as car park shading, solar panels.	Reduced heat load to buildings, reduced energy consumption. Potential to extend building fabric lifespan. Potential to support improved outdoor amenity and open space.
Increased heat & Rainfall intensity	Reduction of hard-paved surfaces throughout the site	Reduced run-off volumes and intensity. Reduced heat island effect from radiant heat.
Increased heat & Rainfall intensity	Increased tree canopy and increased landscaped areas [a pre-requisite is a reliable irrigation water supply]	Increased urban shade which contributes to reduced heat island effect, supporting improved urban heat resilience and reduced air conditioning loads for buildings. Reduced stormwater runoff due to tree canopy rainwater retention.
Increased heat & Rainfall intensity	Measures may include green infrastructure such as bio-swales and raingardens.	Reduced run-off volumes and intensity. Reduced heat island effect from radiant heat. Improved open space and places of respite.
Increased Rainfall intensity	Additional rainwater harvesting and storage capacity, increased rainwater detention capacity through built and nature-based solutions.	Reduced stormwater runoff intensity and volume, reduced flood risk
Increased Rainfall intensity	Upgrades to roof drainage capacity including upgrade to or elimination of box gutters	Reduced risk of roof drainage blockage and/or overflow, reduced risk of roof leakage or collapse. Reduced roof maintenance costs.

6. Monitor and Review

6.1. Monitoring and Evaluation Plan

The monitoring and evaluation plan helps achieve a number of objectives. These will include;

- To assess progress of adaptation actions
- To track risk exposure at enterprise or program level, or provide input into enterprise risk and financial risk reporting
- To identify and integrate new knowledge about climate change impacts and climate projections as they arise
- To track management thresholds and triggers
- To inform improvements and realignment of action in response to changing context or impacts
- To provide progress updates to stakeholders or adaptation delivery partners
- To inform reporting to meet legislative or regulatory obligations.

Table 11 Monitoring and Evaluation Plan Minimum Components

Plan Components	Action	BBCH Response (recommendations)
Time period	An agreed period for ongoing monitoring	5-yearly risk re-assessments and adaptation plan updates recommended. Bespoke reviews (even if minor) in response to UN IPCC reports or new data.
Lifecycle	An agreed decision lifecycle for adaptation interventions	To be aligned with SNSWLHD asset management cycle.
Responsibility	For data collection, reviews, and reports	SNSWLHD stakeholder responsible for ongoing climate risk management to be identified.
Outcomes	Clear articulation of long-term and intermediate outcomes	To mitigate all High and Extreme risks identified. To retain insurance coverage year on year.
Performance	Indicators and management triggers	To be developed with BBCH asset management. Examples include <ul style="list-style-type: none"> • Maximum indoor temperatures • No. of heat-related illnesses and incidents reported on site • No. of hours/days under reduced energy supply (due to e.g., grid failure) • No. of roof leaks reported • Total AUD\$ weather-related damage year on year • % loss / gain of tree canopy per annum
Metrics	Agreed measures that will indicate change, and baseline where appropriate	All High and Extreme risks to be mitigated.
Targets	Targets that will demonstrate success	Linked to Performance metrics. To be developed with BBCH asset management.
Review trigger points	To guide changes as new knowledge is gained	Review with each IPCC Working Group report update, and as a minimum with each AR update.

6.2. Ongoing Review & Learning

Given the pace at which new data becomes available in relation to climate change it is vital that any Climate Adaptation Plan developed for the BBCH is regularly monitored, reviewed, and updated. The diagram below describes a recommended starting point for the integration of ongoing climate risk assessments and updates to the Climate Adaptation Plan.

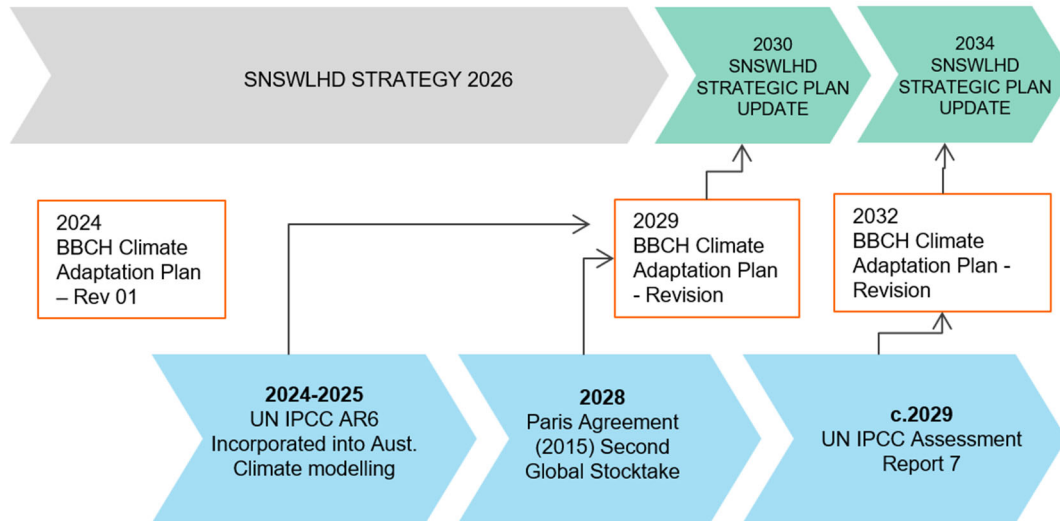


Figure 17 Draft Adaptation Strategy revision cycle

The following notes accompany the diagram above;

1. From time-to-time the UN IPCC release Special Reports¹⁰ which provide interim findings between the major Assessment Report updates. These Special Reports should be monitored and if warranted should inform off-program updates of this Plan.
2. The 2028 'Paris Agreement Second Global Stocktake' may trigger shifts in federal or State-based climate policy or related carbon emissions policy. The results of this activity may warrant re-assessment of climate risk and an update (even if minor) of this Plan.
3. It is recommended that the 2029 and future updates of this Plan are reflected in the next and subsequent updates to the SNSWLHD Strategic Plan.

¹⁰ <https://www.ipcc.ch/reports/>

7. Conclusion & Recommendation

This first draft of the BBCH Climate Risk Assessment and Adaptation Plan provides a site-specific review of identified climate risks only. The site-specific climate risks are identified as a function of understanding relevant climate change hazards that may have possible impacts on the BBCH built assets. Based on the predicated hazards, the risk of these hazards is a calculation of the likelihood of the event taking place compounded by the consequences should that event take place.

All identified High and Extreme risks are to be addressed through proposed adaptations described in this Plan. It should be noted that the classification of climate risks relating to the BBCH are determined by SNSWLHD asset management (rather than by Climatewise Design), given that risk is partly determined by the degree of consequence as nominated by BBCH stakeholders.

This climate risk assessment and report has adopted the 2050 and 2090 timelines. Noting that the project is due to be completed around 2027, the 2050 timeline was selected to provide a near-term view of the most likely climate driven impacts. The 2090 timeline is selected to provide a longer-term view of climate risks over the lifespan of the asset.

The key climate impacts resulting from the initial assessment include;

- Increase in average annual temperatures
- Increase in the frequency, duration, and severity of heat events
- Significant Increase in the frequency and duration of drought
- Increase in rainfall intensity but decrease in overall rainfall per annum

NOTE:

1. This revision has not assessed the climate vulnerability of existing assets, including infrastructure, on the BBCH campus, and is limited to the BBCH Project scope of works only.
2. From this revision, acceptance of the following criteria is required prior to the next revision;
 - a. 2050 and 2090 timelines
 - b. Adoption of RCP8.5

8. References

- Climate Change in Australia; <https://www.climatechangeinaustralia.gov.au/en/>
- NSW Government, Environment and Heritage, Adapt NSW; <http://climatechange.environment.nsw.gov.au/>
- NSW Rural Fire Service, <http://www.rfs.nsw.gov.au/>
- Australian Government, Dept. of the Environment and Heritage, Australian Greenhouse Office; Climate change impact and risk management – A guide for business and government (2006)
- NSW Government, Environment and Heritage, Adapt NSW; Heatwaves Climate Change Impact Snapshot (2015)
- EDG Environment Design Guide; Climate Change Adaptation for Building Designers: An Introduction (2011)
- Investor Group on Climate Change; Assessing Climate Change Risks and Opportunities for Investors: Property and Construction Sector
- City of Sydney, Adapting for Climate Change - A long term strategy for the City of Sydney 2016
- “Commonwealth of Australia, ‘National Climate Resilience and Adaptation Strategy’.” 2015. licensed under a Creative Commons Attribution 3.0 Australia licence(CC BY 3.0) (<http://creativecommons.org/licenses/by/3.0/au/deed.en>).

9. Appendix A – BBCH Climate Risk Assessment Tool

BBCH Climate Risk Register

Risk Register Owner Name:	BBCH
Risk Register Owner Position Name:	[Facility Planner]

Updated by Name:	Climatewise Design
Last Update Date:	27/08/2024

Risk ID	Risk description <i>Uniq. Refer to Guidance for advice on developing a climate risk statement, or refer to the Example in the Risks tab</i>	Business area/Risk owner <i>Who is responsible for managing the risk</i>	Date last assessed DD/MM/YY	Risk category <i>e.g. financial, service delivery, work health and safety</i>	Natural hazards (climate related) <i>e.g. map against natural hazards to help understand how many risks relate to specific natural hazards and/or identify any gaps</i>							Worst case risk rating based on 2050 climate change projections <i>The risk if the current control strategy fails completely, based on the risk assessment criteria outlined by your organisation's enterprise risk management framework/guidance</i>			Worst case risk rating based on 2090 climate change projections <i>The risk if the current control strategy fails completely, based on the risk assessment criteria outlined by your organisation's enterprise risk management framework/guidance</i>			Controls & treatments (existing) <i>Current controls</i>	Control effectiveness <i>Select level of effectiveness from drop-down list</i>	Proposed treatments (adaptation actions) <i>Additional control if risk is not acceptable. Refer to Example adaptation actions tab</i>	Residual risk level 2050 <i>Expected level of risk remaining after adaptation actions are implemented</i>	Review and reporting requirements <i>How and when the risk and controls are to be reviewed and reported</i>	Comments <i>Uncertainties or sensitivities; potential impact on organisational objectives; resources required (financial, physical, human resources, knowledge)</i>
					Sea level rise & Mean temperature	Heatwaves/drought	Relative humidity	Bushfires	Extreme rainfall	Extreme storms	Droughts	Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating						
HEAT - Mean Temperatures																							
1	Increased energy and water demand across the site	Design			✓	✓							Likely	Minor	Medium	Almost certain	Moderate	High	Select	Asset Management Program	Select	Asset Management Program	Ongoing technological advances - assets will need to be continually upgraded. Annual GREP report to MOH.
2	Higher frequency HVAC system replacement requirements	Operations/ Design	23/07/24	Operations/ Design	✓	✓							Possible	Minor	Medium	Likely	Minor	Medium	Select	Asset Management Program	Select		
3	Increased need to cool buildings	Operations	23/07/24	Operations/ Design	✓	✓							Almost certain	Minor	Medium	Almost certain	Minor	Medium	Select	Periodic reviews (5-years) of external solutions such as additional shading, insulation upgrades, roofing upgrades	Select		Consider design controls for new builds and asset upgrade program for existing. For BBCH project: review proposed building envelope specifications / thermal performance against increased mean temperatures.
4	Increased risk to site workers during construction	HI	23/07/24	Operations/ Design	✓	✓							Possible	Moderate	Medium	Possible	Moderate	Medium	Select	Increased preference for off-site fabrication. Shift site-construction hours away from highest heat risk during day, e.g. extend working hours, night work.	Select		HI: confirm that heat risk for site construction workers is adequately addressed via head contracts? Is this risk item adequately highlighted in procurement process?
5	Increased risk to site workers during operations and maintenance	Operations	23/07/24	Operations	✓	✓							Possible	Moderate	Medium	Likely	Moderate	High	Select	UV Exposure policy procedure Appropriate use of PPE Dynamic risk assessment	Select		BBCH: any proposed adaptations to work plans, SWMs etc.? Develop site-wide urban heat resilience plan. BBCH: do existing OH&S systems address heat conditions for personnel? E.g. maximum temp above which staff are not permitted to work outdoors without adequate measures in place? Highest worker risk likely coincides with highest probability of equipment failure.
6	Increased stress on vital equipment and services (e.g. mechanical plant) leading to greater maintenance demands	Operations	23/07/24	Operations	✓	✓							Possible	Moderate	Medium	Likely	Minor	Medium	Select	BBCH: review equipment locations, particularly critical equipment, for overall heat exposure, e.g. equipment exposed to direct sun, or to heated air from hard surfaces. Review remedial / upgrade works through urban heat resilience strategy	Select		BBCH: recommended to review contextual heat risks such as high heat island impacts, direct sun exposure. Consider heat resilience works in conjunction with energy efficiency upgrade works, e.g. equipment performs more efficiently at optimum temperatures
7	Greater instances of superficial peeling, cracking, corrosion, etc. to facades including glazing and cladding, structures and surfaces	Design	23/07/24	Operations/ Design	✓	✓							Possible	Moderate	Medium	Possible	Moderate	Medium	Select		Select		Resource management & additional funding required. [residual risk nominated as 'medium' due to note regarding funding & resourcing.
8	Greater instances of material degradation to facades, structures and surfaces	Design	23/07/24	Operations/ Design	✓	✓							Possible	Moderate	Medium	Possible	Moderate	Medium	Select		Select		Financial impact will need to be factored in
9	Impacts to landscaping and plantings	Design then Operations	23/07/24	Operations/ Design	✓	✓							Likely	Minor	Medium	Almost certain	Minor	Medium	Select	groups of plantings without irrigation backup? If so, are those planting types at risk if mean temperatures continue to increase? BBCH new works: ensure that all species and garden arrangements are heat resilient and supported by irrigation.	Select		Recommend landscape audit (by qualified ecologist) to assess heat-survivalability of plant & tree species over timescale. Develop asset replacement strategy if not in place.
10	Impacts to the thermal performance levels of buildings leading to reduced comfort levels for building occupants (e.g. tenants, customers, visitors, etc.)	Design	23/07/24	Operations/ Design	✓	✓							Likely	Moderate	High	Almost certain	Moderate	High	Select	BBCH: stress test envelope design if extended grid failure? [i.e. how robust is passive design?]. How resilient is backup power, what is maximum operability of backup power?	Select		Needs AM strategy for fabric performance and building services resilience. Initial Building Design considerations to maximise the temperature resilience. BBCH: is there a register of 'problem areas' with thermal comfort? (i.e. higher hot calls)
11	Reduction in the use of outdoor recreational spaces and amenities (due to decrease in comfort hours)	Design	23/07/24	Operations/ Design	✓	✓							Possible	Moderate	Medium	Likely	Moderate	High	Select	BBCH: how integral is outdoor gym space in provision of services? i.e. if unusable due to heat, can level of service still be met? New design to identify solutions such as creating new outdoor nature space, increasing tree canopy to public space.	Select		as above
12	An increase in the urban heat island effect impacting comfort and amenity of outdoor areas	Design	23/07/24	Operations/ Design	✓	✓							Likely	Moderate	High	Possible	Moderate	Medium	Select		Select		Review design of outdoor shading zones etc BBCH: establish urban heat resilience strategy, e.g. create continuous shade pathways
13	Increased pressure across the energy network leading to an increase in energy network instability (e.g. brownouts and blackouts)	operations	23/07/24	Operations/ Design	✓	✓							Possible	Moderate	Medium	Possible	Moderate	Medium	Select	BBCH: Is there an 'emergency mode' plan for energy distribution during blackouts? E.g. if emergency generators are relied upon, how long do they last for essential services, and what services are switched off? (useful to understand how the addition of on-site PV + battery storage might improve this scenario)	Select		
14	Higher evaporation rates of water storage sites	Operations	23/07/24	Operations/ Design	✓	✓							Likely	Insignificant	Low	Almost certain	Minor	Medium	Select	BBCH: would be useful to have an overall picture of RW storage capacity & locations against proposed landscaping scheme as part of project. Balance new planting types / design with available (installed) RW capacity. Treat RW tanks as insurance policy for landscape (which provides shade and heat protection for people)	Select		Question relates to external sources of Water. Potential to increase onsite water saving & producing strategies. What is Albury City water resilience strategy given high dependence on River Murrumbidgee supply?
15	Increased water contamination and algae blooms	Operations	23/07/24	Operations/ Design	✓	✓							Possible	Minor	Medium	Possible	Minor	Medium	Select	BBCH: assumed that water restrictions do not apply to healthcare sites	Select		Will be dependant on available technology. This risk resides largely with Albury City Water
16	Decreased agricultural and regional productivity, disruption of food productivity	Operations	23/07/24	Operations/ Design	✓	✓							Possible	Minor	Medium	Likely	Minor	Medium	Select		Select		Climate-impacted agricultural production will impact availability, food safety standards and prices. Consider strategy for future on-site production & regional food system
17	Greater failure of transport infrastructure	Operations	23/07/24	Operations/ Design	✓	✓							Possible	Minor	Medium	Possible	Minor	Medium	Select	BBCH: consider development of Green Travel Plan that also provides response for heat events, e.g. additional drop-off zones, additional / overflow parking, patient collection / transport services etc.	Select		Heat waves / heat events statistically increase private vehicle use over public transport.
HEAT - Heat Waves & Heat Days																							
18	Increased instances of heat stress for building occupants (e.g. patients, staff, visitors, etc.), particularly vulnerable groups, e.g. heart conditions, cardiovascular diseases, diabetes, lung diseases, respiratory diseases, fluid / electrolyte disorders and some neurological disorders	Operations	23/07/24	Operations/ Design	✓	✓	✓						Likely	Moderate	High	Likely	Moderate	High	Select	thermal comfort during grid failures. Adaptation planning to include upgrade of building envelopes, deployment of urban heat resilience strategy and creation of shade. Nominate 'last resort' heat shelters, supported by grid-independent energy systems. Provide sufficient thermally comfortable rooms to cater for on-site population.	Select		Needs holistic heat resilience strategy for new buildings, existing assets, and all outdoor areas. Consider 'day in the life' trails of staff and patients to prioritise heat exposure points. Conduct stress testing of buildings under system failure, e.g. understand thermal performance / risk under passive conditions.

Risk ID	Risk description <i>Uniq Refer to Guidance for advice on developing a ue climate risk statement, or refer to the Example iden Risks tab tifier</i>	Business area/Risk owner <i>Who is responsible for managing the risk</i>	Date last assessed DD/MM/YY	Risk category <i>e.g. financial, service delivery, work health and safety</i>	Natural hazards (climate related)								Worst case risk rating based on 2050 climate change projections			Worst case risk rating based on 2090 climate change projections			Controls & treatments (existing) <i>Current controls</i>	Control effectiveness <i>Select level of effectiveness from drop-down list</i>	Proposed treatments (adaptation actions) <i>Additional control if risk is not acceptable. Refer to Example adaptation actions tab</i>	Residual risk level 2050 <i>Expected level of risk remaining after adaptation actions are implemented</i>	Review and reporting requirements <i>How and when the risk and controls are to be reviewed and reported</i>	Comments <i>Uncertainties or sensitivities; potential impact on organisational objectives; resources required (financial, physical, human resources, knowledge)</i>
					Sea level rise & Mean temperature	Heatwaves/extreme	Relative humidity	Bushfires	Extreme rainfall	Extreme storms	Droughts	Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating							
19	More frequent heat stress/solar exposure of outdoor building users/staff resulting in health impacts or decreased productivity	Operations	23/07/24	Operations/ Design	✓	✓	✓					Possible	Moderate	Medium	Likely	Moderate	High	Select	As above. Develop heat resilience strategy and solutions for exposed journey points. BBCH: any proposed adaptations to work plans, SWMs etc.? BBCH: develop site-wide urban heat resilience plan.	Select		Consider sheltered / indoor nature spaces, semi-controlled gardens etc.		
20	More frequent heat stress/solar exposure of construction workers, and reduction of productive site-days resulting in program delays	Construction	23/07/24	Design, procurement	✓	✓						Possible	Minor	Medium	Possible	Moderate	Medium	Select	Construction heat mitigation strategies - shade structures, night works, icepack coolers inbuilt in clothing etc.	Select		May not be a material risk for BBCH project program however is likely to be longer term risk for on-site asset management, refurbishments and new builds.		
21	Increased demand for outdoor respite and refuge areas resulting in insufficient capacity	Operations	23/07/24	Operations/ Design		✓						Possible	Minor	Medium	Possible	Moderate	Medium	Select	spaces that are at risk of becoming too hot during prolonged heat events or extreme heat days? Would there be any need to evacuate occupants to outdoor spaces? For new works: review outdoor / landscape design / place making to allow for influx of 'climate evacuees' during heat events, e.g when local residents without air conditioning might seek refuge on BBCH campus. How well might BBCH outdoor spaces provide coolth / shade /	Select		Refers to increased demand for places of respite for local residents / community during climate-driven events such as heat waves and power outages.		
22	Increased instances of energy and telecommunications network failure (e.g. blackouts/brownouts, etc.) impacting business operations and activities, including e.g. hygiene services, cold storage, refrigerated waste storage, disruption of pumped irrigation, etc.	Operations	23/07/24	Operations/ Design		✓	✓					Possible	Moderate	Medium	Possible	Moderate	Medium	Select		Select		Recommend stress testing / disaster scenario study if not already carried out. E.g. where are weak points in supply infrastructure?		
23	Impacts to the transport network (as a result of energy and telecommunications network failure) causing e.g. staff delays and reducing accessibility to building, suspension or interruption of healthcare service delivery, suspension of deliveries, patient transport interruptions, etc.	Operations	23/07/24	Operations		✓						Possible	Minor	Medium	Possible	Moderate	Medium	Select	Increase off street car parking capacity. Increase drop-off capacity and short term parking. Increase patient transport services (e.g. shuttle). Increase telehealth services.	Select		Vulnerable to external infrastructure and the extent to which it is resilient to extreme events. (unknown)		
24	Impacts to the transport network as a result of higher private car usage (to avoid public transport)	Operations	23/07/24	Operations/ Design		✓						Possible	Minor	Medium	Possible	Moderate	Medium	Select	Increase off street car parking capacity. Increase drop-off capacity and short term parking. Increase patient transport services (e.g. shuttle). Increase telehealth services.	Select		During extreme temperature events people opt for private cars over public transport		
25	An exacerbation of urban heat island effects impacting comfort and amenity	Design	23/07/24	Operations/ Design	✓	✓						Possible	Moderate	Medium	Possible	Moderate	Medium	Select	Create more green spaces	Select		Note that under the BBCH (masterplan)scheme the total values for open space and tree canopy are decreasing. Concept design to review solutions to significantly increase the provision of urban shade through an urban heat resilience strategy.		
26	Increased energy and water demand across the site	Operations	23/07/24	Operations/ Design	✓	✓	✓	✓				Likely	Minor	Medium	Almost certain	Minor	Medium	Select	BBCH existing assets; review urban heat resilience strategy, review upgrade to building envelope performance including additional shading, roof colours, roof replacement, addition of solar panels, addition of green roofs, addition of external sun-shading, etc. BBCH: review pathway to exceed minimum thermal performance requirements for building envelope and building services.	Select		User input		
27	Increased demand on the building as a potential area of respite	Operations	23/07/24	Operations/ Design	✓	✓	✓	✓				Possible	Minor	Medium	Possible	Moderate	Medium	Select	Increase retail & recreation spaces at entry level. For new works: review outdoor / landscape design / place making to allow for influx of 'climate evacuees' during heat events, e.g when local residents without air conditioning might seek refuge on BBCH campus. How well might BBCH outdoor spaces provide coolth / shade / respite from heat?	Select		Relates to disaster management plan. What type of climate / weather events might drive influx of patients, local residents etc.?		
28	Increased incidence of complaints and/or antisocial behaviour	Operations	23/07/24	Operations	✓	✓	✓	✓	✓			Possible	Moderate	Medium	Possible	Moderate	Medium	Select	Design input calming colours & décor & graphics. Spaces of respite (cooler)	Select		Relates to disaster management plan. What type of climate / weather events might drive influx of patients, local residents etc.?		
29	Greater demand for community services and emergency services (e.g. increased mental health impacts)	Operations	23/07/24	Operations		✓			✓	✓		Possible	Minor	Medium	Possible	Moderate	Medium	Select	Clinical Services plan instrumental to design building services.	Select		User input		
30	Increased public health risk for recreational activities and events	Operations	23/07/24	Operations		✓	✓		✓	✓		Possible	Minor	Medium	Possible	Moderate	Medium	Select		Select		Generally an operational issue but review open space planning during master plan for relevance.		
31	Loss of biodiversity and ecosystem function (e.g. extreme heat mortality)	Facilities	23/07/24	Operations/ Design	✓	✓	✓	✓	✓	✓		Likely	Minor	Medium	Almost certain	Minor	Medium	Select		Select		User input		
RELATIVE HUMIDITY / WET BULB																								
32	Build-up of mould and condensation leading to increased operations and maintenance requirements and costs	Facilities	23/07/24	Operations/ Design			✓					Unlikely	Moderate	Medium	Possible	Moderate	Medium	Select	Design & building construction	Select		User input		
33	Changes in relative humidity resulting in decreasing thermal comfort resulting in health impacts or decreased productivity	Operations	23/07/24	Operations/ Design			✓					Unlikely	Moderate	Medium	Possible	Moderate	Medium	Select	Design & building construction	Select		User input		
34	Impacts to the spread of water-borne diseases and distribution of pest species	Facilities	23/07/24	Operations/ Design	✓	✓						Unlikely	Moderate	Medium	Possible	Moderate	Medium	Select	Facility Maintenance	Select		Increase frequency of water testing.		
35	Accelerated carbonation of concrete structures	Facilities	23/07/24	Operations/ Design			✓					Unlikely	Moderate	Medium	Possible	Moderate	Medium	Select	Facility Management	Select		User input		
36	Increased energy demand across the site	Operations	23/07/24	Operations/ Design		✓						Likely	Minor	Medium	Likely	Minor	Medium	Select	Facility Management	Select		Implement additional energy efficiency measures as available (kinetic energy, building wind turbines.		
INCREASED STORM INTENSITY																								

Risk ID	Risk description	Business area/Risk owner	Date last assessed DD/MM/YY	Risk category	Natural hazards (climate related)							Worst case risk rating based on 2050 climate change projections			Worst case risk rating based on 2090 climate change projections			Controls & treatments (existing)	Control effectiveness	Proposed treatments (adaptation actions)	Residual risk level 2050	Review and reporting requirements	Comments				
					Sea level rise & inundation	Mean temperature increase	Heatwaves/extreme heat	Relative humidity	Bushfires	Extreme rainfall	Extreme storms	Droughts	Likelihood	Consequence	Risk rating	Likelihood	Consequence							Risk rating			
37	Increased incidence of mental health presentations in storm or flood	Operations	23/07/24	Operations/ Design						✓	✓			Likely	Insignificant	Low	Likely	Minor	Medium	Select		Select		Relates to clinical presentations.			
38	Increased storm and hail damage to building structure, façade and/or landscaping	Design	23/07/24	Operations/ Design								✓	✓		Possible	Moderate	Medium	Likely	Moderate	High	Select	New builds: enact minimum performance requirements, e.g. 'no box gutters', minimum roof pitches, gutter/drain sizes etc. Structural review of existing assets for wind loading. New works to review minimum design load to optimise risk management.	Select		On-site audit of roofing required: assess flood vulnerability for each roof, gutter sizes and likelihood of blockages, review historical incidences of blockages. Incorporating this approach into AMP can reduce residual risk to Medium.		
39	Increased storm and hail damage to utilities, services and critical plant	Facilities	23/07/24	Operations/ Design						✓	✓				Possible	Moderate	Medium	Possible	Moderate	Medium	Select	BBCH: have increased rainfall volumes been considered in roof design? Critical services appear to be protected by undercroft.	Select		Review critical infrastructure and essential services for storm exposure. Ensure that AMP includes consideration of climate-driven hazards beyond historical experience.		
40	Increased levels of rain (rainfall intensity)/moisture penetration	Facilities	23/07/24	Operations/ Design						✓	✓				Likely	Minor	Medium	Likely	Minor	Medium	Select	as above. BBCH: ensure that detailing accounts for increased rainfall volumes / intensity. Eaves design appears to cater for overflow / increased volumes.	Select		as above		
41	Increased safety issues for customers/patrons, tenants and staff (including operations and maintenance staff)	Operations	23/07/24	Operations						✓	✓				Possible	Moderate	Medium	Possible	Moderate	Medium	Select	Controls for worker exposure - UV exposure policy procedure. Appropriate use of PPE for external work (hats/sunscreen) Dynamic risk assessment of weather as go no go	Select		Review risk points during weather event scenarios. May align closely with above		
42	Increased instances of energy and telecommunications network failure impacting business operations and activities	Facilities	23/07/24	Operations						✓	✓				Rare	Moderate	Low	Unlikely	Moderate	Medium	Select		Select		User input		
43	Impacts to the transport network causing staff delays and reducing accessibility to building	Operations	23/07/24	Operations/ Design						✓	✓				Rare	Moderate	Low	Possible	Moderate	Medium	Select	New Staff Buiding accommodation or hybrid staff/ daycase accommodation facilities?	Select		Has on-site staff accommodation been included in design brief or future master planning? Is there a process that assesses extreme weather forecasts and plans for transport disruptions in advance?		
44	Increased demand on the building as a place of refuge and/or as a designated evacuation centre	Operations	23/07/24	Operations/ Design						✓	✓				Possible	Minor	Medium	Possible	Moderate	Medium	Select	Flexible short stay clinical spaces could potentially be converted to emergency accommodation. LGA emergency planning strategies in place for adverse weather events.	Select				
46	Greater strain or loss of building fixtures, fittings and fastenings	Facilities	23/07/24	Operations/ Design						✓	✓				Unlikely	Moderate	Medium	Possible	Moderate	Medium	Select		Select		User input		
47	Damage from unsecured debris	Facilities	23/07/24	Operations/ Design						✓	✓				Rare	Moderate	Low	Unlikely	Moderate	Medium	Select		Select		User input		
48	Additional demand/delays in the emergency service network leading to exacerbated impacts (e.g. injury, stranding) to building occupants or users (e.g. tenants, customers, visitors, etc.)	Operations	23/07/24	Operations/ Design						✓	✓				Possible	Moderate	Medium	Possible	Moderate	Medium	Select		Select		Strategies include reducing elective surgeries or increasing temporary facilities.		
CHANGES TO RAINFALL PATTERNS (INCLUDING DROUGHT)																											
49	Degraded building foundations and other below-ground infrastructure (e.g. wiring) as a result of decreased soil moisture	Facilities	23/07/24	Operations/ Design								✓			Unlikely	Minor	Low	Unlikely	Minor	Low	Select	BBCH: Green Infrastructure / heat resilience strategy may mitigate risk via sustainable landscape irrigation.	Select		Potentially opposite as dry ground soil could be beneficial for reticulated electrical systems.		
50	Decreased availability of potable water, noting Albury's heavy reliance on River Murray water and an apparent absence of a climate resilience strategy for water supply (?)	Design then Operations	23/07/24	Operations/ Design								✓			Unlikely	Minor	Low	Possible	Moderate	Medium	Select	Increase rain tank numbers & incorporate into building design. (Green Infrastructure strategy may identify additional RW storage options). BBCH, incorporate RW storage to secure irrigation for landscape	Select		User input		
51	Increased spread of water-borne diseases and distribution of pest species	Operations	23/07/24	Operations/ Design			✓				✓				Rare	Moderate	Low	Unlikely	Moderate	Medium	Select		Select		User input		
52	Increased incidence of mental health presentations in drought or flood	Operations	23/07/24	Operations/ Design						✓	✓		✓		Possible	Minor	Medium	Likely	Minor	Medium	Select		Select		Refers to additional presentation load from community / catchment during climate events. Possibly lower risk in this catchment (compared to regional areas?)		
53	Loss of farming productivity and impacts on local food supply	Operations	23/07/24	Operations/ Design						✓	✓		✓		Possible	Insignificant	Low	Likely	Minor	Medium	Select	Consider inclusion of on-site / local / secure fresh food production to partially mitigate against risk	Select		Likely future impact on fresh food availability / safety / affordability		
54	Damage to infrastructure and assets (e.g. buildings, telecommunications)	Facilities	23/07/24	Operations							✓				Possible	Moderate	Medium	Possible	Moderate	Medium	Select	Carry out risk assessment of existing services supply lines and on-site infrastructure	Select				
55	Increased instances of energy and telecommunications network failure impacting business operations and activities	Operations	23/07/24	Operations							✓				Possible	Moderate	Medium	Possible	Moderate	Medium	Select	BBCH: make extra allowance for higher rainfall intensity (beyond code compliance)	Select				
CHANGES TO BUSFIRE PATTERNS INTENSITY &																											
65	Reduced air quality within internal areas and increase health impacts	Operations	23/07/24	Operations						✓					Possible	Moderate	Medium	Likely	Moderate	High	Select	Disaster Management Plans remain active with ongoing review.	Partially effective	Develop BBCH bushfire response plan. Isolate outdoor intake and fire alarm system. Prioritise or relocate service provision where required. Use of	Medium	Medium	Annual review or immediate review after bushfire event

Risk ID	Risk description	Business area/Risk owner	Date last assessed DD/MM/YY	Risk category	Natural hazards (climate related)						Worst case risk rating based on 2050 climate change projections			Worst case risk rating based on 2090 climate change projections			Controls & treatments (existing)	Control effectiveness	Proposed treatments (adaptation actions)	Residual risk level 2050	Review and reporting requirements	Comments	
					Sea level rise & Mean temperature	Heatwaves/extreme	Relative humidity	Bushfires	Extreme rainfall	Extreme storms	Droughts	Likelihood	Consequence	Risk rating	Likelihood	Consequence							Risk rating
70	Reduced air quality within outdoor open space areas and increase health impacts	Operations	23/07/24	Operations							✓	Possible	Moderate	Medium	Likely	Moderate	High	Disaster Management Plans remain active with ongoing review. Business Continuity Plans Design to meet standards and BCA. Disaster Management Plans remain active with Flex up service provision via internal escalation	Partially effective	Develop BBCH bushfire response plan Cease provision of services in outdoor spaces. Prioritise	Medium	Medium	Annual review or immediate review after bushfire event
71	Smoke and embers impacting ventilation and air-conditioning systems	Operations / Design	23/07/24	Operations							✓	Unlikely	Minor	Low	Possible	Minor	Medium	Disaster Management Plans remain active with Flex up service provision via internal escalation	Partially effective	Develop BBCH bushfire response plan Smoke and ember protection on outdoor air vents.	Low	Medium	Annual review or immediate review after bushfire event
72	Increased trauma for community members from a fire event leading to increased demand for psychosocial services	Operations	23/07/24	Operations							✓	Possible	Moderate	Medium	Likely	Moderate	High	Emergency Management Plan Business Continuity Plan Cessation/Diversion of	Partially effective	Develop BBCH bushfire response plan	Medium	Medium	Annual review or immediate review after bushfire event
73	full or partial fire damage to buildings and public spaces	Operations	23/07/24	Operations/ Design							✓	Rare	Major	Low	Unlikely	Major	Medium	Emergency Management Plan Business Continuity Plan Cessation/Diversion of	Partially effective	Develop BBCH bushfire response plan	Low	Medium	Annual review or immediate review after bushfire event
74	increased instances of energy and telecommunications network failure impacting business operations and activities	Operations	23/07/24	Operations/ Design							✓	Possible	Moderate	Medium	Likely	Moderate	High	Business Continuity Plan	Partially effective	Develop BBCH bushfire response plan	Medium	Medium	Annual review or immediate review after bushfire event
75	impacts to the transport network causing staff delays and reducing accessibility to building	Operations	23/07/24	Operations							✓	Possible	Moderate	Medium	Likely	Moderate	High	Business Continuity Plan Diversion of services	Partially effective	Develop BBCH bushfire response plan	Medium	Medium	Annual review or immediate review after bushfire event
76	increased demand on the building as a designated 'safer place' or evacuation centre	Operations	23/07/24	Operations/ Design							✓	Possible	Moderate	Medium	Likely	Moderate	High	Emergency Management Plan	Partially effective	Develop BBCH bushfire response plan	Medium	Medium	Annual review or immediate review after bushfire event
77	damage to infrastructure and assets that deliver public services (e.g. buildings).	Operations	23/07/24	Operations/ Design							✓	Possible	Moderate	Medium	Likely	Moderate	High	Emergency Management Plan	Partially effective	Develop BBCH bushfire response plan	Medium	Medium	Annual review or immediate review after bushfire event
78	increased demand on emergency services	Operations	23/07/24	Operations							✓	Possible	Moderate	Medium	Likely	Moderate	High	Business Continuity Plan	Partially effective	Develop BBCH bushfire response plan	Medium	Medium	Annual review or immediate review after bushfire event