



Temora Hospital Redevelopment

Sustainable Development Strategy

Health Infrastructure (NSW Government Health
Infrastructure)

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→ The Power of Commitment



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GHD Pty Ltd | ABN 39 008 488 373

Suite 10, Zenith Building, 6 Reliance Drive

Tuggerah, New South Wales 2259, Australia

T +61 2 4350 4100 | **F** +61 2 9475 0725 | **E** ntlmail@ghd.com | **ghd.com**

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1. Introduction

1.1 Purpose of this report

This report provides a summary of the sustainable development strategy adopted for the Temora Hospital Redevelopment.

This report details the following:

- The Ecologically Sustainable Design (ESD) statutory requirements and guidelines applicable to the development (refer Section 2).
- Methodology and approach to consideration integration of sustainability initiatives into the project (refer section 3)
- Summary of proposed sustainability initiatives (Section 4).
- The project is currently in the schematic design stage. This report will be updated at each design stage with the latest design.

1.2 Project Description

The NSW Government has committed \$80 million to the Temora Health Service redevelopment, which will provide a high-quality contemporary health facility and ensure health care services are carefully planned to meet community needs now and into the future. The project is currently in the planning stage, with master planning currently underway.

The works will involve the complete demolition of the Heritage buildings with the new build consisting of Emergency/ IPU/ Maternity/ Medical Imaging/ FOH/ BOH/ Admin/ Perioperative/ Ambulatory care/ Plant spaces.

1.3 Workshops

A number of workshops were held during Part 0 to Part 2 phase to coordinate and develop initiatives:

- ESD working group workshop on 08/06/2023.
- Design team ESD workshop on 13/07/2023
- Daylight workshop with architect on 7/04/2024

1.4 Scope and limitations

This report: has been prepared by GHD for Health Infrastructure (NSW Government Health Infrastructure) and may only be used and relied on by Health Infrastructure (NSW Government Health Infrastructure) for the purpose agreed between GHD and Health Infrastructure (NSW Government Health Infrastructure) as set out in section 1.1 of this report.

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1.5 Reference documents

This report has been based on:

- Architectural Documentation dated 31/01/2024.
- Schematic Design Report (Building Services and ESD) issued on February 2nd, 2024.
- Commitments made by HI in relation to targeting 45 points rating in accordance with the HI ESD evaluation toolkit.
- MLDH Climate Change Risk Assessment Register V4 21/06/2023 .

2. Sustainability Requirements

The relevant regulations (incl. state planning requirements) and other drivers which collectively influence the sustainability response for the proposed development at Temora hospital are as follows:

- National Construction Code 2022 – Section J
- DGN 058 / ESD Evaluation Tool
- Environmental Sustainability Strategy 2022-2024 from Health Murrumbidgee Local Health District
- Other drivers e.g., decarbonisation of the built environment

2.1 Building Code of Australia – Section J

Section J in The National Construction Code (NCC) 2022 Volume 1 Building Code of Australia (BCA) sets the mandatory minimum energy performance requirements. The objective is to reduce building greenhouse gas emissions by efficiently using operational energy whilst maintaining comfort levels.

The building must as a minimum meet the requirements as set out in the NCC BCA Section J building fabric, glazing, building sealing, HVAC and light and power provisions.

Note that the project is targeting improved energy performance over the minimum code requirements. This is to support better operational performance outcomes and to address DGN58 performance requirements.

2.2 Design Guidance Note 058 (DGN 58)

Health infrastructure has introduced its own sustainability evaluation tool. The HI tool defines a range of principles and performance targets covering the design and major refurbishment of HI projects. DGN58 provides instructions on how to use the tool to evaluate the projects performance and describes the assessment procedure required by HI on all of its projects.

Health infrastructure has defined minimum targets, in alignment with the NSW Government Resource Efficiency Policy v2 section E4, for individual point categories.

Based on the location of our project the following requirements apply:

- A minimum of 45 points is to be achieved by the design in accordance with the Hi ESD evaluation tool. The preliminary strategy was updated for the schematic stage. It is presented in appendix A.
- A minimum 10% improvement in energy efficiency compared to a baseline NCC section J compliance is applicable.

2.3 Local Health District Environmental Sustainability strategy

The Murrumbidgee Local Health District has produced a sustainability strategy for 2022-20224. The document follows the NSW government strategic commitments to achieve net zero by 2050 and the NSW health commitments around energy consumptions reductions to achieve a 10% reduction in electricity and gas use.

The plan identifies key sustainability actions:

- Energy use reduction
- Water consumption reduction
- Whole Of Life approach
- Waste reduction

2.4 NSW Government Resource Efficiency Policy

The NSW Government Resource Efficiency Policy (GREP) objective is to reduce the NSW Government's operating costs and lead by example in increasing the efficiency of its resource use. The policy includes measures and targets to reduce and report on energy, water, waste and air emissions from NSW government operations, including facilities. The policy includes a 10% energy improvement target. Relevant Policy requirements will be adopted as part of the design.

2.5 NSW Climate Change Policy

NSW Government have committed to reaching Net Zero by 2050. Whilst no formal target has yet been set by NSW HI, this project, in anticipation of a future target will opt to design and construct the project to be "Net Zero Enabled" to allow for future net zero operation with the use of 100% green power and offsetting residual emissions from waste and water.

2.6 Other tending issues

2.6.1 Climate risk and resilience

The project will aim to develop strategies to increase resilience of the project in response to potential risks arising from climate change. An analysis of key risks arising from climate change projections ¹which could affect the project include:

- Global temperature rise with warmer and longer heat waves with fewer cool days;
- Increased in proportion of high intensity storms;
- Heavier rainfall storms more intense;
- Longer fire weather season,

2.6.2 Energy transition and decarbonisation of the built environment

NSW Government have committed to reaching Net Zero by 2050. In anticipation of a future target HI NSW has opted to design and construct the project to be "Net Zero Enabled".

Net Zero enablement typically requires adoption of the following strategies:

- Maximise building energy efficiency through passive and active means.
- Include onsite renewable energy systems where practical (or allow for future provision for installation of renewable energy systems)
- Avoidance fossil fuel-based building services such as gas for heating hot water plant

Following enablement buildings can easily transition to net zero operation by using 100% renewable energy and offsetting any residual carbon emissions associated with water and waste.

The Temora development does not currently include equipment relying on fossil fuel.

¹ <https://www.climatechangeinaustralia.gov.au/en/projections-tools/regional-climate-change-explorer/sub-clusters/>

2.6.3 Circular economy and social outcome

In adherence to the NSW Circular Economy Policy principles (Principle #)² and the NSW Circular Design Guidelines for the Built Environment (Guideline #)³, the refurbishment and extension of the regional hospital will incorporate the following:

- **Re-Use of Existing Assets:** The refurbishment should revolve around renewing existing resources. By re-using existing assets or materials (Guideline #6) and designing for longevity (Guideline #1), the hospital rejuvenates its infrastructure, ensuring resources continually serve the community. This approach resonates with sustainable management of all resources (Principle #1) and valuing resource productivity (Principle #2).
- **Sustainable Design with Flexibility:** The hospital should adopt a design that allows flexibility and adaptability (Guideline #2) of spaces, and disassembly principles (Guideline #3) for material reuse at the end of their life cycle. Such measures ensure the premises remain relevant over time, allowing spaces to be repurposed without extensive modifications.
- **Energy Efficiency and Sustainable Design:** Championing the principle of designing for materials efficiency (Guideline #4) and sustainable management of all resources (Policy #1), the hospital will prioritise energy efficiency. Incorporating renewable energy sources and selecting low-impact materials (Guideline #10) will cultivate a supportive atmosphere for both patients and staff.
- **Waste Management and Recycling:** Aiming to design out waste and pollution (Principle #3), the hospital's redevelopment will introduce a comprehensive waste reduction and recycling plan. This mirrors the design for best practice operational waste management (Guideline #5), ensuring a conscientious handling of both construction and operational waste, and a healthier environment, both within the facility and in its surrounding community.
- **Therapeutic Natural Spaces:** Circular principles extend to the design of hospital spaces, integrating greenery and views to natural elements (Guideline #11). The aim should be to create a therapeutic ambiance that enhances patients' well-being, contributing to their overall recovery and mental health.
- **Circular Procurement and Community Impact:** Circular procurement practices offer a dual benefit, as they reduce waste and support local suppliers committed to sustainability (Guidelines #7 to #10, and #13). This approach aligns with the broader objective to create new circular economy jobs (Principle #6).
- **Engaging the Local Community:** Aligning with the NSW Circular Economy Policy's Principle #7 on fostering behavioral change, the hospital redevelopment should propose some education initiative to communicate the adopted circular and sustainable solutions to the community.

² NSW CE Policy summary of principles:

1. Sustainable management of all resources
2. Valuing resource productivity
3. Design out waste and pollution.
4. Maintain the value of products and materials.
5. Innovate new solutions for resource efficiency.
6. Create new circular economy jobs.
7. Foster behaviour change through education and engagement.

³ NSW Circular Design guidelines for the built environment

1. Design for longevity
2. Design for flexibility and adaptability
3. Design to maximise materials circularity and enable disassembly.
4. Design for materials efficiency
5. Design for best practice operational waste management
6. Re-use existing assets or materials
7. Select products with recycled content.
8. Select products that are designed for disassembly.
9. Select products and materials that have an identified end-of-life use.
10. Select low impact materials.
11. Incorporate green infrastructure.
12. Maintain a material database.
13. Procure products as a service.

3. Sustainability approach

Review and integration of the sustainability performance requirement and principles has been a key driver of the design thus far. The focus during these early stages of the design has been to collaborate closely with the project team to facilitate and drive integrated sustainable strategies with regard to capital and life cycle cost and other engineering and practical constraints.

Regular meetings and workshops with the wider project team have been held. Refer workshop slides in Appendix B.

GHD also undertook preliminary analysis to inform development of design strategies in relation to the building water performance. Refer to summary in Appendix B.

As the project design develops in the next phase there will be a need to refine and further assess the strategies identified in concept design. Once final design decisions have been made the project sustainability / ESD consultant focus should then transition from sustainable design optimisation to a review and coordination role focusing efforts on checking the design and reporting against key sustainability targets.

During construction stage, the sustainability consultant will also need to assist the contractor with technical clarifications regarding implementation of the sustainability initiatives and collation and preparation of documentation required to support the HI tool Matrix updates.

If there are changes to the design impacting the targeted credits in the HI ESD evaluation tool, the project shall identify alternative points to maintain the project buffer (minimum points + 5 points buffer). A full Matrix will be reviewed for detailed credit as provided in the ESD evaluation tool in appendix. The current Matrix can be found in Appendix A.

4. Sustainability Initiatives

The requirements set in Section 2 have been used to inform the design response. The strategies summarised in this section are to be considered, developed, and documented as the design progresses. Verification of the measures will need to be made through the formal building certification and ESD validation process using the HI ESD validation tool.

The current schematic design scheme has been evaluated against the HI ESD evaluation tool in consultation with the disciplines and the architect. Comments and status of the targeted strategies have been included in the ESD schedule and provided in Appendix C of this report. Below is a summary of the current design ESD strategy:

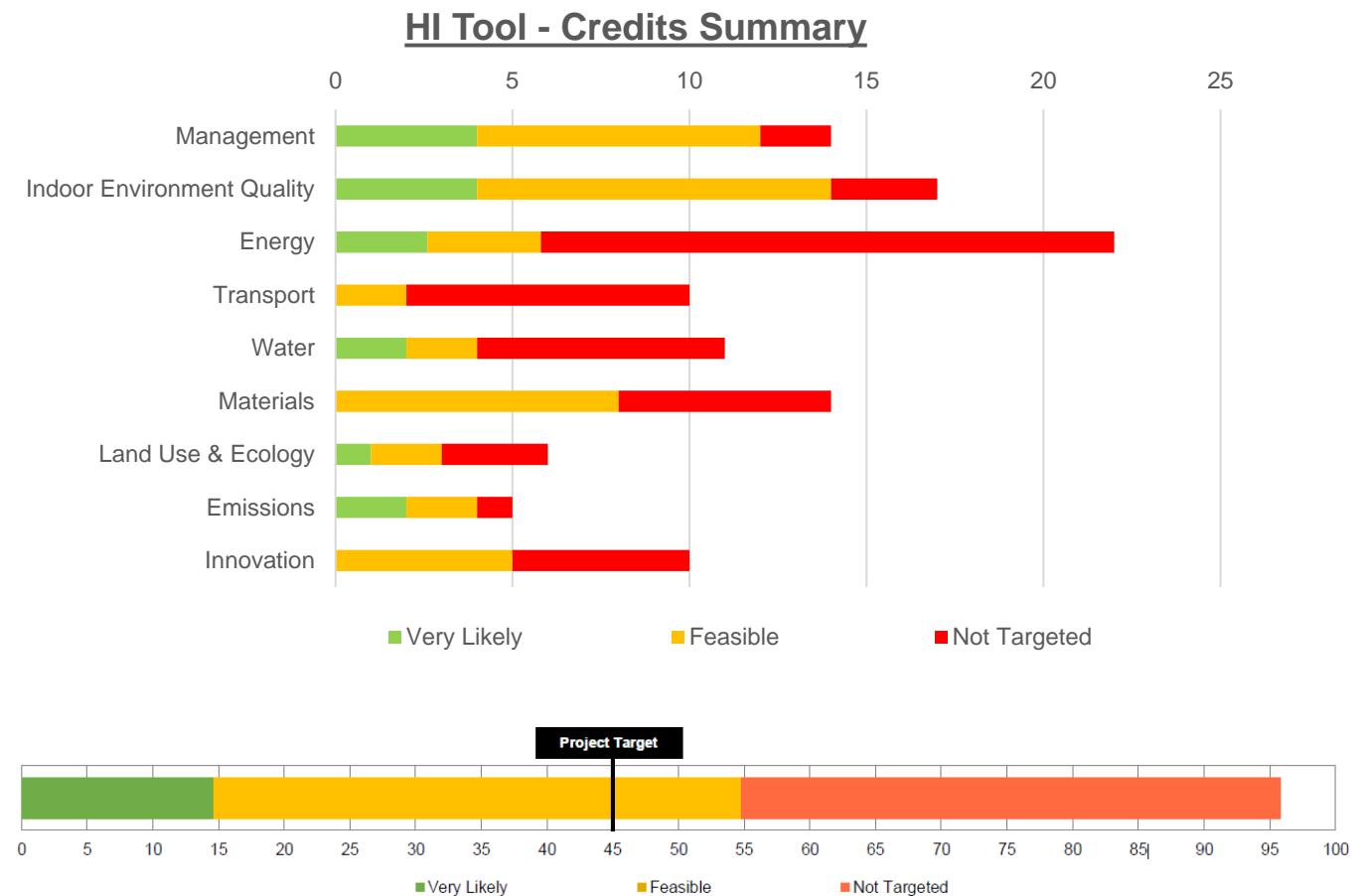


Figure 4.1 HI ESD tool – Current ESD strategy

As the project is currently in schematic design phase, most proposed sustainability initiatives that have been identified and are being considered for value management. As the design progresses a Whole of Life Approach to decision making will be followed. Relatively inexpensive sustainable solutions will be prioritised to achieve good ESD outcomes in a cost-effective manner. Discussion and coordination with the project team will be undertaken during all stages of the design to reconfirm the implementation of the selected strategies. The following sections summarise the intent and design considerations of each HI tool category.

4.1 Management

The following initiatives are being targeted to demonstrate leadership by embedding commitments to targets over and above business as usual and using the HI ESD tool environmental rating system as means to verify that sustainability outcomes are implemented. The development is:

- Targeting 45 points using HI ESD framework.

- Adopting a “net zero carbon ready” design approach: HI Net Zero Road Map follows the NSW Government’s net zero plan to reduce emissions and achieve Net zero by 2050.
- Developing a Design Intent Report (DIR) or Owner’s Project Requirements (OPR) document that states the environmental performance targets for the development is to be written.
- Likely to engage an Independent Commissioning Agent (ICA) to oversee the Commissioning and Tuning requirements for the project
- Considering to undertake a Climate Adaptation Plan (this will need to be confirmed for detailed design stage).
- Developing a metering and monitoring strategy that captures all major energy and water end uses as well as provides up to date information on consumption patterns.

4.2 Indoor Environmental Quality

Health and wellbeing of personnel and visitors shall be maximized through incorporation of outdoor space, facilities to support active living, and implementation of measures to provide best practice indoor environmental quality. These may include the following strategies that will be investigated during design:

- Outdoor shaded landscaped communal areas where feasible.
- Nominating use of the low formaldehyde engineered timber and low volatile organic compounds (VOCs) materials to improve internal air quality.
- Use of natural daylight consistent with best practice thresholds for primary spaces where feasible.
- Designing internal spaces to have views to the outside.
- Control of external noise, building services noise, reverberation management and limiting sound transmission between internal spaces for acoustic comfort
- Use of natural ventilation as part of a mixed mode system for ventilation and thermal comfort where feasible.
- Lighting designed to meet best practice illuminance levels and control glare.
- High performance building envelope to minimise heat losses and gains to provide thermal comfort.
- Air conditioning for primary and secondary spaces to provide year-round thermal comfort.

4.3 Energy

The minimum target is 10% reduction in electricity and gas use. As part of the overall strategy to reach a score of 45 in the HI ESD tool an energy reduction target of 30% is currently targeted.

The following strategies will be investigated further during the design to reduce energy consumption and generate power through renewable sources to contribute to operational carbon emissions reduction and reduce ongoing operating costs:

- The design will follow the energy reduction hierarchy in design of the buildings: passive design, energy conservation, energy efficiency, renewable energy and use of low or zero emission energy.
- The design will investigate the use of highly efficient thermal envelopes and glazing systems in combination with considered shading devices to effectively manage heating and cooling loads & energy consumption.
- Building envelope considerations will include the following features to balance heat loads, glare and daylighting:
 - Walls, roofs and floors to be insulated to higher performance requirements than section J to reduce heat gains and support occupant thermal comfort.
 - Thermal mass to be made available to the internal spaces of the building by using a reverse wall construction with concrete, brick or blockwork available on the inside of the building to reduce peak heating and cooling loads, peak electricity demand, reduce mechanical equipment size and reduce energy use.
 - Shading to glazing using proprietary shades, overhangs which minimise solar heat gains.
 - Exposed areas of roof are to be light coloured with high solar reflectance and low emissivity. Solar reflectance index (SRI) to be at least 64 (three-year value) to support a reduction in the heat island effect.

- Building Services design targets improvement over minimum NCC Section J requirements as far as practicable to optimise energy efficiency. Design considerations will include:
 - All electric air conditioning using reverse cycle or heat recovery heat pump systems (for heating and cooling) with improved efficiency specified over NCC minimum requirements.
 - LED lighting with controls and lighting power densities improved over NCC minimums.
 - Electrification of domestic hot water using heat pump technology. Heat pumps offer one of the most efficient forms of hot water generation.
- Roof mounted onsite renewables with overall capacity up to 99 kWp will be considered in design.
- Energy modelling will be completed during the design stages for the new building and confirm the new building initiatives are expected to result in energy reduction more than 10% improvement over existing.

4.4 Transport

The following transportation related initiatives are to be developed:

- Electric vehicle charging provision and enabling infrastructure as per NCC J9 requirements. Infrastructure for EV charging to at least 4 car parking spaces at practical completion is to be considered.
- Bike racks to encourage staff who live in local area to use active modes of transport.

4.5 Land Use and Ecology

The site should include a number of measures to support ecology and biodiversity:

- Retention of existing large mature native species trees where possible.
- Use of native vegetation in new landscaped area
- Consider additional tree planting to overshadow hard landscaping (roads, carparks) to reduce the urban heat island effect.

This will help support biodiversity, ecological regeneration, management of climate change impacts, wellbeing and manage urban heat.

4.6 Water

The project will target a 10% reduction in water use. The following initiatives are to be considered in the design to reduce potable water usage through demand reduction measures and using rainwater capture and reuse for non-potable purpose:

- Waterless heat rejection
- Water efficient taps, toilets, showers and appliances.
- Rainwater harvesting for irrigation (a Whole of Life calculation has been carried out and will be used to objectively inform the value management process.
- Sub-surface drip irrigation with moisture sensors for landscaping

4.7 Materials and resources

The design will incorporate initiatives that reduce material waste, reduce life cycle impacts, and minimise waste to landfill during construction and operation. Initiatives for investigation include:

- At least 90% of waste generated from construction and demolition will be reused or recycled and the appointed contractor will develop waste management plans prior to demolition and construction activities.
- For demolition waste the following process can be applied:
 - Create a salvage list: Some of the construction elements that may be salvaged such as bricks, doors, windows, fixtures and architectural elements of interest. That maybe carefully removed and store for future reuse.

- Put forward a reuse program for salvaged materials; This may include reuse on site, establishing partnerships with local builders, contractors or organization that specialise in reused materials.
- Repurpose material from demolished building: For example, bricks can be cleaned and reused in new construction projects or reused for landscaping purposes.
- Use standardised approaches to manufacture and assembly leading to reduced material waste and construction time compared to on-site construction methods.
- Reducing Portland cement content through maximising use of supplementary cementitious materials where feasible.
- Maximising use of steel and timber sourced from certified environmentally responsible suppliers.
- Use of permanent formwork, pipes, flooring, blinds and cables to be free of PVC or PVC that meets the Best Practice Guidelines.
- Sustainable timber procurement with third party environmental certification schemes.
- Adequate waste storage facilities to enable effective separation of waste streams (and transfer stations for general waste, hospital waste and organics recycling) and ease of collection.

The following additional circular economy principles shall also be adopted within the project:

- Design for increased longevity, adaptability, and disassembly
- Avoid unnecessary use of materials and components.
- Reduce use of virgin materials
- Reduce use of carbon intensive materials
- Design out use of hazardous and polluting materials

4.8 Emissions and discharges

Emissions and discharges from site shall be limited by the following initiatives where possible:

- Water sensitive urban design principles to be adopted to reduce stormwater flow and meet water quality targets.
- Design to minimise the use of refrigerants with high global warming potential and use only zero ozone depleting potential products.
- Light spill to neighbouring properties to be controlled.
- Light pollution to night sky to be prevented compliance strategy.

5. Basis of Design summary

The following table provides a summary of the recommended ESD basis of design by project elements and discipline to meet the project ESD targets and objectives. The table also provides details on initiatives that are:

- Incorporated into the current concept design
- Recommended for inclusion in the project but require further review during the design development stage to confirm whether or not they are to be incorporated into the project and documented in the next stages of design.

The information shown in the table is intended to:

1. Serve as a record of the initiatives proposed, including those not yet fully documented in other discipline design documentation.
2. Provide further explanation on recommended initiatives.

Table 5.1 ***Proposed ESD Strategies***

TEMORA BASIS OF DESIGN SUMMARY		
Discipline	Element of design	Early schematic Design recommendations 16/01/2024 (to be updated in sustainable development plan)
Architecture		
	Walls	For walls/partitions part of the air conditioned envelope: - Insulate walls to R4 (total value including thermal bridging)
	Floors	Floors to meet R2 (total value including thermal bridging)
	Roof	Roofs to be light coloured with solar absorptance to meet SA<0.43 Roofs to meet R5 (total value including thermal bridging)
	PV	Install PV panels to generate electricity to be reuse on site. No battery 600m2 99kWp. 15degrees roof.
	Skylights	None at present. Consider the use of clerestory windows rather than skylight: if facing south they provide daylight without solar gains and if openable they c design strategy. If clerestory windows cannot be installed, allow for the installation of solar ducts in internal staff spaces.
	External shading	External shading is the best solution to improve energy use For glare control to occupied spaces, Provide blinds or design external shading designed to blo times.
	Internal blinds	Include in design for glare control
	Glazing/windows	Glazing windows will need to be reviewed base on preliminary section J assessment but wall generally need to be improved compared to DTS requirement reduction. Glazign performance to be double glazing with U -value <3 W/m2K and SHGC < 0.3 , VLT>40% (values including frame) When designing windows, consider provision of daylight and clear line of sight to high quality views in all primary spaces and chose glazing with VLT > 40% For spaces with 2 orientation, maximise glazing facing South, or North with large overhang. Provide vertical shades in front of west and East facing glazing
	Internal / linings partitions	- Consider the use of building materials which are able to be disassembled for re-use, in conjunction with considerations for the addition and removal of sp -internal parturitions and surface finishes to be documented in accordance acousticians recommendations for sound isolation and reverb control
	Furnitures/fixtures	Consider: - reuse and /or recycling of existing furniture - selection of new furniture and equipment with at least 10 years life span
	Joinery	Consider specifying joinery as follows - At least 95% of all engineered wood products to meet formaldehyde emission limits - At least 95 % (by cost) of all timber used to be certified or reused - With sustainable product certifications (such as EPD, Third party certs etc)
	Paints	Consider specifying paints as follows: - 95% of all internal paints, low or ultra low VOC limits - 50% of paints to have max TVOC content of <5g/L
	Sealants	Consider specifying sealants as follows: - 95% of all adhesives and sealants to meet low or ultra low VOC limits

	Operational wastes	Develop an operational waste management plan with targets Outcome of plan is to inform location and size of waste storage areas required. Storage required: - general landfill, - recycling (containers, paper cardboard - soft plastics - organics. Consider vehicle access and bin cleaning /washdown areas. Recycling of demolition waste Consider to include as contractual obligation for appointed contractor.
	Acoustic	Consider designing envelope to limit noise intrusion, control reverb and noise between rooms. Acoustic input required
	Lighting	Consider designing lighting to provide uniformity by using indirect lighting and well designed surface colours
	Accessibility/Universal design	- Provide circulation areas/facilities designed be accessible - Provide hearing augmentation system for areas that have amplification, generally within communal areas, provide a system to assist the aurally challenged speech within the main communal spaces
	Kitchen	Consider specifying all electric kitchen appliances
	Landscaping	Design to allow: - increasing significantly the area of native vegetation on site. - use of rainwater for irrigation (3# 10kL rainwater tanks) - preference for native drought resistant plants - Use light coloured hardscaping - use of permeable pavement as often as possible
Structural		
	Concrete	1. Reduce Portland cement content through maximising use of supplementary cementitious materials. Target 20-40% Cement replacement using either fly 2. Use recycled aggregates.
	Steel	Where steel is used, - procure from certified environmentally responsible suppliers who use low energy processes. - Needs to have a high recycled content.
	Timber	Specify they use of timber that meet the following criteria: - No rainforest timbers, or timbers from high conservation forests, are to be used unless plantation grown. Use only recycled timber, engineered and glued products, or timber from plantations or from sustainably managed regrowth forests that is FSC or PEFC certified. - At least 95% of all engineered wood products meet formaldehyde emission limits - At least 95 % (by cost) of all timber used is certified or reused - All timber used is to be termite (white ant) resistant or treated to be termite resistant to the appropriate hazard level
Civil		
	Stormwater	Consider how the post development peak discharge can be kept in line with pre development peak discharge. note that because increased rainfall and flood is likely to be a climate risk, consider achieving post development discharge not exceeding pre development with storm water pollution reduction to Green star levels using retention tank with filtration.
		Confirm local authority requirements. Consider adding additional treatment to reduce pollution.
	Rainwater	Provision of 30kL water tank (over 3 tanks) to be reused for irrigation
Electrical		
	Internal Lighting/Controls	Install luminaires / controls capable of reducing by 20-30% the DTS Lighting power density (J6)
		Specify lights in primary spaces to be Flicker-free lights and min Colour Rendering Index (CRI) of 80
	External lighting	Specify external luminaires to meet Australian Standard to avoid light pollution to neighbouring development and control of obtrusive effects as per Australian Standard AS/NZS 1581:2013
	PV	Included in design

	Metering	Provide easily accessible data logging meter on incoming electricity for recording and monitoring
	Commissioning	services engineer to specify detailed commissioning requirements
	Acoustics	Penetrations for cabling etc to be addressed as per acoustic consultant recommendations to maintain acoustic performance of wall and floor systems
Mechanical		
	HVAC systems	Consider the following in design: - Choice of HVAC system with COPs and EERS (10-15% better than DTS or MEPs). - energy storage - Design features to achieve lower fan power (Low pressure drop distribution with oversizing ducts to lower pressure drop/meter, use of turning vanes in large ducts to improve fan efficiencies, improved motor efficiencies) -including DCV and Heat recovery on all primary systems
	Water	Waterless heat rejection proposed
		Include Legionella control and risk management in design of water based heat rejection systems
	IAQ	Consider improvement to IAQ by increasing the Outside air flow rates from minimum AS1668 requirements
	Metering	Provide easily accessible data logging meter on incoming electricity recording and monitoring
	Maintenance	Design ventilation and HVAC systems for ease of maintenance. (Dual access) Allow for cleaning of components coils, fans and other systems components that can trap dust and debris. minimise outdoor air pollutants with filtration and/or choice of air intake location
	Commissioning	specify detailed commissioning requirements as per Green star commissioning credit
	Acoustics	requires control of HVAC noise to achieved a total ambient noise of no more than 5db(A) above lower figure in table 1 of AS/NZS 2107:2016 Penetrations for duct work and duct noise transfer to be addressed as per acoustic consultant recommendations to maintain acoustic performance of wall and floor systems
Hydraulics		
	DHW production	Heat pumps will be installed. Gas supply and reticulation not required on site
	Fixtures	Consider specifying High WELS rating fixtures: - Showers 3 star WELS rated at 7.5 l/min - Indoor taps 6 star WELS rated - Toilet and urinals to be 4 star WELS rated - Washing machines and dishwashers to be 4 star WELS rated
	Irrigation	30kl rainwater harvesting tanks for irrigation.
	Metering	Provide easily accessible data logging meter on incoming water and gas for monitoring and inclusion of data into principal dashboard. Provide metering on all main water end uses
	Arrestors	Arrestors for acid, grease, plaster and clay of adequate capacity must be installed to treat wastewater from critical areas such as kitchens.
	Commissioning	Services engineer to specify detailed commissioning requirements as per Green star commissioning credit
Contractor TBC GENERAL / HI		
	Consultancy team	Consider engaging CCRA consultant to prepare CCRA and review and coordinate adaptive measures into the design
	Commissioning	Involve commissioning team early in design
	Commissioning	Confirm 2 x building performance metrics with a commitment to performance
	Contamination	Provide contam and hazmat report detailing materials found on site and proposal for remediation
	Operational Waste	Engage waste management planner
	Cleaning	Develop and implement a green cleaning policy

6. Conclusion

This report summarises the main sustainability requirement applicable to the development including emerging and leading practice considerations such as circularity,

A sustainability strategy and supporting initiatives have been proposed that when adopted in the final design and constructed works will meet the identified ESD requirements,

Beyond meeting the stated requirements, the initiatives proposed will result in a number of operational and environmental benefits for HI NSW and the amenity of the future staff and facility users.

Appendices

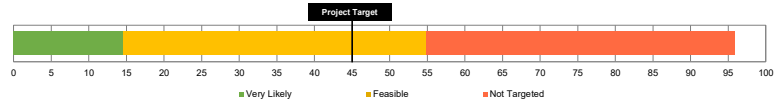
Appendix A

HI Toolkit Matrix

SUMMARY OF POINTS TO TARGET AND CONFIRM

22/01/2024

	Very Likely	Feasible	Not Targeted
Subtotal	14.6	39.2	41
Innovation	0	1	0
Total Points	14.6	40.2	41

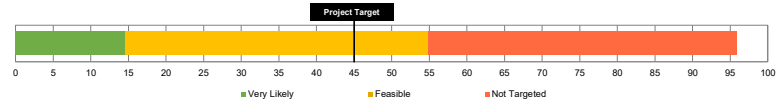


CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	POINTS AVAILABLE	Very Likely	Feasible	Not Targeted	DISCIPLINES	Comments from ESD team 22.01.2024	Overlaps HI ESG AusHFG NCC 2019 SSDA Req	Standard Practice (1) Minimum requirement (C)	Healthcare relevant initiatives (1) Primarily for IPU type spaces.	Low focus initiatives	Boundary / Scope Comments
Management														
Accredited Professional	To recognise the appointment and active involvement of an Accredited Professional (under an Environmental Rating System) in order to ensure that the rating tool is applied effectively and as intended.	1.0	Accredited Professional	1	1			ESD	GHD appointed to review the design under the HI ESD framework tool		1			
Commissioning and Tuning	HI ESD framework	2.0	Environmental Performance Targets	-	-			HI	Design team to set Environmental performance targets on each nominated system early on in the design in design reports		C			
		2.1	Services and Maintainability Review	1	1			ALL	Consider an embedded approach to commissionability, controllability and maintainability. Involve HI commissioning team during SD to facilitate.		1			
		2.2	Building Commissioning	1	1			ALL	Air tightness testing recommended		1			
		2.3	Building Systems Tuning	1	1			ALL	Will require a tuning plan early on in the design		1			
		2.4	Independent Commissioning Agent	1		1		GHD	Engage a commissioning agent early on in the design					Requires an additional consultant. HI undertake a similar role to ICA.
Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan	2		2		ENV	Considering the location of the 2 hospital, implementing a Climate Adaptation Plan would encourage inclusion of resilience in the design. Is a CCRA available for the site? If not, consider engaging a qualified professional to prepare a site specific CCRA to inform project on climate risks to be addressed in the design High risk may include: - Water resilience (consider rainwater collection) - Extreme temperature (consider designing to increased max temperature) - Flooding (consider flood levels when deciding buildings Levels)	SEARS condition: Credit can be used to demonstrate CSIRO project climate impacts				
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.	4.1	Building Information	1		1		ARCH			1			
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		HI	Environmental performance targets for two items to be nominated and monitored. Is there a current monitoring system that would allow this.		1			
		5.2	End of Life Waste Performance	1			1	ARCH	Reuse of existing furniture and selection of new furniture and equipment with at least 10 years life span					
Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering	-	-			MECH	Consider sub-metering electrical and water major end uses		C			
		6.1	Monitoring Systems	1		1		MECH			1			
Responsible Building Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan	-	-			CONTR	Requirement to be included in spec and contracts documents		1			
		7.1	Formalised Environmental Management System	1		1		CONTR	Requirement to be included in spec and contracts documents		1			
		7.2	High Quality Staff Support	1		1		CONTR						Construction related credit for contractor to consider.
Operational Waste	Performance Pathway	8A	Performance Pathway - Specialist Plan	1		1		WASTE	Provide a waste management plan to inform design for waste collection, storage and disposal		1			out of scope?
Category Total				14	4	9	1				10	0		
Indoor Environment Quality														
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes	1	1			MECH	Design HVAC systems for ease of maintenance, minimise outdoor air pollutants with filtration and/or choice of air intake location			1		
		9.2	Provision of Outdoor Air	2		1	1	MECH	Consider increase of OA air flow rates compare to AS1668. Note this will impact negatively the energy use but improve occupants comfort and has been proven to reduce the spread of airborne diseases	EFG requirements request 2.0 ACH to IPU spaces.		1		

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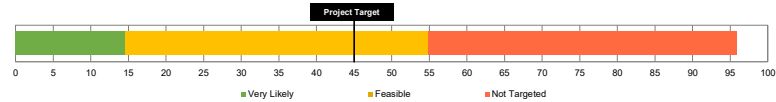


CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	POINTS AVAILABLE	Very Likely	Feasible	Not Targeted	DISCIPLINES	Comments from ESD team 22.01.2024	Overlaps HI ESG AusHFG NCC 2019 SSDA Req	Standard Practice (1) Minimum requirement (C)	Healthcare relevant initiatives (1) Primarily for IPU type spaces.	Low focus initiatives	Boundary / Scope Comments
		9.3	Exhaust or Elimination of Pollutants	1	1			MECH	Generally best practise to provide separate exhaust to kitchens and store rooms			1		
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels	1		1		ACOUS	Consider designing envelope to limit noise intrusion. Acoustic input required			1		
		10.2	Reverberation	1		1		ACOUS	Consider use of absorptive finishes to control reverb. Acoustic input required			1		
		10.3	Acoustic Separation	1		1		ACOUS	Acoustic input required.			1		
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort	-	-			ELEC	Lighting will use of flicker free lights and CRI of 80			C		
		11.1	General Illuminance and Glare Reduction	1		1		ELEC	Lighting will be designed to reduce glare			1		
		11.2	Surface Illuminance	1		1		ARCH	Consider designing lighting to provide uniformity by using indirect lighting and well designed surface colours			1		
		11.3	Localised Lighting Control	1		1		ELEC	Consider providing localise lighting control to occupants immediate environment			1		
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	-	-			ARCH	Design will provide blinds or design external shading to block direct sunlight			C		
		12.1	Daylight	2		1	1	ARCH	Consider provision of daylight in all primary spaces and chose glazing with VLT > 40%			1		
		12.2	Views	1		1		ARCH	Consider providing clear line of sight to high quality view in the primary spaces			1		
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1	Paints, Adhesives, Sealants and Carpets	1	1			ARCH	Consider the use of low VOC products			1		
		13.2	Engineered Wood Products	1	1			STRUC	Consider the use of low formaldehyde emissions products			1		
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	1		1		MECH ARCH	PMV within +/-1 should be achievable. Comfort modelling required	NCC 2019 JV3 requires a PMV assessment to be undertaken		1		
		14.2	Advanced Thermal Comfort	1		1	0	MECH ARCH	PMV within +/-0.5 would require good façade treatment (double glazing and good solar control) . Comfort modelling required			1		
Category Total					17	4	11	2			0	15		
Energy														
Greenhouse Gas Emissions														
		15E.0	Conditional Requirement: Reference Building Pathway	-	-			MECH ELEC HYDR ARCH	Proposed building must achieve 10% improvement on NCC Section J reference building as part of HI ESG guidelines. Energy saving/GHG emissions reduction strategy to include: - High performance envelope (10% better than DTS) - Choice of HVAC system with COPs and EERS (10-15% better than DTS or MEPs) - Choice of lighting and controls to achieve 20% better than DTS. - Fuel switching for:DHWS (Gas to heat pump for generation) consider switching in for kitchens so gas connection/reticulation is not required on site	Aligns with HI ESG 10% Improvement and NSW GREP. The NCC JV3 Energy Modelling approach should be used.	C			
		15E.1	Comparison to a Reference Building Pathway	20	1.6	3.2	11	MECH ELEC HYDR ARCH	Consider aiming for a 20-30% improvement. Energy saving/GHG emissions reduction strategy to include: - Very high performance envelope (Double glazing, external shading and use of thermal mass to flatten the load curve) - Choice of HVAC system with COPs and EERS (10-15% better than DTS or MEPs). Use of thermal mass to reduce demand. Consider evaporative cooling. - Choice of lighting and improved control strategy to achieve 30% better than DTS. - Fuel switching for:DHWS (Gas to heat pump for generation) consider switching in for kitchens so gas connection/reticulation is not required on site - Use of on site renewables with PV panels on the roof	Aligns with HI ESG 10% improvement and NSW GREP. The NCC JV3 Energy Modelling approach should be used. 10% improvement equates to 1.6 points. 10% additional for PV panel generation	1	1		

SUMMARY OF POINTS TO TARGET AND CONFIRM

22/01/2024

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		168	Performance Pathway - Reference Building	2	1		1	ELEC	Above mentioned energy reduction strategies will reduce peak demand as will the use of thermal mass.			1		
Category Total				22	2.6	3.2	12				1	2		
Transport														
Sustainable Transport	Performance Pathway	177.1	Performance Pathway	30				TRANS	Consider providing transport plan and additional car parking spaces. Consider end of trip facilities, cycle paths and bicycle storage in master planning					Hospitals are usually well connected to public transport nodes. Large percentage of patients require access to hospitals via vehicles. Expansion of existing hospital also require additional carparking.
		178.1	Access by Public Transport				9							
		178.2	Reduced Car Parking Provision											
		178.3	Low Emission Vehicle Infrastructure	0		1								
		178.4	Active Transport Facilities											
		178.5	Walkable Neighbourhoods											
Category Total				10	0	1	9				0	0		
Water														
Potable Water	Prescriptive Pathway	18A.1	Potable Water - Performance Pathway	12	2	2	7	HYDR	Consider specifying High WELS rating fixtures: - Showers 3 star WELS rated at 7.5 l/min - Indoor taps 6 star WELS rated - Toilet and urinals to be 4 star WELS rated - Washing machines and dishwashers to be 4 star WELS rated Consider rainwater harvesting for irrigation. Consider targeting a 30% reduction in potable water.	AusHFG Requirements limit use of RW systems (maintenance / Payback / health risks)				Hospitals require extensive use of potable water and typically lower use for recycled water. AusHFG requirements limit use of rainwater systems, limiting the use to primarily landscaping.
Category Total				12	2	2	7				3	0		
Materials														
Life Cycle Impacts	Performance Pathway - Life Cycle Impacts	198.1	Concrete	3		2	1	STRUC	Consider: 1. Reducing Portland cement content by 40%. Cement replacement using either fly ash or GGBS 2. Water used in concrete contains at least 50% reclaimed water 3. Use 40% slag or recycled aggregates OR 25% of fine aggregate (sand) is manufactured sand or other alternative		1			
		198.2	Steel	1		1		STRUC	Consider: - procuring steel from certified environmentally responsible suppliers who use low energy processes. - Procuring steel with high recycled content.		1			
		198.3	Building Reuse	4			3		retaining existing structure created problems with servicing the building and reducing energy emissions.					
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		STRUC	Consider procuring steel from responsible suppliers		1			
		20.2	Timber Products	1		1		ARCH	Consider procuring timber from responsible suppliers		1			
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1		1		HYDR MECH ELEC ARCH STRUC	Consider procuring sustainably sourced materials		1			

22/01/2024

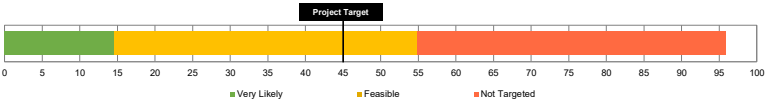
A horizontal stacked bar chart illustrating the distribution of project targets. The x-axis represents a scale from 0 to 100. The bar is divided into three segments: 'Very Likely' (green, 0 to 15), 'Feasible' (yellow, 15 to 55), and 'Not Targeted' (red, 55 to 95). A vertical line at 45 is labeled 'Project Target'.

Category	Start Value	End Value	Color
Very Likely	0	15	Green
Feasible	15	55	Yellow
Not Targeted	55	95	Red

[illegible]

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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											
	Supplementary or tenancy fitout systems review	30C	Commissioning and Tuning					ICA						
	Daylight See credit	30C	Visual Comfort					ARCH						
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the above Credits.	30D	Innovation Challenge			1		ESD HI	Community benefits (health promoting project) RAP endorsed by Reconciliation Australia Universal design (accessibility plan) Ultra low VOC Green Cleaning					
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											
Category Total				10	0	1	0				0	0		
Grand Total					14.6	40.2	41				23	18		

Appendix B







Climate Overview

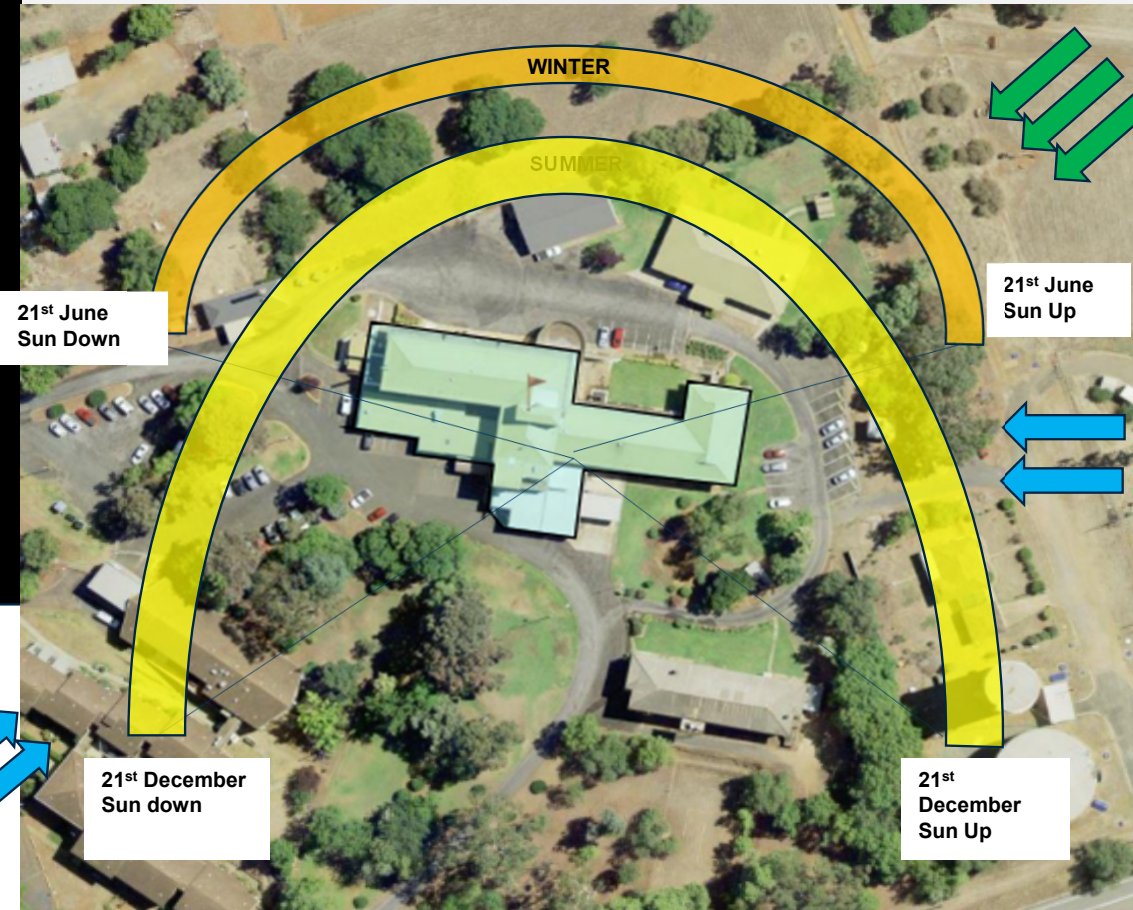
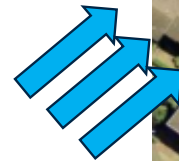


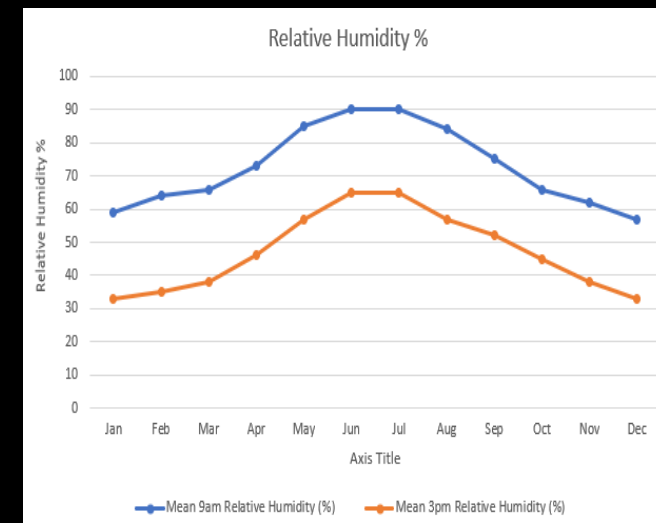
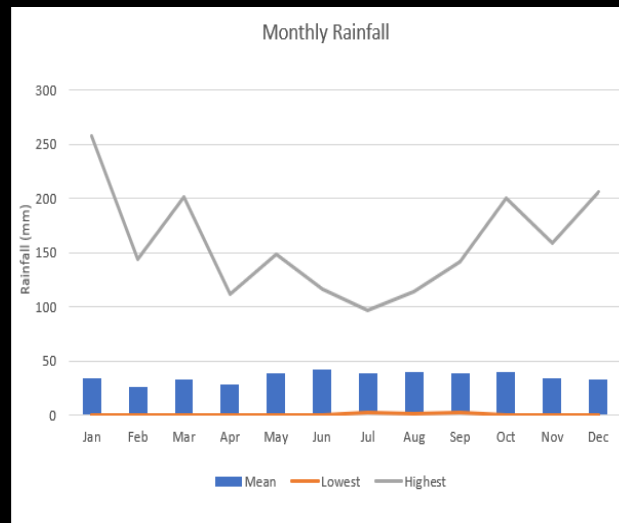
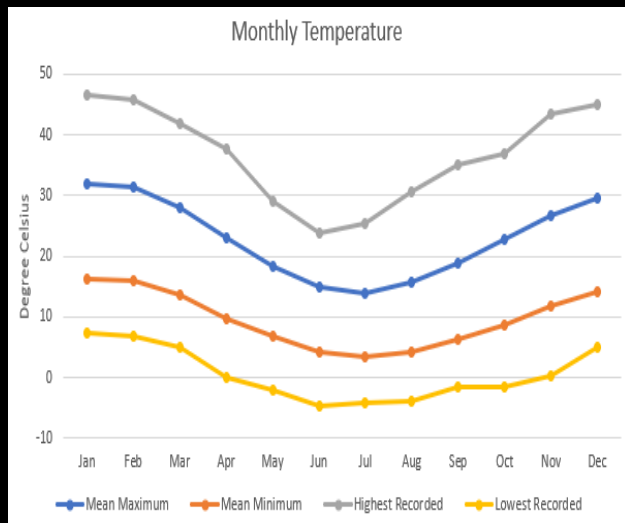
Site Context

→ Temora

NATURAL ENVIRONMENT

-  EXISTING BUILDING
-  PREVAILING SUMMER WIND
-  PREVAILING WINTER WIND
-  SUMMER SOLAR ARC
-  WINTER SOLAR ARC
-  HERITAGE TREES - TBC

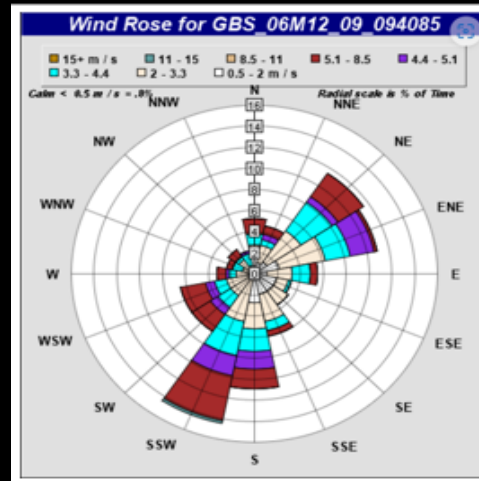




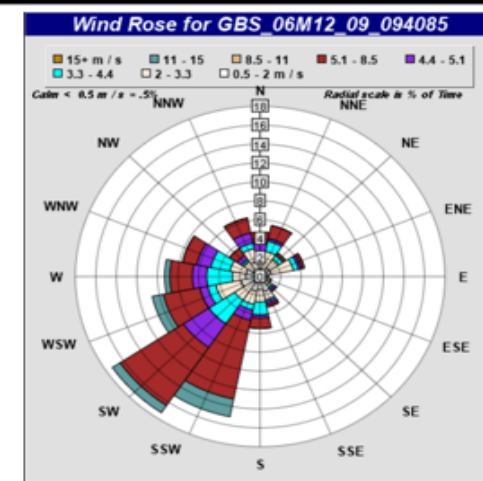
→ Site Context – Current Climate (Temora)

Temperature	Value(°C)
Mean maximum temperature	23.5
Highest maximum temperature	46.4
Mean minimum temperature	8.7
Lowest minimum temperature	-6.8

9AM-Total-Observations



3PM-Total-Observations





Hazard	Increase or decrease	Level of confidence
Rainfall	Winter rainfall decrease	Medium
Temperature	Increase in all seasons	Very high confidence
Extreme temperature	More hot days and warm spells	Very high confidence
Extreme rainfall & drought	Increased intensity of extreme rainfall events	High confidence
Mean sea level	Continue to rise	Very high confidence
Fire weather	Harsher in the future	High confidence (low confidence in magnitude of change)

→ Site Context – Future Climate Hazards – awaiting CCRA from LHD

Variable	Near Future	Far future
Average temperature (°C)		
Maximum temperature (°C)	-1.3	+5
Minimum temperature (°C)		
Severe fire danger days per year	+1.5	+6.3
Change in rainfall	-110 mm	-250 mm
Maximum 1 day rainfall for a 20 year ARI event	Awaiting CCRA	Awaiting CCRA

Climate variable	Range: all sites	
	2030	2070
Number of days over 30°C	40 - 48	56 - 66
Number of days over 35°C	10 - 11	15 - 18
Maximum Number of days over 40°C	4 - 8	5 - 8
Highest temperature	44 - 45°C	48.1 - 49.3°C

