If a building becomes architecture, then it is art. Clearly, if a building is not functionally and technically in order, then it isn't architecture either – it's just a building.
Arne Jacobsen

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SUSTAINABLE DESIGN

STEENSEN VARMING

Tamworth Mental Health Unit ESD Review of Environmental Factors (REF) Report

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1.0 Executive Summary

This report has been prepared by Steensen Varming on behalf of the Applicant. It accompanies a Review of Environmental Factors (REF) for Tamworth Hospital Mental Health Unit (TMHU) project. Steensen Varming has been appointed by Health Infrastructure (HI) as the Environmentally Sustainable Design (ESD) Consultant.

The purpose of this report is to summarise the Environmentally Sustainable Design (ESD) initiatives being considered for TMHU, explain how the project has addressed the REF and to provide an overview of how the proposed design is responding to sustainable planning guidelines.

In the role of the project's ESD consultant, Steensen Varming have advised on suitable sustainability initiatives, drawing on HI Sustainability targets, as well as national and international best practice guidelines, as well as their own experiences to achieve the best outcome for the project, within budget constraints. The project benefits from a collaborative design team, who are continually identifying cost effective, integrated and Whole of Life appropriate design solutions.

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2.0 Assessment Requirements

In preparing this report, the following Review of Environmental Factors (REF) General Requirements and Key Issues have been addressed. The table below sets out the reference or location of these matters within this report.

Ecologically Sustainable Development

General Requirement or Key Issue	Reference / Location within this report
Address how the development will meet HI's ESD principles and achieve building sustainability/ energy/ water/material performance.	The ESD initiatives proposed for the project aim to reduce the environmental impacts typically associated with buildings during the construction and ongoing operation of the building. The project utilises a resource hierarchy approach, with emphasis on avoiding, then reduction of energy, water, waste and materials. Resource conservation is a key focus of the sustainability strategy, including strategies for energy, water, and material resources. The project meets HI's sustainability targets from the HI ESD Evaluation tool and from DGN 058. Refer to sections 6, 7 and 8.

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3.0 Introduction

This report has been prepared by Steensen Varming for Tamworth Hospital Mental Health Unit (TMHU).

NSW Health Infrastructure proposed to redevelop a part of the Tamworth Hospital, which includes a community mental health unit. The entire redevelopment project will be carried out in two stages (i.e. Early works and Main works), under separate environmental assessment processes. Both stages will be assessed under Part 5 of the Environmental Planning and Assessment Act 1979. In summary, the two stages of the project include:

1. Early Works
   - Demolition and expansion works to the car park.
   - Alterations to access and traffic movement

2. Main Works
   - Addition of 47 new car park spaces
     - Addition of a new Mental Health Unit, comprised of: Entry / Reception / Waiting, Patient Area, Clinical support and non- clinical support areas, staff areas and 4 bedrooms and support areas (shared with Older Persons)

This report relates to the TMHU and will accompany both Review of Environmental Factors reports.

Steensen Varming has been engaged by TMHU as an independent ESD consultant. This report outlines the Ecologically Sustainability Development (ESD) requirements, principles and strategies recommended for this project required to meet HI's ESD principles. At Steensen Varming, the approach to sustainability is to work with the client and design teams to develop best practice sustainable principles that align with the vision and respond to the unique context of the site and building requirements as well as acknowledging the unique requirements of this project as a health care facility.

Figure 1 TMHU Site Plan

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4.0 Requirements and targets

NSW Health Infrastructure (HI) and the Local Health District (LHD) have defined high-level ESD targets for TMHU as follows:

- As per DGN 058 and considering the project's location, **a minimum of 45 points + 5 buffer points (4-star equivalent**) to be achieved by the design in accordance with HI's ESD Evaluating tool.
- The local health district (LHD) has set an aspirational target for this project to go beyond the minimum requirements and aim to meet **60 points + 5 buffer points (or 5-star equivalent)** to be achieved by the design in accordance with HI's ESD Evaluating tool.
- A **minimum 10% improvement** in energy efficiency, compared to the NCC Section-J deemed-to-satisfy (DTS) baseline compliance requirements, applicable to the development.

4.1 HI ESD Evaluation Tool

HI ESD evaluation tool is comprised of a list of sustainable initiatives categorised in 9 sustainability sections, which cover issues such as management, indoor environment quality, energy, water, waste, transport, emissions, ecology, and innovation.

TMHU is targeting a self-certified approach to achieve 'Australian best practise' level, which is equivalent to 45 points out of 110 available. The self-certification pathway is based on the agreed approach between Health Infrastructure and Department of Planning, Industry and Environment (DPIE) in demonstrating a high level of sustainability outcome, using the HI ESD Evaluation Tool.

The evaluation tool contributes to the 2050 Net Zero goal by including several targets focused on resource conservation and minimising operational energy use. It also incentivises the transition to full electric developments, enabling 100%.

4.2 NCC Section-J

Section-J of the National Construction Code (NCC) 2022 (Previously known as the Building Code of Australia (BCA)) relates to "energy efficiency" of buildings". Section J is a minimum performance target for standard buildings and specifies minimum performance targets known as deemed-to-satisfy (DTS) requirements, for building fabric and services.

TMHU's target is to achieve a minimum 10% greenhouse gas improvement against the NCC 2022 Section J baseline. This will require the design team to incorporate energy efficiency features into the proposed building. For this project, energy modelling is outside the ESD Consultant's scope of work; it is being performed by the Mechanical engineer, during Schematic design through to Detailed Design. Any improvement in energy efficiency beyond the minimum requirements of Section-J, will also contribute towards the project's HI ESD Evaluation Tool energy score.

NSW Government has committed to achieving net zero emissions by 2050. DPIE's *NSW Net Zero Plan, Stage 1:2020-2030* report outlines key priorities for achieving this target. Recently, the NSW Government has committed to an interim target of 50% emission reduction from 2005 levels by 2030. Steensen Varming recommends a high performance and low carbon outcome for the TMHU project to align with the NSW Government's stated emissions reduction targets.

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5.0 Health care specific considerations

The physical environment of healthcare facilities can have a significant effect on the health and wellbeing of both patients and staff and has the potential to minimise stress. Therefore, the design team should focus on optimising the environment to ensure positive outcomes.

There has been a growing awareness among healthcare administrators and medical professionals of the need to create a healthy indoor environment that would be healing and therapeutic to enhance patient wellbeing and conducive to staff wellbeing and productivity. This list below outlines some of the key healthcare specific sustainability principles that have been recognised by the design team, for TMHU:

Indoor environmental quality

Health Care facilities are one of the most complex building types, and the greatest challenge is to reduce their energy consumption, while maintaining their specific functional needs to enhance patient comfort.

Daylight

Daylight is found to be a critical requirement for human beings, for both psychological and physiological wellbeing. In healthcare settings daylight is found to be beneficial to the patients as well as staff.

Views

Windows provide access to a view to the outside and establish connections to the surrounding natural environment, both in terms of weather conditions and time of day. Among patients, having such visual connections have been associated with reduced anxiety, pain, depression, and delirium.

Outdoor Places of Respite

There are increasing evidence that prove that patients gain healing benefit from having access to outdoor gardens and places of respite.

Biophilia

Integration of greenery improves views, air quality and connection to nature, which can reduce anxiety, pain and depression. Balconies can also support additional shading and improved energy efficiency and access to outdoor space.

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Air Quality

It is important to achieve good air quality in controlling and preventing airborne infections in healthcare facilities. Providing clean, filtered air and effectively controlling indoor air pollution through ventilation are two key aspects of maintaining good air quality. Several studies show that high-efficiency particulate air (HEPA) filters are highly effective in filtering out harmful pathogens and are strongly recommended in areas housing immunocompromised patients. Adequate ventilation rates and regular cleaning and maintenance of the ventilation system are critical for controlling the level of pathogens in the air.

Acoustics

Healthcare facilities can be extremely noisy. The high ambient noise levels, as well as peak noise levels in these types of buildings, can have serious impacts on patient and staff outcomes ranging from sleep loss and elevated blood pressure among patients to emotional exhaustion among staff. Poorly designed acoustic environments can pose a threat to patient confidentiality if private conversations between patients and staff or between staff members can be overheard by unintended listeners and, a poor acoustic environment impedes effective communication between patients and staff and between staff members by rendering speech and auditory signals less intelligible or detectable. Installing high-performance sound-absorbing acoustic finishes results in shorter reverberation times, reduced sound propagation, and improved speech intelligibility.

Smart Technology & Infrastructure

Integration of site wide data connectivity to enable open data sharing and adoption of smart technology throughout building areas.

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6.0 Sustainability Approach

Sustainability requires a holistic and integrated design approach, which builds on the awareness of climate, site, form, function, and a broad range of other initiatives.

6.1 Climate Overview

Understanding the local climatic conditions is essential for the development of appropriate, climate-responsive passive and active strategies for the building and its services. The analysis includes:

- Temperatures – daily and annual heights, lows, and averages
- Humidity and dewpoint – periods of muggy or dry conditions
- Wind – annual average wind frequency, direction and strength
- Sun – solar exposure and intensity

The following graphs show the average conditions from the Tamworth Airport weather station. A review of likely climate change impacts is also presented to acknowledge the shifting climate conditions in the future.

Table 1 – Climate Statistics for Tamworth:

Climate Variable	Period 1992-2023 Annual Average
Mean Maximum Temperature (°C)	24.9 °C (Summer: 33 °C Winter: 16.5°C)
Mean Minimum Temperature (°C)	9.8 °C (Summer: 17.7 °C Winter: 2.3 °C)
Mean Number of Days ≤ 2 C°	52.8
Mean Rainfall (mm)	648
Mean number of days of rain	86
Mean number of days of rain ≥ 10 mm	21.9

Source: BOM

6.2 Temperature

The warm season at Tamworth is for approximately 6 months from October to March, with temperatures exceeding 36 °C for approx. 1 month. On the other hand, winter is shorter and cold with frequent frost, lasting only from May till September. The peak high and low temperatures should be accounted, especially with respect to daylight, to prevent heat stress and utilise sunlight in winter.

The following diagrams show the annual average variation (high and low) in outdoor temperatures and the comfort ranges for the site throughout the year.

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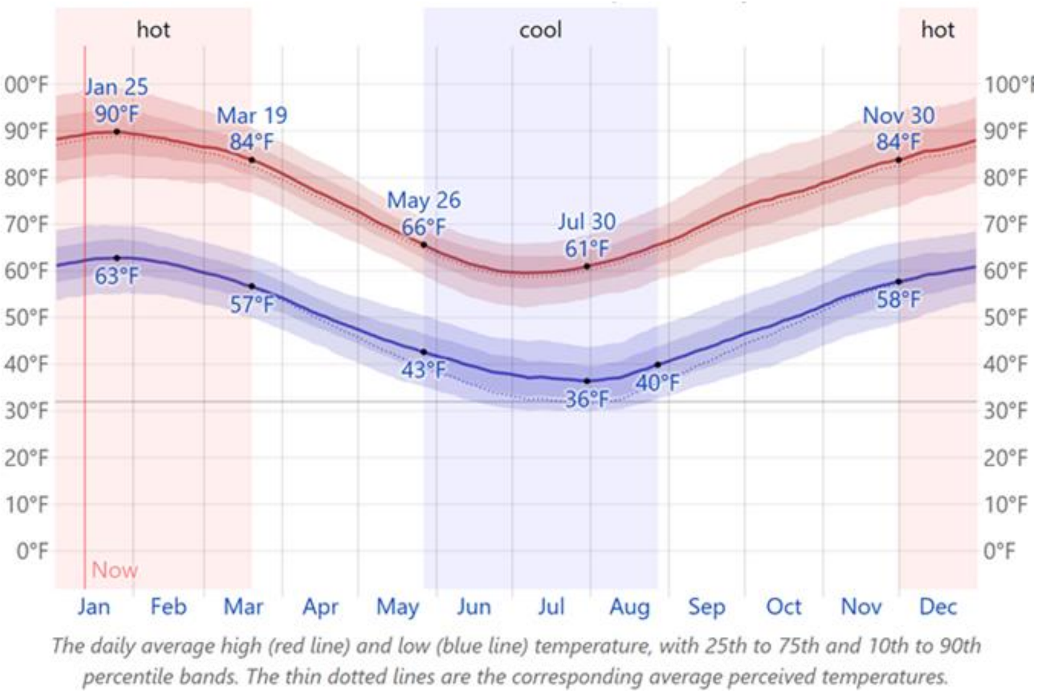


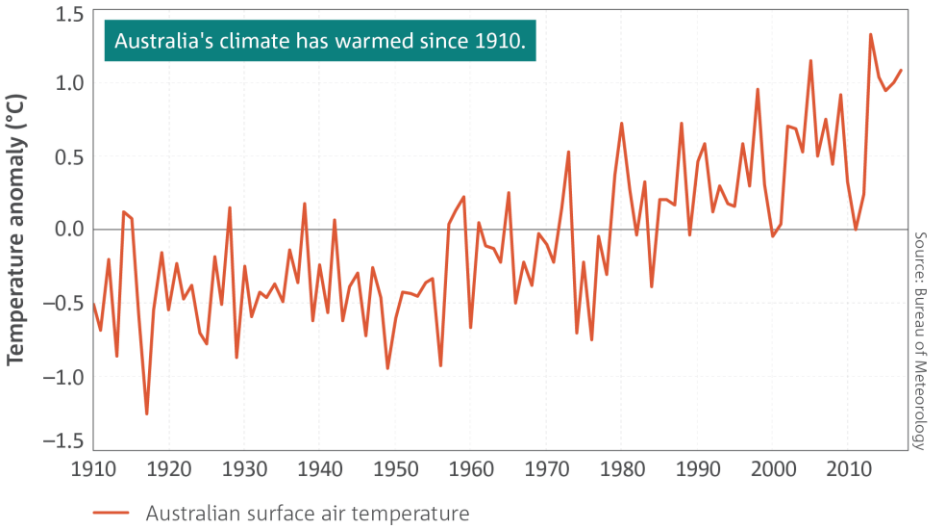
The daily average high (red line) and low (blue line) temperature, with 25th to 75th and 10th to 90th percentile bands. The thin dotted lines are the corresponding average perceived temperatures.

Source: BOM & Weatherspark

6.3 Climate change impacts on temperatures

Australia's climate has seen gradually increasing average temperatures over the past century, with an increase of just over 1°C since 1910. The majority of this increase has occurred since 1950 and 8 of Australia's top ten warmest years on record have occurred since 2005.

It has also seen an increase in the number of extreme temperature days (days where temperatures exceed the 99th percentile of each month from 1910-2017). The two graphs below show the average temperature anomalies (using 1961-1990 as the averaging point) and the frequency of extreme heat events between 1910 and 2019:



Source: BOM & AdaptNSW

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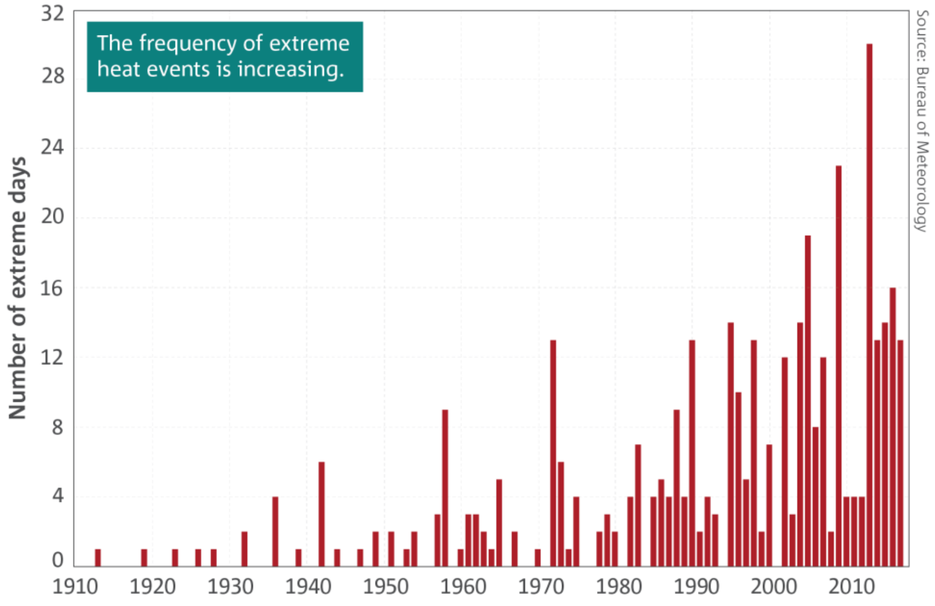

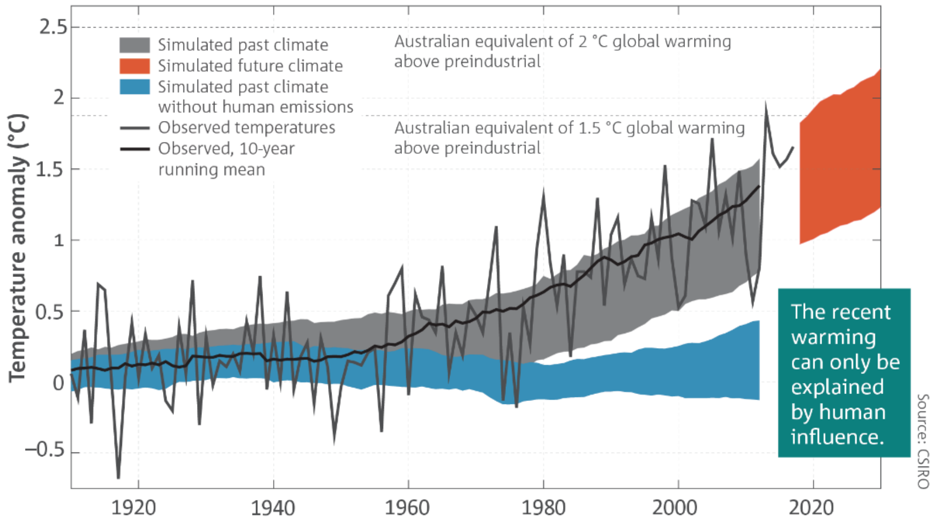

This trend is predicted to continue, and the extent of the warming will be based on global emissions scenarios. The current projections (source: Adapt NSW) are as follows:

Climate Projections for:	Near future (2020-39) Annual:	Long term (2090) Annual:
Change in mean temperature	+0.75°C	+2.28°C
Change in rainfall	+2.47%	+10.81%
High fire danger days	+0.28	+1.46
Hot days over 35°C	+13.75	+41.36

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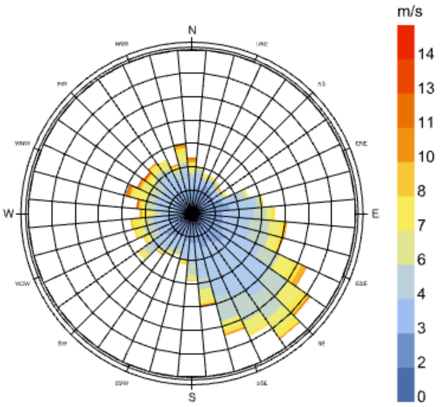
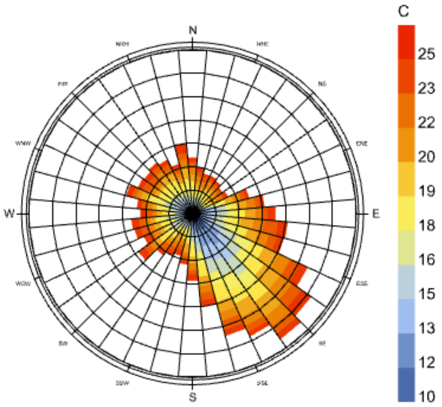
6.4 Wind

Winds are predominant in Tamworth from the southwestern direction, with speeds ranging from 0- 14 m/s, with peak wind temperatures up to 25 °C. Summer prevailing winds are in all the directions, but highest from southwest. Natural ventilation strategies through the building can thus utilize winds to reduce the cooling load.



Wind Speed (m/s)
city: Tamworth.Rgnl.AP
country: AUS
time-zone: 10.0
source: SRC-TMYx
period: 1/1 to 12/31 between 0 and 23 @1
Calm for 3.51% of the time = 197 hours.
Each closed polyline shows frequency of 0.9% = 50 hours.

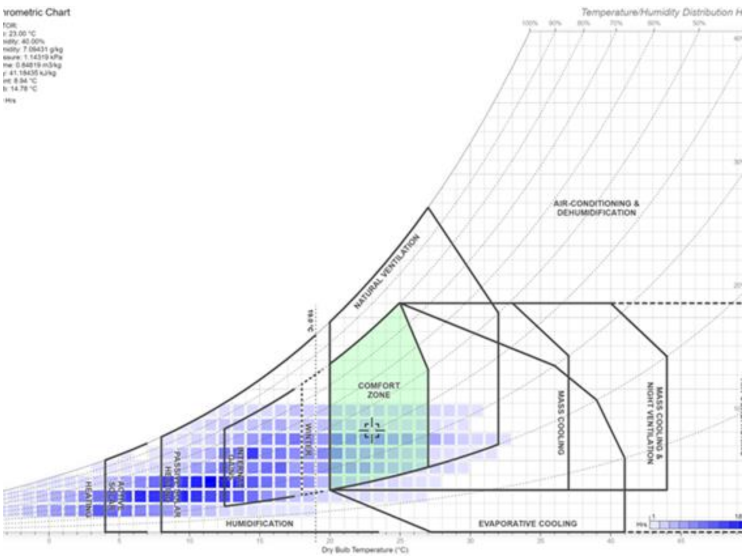


Dry Bulb Temperature (C)
city: Tamworth.Rgnl.AP
country: AUS
time-zone: 10.0
source: SRC-TMYx
period: 1/1 to 12/31 between 0 and 23 @1
Each closed polyline shows frequency of 0.9% = 50 hours.

6.5 Thermal Comfort

As shown in the charts above, the climate is sub-tropical, with hot, dry summers and cool winters. Due to relatively comfortable year-round conditions, the climate should enable passive strategies to be used for most of the year.

The following psychrometric chart shows the distribution of wet and dry bulb fluctuations throughout the year, with possible passive building design strategies that could work for the new research centre:



Psychrometric chart for Tamworth climate with passive design strategies overlaid.

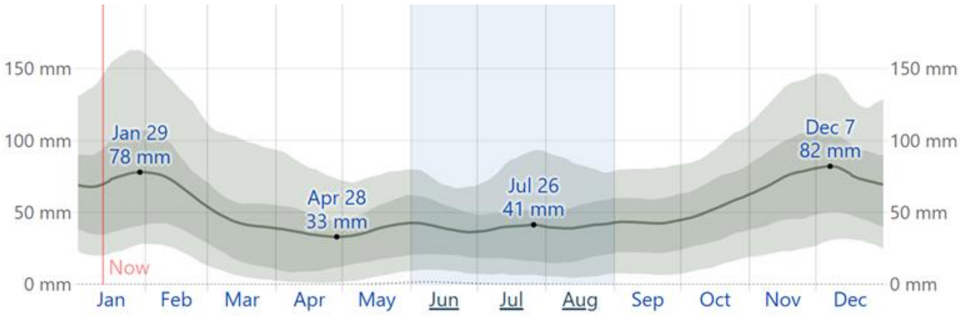
The chart shows the following key analysis:

1. **Summer strategies:** a combination of natural ventilation and mass cooling could help passively cool areas of the building.
2. **Winter strategies:** passive solar heating could help warm the building.

It is important to note that while passive heating and cooling strategies can be adopted throughout the building, additional environmental control of the hospital spaces will still be required throughout the year to maintain the stricter temperature and humidity set points for critical care areas.

6.6 Rainfall

The highest precipitation in Tamworth is in the summer months from November to February, when water is most needed, Rainwater harvesting can aid to site irrigation and reapplication as greywater in the building, as Tamworth receives rainfall year-round. December receives the most rainfall in Tamworth (average 77 mm) while April sees the lowest rainfall (average 35 mm).



The average rainfall (solid line) accumulated over the course of a sliding 31-day period centered on the day in question, with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the corresponding average snowfall.

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7.0 Sustainable Design strategies

An overview of strategies that have been discussed with the project team to improve the sustainability performance of the project is presented in the table below.

Key Principles		**Strategies Currently Under Consideration**
	Site and Environment	▪ Avoid development on areas of high ecological value ▪ Enhance ecological value of the site ▪ Selection of endemic native species with high ecological value ▪ Access to outdoor space ▪ Light pollution reduction ▪ Water Sensitive Urban Design for Stormwater management onsite
	Transport	▪ Electric vehicle infrastructure provision (as per NCC 2022)
	Energy	▪ Optimised façade performance (WWR, SHGC, U-value, light transmittance, shading) ▪ Optimised building massing and orientation ▪ Efficient equipment ▪ Rooftop PV ▪ Building Integrated PV ▪ Other On-Site Renewables – solar hot water / etc. ▪ Off-site renewables
	Water	▪ Water recycling (rainwater) ▪ Reduce water use with the selection of efficient fittings and irrigation system ▪ No cooling towers or cooling tower water use reduction strategies
	Material and waste	▪ Reduce the use of materials through space planning and prefabrication techniques ▪ Use of materials with low embodied carbon ▪ Design for deconstruction ▪ Operational waste strategy ▪ Selection of timber materials where possible ▪ Use of cement replacement and low impact concrete ▪ Selection of materials with Environmental Product Declaration (EPDs) ▪ Selection of stone paving with low environmental impact ▪ Responsible sourcing ▪ Segregation and recycling of construction and operational waste

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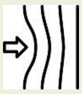
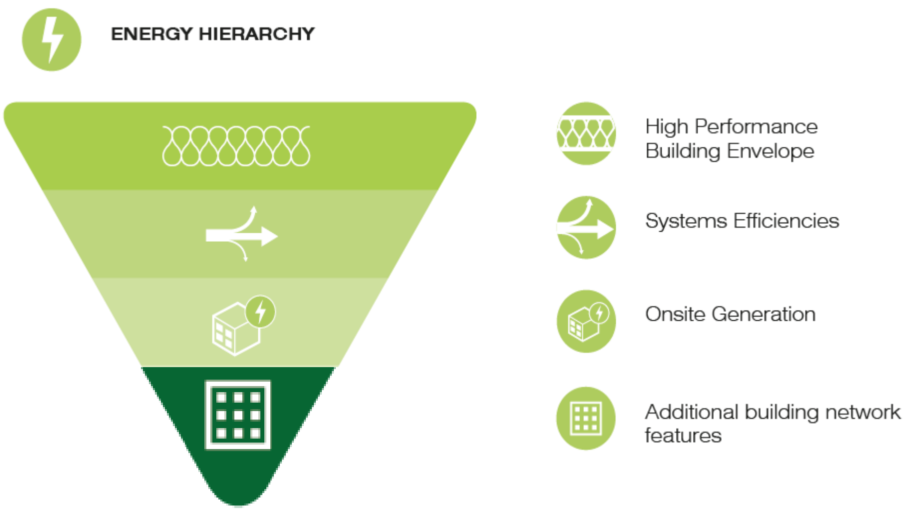
	Health and wellbeing	▪ High level of air filtration ▪ Increased outdoor air supply ▪ Water filtration, drinking water dispenser, bottle refill ▪ Glare control ▪ Daylight and views ▪ Thermal comfort ▪ Lighting comfort ▪ Acoustic comfort ▪ Biophilia and beauty (planting, artwork) ▪ Outdoor place of respite ▪ Low VOCs materials ▪ Fitness facilities and place of respite ▪ Provision of healthy food
	Resilience	▪ Climate change adaptation ▪ Hazard assessment ▪ Space flexibility and adaptability ▪ Selection of robust materials ▪ Reduce heat island effect with green infrastructure, light colour hardscape and roof finishes
	Sustainability Management & Optimization	▪ Advanced metering strategy ▪ Integrated smart technology to optimise all strategies, including energy, water, waste. ▪ Free wifi to patients, staff and visitors ▪ High speed connectivity

7.1 Resource Conservation – Energy

The proposed approach to sustainability and energy related systems is based on applying an "energy hierarchy" methodology.

This methodology has the reduction of energy use as its priority, and then seeks to meet the remaining energy demand by the most efficient means available, before the inclusion of on-site generation and importation of green power.



The following energy conservation initiatives are being considered for the proposed design:

Passive Design Strategies:

- High-performance building envelope - An orientation-specific façade design approach has been taken to ensure orientation climatic issues are effectively managed for TMHU. A combination of efficient shading and high-performance glazing is incorporated, where needed. External shading is proposed to the northern and western inpatient bedrooms. Internal roller blinds will be provided throughout.
- The external glazing would satisfy the provisions of NCC Section-J 2022 of the Building Code of Australia. Consideration has also been given to future climate conditions and the respective impact on the building envelope and energy demands.

Active Measures / Building Systems Design

- **Zoning of HVAC and lighting services** – Zoning of HVAC and lighting services has been incorporated to avoid energy wastage.
- **High-efficiency plant and associated controls**
- Mechanical cooling plant will be run in economy cycle when conditions are appropriate
- **Pre-temper outside air** – Use of heat recovery systems to lower outside air temperatures.
- **Relax internal set points** (where appropriate) – Allowing a greater range of thermal conditions can reduce heating and cooling plant loads

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- **Seasonal temperature and humidity set points** – Vary set-points throughout the year based on operational use and user demographics
- **Enhanced commissioning** – Commissioning of building services, along with quarterly fine-tuning to ensure that the systems perform at their optimum capacity.

Renewable Energy:

The following renewable energy opportunities have been considered, including:

- **Solar Photovoltaics (PV) –** Rooftop PV array of around 99kW

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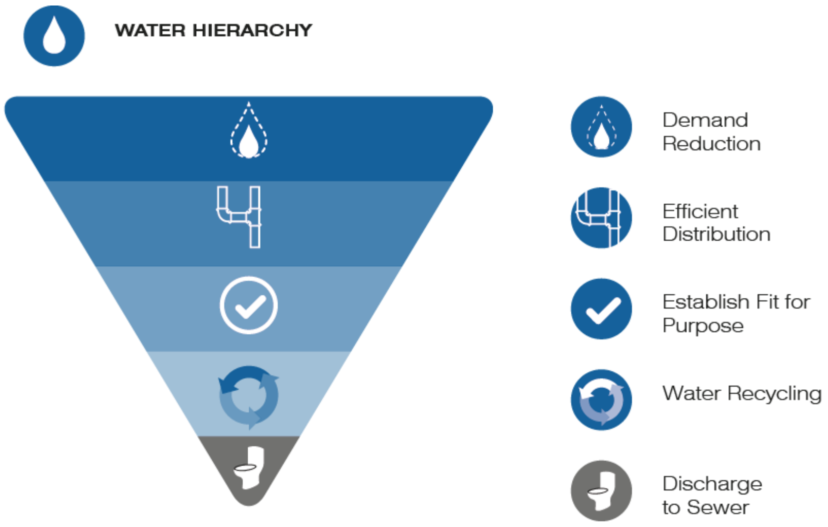
7.2 Resource Conservation – Water

The following hierarchy and strategies has been applied to the TMHU design:

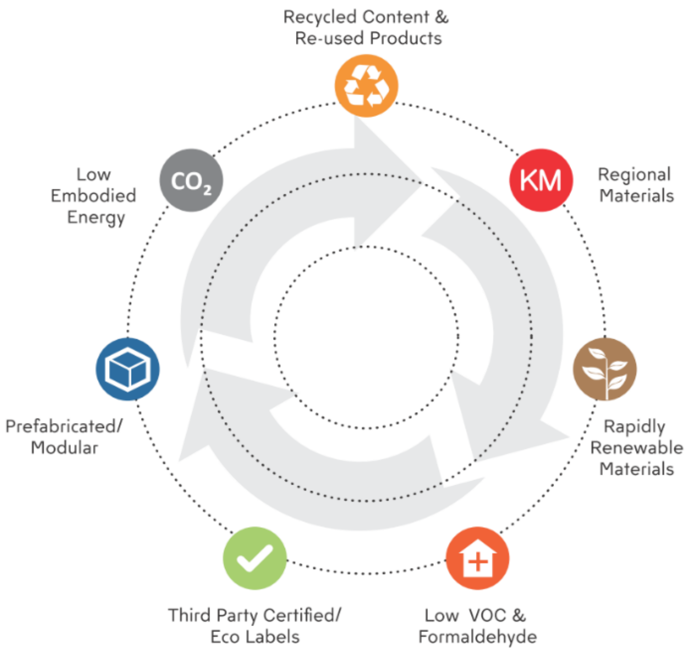


The following water initiatives have been proposed and their individual merits will be assessed further during future design stages:

- **Water efficient fixtures / fittings will be specified.** These include fittings such as taps, showerheads, toilets, zip taps, dishwashers etc certified under the WELS rating scheme.
- **Rainwater Reuse** - Rainwater collection and reuse are included in the design. Collected water will be used for landscape irrigation
- **Drip and demand-controlled irrigation** to optimise irrigation supply

7.3 Resource Conservation – Materials and Waste

Selection of environmentally preferable materials is a key priority for the project because building materials consume energy and natural resources during its manufacture and for their transportation to the construction site. Choices of materials and construction methods can significantly change the amount of energy embodied in the structure of a building.



Low-impact construction methods such as offsite prefabrication/preassembly shall be considered where applicable. Preference will be given to materials that contain high-recycled content and/or are highly recyclable. The following water initiatives have been proposed and their individual merits will be assessed further during future design stages:

- **Use sustainable timber** – Timber products used for concrete formwork, structure, wall linings, flooring and joinery will be sourced where possible from reused, post-consumer recycled or FSC-certified, or PEFC certified timber.
- **Steel** – will be specified to meet specific strength grades, energy-reducing manufacturing technologies, and off-site fabrication. Steel will also be sourced with a proportion of the fabricated structural steelwork via a steel contractor accredited by the Environmental Sustainability Charter of the Australian Steel Institute if available within rural areas.
- **Recycled concrete** – The project aims to reduce the use of Portland cement through substitutions. Fine and coarse aggregate inputs are to be sourced from manufactured sand or other alternative materials, and the amount of Portland cement will be reduced within the concrete mix when possible. It will depend on supply opportunities.
- **High recycled content or recyclability** – Furniture items with high recycled or recyclability content to be considered.
- **Materials with low VOC content -** VOC off-gassing from internal materials and finishes is very harmful to occupant health and productivity. The design team would ensure that flooring, paints, adhesives and sealants are specified to meet low VOC requirements (as per Green Star VOC targets).
- **Formaldehyde Minimisation** - All engineered wood products to be specified to either have low formaldehyde emissions or contain no formaldehyde.
- **Insulation ODP** – All thermal insulation products (used within both HVAC ductwork and building envelope) to be specified to be of zero ODP type. (i.e. avoid the use of ozone-depleting substances in both its manufacture and composition).

- **Locally manufactured materials -** Preference would be given to locally manufactured products wherever feasible, in order to reduce their embodied energy and associated GHG emissions.

The following initiatives are being considered to minimise waste during construction and operation phases:

- **Construction waste management** - This is to ensure that recycling of waste from demolition and construction is maximised and that the volume of demolition and construction waste ending up in landfill is minimised.
- Sub-contractors should be instructed to send the recyclable resources recovered from demolition and construction back to their manufacturers and suppliers for recycling/reuse where possible.
- **Operational waste management** - To ensure recycling of operational waste, dedicated storage space should be provided for locating recycling bins. Hazardous and biological waste should be considered.

7.4 Health and Wellbeing

Indoor Environmental Quality

The following occupant comfort strategies are being considered for the proposed design for the project.

- **Indoor Air Quality**–Increased levels of fresh outdoor air above AS1668 should be provided.
- **Daylight** - The façade design allows for the provision of high levels of natural light (where applicable). Where appropriate, the design has sought to maximise daylighting and reduce the reliance on artificial lighting, while controlling for unwanted solar heat gains. External shading and internal blinds could be provided to manage instances of glare.
- **External views** – are provided, to give views of surrounding landscape, as well internal views towards the atrium. The provision of views helps to improve patient and staff wellbeing.
- **Glare** - should be reduced using fixed shading devices, window tinting or operable devices such as shades or blinds to all external or perimeter windows and glazing.
- **Thermal comfort** – should be a key focus of naturally (mixed mode spaces) and mechanically ventilated spaces.
- **Building noise** – Both internal and external noise sources and levels should be considered and controlled in accordance with AS/NZS 2107.

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7.5 Site & Environment

Proposed design aims to protect the project site and ensure the reduction of potential emissions, including air pollutants, watercourse pollutants, light pollution, refrigerant leakage, etc.

Water Sensitive Urban Design example

The following initiatives are being considered to preserve site quality and reduce pollution:

- **Stormwater Reduction** – Manage the impacts of stormwater run-off from the development. This would include measures to prevent stormwater contamination, control sedimentation and erosion during construction and operation of the building, such as rainwater reuse etc.
- **Pollution of the night sky** should be minimised by ensuring that the electric lighting within the site should not cause any direct beam of light into the night sky. Light pollution can disturb the habitat of migratory birds and impacts the behaviour of nocturnal animals in the site vicinity.
- **Emissions from HVAC refrigerants** and insulation products have the capacity to damage the ozone layer. For the proposed design, refrigerants with zero ODP and Low GWP should be specified and installed within all the proposed HVAC systems.

8.0 ESD Evaluation Tool Assessment

The HI ESD Evaluation tool has been used during the schematic development process to assess and coordinate the targeted credits and define the overall score. The selection of the credits targeted has been based on the following:

- ESD target requirements
- Review of site, context, and proposed design
- Opportunities & constraints identified within the current design
- Key ESD healthcare specific considerations (As described in Section 5)
- Project team experience in other similar health care projects.

8.1 Current rating – 4 star

The status of the assessment includes 58 points, that are deemed to be of low/medium risk. As summarised in the below table, the points score of 58 points would result in a 4-star rating, with a buffer of 13 points, thereby having a higher contingency than the DGN58. (NOTE: DGN 58 requires a minimum of 5 buffer points).

Category	Available Points	Low / Med Risk
Management	14	12
Indoor environmental quality	17	11
Energy	22	4
Transport	10	2
Water	12	4
Materials	14	8
Land use & ecology	6	3
Emissions	5	4
Innovation	10	10
Total	**110**	**58**
4 Star Target	**45 (+5 buffer points)**	**Pass**
5 Star Target	**60 (+5 buffer points)**	**Fail**

The targeted credits require some further investigation to ensure they are adequately incorporated into the design and achieve the necessary performance. This work to confirm these credits will continue during the detailed design and construction stages.

As the project progresses, if some credits are deemed unachievable, alternative credits and strategies will be explored.

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8.2 Stretch target – 5 star

The LHD has an aspirational stretch target of 5-star rating. To support this intent, an additional 13 points have been identified (totalling 71 points). This results in a 11-point buffer above minimum threshold of 5-star rating. However, it should be noted that these stretch points are identified as high-risk, due to the potential cost and space impacts.

The high-risk items relate to the following:

- Reduction of greenhouse gas emissions of the Proposed Building by 20% compared to the Benchmark Building (10% reduction is being considered as the 4-star target).
- Demonstrate a reduction of the project's predicted peak electricity demand by 30%, below that of a Reference Building (i.e. NCC code compliant minimum performance building).
- Demonstrate a reduction of potable water consumption by atelast 30% compared to a reference building (20% reduction is being considered as the 4-star target).

As summarised in the below table, the additional points would result in achieving a 5-star outcome, with a buffer of 11 points, above the minimum score of 60 points.

HI ESD Evaluation Tool Score Summary

Category	Available Points	Low / Med Risk	High Risk	Total Targeted
Management	14	12	1	14
Indoor environmental quality	17	11	2	10
Energy	22	4	5	5
Transport	10	2	0	1
Water	12	4	2	4
Materials	14	8	0	8
Land use & ecology	6	3	0	2
Emissions	5	4	0	2
Innovation	10	10	0	10
Total	**110**	**58**	**13**	**71**
4 Star Target	**45 (+5 buffer points)**	**Pass**		**Pass**
5 Star Target	**60 (+5 buffer points)**	**Fail**		**Pass**

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9.0 Next Steps

This report provides a list of recommended sustainability strategies for the TMHU project in line with the project brief and the schematic design proposed.
The following steps are recommended during the detailed design and construction stages consolidate a set of sustainability strategies and targets, embed these into the project and collate evidence to demonstrate achievement of performance for each targeted credit:

- Review of the targeted items to determine achievability and further coordination with design teams for strategy development as design develops at the DD stage
- Teams to carry out or finalise calculations, modelling or analysis required to support strategies and achieve targeted points (e.g. JV3, daylight, views, and energy modelling, water calculations, climate risk assessment)
- Coordination with QS to ensure any cost impact from required strategies is included within the cost plan and within the procurement requirements
- Finalise set of strategies to be agreed by the design team, stakeholders and the LHD, and to be confirmed by HI to include in the design moving forward.