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

Mechanical Engineering
Lighting Design
Sustainable Design
Electrical Engineering

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SUSTAINABLE DESIGN

STEENSEN VARMING

Warrawong Community Health Centre 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 an Review of Environmental Factors (REF) for the Warrawong Community Health Centre (WCHC).

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

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2.0 Assessment Requirements

Geolink has advised the general requirements for the development at Warrawong Community Health Centre (WCHC) to be considered as Development Without Consent, requiring preparation and determination of a Review of Environmental Factors (REF) by Health Infrastructure under Part 5, Division 5.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The REF requirements for the project were issued by Geolink on 20 July 2023.

In preparing this report, the following REF requirements have been addressed. The table below sets out the reference or location of these matters within this report.

Ecologically Sustainable Development

REF Requirement	Reference / Location within this report
Demonstrate consideration of, and compliance with, DGN 58/HI Sustainability Framework (including Section 2.56 of the Health Infrastructure Services Guideline dated 6 August 2021).	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 will meet HI's ESD principles by aspiring to meet the sustainability targets from HI's ESD Evaluation tool from DGN 058. Refer to Sections 6, 7 and 8.
Consider also the provisions of draft SEPP Sustainable Buildings 2022 (Chapter 3).	As the project is pursuing the Review of Environmental Factors (REF) pathway through Part 5 of the Environmental Planning and Assessment Act 1979, Geolink/HI Planning has advised that the non-residential development (Chapter 3) requirements of the State Environmental Planning Policy (Sustainable Buildings) 2022 (Sustainable Buildings SEPP) do not apply. However, Geolink further advise that the non-residential development (Chapter 3) requirements of the State Environmental Planning Policy (Sustainable Buildings) 2022 will need to be considered by the project. While the proposed development is not subjected to the additional Sustainable Buildings SEPP requirements, it proposes to achieve a 5 Star (Australian Best Practice) equivalent rating through the DGN058 sustainability framework developed by Health Infrastructure NSW. The ESD strategy has been tailored to align with the new Sustainable Buildings SEPP requirements.
Describe any climate resilient design measures in response to climatic risks. For example, design responses to heat (e.g. localities more prone to drought or urban heat areas), water (e.g. stormwater/flooding), and/or coastal (e.g. erosion or other).	Climate risk for the location has been identified and recommended strategies have been included and discussed with the project team. A final assessment will be undertaken in the next stage of the design. The key climate risks consideration has also been outlined within the sustainability strategy. Refer to Sections 7.
Sustainability Report should describe in detail the sustainable design measures and outcomes, including waste minimisation, energy use, renewable energy, water consumption, water recycling, passive design and any climate resilience measures.	Resource conservation is a key focus of the sustainability approach for the project, strategies for energy, water, and material resources as well as as climate resilience have been considered as the overall approach to embed sustainability in the project. Refer to Sections 7.

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3.0 Introduction

This report has been prepared by Steensen Varming for the Warrawong Community Health Centre (WCHC).

As part of the Community Infrastructure Strategy, the Warrawong Community Health Centre will be one of the community based facilities to support the Illawarra Shoalhaven Local health District (ISLHD) in delivering accessible, equitable and safe care in the right setting for the Warrawong Community.

The ISLHD Health Care Services Plan (HCSP) builds on previous service planning; setting out key directions for service and capital development across the ISLHD from 2020 to 2030, as well as the vision for an integrated health system in the Illawarra Shoalhaven region. The Warrawong Community Health Centre serves to integrate services from the (now decant) Port Kembla Hospital as well as other partnered services to provide appropriate care to the local community. The proposed facility will include in-reach and specialist community based services to meet the healthcare needs of the community. The proposed services include:-

- Provide care locally and support the southern Illawarra population through the provision of:
    - Specialised community-based services that provide care for people and families with chronic health conditions, complex needs and of marginalised status.
    - Targeted approach in providing services, responding to local needs.
    - With care closer to home to effectively minimise inequity to health care access.
- Support the local vulnerable community through the provision of the following clinical services:
    - Services currently hospital based which are more appropriately, conveniently, and effectively delivered within a community setting.
    - Child and Family services including PKH Child Development Service, Illawarra Early Childhood Nurses, Domestic Family Violence and Sexual Assault Services and Binji & Boori Child & Family Illawarra Aboriginal Services (AMHICH).
    - Ambulatory and Primary Health Care services including facilities offering Chronic Disease Prevention and Rehab Services such as the Aunty Jeans Program and Healthy Hearts program.
    - District Wide Sexual Health Service.
    - Drug and Alcohol Services, based in the community including Drug & Alcohol Needle & Syringe Program (First Step), and Counselling & Withdrawal Management.
    - Community based Mental Health services.
    - Allied Health (including Brain Injury Service).
    - Ante-natal.
    - Equipment Loan Pool.
- Support partnered service delivery with the integration and collocation of other health care providers and government agencies to delivered coordinated approaches to supporting the local community.

The site is a brownfield. The existing building will be demolished, with the purposed built Warrawong Community Health Centre constructed over in its place.

Steensen Varming has been engaged by Health Infrastructure to complete Part 3, schematic design for the Warrawong Community Health Centre Project.

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This report outlines the Ecologically Sustainable Development (ESD) requirements, principles and strategies recommended for the project. 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 community health centre.

Proposed site with existing building to be demolished (in red).

Proposed project site plan (in blue) with the remaining part of the Port Kembla Hospital site.

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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 WCHC as follows:

- The Warrawong Community Health Centre (WCHC) is designed to address the requirements of DGN58 and achieve a minimum of **60 points + 5 buffer points** (5-star equivalency rating), in accordance with the HI ESD Framework.
- A **minimum 10% improvement** in energy efficiency compared to a baseline of NCC Section J compliance applicable to the development.

4.1 HI ESD Evaluation Tool

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

WCHC is targeting a self-certified approach to achieve 'Australian Best Practice' level, which is equivalent to 66 points out of 110 available.

The self-certification pathway is based on the agreed approach between Health Infrastructure and the Department of Planning, Industry and Environment (DPIE) in demonstrating an equivalency against the Green Star rating system.

The evaluation tool also contributes towards the 2050 Net Zero goal by including several targets focused on resource conservation and minimising operational energy use. It also commits to full electrification for the proposed development.

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.

WCHC target is to achieve a minimum 10% greenhouse gas improvement against the NCC 2022 Section J baseline. This will require to perform energy modelling and incorporate energy efficiency features into the proposed building. For this project, energy modelling is outside the ESD Consultant's scope of work; it will be 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 WCHC 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 requirements that must be addressed, including:

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 is increasing evidence that proves 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

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

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6.0 Climate Overview

This section provides an overview of the main climate considerations of the site. 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 Kiama 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 Australian Locations: Kiama

Climate Variable	Period 2001-2023 Annual Average
Mean Maximum Temperature (°C)	21.4 °C (Summer: 25.1 °C Winter: 17.4 °C)
Mean Number of Days ≥ 35 °C	1.8
Mean Minimum Temperature (°C)	14.6 °C (Summer: 19.1 °C Winter: 10.2 °C)
Mean Number of Days ≤ 2 °C	0
Mean Rainfall (mm)	1,131.5
Mean number of days of rain	132.2
Mean number of days of rain ≥ 10 mm	30.6

Source: BOM

6.1 Temperature

The area will have a wide temperature range through the year. During mid-seasons the temperatures can be comfortable offering significant opportunities for natural ventilation and being outdoors in shoulder seasons. There are some hot periods during summer and some cold periods during winter.

High external air temperatures in summer advocate for ground sourced heat rejection were feasible and the need for effective solar control.

Swings in diurnal temperatures offer opportunities for night-time cooling/thermal storage strategies utilising the cooler temperatures overnight in summer and midseason, in offsetting AC consumption for the following day.

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

Average Temperature

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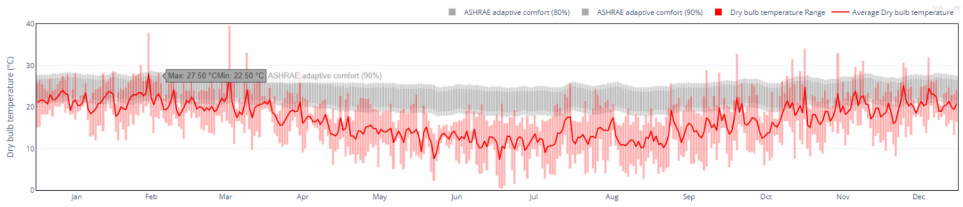
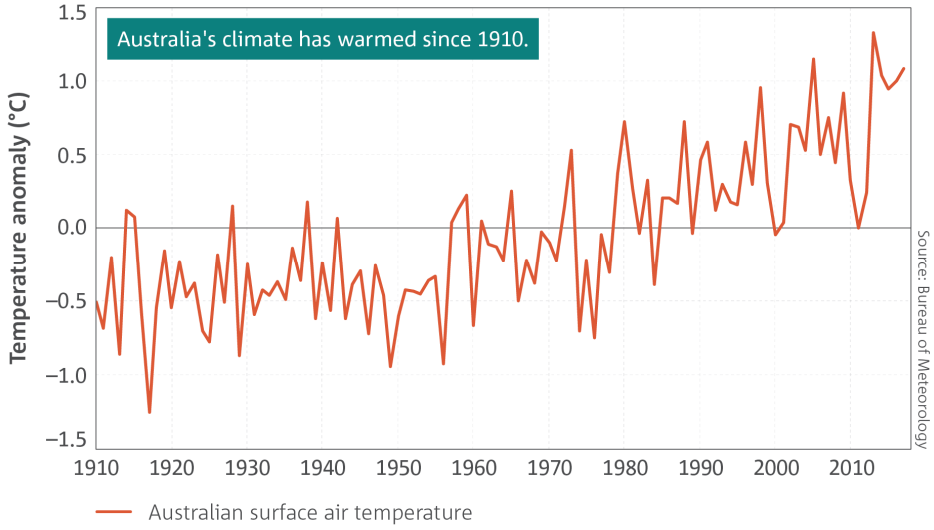


(*Albion Park Airport, Average Temperature (Australia) - Clima*)

6.2 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:



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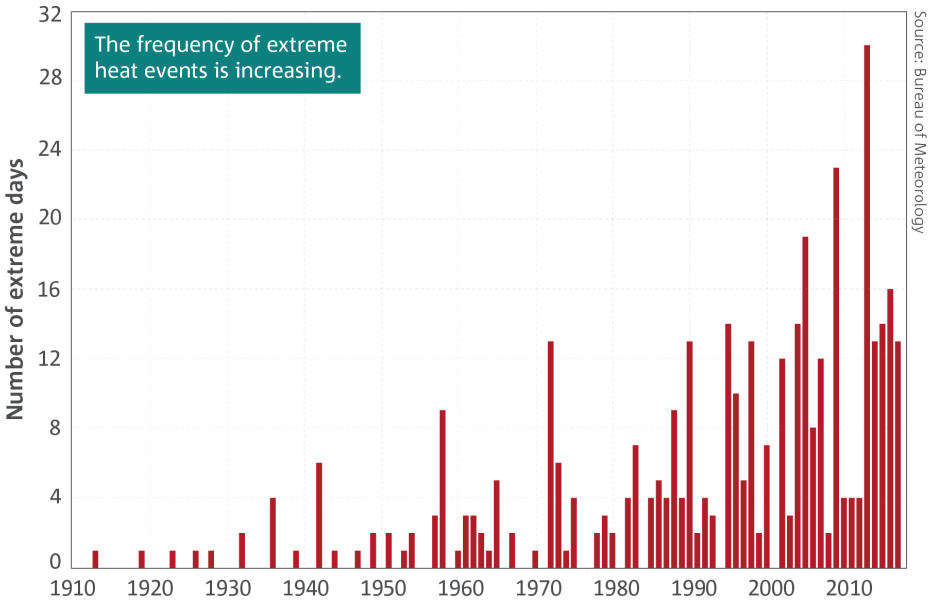
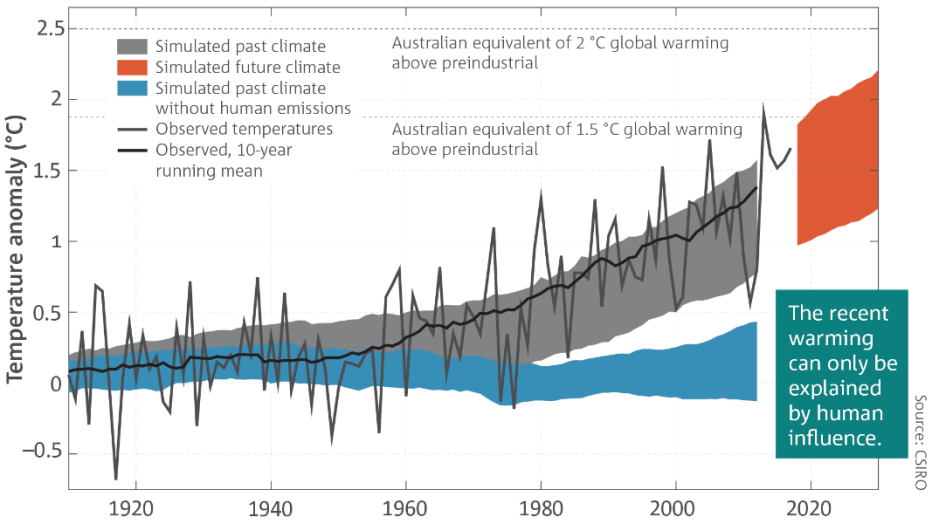




This trend is predicted to continue, and the extent of the warming will be based on global emissions scenarios. The current projections for Warrawong (source: Adapt NSW) are as follows:

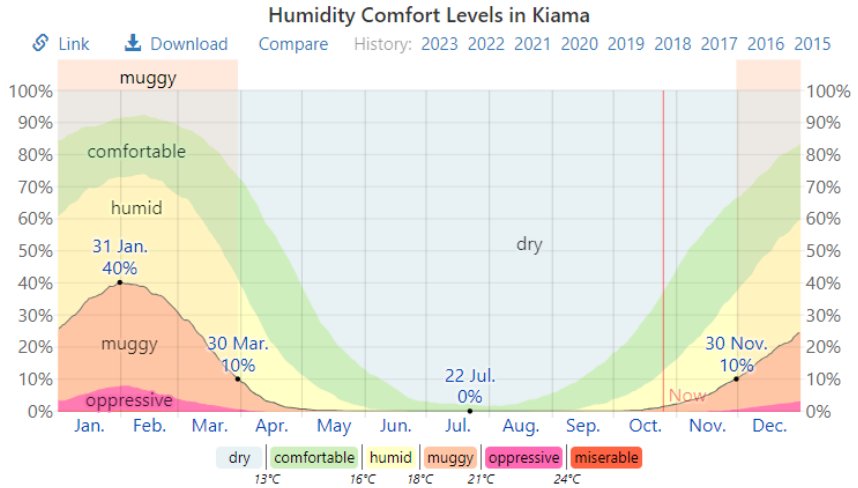
Climate Projections for:	Near future (2020-39) Annual:	Far future (2090) Annual:
Change in mean temperature	+0.63°C	+1.95°C
Change in rainfall	+0.15%	+10.64%
High fire danger days	+0.00	+0.03
Hot days over 35°C	+0.12	+0.28

The recommended climate adaptation and mitigation strategies are addressed iin Section 7 (7.6 and others).

6.3 Humidity

Humidity can be high at certain points during the peak summer months, but otherwise, the air will feel fairly dry and comfortable.

The following diagram shows the humidity comfort levels throughout the year. The graph shows the percentage of time at different dew point temperatures (not Relative Humidity levels), which provides a good indication of how comfortable space feels. Lower dew points feel drier and higher dew points feel more humid.



The percentage of time spent at various humidity comfort levels, categorized by dew point.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Muggy days	10.5d	10.3d	6.0d	1.0d	0.1d	0.0d	0.0d	0.0d	0.0d	0.3d	1.8d	5.6d

6.4 Wind

The diagrams below show the annual wind distribution as averages 10m above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages.

Prevailing winds shift between northerly and southerly directions, with summer winds predominantly from the south west, and in winter, when some level of shelter may be desired when temperatures are cooler, predominant winds are more commonly from the north west.

The acceptability of wind is dependent on the activity of the people in the outdoor space. For example, people walking will tolerate higher wind speeds than those seated. In the table below acceptable wind speeds for different activities are summarised.

Classification	Activity	Mean wind speed (m/s)

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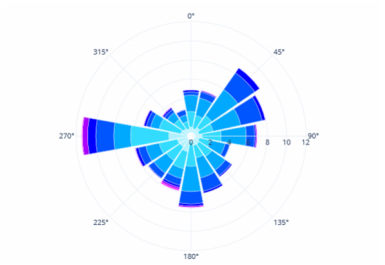
Acceptable for walking	Walking (fast) from A to B	8-10
Acceptable for strolling	Slow walking, window shopping, etc.	6-8
Acceptable for short exposure	Standing or sitting for a short time	4-6
Acceptable for long exposure	Sitting for a long time	0-4

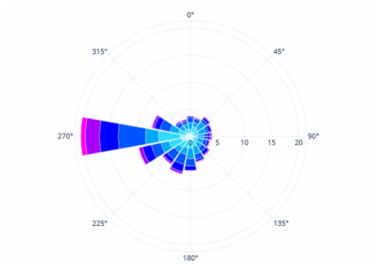
Care must be taken to consider wind flows in forecourt area, where a mix of stationary and active uses will occur.

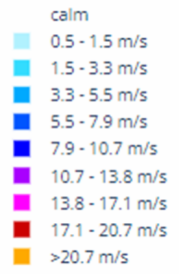
Summer Wind speed and direction.

Mid-Season Wind speed and direction.



Winter Wind speed and direction.





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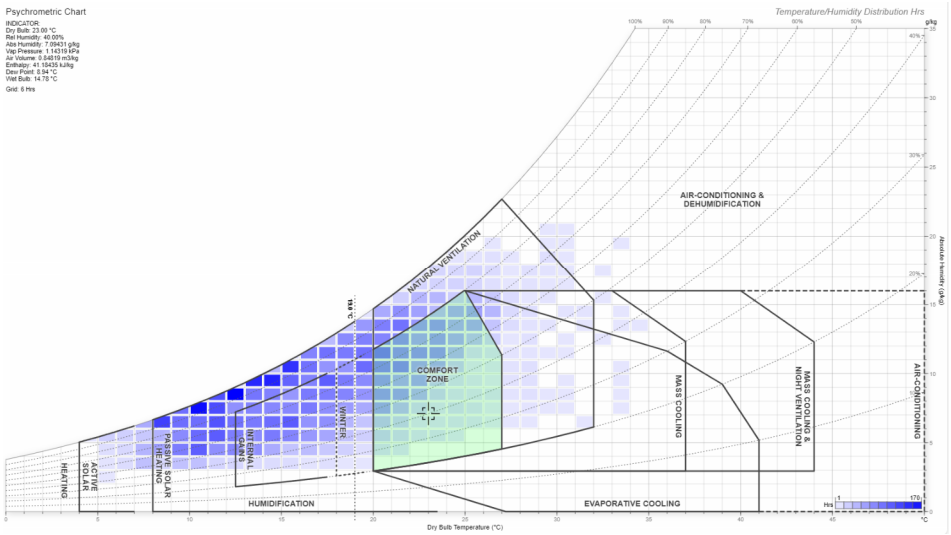
6.5 Thermal Comfort

As shown in the charts above, the climate is sub-tropical, with warm, humid 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 project:



The graph illustrates the comfort zone (green) and how it can be extended through different strategies (black lines).

Psychrometric chart for Kiama climate with passive design strategies overlaid

The chart shows the following key analysis:

1. **Summer strategies:** a combination of natural ventilation and thermal mass with night purge could help passively cool the building;
2. **Winter strategies:** thermal mass and 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 control of the community health centre will still be required throughout the year to maintain the stricter temperature and humidity set points.

6.6 External Noise Sources

Given the importance of acoustics within the work environment, potential external noise sources and levels that may impact the development will be assessed, such as surrounding roads, helicopters, possibly flights and ongoing construction to determine whether acoustic treatment is required and whether opening windows to allow natural ventilation will lead to significant noise issues.

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7.0 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.

7.1 Site & Building Strategy Considerations

The diagram below illustrates site-specific considerations and opportunities being discussed both at site/infrastructure level and at building level. The analysis takes into consideration the current design proposal.

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7.2 Resource Conservation – Route to Zero Carbon

Many strategies have been included to address resource conservation and reducing Greenhouse Gas Emissions, with an overview provided in the following sections. A key strategy is the removal of fossil fuel consumption and full electrification of the site. Through the design of a full electric building, the Community Health Centre could either purchase 100% Green Power or maximise the PV through the available roof and/or carpark areas which would enable net zero GHG emissions in operation.

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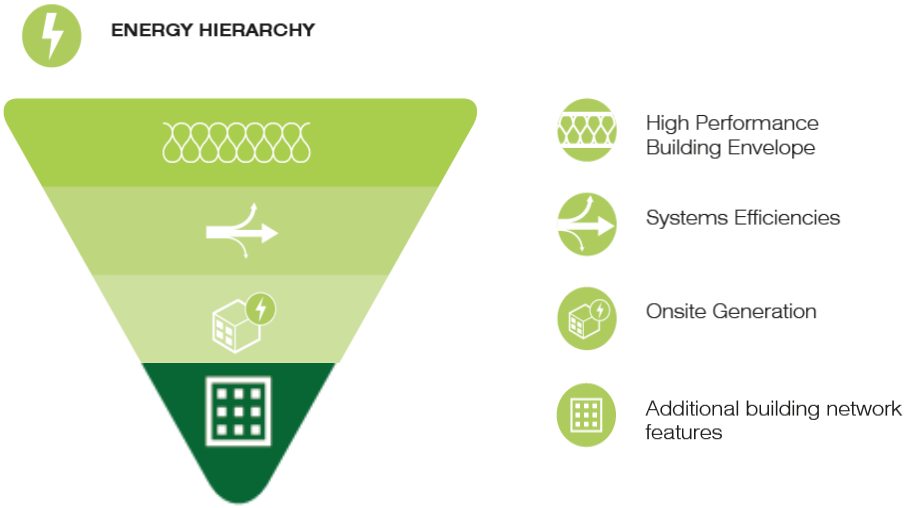
7.3 Resource Conservation – Energy

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:

7.3.1 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 WCHC.

Heat gain through the glazing during the summer will be managed through a combination of efficient shading and high-performance glazing where needed. External shading is proposed by way of overhang and vertical fins to the consultation/therapy rooms. Internal sheer and blackout roller blinds will be provided throughout.

The external glazing should satisfy the provisions of NCC Section-J 2022 of the Building Code of Australia. Consideration should also be given to future climate conditions and the respective impact on the building energy demands.

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7.3.2 Active Measures / Building Systems Design

Mixed-mode ventilation - Mixed-mode ventilation can be considered for non-critical spaces. When outdoor and indoor conditions are favourable for natural ventilation, the air-conditioning could be switched off, therefore reducing energy consumption.

- **Zoning of HVAC and lighting services** – Zoning of HVAC and lighting services should be incorporated to avoid energy wastage.
- **High-efficiency plant and associated controls**
- **Free Cooling** –
  - Run mechanical cooling plant in economy cycle when conditions are appropriate
  - Night purge and other strategies
- **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
- **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

While roof space is limited, renewable energy opportunities will be further considered, including:

- **Solar Photovoltaics (PV) –** 50 kWp of rooftop PV has been considered and included in the Electrical Services Design
- **Solar Thermal for Domestic Hot Water System**

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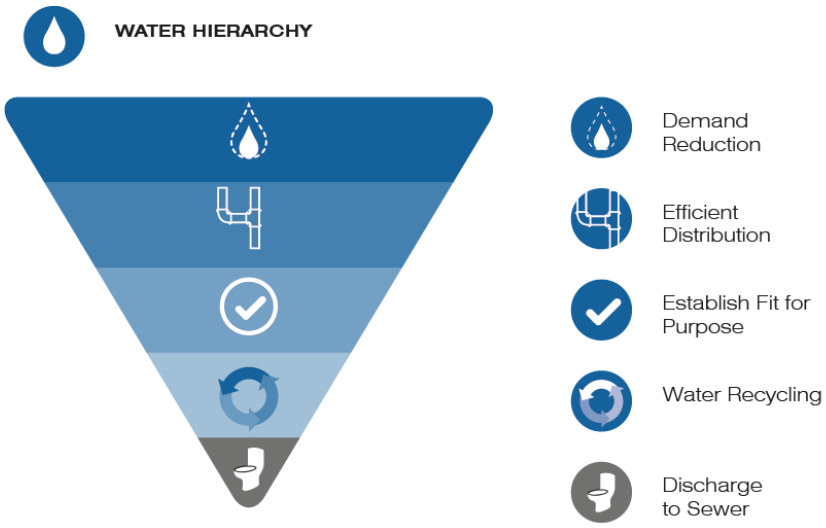
7.4 Resource Conservation – Water

The following hierarchy and strategies will be applied:



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

- **Water efficient fixtures / fittings have been 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 has been included through a 10kL tank included in the Hydraulic Services design. The harvested rainwater will be used to reduce potable water consumption for landscape irrigation.
- **Drip and demand-controlled irrigation** to optimise irrigation supply

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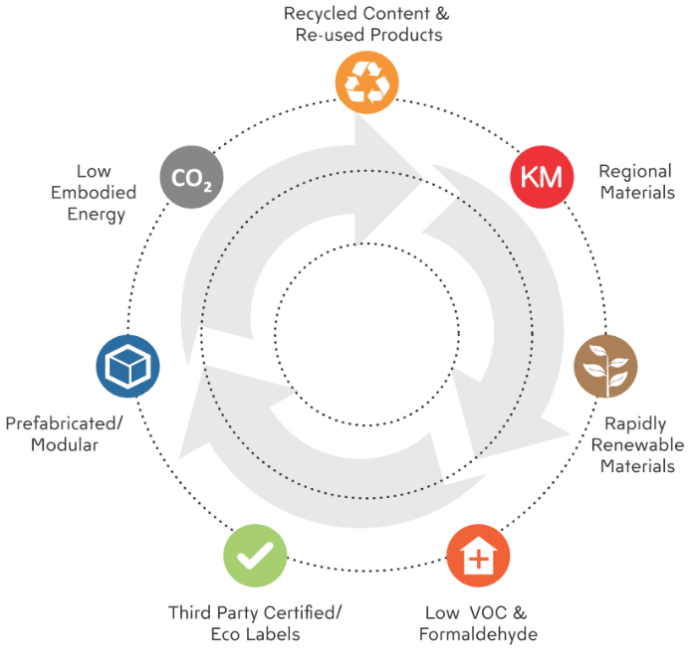
7.5 Resource Conservation – Materials and Waste

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. Prefabricated structures built in purpose-built factories are less labour intensive, more time efficient, and produce less waste compared to traditional onsite construction methods. Raw materials and construction elements are not exposed to the elements, which ensures high quality in the final building, and the construction process is less weather dependant.

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.

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- **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 should 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 should 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) should 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 should 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.

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7.6 Resilience

The project has reviewed, identified and recommended strategies to increase the resilience of the WCHC; in response to potential risks arising from climate change. An overview of predicted future conditions and the project's response is presented below.

- The latest available global climate models show that the climate is warming in the coming decades,
- Australia is projected to experience the following:

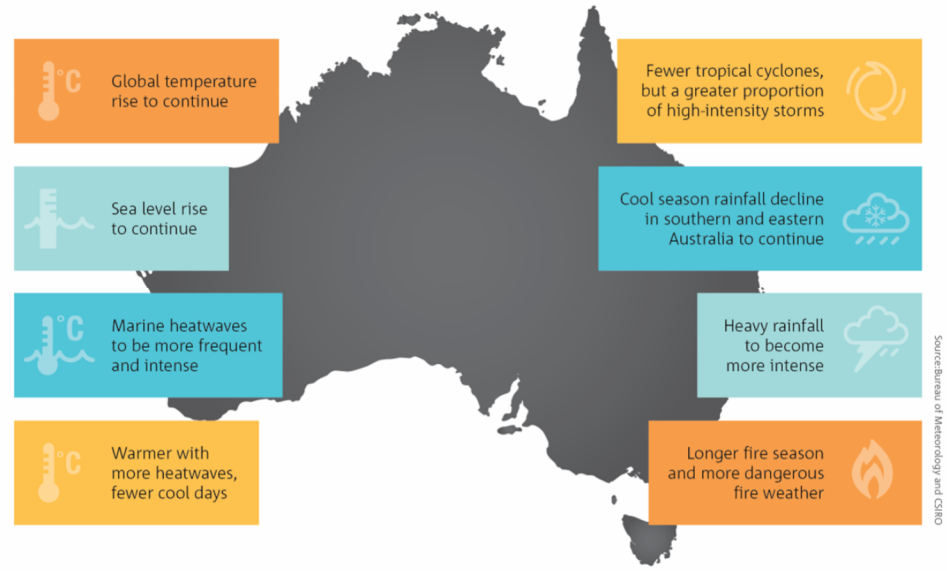

Figure 3: Summary diagram of climate projections for Australia. CSIRO and Bureau of Meteorology. Source: CSIRO

The below climatic variables will be considered to develop a resilience strategy for WCHC.

- Temperature
- Precipitation
- Fire weather/Bushfires
- Drought
- Flood
- Solar Radiation
- Relative Humidity
- Evapotranspiration
- Soil Moisture
- Wind
- Sea-level rise
- Cyclones

The table below summarises the list of climate change risks identified and a review of how the design can address these risks based on discussions with the project

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team. This aligns with the Health Infrastructure Climate Risk Roadmap deliverables for capital projects during schematic design.

Table 4: List of climate change risks and recommended design responses (Source: AdaptNSW and Steensen Varming)

Climate Impact	Risk	Response / Design Considerations
	Increase in **extreme hot days and average temperatures**	Stress on electricity network / **blackouts** Increased **internal temperatures** Greater **energy consumption** Higher **peak loads** Accelerated **degradation of materials** **Heat Stress effects on human health**	**Back-up power** (Generators / PV) **Redundancy** built into cooling capacity **Thermal Storage** – manages peak loads **Durable materials** selection **Mechanical System** to be able to respond to extreme temperatures
	Increased storm intensity	Blowing debris causing property damage and safety risks Interruption of waste collection services	**Durability** of materials selection **Predictive management** planning in even of large storm events
	Increased **rainfall variability** and **flooding**	Damage to buildings, landscape, and infrastructure. Flooding impacts	**Sustainable urban drainage** features will capture, treat, store stormwater, and reduce outflow. Predictive / forecast management of water storage
	Increased **drought duration**	Restrictions to **water supply** for patients, staff and heat rejection **Damage to landscape** and higher maintenance costs	**On-site efficiency measures** to reduce potable water demand Drought resistant planting selection
	Increased **fire weather**	**Smoke from bushfires** causing health impacts **Damage to powerlines** impact supply	**Back-up power** systems & **onsite generation** **Filtration** for air intakes into buildings

7.7 Health and Wellbeing

Indoor Environmental Quality

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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 glazing should provide high levels of natural light (where applicable. Where appropriate, the design should seek 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** – should be provided to give views of nature, which help 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.

7.8 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.

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, and control sedimentation and erosion during the 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.

Water Sensitive Urban Design example

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8.0 ESD Evaluation Tool Assessment

The HI ESD Evaluation tool has been used throughout the design 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.

The risk categories are determined on the following basis:-

- Low – already addressed in the design (Standard HI practise)
- Medium – can be achieved but will have some potential cost implications
- High – potential cost and spatial implications, require further investigation during detailed design.

At this stage, a rating of 5 Stars (**60 points + 5 buffer points)** is targeted through the HI ESD Evaluation tool for WCHC. The status of the assessment includes 55 low risk points and 11 higher risk points (totalling 66 points). A 6-point buffer above minimum threshold has been considered to mitigate any risks that may arise from supply chain limitations to ensure that the minimum project sustainability requirement of 60 points is still achievable.

A breakdown of the targeted credits is shown in the table below, with the full scorecard provided in Appendix A. This also includes comments recording the outcomes of workshops and subsequent key communications. A summary of the score distribution is shown below:

Green Star Design & As Built v1.3

Category	Available Points	Low / Med Risk	High Risk	Total Targeted
MANAGEMENT	14	12	1	13
INDOOR ENVIRONMENTAL QUALITY	17	11	4	15
ENERGY	22	6	2	8
TRANSPORT	10	2	1	3
WATER	12	5		5
MATERIALS	14	6	2	8
LAND USE & ECOLOGY	6	2	0	2
EMISSIONS	5	4	0	4
INNOVATION	10	7	1	8
Total	**110**	**55**	**11**	**66**
4* Target	**45**	**Yes**		**Pass**
5* Target	**60**	**Fail**		**Pass**

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9.0 Next Steps

This report provides a list of recommended sustainability strategies for the WCHC project in line with the project brief and the proposed design. The following steps are recommended during the design development and contract documentation stages to 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 finalisation as design develops at the DD stage
- Teams to finalise calculations, modelling or analysis required to support strategies and achieve targeted points (e.g. JV3, daylight, views, water calculations, climate risk assessment and energy modelling, water calculations, climate risk assessment)
- Coordination with QS to ensure any cost impact from required strategies will be included within the final cost plan and the procurement requirements
- Finalise set of strategies is to be agreed upon by the design team, stakeholders and the LHD, and to be confirmed by HI to include in the design moving forward.

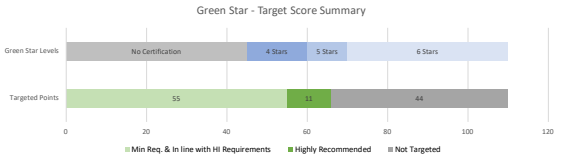
10.0 Appendices

10.1 Appendix A – HI ESD Evaluation Tool

Warrawong Community Health Centre ESD Evaluation Tool

Green Star Design & As Built v1.3

Category	Available Points	Low / Med Risk	High Risk	Total Targeted	Not Targeted
MANAGEMENT	14	12	1	13	1
INDOOR ENVIRONMENTAL QUALITY	17	11	4	15	2
ENERGY	22	6.0	2.0	8	14
TRANSPORT	10	2	1	3	7
WATER	12	5	0	5	7
MATERIALS	14	6	2	8	6
LAND USE & ECOLOGY	6	2	0	2	4
EMISSIONS	5	4	0	4	1
INNOVATION	10	7	1	8	2
Total	**110**	**55**	**11**	**66**	44
4* Target	**45**	**Yes**		**Pass**	
5* Target	**60**	**Fail**		**Pass**	
	44				



HI Standard Practice (must achieve)
HI Health relevant initiatives (should achieve - Primarily focused on IPUs))
Possible Risk - To be confirmed by design teams
Targeted points

Pre-assessment 27 Oct 2023

CATEGORY / CREDIT	No.	Credit Criteria	Points Available	Points Targeted (4 Star)	Additional Points TBC (5 Stars)	Total	Credit Requirements	Risk L / M / H	RESPONSIBILITY	ESD Assessment (Steensen Varming)	Project Team Comments Sep 2023	Potential Cost implications (Steensen Varming)
Management			**14**	**12**	**1**	**13**			0			
Green Star Accredited Professional	1.0	Accredited Professional	1	1		1	An ESD specialist has been contractually engaged as part of the project team, to deliver advice and must deliver at least one workshop to the project team. It is expected that this workshop will be of most benefit at project inception.	L	HI, ESD, Head Contractor	Steensen Varming has been appointed as the project ESD consultant. The head contractor is required to engage an ESD consultant to manage the submission of evidence for the HI ESD Consultant.	N/A	Contractors ESD Consultant Scope
Commissioning and Tuning	2.0	Environmental Performance Targets	C	C		C	Minimum requirement to establish targets for environmental performance. This includes 3 items at a minimum and should consider energy, water, IEQ, waste etc. Performance targets either documented in an OPR or design intent report.	L	HI, Mechanical, Electrical, Lighting, V. Transport, ESD, Fire, Hydraulics, Acoustics, Civil, Landscape	Assume similar approach to NSH has been undertaken; STN to demonstrate at least 10% improvement over NCC when using the Standard HVAC type (HI ESD Framework)		Inherent Project Cost
Commissioning and Tuning	2.1	Services and Maintainability Review	1	1		1	Services and maintainability review must address the following aspects for all nominated building systems: - Commissionability; - Controllability; - Maintainability; - Operability, including 'Fitness for Purpose'; - Safety.	L	HI, Façade, Mechanical, Electrical, Lighting, V. Transport, Fire, Hydraulics, Civil	Assume similar approach to NSH has been undertaken; project team to include services and maintenability of respective systems in SD documentations		Inherent Project Cost
Commissioning and Tuning	2.2	Building Commissioning	1			0	The contractual tender or construction documentation must - List the design parameters for each system; - List the required commissioning activities; - Define how each system is intended to operate; and - List the acceptable tolerances during commissioning. A commissioning plan shall be developed and include at least the following, the: - Objectives, or basis, of the design; - Scope of the commissioning plan; - Commissioning team list, the individual responsibilities and interface matrix; - General sequence of commissioning; - Proposed commissioning procedures; - Witnessing requirements; - Commissioning program; and - Requirements for subcontractor commissioning manuals. An air permeability test must be carried out by a member of the Air Tightness Testing and Measurement Association (ATTMA) or a testing member of the Air Infiltration and Ventilation Association of Australia (AIVAA), in accordance with AS/NZS ISO 9972:2015 Thermal performance of buildings - Determination of air permeability of buildings - Fan pressurization method, over a sample area testing, the test must be carried out on either 2,000m2 or 10% of the building's total envelope area, whichever is greater. The test results must not exceed a maximum	H	Mechanical, Electrical, V. Transport, Fire, Hydraulics			Inherent Project Cost + Air tightness testing
Commissioning and Tuning	2.3	Building Systems Tuning	1	1		1	An owner/client has formally committed to a tuning process for all nominated building systems Operating and Maintenance Manuals to be developed in accordance with approved standards and guidelines; A building tuning manual, or a building tuning plan, has been developed in accordance with - The approved standards and guidelines; - A building tuning team has been created including the facilities manager, the owner's - Representative and the ICA (if applicable). The head contractor and the services design professionals are available to address specific tuning issues where required; and - The owner to engage parties to tune the nominated systems. This engagement includes requirements for: a. Verification that nominated systems are performing to their design potential at full and part load conditions; b. Reviews of environmental performance against the environmental targets; c. Collection of user feedback to match the system performance with the occupant's needs;	L	Mechanical, Electrical, V. Transport, Fire, Hydraulics, Head Contractor	Assume similar approach as NSH, we understand that CSI will be engaged as the ICA for the project.		Inherent Project Cost
Commissioning and Tuning	2.4	Independent Commissioning Agent	1		1	1	An Independent Commissioning Agent (ICA) has been appointed to advise, monitor, and verify the commissioning and tuning of the nominated building systems throughout the design, tender, construction, commissioning and tuning phases.	H	HI, Mechanical, Electrical, V. Transport, Fire, Hydraulics, Head Contractor	Assume similar approach as NSH, we understand that CSI will		Standard ESG requirements, but may trigger additional consultant fees
Adaptation and Resilience	3.1	Implementation of a Climate Adaptation Plan	2	2		2	The Climate Adaptation Plan must contain as a minimum the following information: Summary of the project's characteristics (site, location, climatic characteristics); - Assessment of climate change scenarios* and impacts on the project using at least two time scales (e.g. 2030, 2040, 2050 or 2070), relevant to the projects anticipated lifespan. This must include a summary of potential direct and indirect climate change impacts (environmental, social and economic) on the project; - Identification of the potential risks (likelihood and consequence) for the project and the potential risks to people. This risk assessment is to be based on a recognised standard; - At least two risk items identified in the risk assessment component of the Climate Adaptation Plan are addressed by specific design responses and all risk items identified as 'high' or 'extreme' are addressed by specific design responses. - A list of actions and responsibilities for all 'high' and 'extreme' risks identified; and - Details of stakeholder consultation that was undertaken during plan preparation and how the issues raised have been incorporated. *The Australian Greenhouse Office (AGO) Guide calls for climate change scenarios to be developed and reviewed (Section 4.2). The scenarios used by the project team must be sourced from the Intergovernmental Panel on Climate Change (IPCC) endorsed Global Circulation Models (GCMs) and may include: - CSIRO projections; - State or Federal climate projections; or	L	ARCH, Façade, Mechanical, Electrical, Fire, Hydraulics, Civil, Landscape, Structrural, CAP Consultant	Assume similar approach as NSH, a climate change workshop will be undertaken with the project team and relevant stakeholders.		Climate risk assesment has been included in ESD fee, there maybe additional capital costs if any of the high risk items require additional mech plant space to account for higher temperature.
Building Information	4.1	Building Information	1	1		1	Comprehensive operations and maintenance (O&M) information is available to the facilities management team. Current building user information is available to all relevant stakeholders. The building log book must: - Be developed in line with CIBSE TM31: Building Log Book Toolkit; - Cover all nominated building systems; and - Include links or references to all relevant operations and maintenance information. Nominated building systems are mentioned in 2.0 of this document.	L	Façade, Mechanical, Electrical, V. Transport, Fire, Hydraulics, Landscape, Structrural, Head Contractor	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification, inline with ESG and GC21 requirements		Inherent Project Cost; ESG requirements
Commitment to Performance	5.1	Environmental Building Performance	1	1		1	At least 80% of the project's gross floor area (GFA), excluding car parking areas, is covered by a commitment to set, measure and report on its environmental performance	L	HI	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Inherent Project Cost; ESG requirements
Commitment to Performance	5.2	End of Life Waste Performance	1	1		1	At least 80% of the project's GFA, excluding car parking areas, has a formal commitment in place to reduce demolition waste at the end of life of an interior fitout or base building component.	M	HI	LHD Policy for end of life fit out requirements i.e. extend the life of fit outs to 10 years minimum + if fit outs are updated, contractors must adhere to recycling requirements.	Savills to communicarte requirements with LHD.	Inherent Project Cost; ESG requirements
Metering and Monitoring	6.0	Metering	C	C		0	Metering shall be provided to allow for monitoring of the relevant areas or functions of the project. In most cases floor-by-floor metering will suffice if the entire floor has a single use. If a floor has multiple uses, the different uses shall be metered. Therefore, should a floor be composed of office space and a seminar room, both spaces shall be separately sub-metered. If a floor has multiple tenants or owners, each tenancy or property shall also be separately sub-metered. Where an energy load for a single item exceeds 5% of the total energy use for the building, or 100kW, it must be independently metered. Supplementary equipment can also be installed on the same measured circuit as the major use item. However, the total combined energy use of any systems connected to the major use item must not contribute more than 10kVA to the overall energy use. Where a common water use consumes 10% of the project's water use, these must be independently metered.	L	Mechanical, Electrical, Hydraulics, Landscape	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Inherent Project Cost; ESG requirements
Metering and Monitoring	6.1	Monitoring Systems	1	1		1	A monitoring system is provided capable of capturing and processing the data produced by the installed energy and water meters. The monitoring system must accurately and clearly present the metered data and include reports on consumption trends. The monitoring strategy must include a metering schedule. This schedule shall address the estimated loads for energy and water and must list: •The incoming input (electricity, gas, water, etc.); •The end use (lighting, HVAC, fans); •The estimated energy consumption for the end use; •Which meter(s) provide the required information; and	L	Mechanical, Electrical, Hydraulics	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Inherent Project Cost; ESG requirements
Responsible Construction Practices	7.0	Environmental Management Plan	C	C		C	A project-specific best practice EMP is developed and implemented, to assist the Principal/Head Contractor and its service providers to manage environmental performance, conditions and impacts arising from demolition, excavation and construction. The EMP must cover environmental impacts arising from construction works, and it must be site-specific.	L	Head Contractor	Assume similar approach as NSH, the requirements will be outlined in the ESD		Inherent Project Cost

CATEGORY / CREDIT	No.	Credit Criteria	Points Available	Points Targeted (4 Star)	Additional Points TBC (5 Stars)	Total	Credit Requirements	Risk L / M / H	RESPONSIBILITY	ESD Assessment (Steensen Varming)	Project Team Comments Sep 2023	Potential Cost implications (Steensen Varming)
Responsible Building Practices	7.1	Formalised Environmental Management System	1	1		1	A formalised systematic and methodical approach to planning, implementing and auditing is in place during construction, to ensure compliance with the EMP. The plan must be implemented by a responsible party with a formal environmental management system in place. For the purposes of this credit, this is achieved through a formalised environmental management system implemented by the key party responsible for managing the site. There are two compliance pathways for this criterion. Must demonstrate compliance with the pathway specified for the project's contract value, below: - For projects with a contract value less than $10 million, the environmental management system (EMS) must comply with either NSW Environmental Management Systems Guidelines or a recognised standard. - For all other projects, the formalised Environmental Management System must have been independently certified to a recognised standard, such as AS/NZS ISO 14001, BS 7750 or the	L	Head Contractor	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. Savills to confirm inclusion in GC21 for tender.		Inherent Project Cost
Responsible Building Practices	7.2	High Quality Staff Support	1	1		1	Promote positive mental and physical health outcomes of site activities and culture of site workers, through programs and solutions on site; and Enhance site workers' knowledge on sustainable practices through on-site, off-site, or online education programs.	M	Head Contractor	Assume similar approach as NSH, the requirements will be outlined in the ESD		Additional cost by the contractor, to be captured through GC21 requirements
Operational Waste	8A	Performance Pathway - Specialist Plan	1	1		1	A qualified waste auditor prepares an Operational Waste Management Plan (OWMP) for the building in accordance with best practice approaches. The requirements or recommendations made in the Operational Waste Management Plan must then be reflected in the design of the building's facilities.	M	HI, ARCH, Waste Consultant	Assume similar approach as NSH, the requirements will be outlined in the ESD		Inherent Project Cost
Indoor Environment Quality			**17**	**11**	**4**	**15**						
Indoor Air Quality	9.1	Ventilation System Attributes	1	1		1	The entry of outdoor air pollutants to the space must be minimised. The building ventilation systems must be designed to comply with ASHRAE Standard 62.1:2013 in regards to minimum separation distances between pollution sources and outdoor air intakes. Windows, doors, openings, vents, grilles, and skylights are all considered outdoor air intakes for purposes of this credit and must be modelled taking into account their free area. Any mechanical ventilation system within the building, whether existing or new, must be designed to provide adequate access for maintenance, to both sides of all moisture and debris-catching components, within the air distribution system. Moisture-producing and debris-catching components include items such as cooling coils, heating coils, fan coil units, humidifiers and filters in the air handling system. All new and existing ductwork that serves the building must have been cleaned in accordance with the recognised Standards. This includes all ductwork in the base building that serves the building	L	Mechanical	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		STN advice no addional costs
Indoor Air Quality	9.2	Provision of Outdoor Air	2		1	1	For mechanically ventilated or mixed-mode spaces, outdoor air is provided at a rate 50% (1 point) 100% (2 points) greater than the minimum required by AS 1668.2:2012, or CO2 concentrations are maintained below 700ppm. Must be achieved for 95% of primary and secondary spaces.	H	Mechanical	Assume similar approach as NSH, the requirements will be outlined in the ESD		STN advice additional costs
Indoor Air Quality	9.3	Exhaust or Elimination of Pollutants	1	1		1	Pollutants from printing and photocopying equipment, cooking processes and equipment, and vehicle exhaust, are limited from the nominated area by either: * Sources of pollutants, such as printing or photocopy equipment, kitchen stoves or vehicles, must be compliant with minimum emissions standards or not be present within the nominated area. Where printing and/or photocopying equipment is present within the building, these must be certified in accordance with one of the following test standards: ECMA-328; RAL-UZ 171; or GGPS.003. OR * A specified sources of pollutants shall be exhausted directly to the outside of the project in accordance with a recognised Standard; and/or physically separated from occupants. The following requirements for printing and photocopy equipment, kitchen cooking processes and equipment, and vehicle exhaust apply.	L	ARCH, Mechanical	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Inherent Project Cost
Acoustic Comfort	10.1	Internal Noise Levels	1	1		1	**Internal ambient noise levels** in the nominated area is no more than 5dB(A) above the "satisfactory" sound levels provided in Table 1 of AS/NZS 2107:2016. - The noise measurement and documentation must be provided by a qualified acoustic consultant. Qualified acoustic consultant - A member of the Australian Acoustical Society (AAS) or equivalent international recognised body, or a qualified staff member within an Association of Australian Acoustical Consultants (AAAC) member firm. - Noise measurement must account for all internal and external noise sources including noise arising from building services equipment, noise emission from outdoor sources such as traffic, and (where known) noise from industrial process. Occupancy noise is excluded. - When compliance is demonstrated through measurement at the time of commissioning, the measurements shall be conducted in at least 10% of the spaces in the nominated area. The range of measurement locations shall be representative of all the spaces available within the nominated area. All relevant building systems must be in operation at the time of measurement - In naturally ventilated buildings, all measurements must be carried out with natural ventilation openings open. The internal ambient noise levels must be no more than 10dB(A) above the lower figure in the range recommended in Table 1 of AS/NZS 2107:2016.	M	ARCH, Mechanical, Acoustics	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.	STN advice no addional costs	Inherent Project Cost
Acoustic Comfort	10.2	Reverberation	1	1		1	**Reverberation** - The persistent prolonged reflections of sound in a space. A technical definition is provided in AS/NZS 2107:2016. **Reverberation** time in the nominated area must be below the maximum stated in the 'Recommended Reverberation Time' provided in Table 1 of AS/NZ 2107:2016. - Where note 3 of AS/NZ 2107:2016 applies and requires that reverberation times be minimised as far as practical, acoustic absorption should be installed in the noise sensitive space, treating at least 50% of the combined floor and ceiling area with a material having a noise reduction coefficient (NRC) of at least 0.5 - Dedicated teaching space must have reverberation times in the lower half of the range specified in Table 1 of AS/NZ 2107:2016.	M	ARCH, Acoustics, Structrual	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.	STN advice no addional costs	Inherent Project Cost
Acoustic Comfort	10.3	Acoustic Separation	1	1		1	**Enclosed space -** Meeting rooms, private offices, classrooms, residential units and any other similar space, where it is expected that noise should not carry over from one space to the next. **10.3** The project addresses noise transmission in enclosed spaces. There are two methods for demonstrating compliance with this criterion. **10.3 OPTIION A** The partition between the spaces should be constructed to achieve a weighted sound reduction index (Rw) of at least 45. **10.3 OPTION B** The sound insulation between enclosed spaces complies with: Dw + LAeqT > 75 Where: Dw = Weighted sound level difference measured between two spaces; and LAeqT = Indoor ambient noise level in the space adjacent to the enclosed space. The sounds tests from which Dw is derived must be measured in accordance with ISO 140-4:1998. Measurements must be based on finished rooms, accounting for any carpets and acoustically absorbent ceilings specified. The measurements can be conducted in either furnished	M	ARCH, Mechanical, Acoustics, Structrual	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.	STN advice no addional costs	Inherent Project Cost
Lighting Comfort	11.0	Minimum Lighting Comfort	C	C		C	**11.0 Flicker-free lighting** to luminaires that have either: - A minimum Class A1 & A2 ballast; - High frequency ballasts for all fluorescent lamps; or - Electronic drivers that feature 12-bit or greater resolution for all Light-emitting Diode (LED) lighting. **11.0 Minimum Colour Rendering Index (CRI) of 80**, unless the project team can demonstrate that, in a particular area, the activity is not impeded by a lower CRI based on Table 7.2 in AS 1680.1:2006.	L	Electrical, Lighting	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.	JHA advice no addional costs	Inherent Project Cost
Lighting Comfort	11.1	General Illuminance and Glare Reduction	1	1		1	**11.1.1 General Illuminance** Maintained illuminance that meets the levels recommended in the relevant Standard (AS1680) or ANSI/IES RP-28-07 for retirement living spaces. Maintained Illuminance values must achieve a uniformity of no less than that specified in Table 3.2 of AS 1680.1:2006, with an assumed standard maintenance factor of 0.8. If a particular space are not specified, the values to be used must relate to the closest type of task as defined in AS 1680.1:2006 Table 3.1. **11.1.2 Glare Reduction methods** - Prescriptive: all bare light sources must be fitted with baffles, louvers, translucent diffusers, ceiling design, or other means that obscures the direct light source from all viewing angles of occupants, including looking directly upwards. - Prescriptive: For uniform lighting solutions, the lighting system complies with the Luminaire selection system as detailed in Section 8.3.4 of AS1680.1-2006. - Performance: The Unified Glare Rating (UGR)calculated for the lighting on a representative floor must not exceed the maximum values listed in Table 8.2 of AS 1680.1-2006, calculated in	L	Electrical, Lighting	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Inherent Project Cost
Lighting Comfort	11.2	Surface Illuminance	1		1	1	**OPTION 1**: 95% of the spaces in the nominated area must have: - A surface reflectance for ceilings of at least 0.75 obtained from the manufacturer's data sheet; - A direct/indirect lighting system present such that the ceiling area has an average surface illuminance of at least 30% of the lighting levels on the working plane. **OPTION 2**: the 95% of the spaces in the nominated area must be modelled to show that: -The average ceiling luminance (excluding light fixtures) does not exceed 0.5 kcd/m2 and the maximum luminance at any point on the ceiling does not exceed 1.5 kcd/m2; -The ceiling area has an average surface illuminance of at least 30% of the lighting levels on the working plane; and -In rooms less than 100m2, or in rooms where more than 20% of workstations are located within 3m of walls, the wall area above the working plane has an average surface illuminance of at least 50% of the lighting levels on the working plane. The illuminance values for ceilings, walls, and floors must be calculated in accordance with	H	ARCH, Electrical, Lighting	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Additional material costs (be specific!)
Lighting Comfort	11.3	Localised Lighting Control	1	1		1	95% of the nominated area, occupants have the ability to control the lighting in their immediate environment. This includes turning the lights on and off and adjusting their light levels.	M	Electrical, Lighting	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Inherent Project Cost
Visual Comfort	12.0	Glare Reduction	C	C		C	**OPTION 1**: For viewing facades (except skylights) , the nominated plane is at ground level and is a narrow band along the entire length of viewing façade, 1.5m in from the viewing façade. For skylights, the nominated plane is the skylight. **OPTION 2**: All blinds or screens in the nominated area must meet the following criteria: The blinds must provide glare reduction to at least 95% of the area of viewing façade and skylights; Blinds must be controlled by all affected occupants within each individual space; and Blinds must have a visual light transmittance (VLT) of = 10%. **OPTION 3**: A modelling can be used to demonstrate that any combination of tinted glazing, fixed shading devices and other solutions will meet the minimum requirement	L	ARCH, Façade	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. STH/COX to confirm.		Inherent Project Cost
Visual Comfort	12.1	Daylight	2		1	1	**OPTION 1**: For this option, daylight access is determined through modelling the Daylight Factor across the Nominated Area (Primary areas - ward rooms / nurse stations / clinic rooms / kitchen / cafes / offices / retail). High Levels of daylight are deemed to have daylight factors above 2.0% for all spaces, except living rooms and dining rooms in residential primary spaces, where the threshold is a 1.5% daylight factor. **OPTION 2**: For this option, daylight access is determined through modelling Daylight Illuminance (DI) across the Nominated Area. High Levels of daylight are deemed to have at least 160 lux due to daylight during 80% of the nominated hours.	M	ARCH, Façade, ESD	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. STH/COX to confirm.		Possibly additional cost for daylight modelling (consultant cost) to be procured at DD.
Visual Comfort	12.2	Views	1	1		1	**At least 60% of the nominated area** has a clear line-of-sight to a high quality internal or external view. All floor areas within 8m from a compliant view can be considered to meet this credit criterion. **External views** – A high quality external view must extend to the outside towards natural elements such as large bodies of vegetation, a body of water, frequent movement of (people, vehicles, or animals) or sky. **Internal views** - A high quality internal view is defined as a view towards an area that is landscaped or contains a water feature, or an atrium, or an area where frequent movement of people can be expected. A landscaped area must contain high plant density and may be vertical.	M	ARCH	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. STH/COX to confirm.		Inherent Project Cost

CATEGORY / CREDIT	No.	Credit Criteria	Points Available	Points Targeted (4 Star)	Additional Points TBC (5 Stars)	Total	Credit Requirements	Risk L / M / H	RESPONSIBILITY	ESD Assessment (Steensen Varming)	Project Team Comments Sep 2023	Potential Cost implications (Steensen Varming)
Indoor Pollutants	13.1	Paints, Adhesives, Sealants and Carpets	1	1		1	Max TVOC content in grams per litre (g/L) of ready to use product: General purpose adhesives and sealants - 50 Interior wall and ceiling paint, all sheen levels - 16 Trim, varnishes and wood stains - 75 Primers, sealers and prep coats - 65 One and two pack performance coatings for floors - 140 Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives - 250 Structural glazing adhesive, wood flooring and laminate adhesives and sealants - 100 Carpet Test Standards and TVOC Emissions Limits ASTM D5116 - Total VOC limit* - 0.5mg/m2 per hour ASTM D5116 - 4-PC (4-Phenylcyclohexene)* - 0.05mg/m2 per hour ISO 16000 / EN 13419 - TVOC at three days - 0.5 mg/m2 per hour ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours - 0.5mg/m2 per hour	L	ARCH, Façade, Mechanical, Electrical, V. Transport, Fire, Hydraulics, Acoustics, Head Contractor	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Applies to: Paints, Adhesives, Sealants and Carpets
Indoor Pollutants	13.2	Engineered Wood Products	1	1		1	Either no new engineered wood products are used in the building, or at least 95% (by area) of all engineered wood products meet the formaldehyde emission limits: AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood =1mg/ L AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16 =1.5 mg/L AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16 =1mg/ L AS/NZS 4357.4 - Laminated Veneer Lumber (LVL) =1mg/ L Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL =1mg/ L JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460 =1mg/ L JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460 =1mg/ L JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates) =0.1 mg/m^2hr* ASTM D5116 (applicable to high pressure laminates and compact laminates) =0.1 mg/m^2hr ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates =0.1 mg/m^2hr (at 3 days) ASTM D6007 =0.12mg/m^3** ASTM E1333 =0.12mg/m^3*** EN 717-1 (also known as DIN EN 717-1) =0.12mg/m^3 EN 717-2 (also known as DIN EN 717-2) =3.5mg/m^2hr	L	ARCH, Structrual, Head Contractor	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Applies to: LVL, Plywood, MDF, Chipboard, Does not applt yo: - Formwork, Carpark applications, Non-engineered wood products such as milled timber.
Thermal Comfort	14.1	Thermal Comfort	1	1		1	For 95% of the nominated area and 98% of the year, a high degree of thermal comfort is provided. There are a number of options for demonstrating compliance depending on the type of space, as follows. **A.** Naturally Ventilated Spaces – The internal temperatures in each space are within 80% of Acceptability Limit 1 of ASHRAE Standard 55-2013; **B.** Mechanically Ventilated Spaces – The space meets specified prescriptive criteria for Thermal Comfort or the Predicted Mean Vote (PMV) levels are between -1 and +1, inclusive; **or** **C.** Residential Spaces – An average NatHERS rating of 7 Stars or greater is achieved.	L	Mechanical	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.	STN advice JV3/Energy Modelling to be undertaken in DD.	Inherent Project Cost
Thermal Comfort	14.2	Advanced Thermal Comfort	1		1	1	For 95% of the nominated area and 98% of the year, a high degree of thermal comfort is provided. There are a number of methods for demonstrating compliance, as follows: **A** Naturally Ventilated Spaces A. The internal temperatures in each space are within 90% of Acceptability Limit 1 of ASHRAE Standard 55-2013, in accordance with 14.1A Ventilation Requirements; **B** Mechanically Ventilated Spaces B. The Predicted Mean Vote (PMV) levels are between -0.5 and +0.5, inclusive, in accordance with 14.1B.B Thermal Modelling Requirements; **C** Residential Spaces C. An average NatHERS rating of 8 Stars or greater is achieved. Modelling must be completed in accordance with NCC Section J requirements	H		Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.	**STN advice typical (not as high performing as NSH) façade performance has been provided , less likely to achieve it.**	Possibly additional cost for façade performance uplift, pending energy modelling outcome.
Energy			22	6.0	2.0	8.0						
Greenhouse Gas Emissions	15E.0	Conditional Requirement: Reference Building Pathway	C	C		C	The Benchmark Building represents a 10% improvement on the Reference Building's Greenhouse Gas Emissions. The Reference Building is a building which achieves minimal compliance with the NCC Section J DTS provisions using a defined HVAC system type. Project teams targeting a 5 or 6 star rating must also meet the Conditional Requirement minimum point threshold (5 stars - 3 points, 6 stars - 6 points).	L	ARCH, Façade, Mechanical, Electrical, Lighting, V. Transport, Hydraulics	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		
Greenhouse Gas Emissions	15E.1	Comparison to a Reference Building Pathway. GHG Emissions Reduction: Building Fabric	4			0	(Intermediate Building relative to Reference Building)	M	Mechanical	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		
Greenhouse Gas Emissions	15E.2	GHG Emissions Reduction	16	3.0	2	5	(Proposed Building relative to Benchmark Building) 10% - 3.4 points ----- 40% - 7.6 points ----- 100% - 16 points	M	Mechanical	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. STN to confirm via JV3/Energy modelling.	STN advice %reduction via JV3/Energy Modelling to be undertaken in DD.	Possibly additional cost for PV/facade uplift, pending energy modelling outcome.
Greenhouse Gas Emissions		Transition / All Electric		2		2	2 points are awarded where no fossil fuels are burned on site to generate electricity, heating or cooling. Where a minor amount of fossil fuel (less than 1%) is used on site for purposes where it can be demonstrated that there are no commercial alternatives (e.g. cooking or emergency generators). Renewable energy certificates equal to these emissions for the period of ten years following practical completion must be purchased and retired upfront, or through a contractual agreement with the utility. The RECs purchased must be recognised directly support renewable energy generation in Australia. Refer to the Renewables and Offsets in Green Star Guide for more details.	M	Mechanical, Electrical, Hydraulics	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. STN and Arup to confirm no gas was provided on-site.	Project team confirms no gas supply to the site.	Inherent Project Cost
Greenhouse Gas Emissions	15E.3	OFF-SITE RENEWABLES	20			0	Projects which have committed to procure off-site renewable electricity can be rewarded for supporting grid-connected renewable energy supply infrastructure. Projects must demonstrate that a supply contract is in place to procure 100% off-site renewable electricity for a minimum period of ten years immediately after Practical Completion.					N/A
Greenhouse Gas Emissions	15E.4	District Services	16			0	Projects with shared energy supplies to be rewarded for a reduction in GHG emissions. The intent of this approach is to also reward buildings which connect to low-carbon energy sources at a utility-scale. This approach is intended to cover the procurement opportunities for energy and utility systems: - District thermal networks. - Shared combined heat and power systems - Private wire networks with embedded renewable energy. - Grid connected low-carbon energy (e.g. biomass or biogas systems). Projects must demonstrate that a supply contract is in place to procure 100% electricity from					N/A
Peak Electricity Demand Reduction	16A	Prescriptive Pathway - On-site Energy Generation	-			0	The use of on-site renewable energy or on-site generation sources reduces the peak electricity demand by at least 15%. Peak electricity demand must be calculated in line with the below requirements: - In accordance with AS/NZS 3000:2007 (or as subsequently amended); - As the absolute design capacity of the system, after the application of diversity factors, but prior to the application of contingency factors as required for utility agreements (the value is likely to be about 30% less than that for the utility agreement); and - To include all building end-use loads, except process loads, in the peak demand assessment. For mixed mode ventilated buildings, peak demand must be calculated in the mechanically					N/A
Peak Electricity Demand Reduction	16B	Performance Pathway - Reference Building	2	1		1	The building's peak electricity demand is reduced when compared to that of the Reference Building. Points are awarded as follows: 1 point is awarded for a 20% reduction in peak electricity demand; and 2 points are awarded for a 30% reduction in peak electricity demand.	H	HI, Mechanical	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.	STN to confirm % peak demand reduction via JV3/Energy modelling, achievable with 50 kW PV.	Possibly additional cost for PV uplift, pending energy modelling outcome.
Transport			10	2	1	3						
Sustainable Transport	17A.1	Performance Pathway	10			0	A holistic approach to reducing the impacts from transport, where the proposed building performance is improved when compared to a reference building across four indicators: - Emissions reduction; - Active mode encouragement; - Vehicle kilometres travelled reduction; and - Walkable location		ESD			
Sustainable Transport	17B.1	Access by Public Transport	3	1		1	Points are awarded based on the percentage of people within the Greater Capital City Statistical Area (GCCSA) that can access the site by public transport within 45 minutes during peak hour. Projects located outside of a GCCSA use the 'rest of state' statistical area for assessment.	M		Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. STN to advice.	Bus stop in front of the project footprint.	Inherent Project Cost
Sustainable Transport	17B.2	Reduced Car Parking Provision	1			0	A reduction of car parking spaces for the proposed building, when compared to the maximum local planning allowance.	H		High risks to achieve credit requirements.		Not targetting.
Sustainable Transport	17B.3	Low Emission Vehicle Infrastructure	1	1		1	15% of parking is dedicated to fuel-efficient vehicles (see Definitions), with a maximum of 5% for motorcycle parking; OR - 5% of parking is dedicated to electric vehicles and charging infrastructure is provided for each space in accordance with 17B.3B; or - For residential projects (at least 80% GFA Class 1a or 2), dedicated car share spaces and vehicles are provided at the rate of 1 per 70 project occupants in accordance with 17B.3C; or - No parking spaces have been provided,	M		Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. NCC 2022 J requirements. STN/JHA to advice.	JHA advice EV charger has been provided for 10% of carspace.	Inherent Project Cost - included in SD documentations
Sustainable Transport	17B.4	Active Transport Facilities	1		1	1	Secure bicycle parking for regular occupants is provided for 7.5% of total regular occupants, with associated end-of-trip facilities, Secure bicycle parking is provided for 5% of peak visitors. 1.2 lockers per 1 bicycle space. Showers: 1 (unisex) for 0-12 regular occupants 2 for 13-49 regular occupants 4 for 50-149 regular occupants 6 for 150-299 regular occupants 8 for 300-500 regular occupants add 2 per extra 250 occupants for > 500 regular occupants	M		Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.	COX advice maybe possible, to be finalised in DD.	Secure Bicycle Charging/EoT facilities
Sustainable Transport	17B.5	Walkable Neighbourhoods	1			0	The project is located so that at least four (4) amenities for industrial buildings, or at least eight (8) amenities for all other types of buildings, are within 400m of the project. The distance is to be measured from the centre of the project's site;	H		High risks to achieve credit requirements.		Not targetting.
Water			12	5	0	5						
Potable Water	18A	Potable Water - Performance Pathway	12			0	Up to **12 points** are available. - This credit addresses the potable water consumption from the use of sanitary fixtures, appliances, HVAC, irrigation systems, and swimming pools (where present), and the use of reclaimed water from on-site rainwater, greywater, blackwater, stormwater or supplied reclaimed water. - The Compliance Requirements and guidance for the Performance Pathway are detailed in the Green Star Potable Water Calculator Guide. Points achieved by the Performance Pathway are determined in accordance with the Green Star Potable Water Calculator.	M	ESD, Fire, Hydraulics, Civil, Landscape	Project to further consider this performance pathway to achieve more points.		
Potable Water	18B.1	Sanitary Fixture Efficiency	1	1		1	All fixtures are within one star of the WELS rating stated below: - Taps 6 Star - Urinals 6 Star - Toilet 5 Star - Showers 3 Star (> 4.5 but <= 6.0) - Clothes Washing Machines 5 Star - Dishwashers 6 Star	L	Hydraulics	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. Arup to confirm.		Inherent Project Cost
Potable Water	18B.2	Rainwater Reuse	1	1		1	A rainwater tank is installed to collect and reuse rainwater, within the project's site boundary, and the rainwater tank size meets the following criteria: - Gross Floor Area (GFA in m2) / Rainwater Tank Volume (kL) - 2,500 / 25 - 5,000 / 50 - 10,000 / 100 - 20,000 / 200 Where the GFA of the building falls between the figures outlined in the above, or for projects above or below the areas listed in the Table, a ratio of 10 L/m2 shall be used to determine the minimum tank size required to meet the Compliance Requirements.	M	Hydraulics, Landscape	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. Arup to confirm.	Not been sized yet, but will be designed to optimise tank size using the potable water calculator.	Standard practice

CATEGORY / CREDIT	No.	Credit Criteria	Points Available	Points Targeted (4 Star)	Additional Points TBC (5 Stars)	Total	Credit Requirements	Risk L / M / H	RESPONSIBILITY	ESD Assessment (Steensen Varming)	Project Team Comments Sep 2023	Potential Cost implications (Steensen Varming)
Potable Water	18B.3	Heat Rejection	2	2		2	To comply, the project must be either naturally ventilated (allowing for the use of ceiling fans or similar) or the HVAC system must not use water for heat rejection. The building is naturally ventilated in accordance with AS1668.4-2012 The use of ventilation and air-conditioning in buildings – Part 4: Natural Ventilation of buildings. To claim that no water based heat rejection system is used it must be demonstrated that the air conditioning needs of the project are met by means other than water based heat rejection.	H			STN advice VRF will be used and therefore no water is used for heat rejection.	Inherent Project Cost
Potable Water	18B.4	Landscape Irrigation	1	1		1	Either drip irrigation with moisture sensor override is installed, or where no potable water is used for irrigation. The landscaping and associated systems must be designed to reduce the consumption of potable water required for irrigation through the installation of subsoil drip irrigation and moisture sensor controls. In the case of a xeriscape garden, the provision of irrigation systems must be able to be removed	M	Hydraulics, Landscape	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. Arup/Taylor Brummer to confirm.		Inherent Project Cost
Potable Water	16A	Prescriptive Pathway - On-site Energy Generation	-			0	One of the following conditions is met: - The fire protection system does not expel water for testing; or - The fire protection system includes temporary storage for 80% of the routine fire protection system test water and maintenance drain-downs for reuse on-site. - If sprinkler systems are installed, each floor must be fitted with isolation valves or shut-off points for floor-by-floor testing. - A sprinkler system is not required under Part E of the NCC, or - A sprinkler system is not provided by the project team, and system - Does not include a water-based fire protection					N/A
Materials			14	6	2	8						
Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment	5			0	A whole building life cycle assessment (LCA) is conducted for the project building and a reference building. Project teams shall demonstrate the reduction of environmental impacts when compared to the reference building. Cumulative Impact Reduction 30% - 1 point 70% - 3 points 130% - 6 points Impact categories Climate change - kg CO2 equivalent - IPCC AR4 or AR5 Stratospheric ozone depletion potential - kg CFC-11 equivalent -WMO 1999 ‖ or 2003 Acidification potential of land and water - kg SO2 equivalent - CML Eutrophication potential - kg PO43- equivalent - CML Photochemical ozone creation potential - kg C2H4 equivalent - CML Mineral depletion* (Abiotic Depletion Potential) - kg Sb equivalent - CML Fossil fuel depletion* (Abiotic Depletion Potential) - MJ net calorific value - CML The LCA must be peer reviewed by an independent practitioner as stated in ISO 14044 Clauses	L	ARCH, Façade, Mechanical, Electrical, Lighting, V. Transport, Hydraulics, Civil, Structrural, LCA Consultant, Head Contractor	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. COX/STH to coordinate FFE selection.		
	19A.2	Additional Life Cycle Impact Reporting	2			0	The additional impact categories shall be reported for the project only, not the reference building: - Human Toxicity - CTUh - USEtox – sum of cancer and noncancer effects - Land use - Land Transformation Mg C ha - Soil Organic Matter method (Mila I Canals et al 2007) - Resource depletion - water - m3 water use related to local scarcity of water - Water Stress Indicator - Ionising Radiation - kBq U-235 equivalent - Human Health Effect model - Particulate Matter - kg PM2.5 equivalent - RiskPoll					
	19B.1	Concrete	3	2	1	3	1. Portland cement content is reduced by 30% (1 point), 40% (2 points); measured by mass across all concrete used in the project compared to the reference case. 2. The mix water for all concrete used in the project contains at least 50% (0.5 point) captured or reclaimed water (measured across all concrete mixes in the project). 3. At least 40% of coarse aggregate in the concrete is crushed slag aggregate or another alternative materials (measured by mass across all concrete mixes in the project), provided that the use of such materials does not increase the use of Portland cement by over five kilograms per cubic metre of concrete (0.5 point) OR At least 25% of fine aggregate (sand) inputs in the concrete are manufactured sand or other alternative materials (measured by mass across all concrete mixes in the project), provided that use of such materials does not increase the use of Portland cement by over five kilograms per cubic metre of concrete. (0.5 point)	M	Civil, Structrural	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Inherent Project Cost
	19B.2	Steel	1	1		1	A reduction in the mass of steel framing used when compared to standard practice. The reduced mass of steel framing can be demonstrated by one of the following design initiatives: A. High strength steel; or B. Reduction in mass of steel framing or steel reinforcement by 5% when compared to a suitable reference building	L	Civil, Structrural	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Inherent Project Cost
	19B.3	Building Reuse	4			0	At least 50% (by area) (1 point), 80% (2 points) of the building façade is retained. At least 30% (by mass) (1 point), 60% (2 points) of the existing major structure is retained.	H	ARCH, Civil, Structrural			
	19B.4	Structural Timber	4			0	The proportion (by gross floor area) of structural timber used in the building. For 30% of the building's GFA – 1 point; For 70% of the building's GFA – 2 points; and For 90% of the building's GFA – 3 points.	H	Structrural			
Responsible Building Materials	20.1	Structural and Reinforcing Steel	1			0	95% (by mass) of the building's steel is sourced from a Responsible Steel Maker. At least 60% of the fabricated structural steelwork is supplied by a steel fabricator/steel contractor accredited to the Environmental Sustainability Charter of the Australian Steel Institute (ASI); OR At least 60% (by mass) of all reinforcing bar and mesh is produced using energy-reducing processed in its manufacture (measured by average mass by steel maker annually).	M	Structrural			
	20.2	Timber Products	1			0	At least 95% (by cost) of all timber used in the building and construction works is either: A. Certified by a forest certification scheme, ; or B. From a reused source	M	ARCH, Structrural			Inherent Project Cost
	20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1		1	90% (by cost) of all permanent formwork, pipes, flooring, blinds and cables in a project either: A. Do not contain PVC and have a recognised product declaration; or B. Meet the GBCA's Best Practice Guidelines for PVC	M	ARCH, Façade, Mechanical, Electrical, Lighting, V. Transport, Fire, Hydraulics, Civil	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Applies to: Permanent Formwork, Pipes, Flooring, Blinds, Cables. Civils A minor cost uplift is likely if contractors are unable to use PVC pipework
Sustainable Products	21.1	Product Transparency and Sustainability	3	1	1	2	Demonstrate that a specified percentage of eligible products meet one of the following initiatives: A. Reused Products (SF = 1.0); B. Recycled Content Products (SF = 0-1.0); C. Environmental Product Declarations (SF = 0.5 - 0.75); D. Third Party Certification (SF = 0.5 -1); or E. Stewardship Programs (SF = 0.5). Project Sustainability Value (PSV) = Product Cost ($) x Sustainability Factor (SF) Compliant Products 3% - 1 point 6% - 2 points	H	ARCH, Façade, Mechanical, Electrical, Lighting, V. Transport, Fire, Hydraulics, Structrural	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		
Construction and Demolition Waste	22.0	Construction Demolition Waste - Reporting Accuracy	C	C		C	Waste contractors and waste processing facilities serving the project demonstrate compliance with the Green Star Construction and Demolition Waste Reporting Criteria.	L	Head Contractor	Assume similar approach as NSH, the requirements will be		
Construction and Demolition Waste	22A	Fixed Benchmark	-			0	A. Minimising the total amount of waste sent to landfill when compared against a fixed benchmark; or B. Minimising the total amount of waste sent to landfill as a proportion of total waste generated the construction and demolition waste going to landfill meets a fixed benchmark, defined in kilograms of waste per square meter of gross floor area (GFA). >15 = 0 points 12.5-15 = 0.5 point					
Construction and Demolition Waste	22B	Percentage Benchmark	1	1		1	At least 90% (1 point) of the waste generated during construction and demolition has been diverted from landfill. Waste shall be reported in kilograms. To calculate the amount of waste diverted from landfill, the project team is required to report the total amount of waste generated and the total amount of waste diverted from landfill, and report on the proportion diverted as a percentage	M	Head Contractor	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.		Inherent Project Cost
Land Use & Ecology			6	2	0	2						
Ecological Value	23.0	Endangered, Threatened or Vulnerable Species	C	C		C	A check is carried out to ensure that the site does not contain critically endangered, endangered, or vulnerable species or ecological communities' as defined in the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).	M		Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. Savills to confirm if a	Assume no impact.	Inherent Project Cost
	23.1	Ecological Value	3			0	The change in ecological value is determined by comparing the Ecological Value Score of the site at the time of purchase ('before' state) to the Ecological Value Score of the site as built ('after' state). The change in Ecological Value between the two states is used to determine the relative improvement. Improvement in Ecological Value 0.01 - 1 point 0.1 - 2 pointds. 2+ 3 points	H		Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. COX/STH to confirm if the has been consdered by the landscape	SV to send ecological value calculator to COX/STH.	Landscaping Costs
Sustainable Sites	24.0	Conditional Requirement	C	C		C	The project is not on land containing old-growth forest. AND The project is not on prime agricultural land. AND The project does not impact on any wetland listed as being of 'High National Importance', unless specified Wetland Protection Measures are in place. AND The project does not have a significant impact on 'Matters of National Significance' listed under the Environment Protection and Biodiversity Conservation Act (1999).	L	HI	Biodiversity report to confirm.	Savills to provide biodiversity report.	Inherent Project Cost
	24.1	Reuse of Land	1	1		1	75% of the site was 'previously developed land' at the date of site purchase; or The project is a building extension, and 75% of the extension (including landscaping) falls within an area of the site that was 'previously developed land' at the project's Green Star registration	L	HI	Complies, part of Port Kembla Hospital' footprint.	As agreed, no further impact.	No additional cost
	24.2	Contamination and Hazardous Materials	1			0	The site has been previously contaminated to the extent that the intended uses, as permitted under the relevant planning scheme, were initially precluded; - The developer has adopted and implemented a best practice site remediation strategy; and - The best practice site remediation strategy and implementation has been signed off by an auditor prior to issue of the occupation certificate. OR A comprehensive hazardous materials survey has been carried out on any existing buildings or structures on the project site, in accordance with the relevant Environmental and Occupational Health and Safety (OH&S) legislation; and Where the survey identified asbestos, lead or PCBs in any existing buildings or structures the materials have been stabilised, or removed and disposed of in accordance with best practice	H	HI, Head Contractor	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification, inline with Geolink and GC21 requirements		
Heat Island Effect	25.0	Heat Island Effect Reduction	1	1		1	At least 75% of the whole site area comprises of one or a combination of the following: - Vegetation; - Green roofs; - Roofing materials, including shading structures, having the following: - For roof pitched <15°– a three year SRI of minimum 64; or - For roof pitched >15°– a three year SRI of minimum 34. - Only where the three year Solar Reflectance Index (SRI) for products is not available, use the following: - For roof pitched <15° – an initial SRI of minimum 82; or - For roof pitched >15° – an initial SRI of minimum 39. - Unshaded hard-scaping elements with a three year SRI of minimum 34 or an initial SRI of minimum 39; - Hardscaping elements shaded by overhanging vegetation or roof structures, including solar hot water panels and photovoltaic panels;	M	ARCH, Landscape	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. COX/STH to confirm if the has been consdered by the landscape design.		Inherent Project Cost
Emissions			5	4	0	4						

CATEGORY / CREDIT	No.	Credit Criteria	Points Available	Points Targeted (4 Star)	Additional Points TBC (5 Stars)	Total	Credit Requirements	Risk L / M / H	RESPONSIBILITY	ESD Assessment (Steensen Varming)	Project Team Comments Sep 2023	Potential Cost implications (Steensen Varming)
Stormwater	26.1	Stormwater Peak Discharge	1	1		1	The post-development peak event stormwater discharge from the site does not exceed the pre-development peak event storwater discharge, using the Average Recurrence Interval (ARI) - Climate change and adaptation assessment identifies that there is a low risk of increased rainfall and/or flooding during the design life of the project. 1 year ARI - Climate change and adaptation assessment identifies that there is a medium or high risk of increased rainfall and/or flooding during the design life of the project. 5 year ARI	L	Hydraulics, Civil	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. Arup/enstruct to confirm inclusion.		Inherent Project Cost
Stormwater	26.2	Stormwater Pollution Targets	1	1		1	All stormwater discharged from the site meets the required pollution reduction targets when compared to untreated runoff in accordance with the following requirements. - It is noted that some local governments may provide pre-determined infrastructure solutions that are 'deemed to comply' with the aim of this credit criterion. If this is the case the project team shall have this approach approved by a Technical Question. - In circumstances where this credit specifies levels or targets that are less stringent than those specified in relevant local legislation/regulations, the local legislation/regulations shall take precedence. - Appropriate calculations must be undertaken by suitably qualified professionals. Any calculations and assumptions must be outlined, easy to follow, and in accordance with common practice	M		Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. Arup/enstruct to confirm inclusion.		Inherent Project Cost
Light Pollution	27.0	Light Pollution to Neighbouring Bodies	C	C		C	All outdoor lighting on the project complies with AS 4282:1997 Control of the obtrusive effects of outdoor lighting.	L	Electrical, Lighting	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. JHA to confirm inclusion.		Inherent Project Cost
	27.1	Light Pollution to Night Sky	1	1		1	One of the following specified reductions in light pollution has been achieved by the project. A. Control of Upward Light Output Ratio (ULOR) - no external luminaire on the project has a ULOR that exceeds 5%, relative to its actual mounted orientation; or B. Control of Direct Illuminance - direct illuminance from external luminaries on the project produces a maximum initial point illuminance value no greater than: - 0.5 Lux to the site boundary; and - 0.1 Lux to 4.5 metres beyond the site into the night sky, when modelled using a calculation plane set at the highest point of the building. Calculations shall be in accordance with AS 4282:1997	M	Electrical, Lighting	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. JHA to confirm inclusion.		Inherent Project Cost
Microbial Control	28.0	Legionella Impacts from Cooling Systems	1	1		1	Impacts associated with harmful microbes in building cooling systems are minimised through one of the following: A. Naturally ventilated buildings; B. Waterless heat-rejection systems; or C. Water-based heat rejection systems that include best practice measures for Legionella Control and Risk Management.	H	Mechanical	Assume no water is used for heat rejection, STN to confirm.		Inherent Project Cost
Refrigerant Impacts	29.1	Refrigerants Impacts	1			0	Environmental impacts from refrigerants leaking into the atmosphere are minimised, in accordance with one of the following requirements: A. The combined Total System Direct Environmental Impact (TSDEI) of the refrigerant systems serving the project, is less than 15; B. The combined TSDEI of the refrigerant systems is between 15 and 35; AND a leak detection system is in place covering plant > 50 kWr C. All refrigerants in the project have an Ozone Depletion Potential (ODP) of zero and a Global Warming Potential (GWP) of 10 or less; or D. There are no refrigerants used in the project	L	Mechanical	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification.	STN to advice not possible during DTM.	
Innovation			**10**	**7**	**1**	**8**						
Innovative Technology or Process	30A	Innovative Technology or Process				0						
	30A	Individual Comfort Control	1			0		H	Mechanical			
	30A	Onsite Renewable Energy	2			0	Innovative Technology or Process - Onsite Renewable Energy Renewable Energy Contribution - 1 point = 5% - 2 points = 10%	H	Electrical	We likely need this for the new planing approval requirements.		
	30A	Building Integrated Photovoltaics	1			0	1 pt where BIPV systems contribute to reduction of GHG emissions by at least 15%.	H	Electrical			
	30A	Passive Water Design	1		1	1	Innovation Technology or Process – Passive Design (DAB V1.2) One Innovation point is available for projects that use passive water treatment systems (such as vegetation to treat water passively) to achieve at least one point in the Potable Water Calculator.	H	Civil, Landscape	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. COX/STH to confirm if the has been consdered by the landscape design.		Wicking Beds or Bioswale
	30A	Microbial Control	1			0	Innovative Technology or Process – Microbial Control in Warm Water Systems A project team may claim one (1) Innovation point where it is demonstrated that warm water systems have also been designed to manage the risk of microbial contamination. This may be done in association with operational practices that are to be implemented, as long as there are also design features that facilitate the achievement of the aim of the credit.	H	Mechanical			
	30C	Improving on Green Star Benchmarks Indoor Pollutants - Ultra Low VOC paints	1			0	Exceeding Green Star Benchmarks – Ultra Low VOC Paints One (1) additional point may be awarded where over 50% of paints (by volume) specified in the building have a maximum TVOC content of 5g/L. This must be verified by one of the approved paint test methods.	M	ARCH, Façade, Mechanical, Electrical, V. Transport, Fire, Hydraulics, Acoustics, Head Contractor			
	30C	Improving on Green Star Benchmarks Indoor Pollutants - Mattresses (health and hospital projects only)	1	1		1	One point awarded where 95% of all mattresses that are to be supplied to the building meet the GreenGuard emission criteria for bedding.	M	HI, ARCH	Savills to communicate with the LHD. Understand this is achievable through current procurement		
	30C	Improving on Green Star Benchmarks Stormwater	2			0	Exceeding Green Star Benchmarks – Stormwater Pollution Targets Up to two additional points may be awarded where projects can demonstrate achieving Pollution Reduction Targets from column B (1 point) or C (2 points) as stated in Table 26.1.	M	Civil	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification. Enstruct to confirm.		Inherent Project Cost
	30D	Innovation Challenge - Community Benefits	1	1		1	To claim this Innovation Challenge, project must: • Perform a 'needs analysis' of the surrounding community. This may include community briefings, meetings or workshops; • Develop a strategy for how the project will provide social/community benefits and consult with the broader community on the proposed plan; and • Implement the plan and deliver outcomes as defined by the community benefits strategy.	M	HI, ARCH	Arts in hospital or indigeneous design strategy.		
	30D	Innovation Challenge - Culture, Heritage and Identity	1	1		1	To claim this Innovation Challenge, project teams must • Demonstrate that the building selected is recognised as a place of heritage value, as defined in the Burra Charter or through a heritage listing within a state or local register. • Demonstrate how the building is occupied or has been significantly refurbished, in such a manner as tocelebrate and makes visible heritage elements. • Make information on the heritage values of the building available to the public visitors to the site through site displays or a context aware smart phone application.	M	HI, ARCH	Arts in hospital or indigeneous design strategy.	COX confirm compliance, extent of evidence.	
	30D	Innovation Challenge - Integrating Healthy Environments	1	1		1	To claim this Innovation Challenge, project teams must • Conduct an analysis of community health needs and outline the distribution of health issues among impacted communities. • Prioritize strategies to address identified needs. Identify actions that could be taken to enhance healthsupportive features of the project and those that could minimize potential risks. Identify actions that can be taken within the project's design, construction or operation that will promote health equity. • Intentionally implement selected strategies to address identified community and occupant health needs. • Develop a monitoring plan with performance metrics to evaluate the project's impact on occupant and community health throughout the project life cycle (design, construction and operations).	M	HI, ARCH	No smoking policy and model of care	COX to provide response.	
	30D	Innovation Challenge - Occupant Engagement	1	1		1	To claim this Innovation Challenge, project team must: • Demonstrate that a pre-occupancy survey on staff or occupants (where known) has been performed. Where the building is speculative, the pre-occupancy survey does not need to be performed until a tenant has been signed up, provided such tenant is occupying another space; and • Complete a post-occupancy survey on a significant proportion of occupants (including tenanted spaces) no earlier than 6 months and no later than 12 months after from practical completion. The Applicant must also commit to providing the results upon completion with the GBCA, for information purposes only. This can be provided at a date later than the project's Green Star	M	HI, ARCH	Savill to ensure head contractor undertake activity. This aligns with the Process of Health Planning requirements.		
	30D	Innovation Challenge - Pathways to Carbon Positive	1			0	This Innovation Challenge aims to incentivise buildings to commence on a best practice pathway to carbon neutral and beyond. It rewards the key stepping stones in the permanent transition to a carbon neutral built environment: • the design and operation of highly efficient buildings; • commitment to be powered by 100% renewable energy • elimination or transition away from the use of fossil fuels on site; and • promotion and reward of the use of on-site solar and storage systems where possible and relevant	M	HI, ARCH	We likely need to consider this for the new planing approval requirements.		
	30D	Innovation Challenge - Reconciliation Action Plan	1	1		1	To claim this Innovation Challenge, project teams must • Develop a Reconciliation Action Plan (RAP), as defined and endorsed by Reconciliation Australia. The RAP must be endorsed by Reconciliation Australia. The Green Star project being rated must play a central role in the delivery of the Reconciliation Action Plan. • Demonstrate evidence that relevant Indigenous organisations have been consulted in the development of the RAP. • A structure is in place to deliver the plan including a RAP Working Group, with a RAP Coordinator as part of the Working Group, comprising Indigenous and non-Indigenous staff members from all business areas. • Public reporting is undertaken to Reconciliation Australia (or equivalent body) and in the organisation's Annual Report, or project website, to report on tangible achievements towards reconciliation goals. • At least 80% of the RAP targets have been met in the first reporting cycle.	M	HI, Head Contractor	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification, inline with Geolink and GC21 requirements		Inherent Project Cost
	30D	Innovation Challenge - Universal Design	1	1		1	To claim this Innovation Challenge, project teams must • Review the Design for Dignity Guidelines, or similar guidelines for inclusive design and dignified access. • Perform a 'needs analysis' identifying the project's accessibility issues. • Develop an 'accessibility plan' (or similar) that provides strategies to address the needs determined and identifies actions for how the project will incorporate inclusive design. • Implement the 'accessibility plan' and demonstrate that accessibility initiatives have been carried out for the project.	M	HI, ARCH	Assume similar approach as NSH, the requirements will be outlined in the ESD Master Specification, NSH Health has an inclusion policy		
	30E	Global Sustainability - Green Cleaning Policy	1			0	To claim this Innovation Challenge your project must: • Demonstrate that the building targeting this innovation challenge has been certified against the Cleaning Accountability Framework (CAF) 3 Star standard during the performance period. – For the initial certification, compliance must be demonstrated as having been achieved for at least the final 3 months of the performance period. – For recertification, compliance must be demonstrated as having been achieved for the entire performance period.	M		Require LHD to commit the use of green cleaning (GECA certified) product. https://geca.eco/products/nanocyn-disinfectant-and-sanitiser/		CAF 3 Star Standard – Cleaning Accountability Framework Inc.
	30E	Global Sustainability WELL BUILDING STANDARD Specific Strategies to be confirmed	1			0	Refer to the WELL Building Standard	M	HI, ARCH	Drinking fountains to WELL standards		
TOTAL			**110**	**55**	**11.0**	**66.0**						