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

Shoalhaven District Memorial Hospital (SMDH) Redevelopment
ESD SEARs Report

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Document Revision and Status

Date	Rev	Issue	Notes	Checked	Approved
13/04/2022	00	Draft	For comment	JP	JP
09/05/2022	01	Final	For Issue	JP	JP
11/05/2022	02	Final	For Issue	JP	JP

11th May 2022
Ref. No. 207163

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1.0 Executive Summary

Health Infrastructure NSW (HI) is the applicant for the proposed Shoalhaven Hospital Redevelopment at Scenic Drive, Nowra in the City of Shoalhaven Local Government Area (LGA).

The proposal is State Significant Development (SSD) for the purposes of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and section 14(a) of Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) as it involves development for the purposes of a hospital with a capital investment value in excess of $30 million.

The Shoalhaven Hospital Redevelopment seeks to deliver significantly enhanced acute services, as well as a new campus main entry and drop-off area.
The proposed Acute Services Building will be located south and east of the hospital's existing cluster of buildings at will address Shoalhaven Street to the hospital's east. The development is proposed to be located on the site of the existing Shoalhaven Community Pre-school (which will be separately relocated) and part of the former Nowra Park.

The proposed Shoalhaven Hospital Redevelopment under this SSD relates primarily to the development of a new hospital building and its ancillary works. The scope includes a new 7-level building of about 31,000m2 GFA, with rooftop plant and helipad, generally accommodating the following:

Level 00	Back of House (BOH), Loading Dock, Kitchen, plant, Pharmacy, Staff amenities, Mortuary, and plant.
Level 01	Front of House (FOH), Emergency Department (ED), Medical Imaging, and Cafe
Level 02	Operating Suites & Endoscopy, Central Sterile Supply Department (CSSD), and linkway to Block B
Level 03	Coronary Care Unit (CCU), Close Observation Unit (COU), Intensive Care Unit (ICU), cultural centre, and plant
Level 04	In-Patient Unit (IPU), Mental Health, and plant
Level 05	In-Patient Unit (IPU)
Level 06	In-Patient Unit (IPU)
Level 07	Rooftop plant
Level 08	Helipad

This generally results in 279 new beds and treatment spaces across a range of departments, eight new operating theatres, and two new endoscopy theatres. The works include a new ambulance entry from Shoalhaven Street, new public and servicing accessway off North Street, and separate loading dock entry and mortuary parking off Shoalhaven Street.
A range of infrastructure and civil engineering works are proposed as well as demolition of existing structures within the footprint of the new building and/or on the existing hospital campus where a new linkway connection is proposed.
Earthworks will be necessitated within the building's footprint and immediate environs.
Subdivision of the balance of Lot 104 (the former Nowra Park) remaining and consolidation of the existing pre-school lot into the hospital lot is also proposed.
A number of selected trees will require removal. Other significant trees will be retained and protected. Replacement planting at a minimum rate of 1:1 is proposed.

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2.0 Assessment Requirements

The development's SEARs were issued by the Department of Planning and Environment on 23 February 2022.

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

Ecologically Sustainable Development

General Requirement or Key Issue	Reference / Location within this report
9.1 *Identify how ESD principles (as defined in clause 7(4) of Schedule 2 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development*	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, materials etc. The outcome of the resource hierarchy approach is to ensure the project aligns with the ecological sustainable development principles of Clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000. See sections 2.1 (below), 4, 5 and 6
9.2 Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	The project design has been developed to achieve a 5 Star equivalent rating through the DGN058 sustainability framework developed by Health Infrastructure NSW, with a minimum commitment of 4 Star equivalency based on the DGN058 requirements. See sections 6, 7 and 9 (Appendix A)
9.3 Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	Resource conservation is a key focus of the sustainability strategy, including strategies for energy, water, and material resources. Details are demonstrated in Sections 4 and 6.

2.1 Project Response to SEARS clause 7 (4)

The ESD initiatives proposed for the Shoalhaven Hospital Redevelopment 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 reducing the use of energy, water, materials etc.

The outcome of the resource hierarchy approach is to ensure the project aligns with the ecological sustainable development principles of Clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 and the four key principles and our response listed below.

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Principle	Project Response
The precautionary principle ■ If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. ■ Decisions should be guided by: (i) Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; (ii) An assessment of the risk-weighted consequences of various options.	The project site has been selected to minimise the amount of greenfield / park land that will be used. The landscape strategy has been developed to enhance the environmental performance of the land, including integration of native plant species and incorporation of water sensitive urban design features to passively manage storm water falling on the site and enhance biodiversity.
Inter-Generational Equity ■ The present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.	The project will minimise the impact on the environment through: ■ Resource efficiency measures and selected low embodied carbon materials and using recycled materials where possible ■ Energy, water and waste reduction and conservation measures to reduce consumption of resources ■ Fully electrified site enables the development to purchase 100% renewable energy ■ Landscape strategies and WSUD features to enhance biodiversity and the site's ability to passively control stormwater ■ Connection to country – Integration of indigenous and aboriginal design considerations and features.
Conservation of Biological Diversity Ecological Integrity ■ Conservation of biological diversity and ecological integrity should be a fundamental consideration.	The landscape strategy considers the protection of existing ecological features, and the design will enhance the overall biodiversity and ecological performance of the site.
Improved Valuation, Pricing and Incentive Mechanisms ■ Environmental factors should be included in the valuation of assets and services, such as: (i) Those who generate pollution and waste should bear the cost of containment, avoidance, or abatement, (ii) The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste, (iii) Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.	Detailed sustainability strategy workshops have been completed with the client, design teams and stakeholders to assess a wide range of sustainability strategies. Life Cycle Cost (LCC) analysis has been carried out on strategies to demonstrate whole life impacts, including financial, environmental, and social. Strategies have been developed to achieve the highest sustainability and environmental performance while aiming to stick within budget and minimise high costs.

3.0 Introduction

This report has been prepared by Steensen Varming for the Shoalhaven District Memorial Hospital (SDMH) Redevelopment.
Steensen Varming has been engaged by the NSW Health Infrastructure (HI) as an independent ESD consultant to complete Part 3. Schematic Design for the Shoalhaven Hospital Redevelopment project. This report outlines the Environmental Sustainability Development (ESD) requirements, principles and strategies recommended for this 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 health care institution.

Proposed site with existing buildings (to be demolished)

Proposed site with new building

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4.0 Requirements and targets

NSW Health Infrastructure (HI) has defined high-level ESD targets for Shoalhaven District Memorial Hospital (SDMH) Redevelopment as follows:

- A **minimum of 60 points** (or 5 star equivalent) to be achieved by the design in accordance with HI's ESD Evaluating tool;
- A **minimum 10% improvement** in energy efficiency compared to 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.

SDMH is targeting a self-certified approach to achieve 'Australian Excellence' level, which is equivalent to 60-74 points out of 110 available.

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

In addition to the above high-level targets, NSW Health Infrastructure has defined minimum targets for individual point categories, and these are outlined in the HI ESD Evaluation tool.

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

4.2 NCC Section-J

Section-J of the National Construction Code (NCC) 2019 (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.

SDMH target is to achieve a minimum 10% greenhouse gas improvement against the NCC 2019 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 SDMH 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.

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. The feasibility of this should be discussed with the project team given that Mental Health facilities will have specific finishes requirements.

Smart Technology & Infrastructure

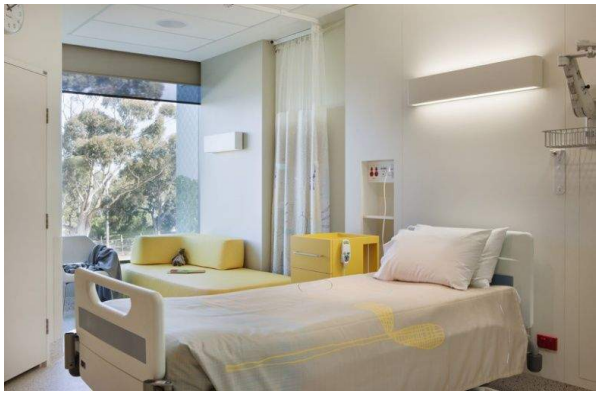
Integrate site wide data connectivity to enable open data sharing and adoption of smart technology throughout building areas.

5.1 Case studies

The examples below show current best practice health care facilities in different countries which have included key spaces and indoor environmental features within their design to improve patient's & staff experiences. Those features include, incorporating outdoor spaces to connect with nature, biophilia, views from patients' rooms, access to daylight and natural ventilation within the patient areas. Opportunities to incorporate these strategies have been considered.

Outdoor Places of Respite - The Christ Hospital Joint and Spine Center, Cincinnati (SOM)

Views from Patient Units



Daylight into Patient Areas – Royal Children's Hospital Melbourne.

Daylight, Views and Natural Ventilation – Ng Teng Fong General Hospital in Singapore

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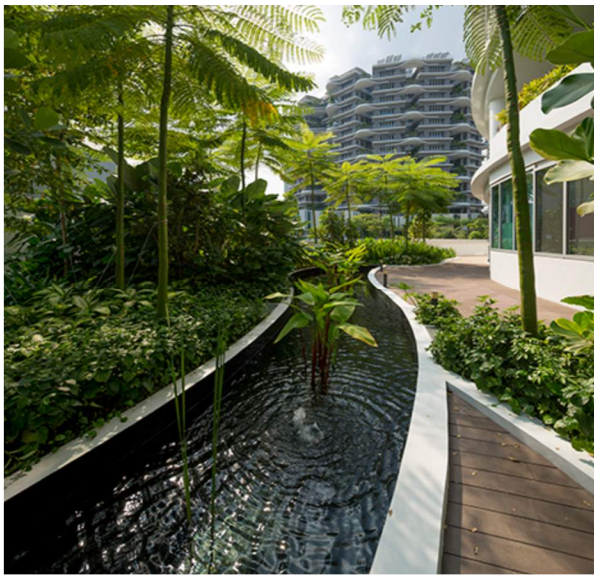

Ng Teng Fong General Hospital in Singapore: showing access to nature, shading, and natural ventilation strategies

Khoo Teck Puat Hospital / Singapore. Greenery and vegetable gardens

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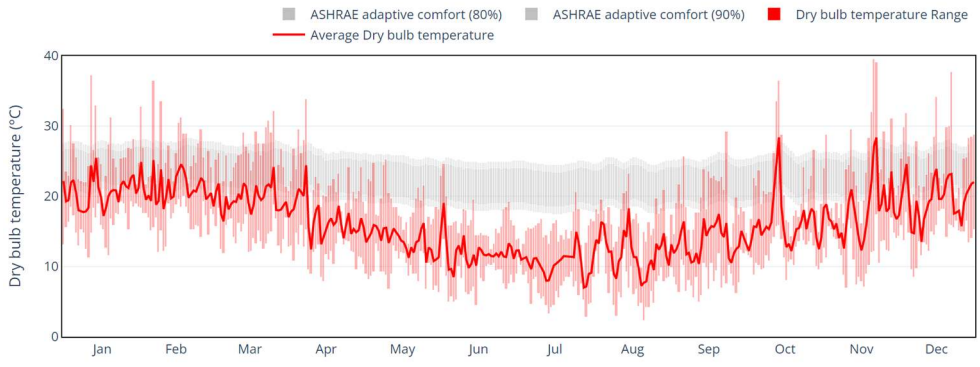
6.0 Sustainability Approach

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

6.1 Climate overview

Understanding the local climatic conditions is essential for the development of appropriate design strategies. The following graphs show the average weather conditions from weather stations closest to the project site, based on a statistical analysis of historical weather data and model reconstructions from 1956 and 2021.

Average Temperature

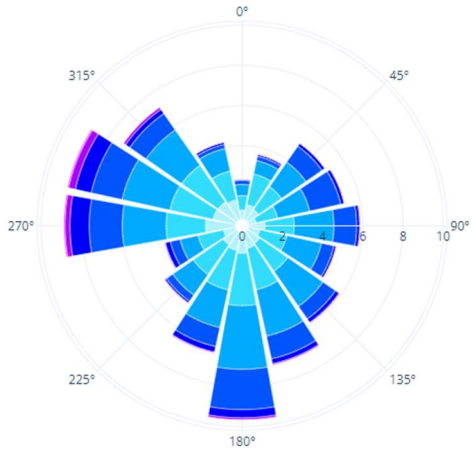


Temperature
The *warm season* lasts for 4 *months*, from *December* to *18 March*, with an average daily high temperature around *20°C*.
The *cool season* lasts for *2.8 months*, from *May* to *August*, with an average daily high temperature around *11°C*.
(https://clima.cbe.berkeley.edu/)

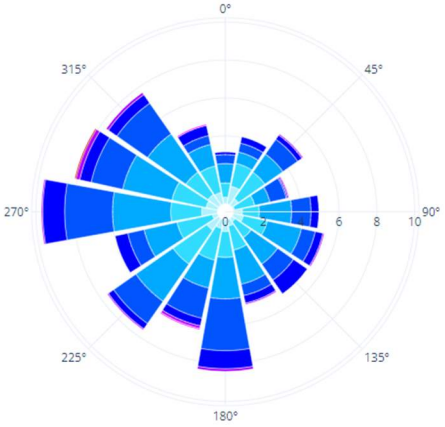
Peak high temperatures in summer should also be taken into consideration as they can cause significant heat stress on building occupants.

Prevailing Winds

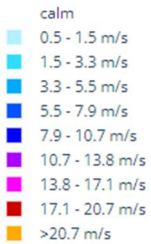
Summer



Winter



Wind
Prevailing winds shift directions through the year.
During summer, prevailing wind direction is mostly North West and South.
During winter, North West, South and South West.
Summer prevailing winds should be taken into consideration for natural ventilation strategies.
(https://clima.cbe.berkeley.edu/)



Rainfall

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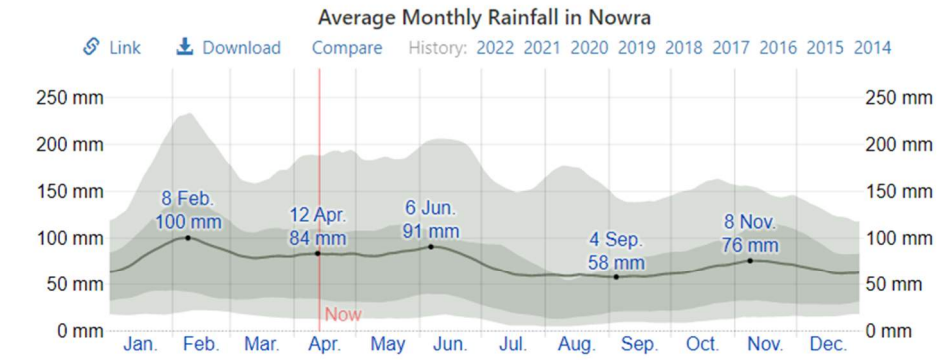


The average rainfall (solid line) accumulated over the course of a sliding 31-day period centered on the day in question, with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the corresponding average snowfall.

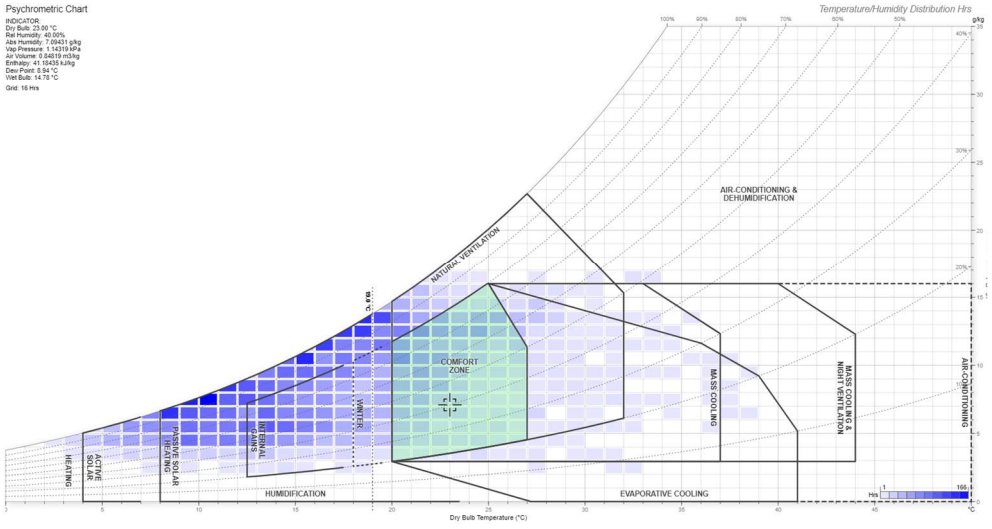
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Rainfall	78.6mm	96.8mm	79.4mm	83.0mm	83.4mm	87.8mm	60.8mm	60.0mm	58.4mm	67.0mm	75.5mm	63.5mm

Rainfall

Peak rainfall season is typically from January to February, decreasing to its lowest in December.

High rainfall during summer can be beneficial for rainwater collection to be used for irrigation during the warmer months when it is most needed.

Psychrometric Chart



Thermal Comfort

The 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 Nowra climate with passive design strategies overlaid. (https://drajmarsh.bitbucket.io/psychro-chart2d.html)

The chart shows the following key analysis:

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

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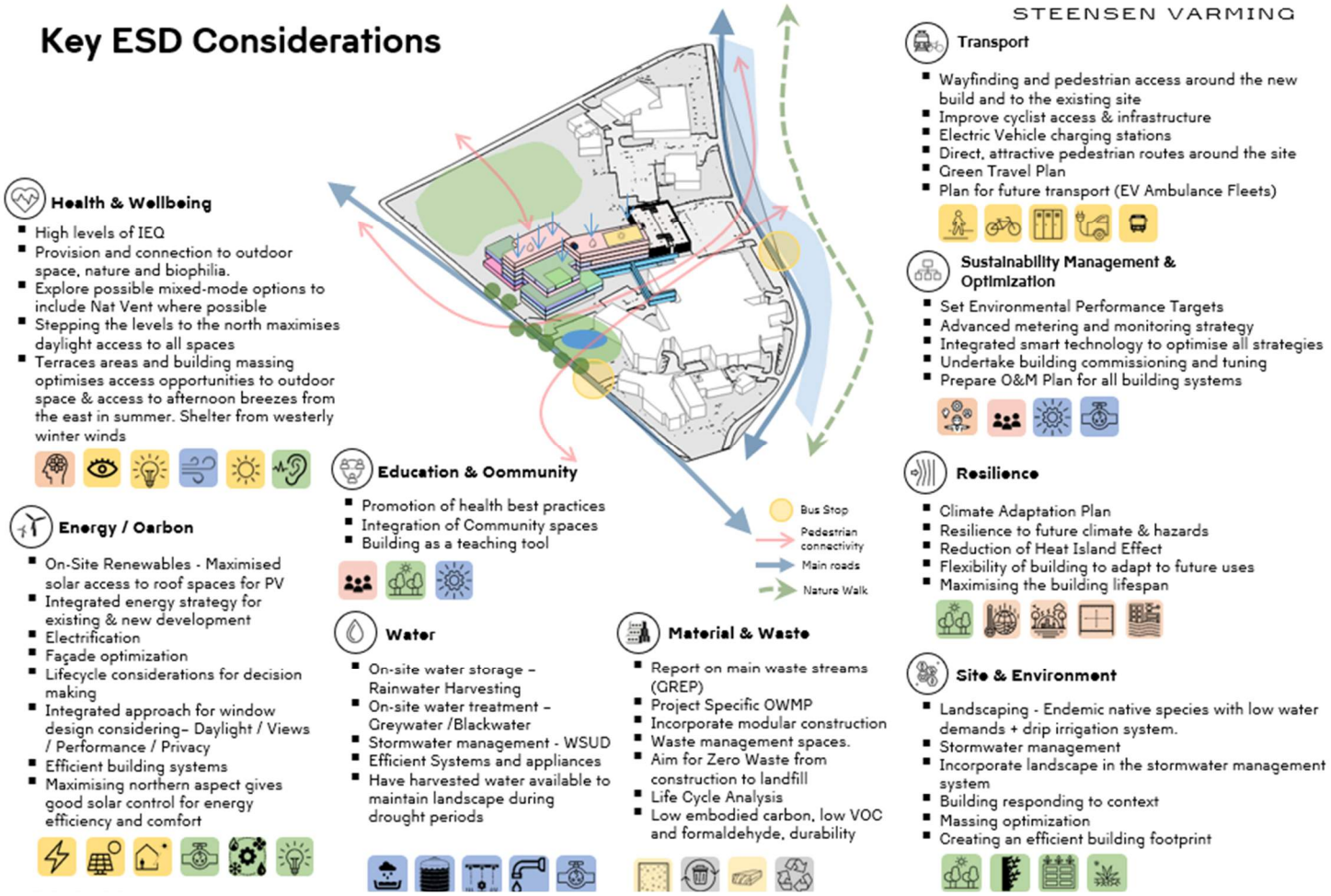
6.2 Site & Building Strategy Considerations

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.



6.3 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 hospital can purchase 100% Green Power which would enable net zero GHG emissions in operation.

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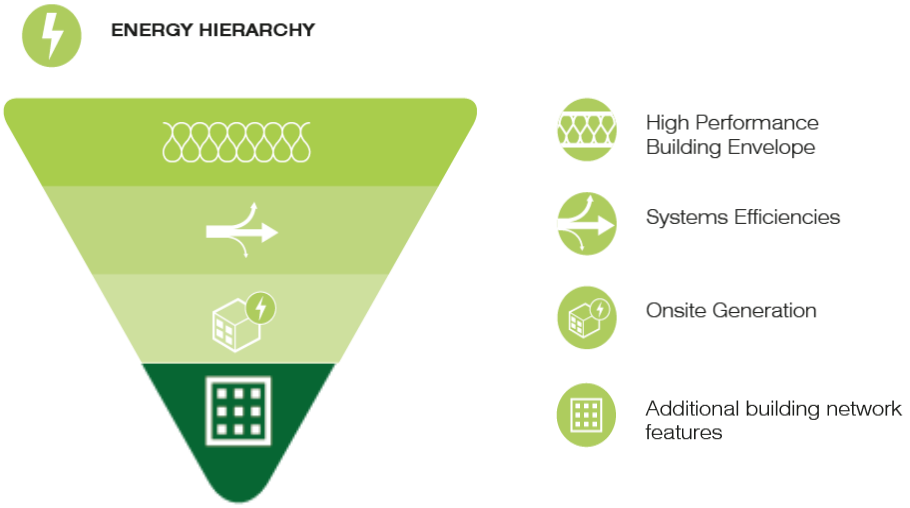
6.4 Resource Conservation – Energy

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

Passive Design Optimisation

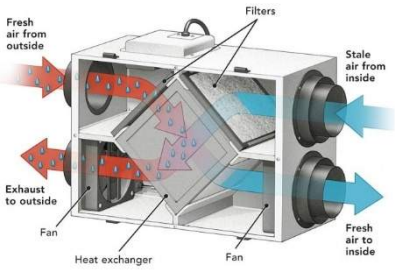
- **Façade performance –** WWR / U-Values of windows and walls / glazing performance (SHGC & VLT)
- **Building Form –** Massing of new building has been designed with consideration of façade access for greater access to natural daylight and opportunity for natural ventilation, within the constraints of the site.
- **Building envelope performance** (airtightness and thermal) will be enhanced by prefabrication where possible. Opportunities for upgrading of existing hospital fabric will also be assessed where relevant.
- **A Mixed Mode Ventilation strategy** will be assessed for non-clinical areas, providing improved indoor air quality, whilst also reducing energy consumption associated with air-conditioning.
- **Building energy performance improvement -** Energy modelling will be performed in development of a design that betters current minimum standards.
- **Performance glazing** – Glazing should be selected to optimise performance, admitting as much daylight as possible, while controlling the transmission of solar heat and thermal conduction
- **Glazing ratio** – Glazing ratios need to achieve an equilibrium between allowing daylight to enter buildings while reducing solar and conductive heat gains
- **Glazing position** – Windows should be positioned to block unwanted solar radiation, while allowing visible light and possibility for natural ventilation
- **External Shading** – Helps restrict unwanted heat gains within spaces, while allowing daylight access. Deciduous trees can also help shade direct solar ingress

- **Building air tightness** – Doors should be designed to close automatically to reduce unwanted heat transfer during peak summer and winter conditions. Consider revolving doors where applicable to maintain air tightness
- **Thermal Mass** – Exposed thermal mass can reduce the rate of change of temperatures within buildings and reduce the peak heating and cooling demands

Active Measures / District Systems

- **Full Electric development,** utilising efficient heat pumps for heating and hot water supply
- **Energy efficient LED lighting, zoning, controls, and site co-ordination** for both internal and external lighting systems are to be designed.
- **Occupancy controls** will be provided to spaces so that AV, lighting, and mechanical systems can be shut down both manually and automatically when unoccupied where appropriate.
- **High efficiency HVAC (Heating, Ventilation & Air-conditioning)** systems to be incorporated
- **Energy Recovery:** Through both air and water-based systems, energy recovery and reuse will be a priority
- **CO2 monitoring** in the appropriate control of outdoor air provisions.
- **Metering and Monitoring** of energy, water, and air quality to promote healthy environment and save energy and resources.
- **Building Management Systems** to link to sensors and meters, with the ability to control lighting, hydraulic and mechanical systems and reduce energy usage.
- **Comprehensive System Commissioning** to ensure the building functions as designed.

Efficient lighting to be considered



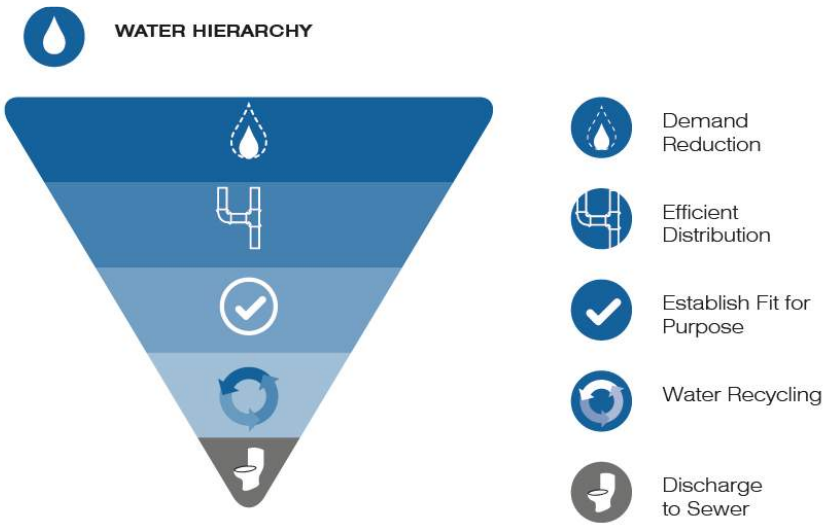
Heat recovery example

Renewable Energy

- **A Solar photovoltaic (PV) array** can be located on rooftops where available.
- **Full Electric development,** removing fossil fuel consumption onsite and purchasing off-site Green Power, enabling carbon positive operational energy

6.5 Resource Conservation – Water

The following hierarchy and strategies will be applied:



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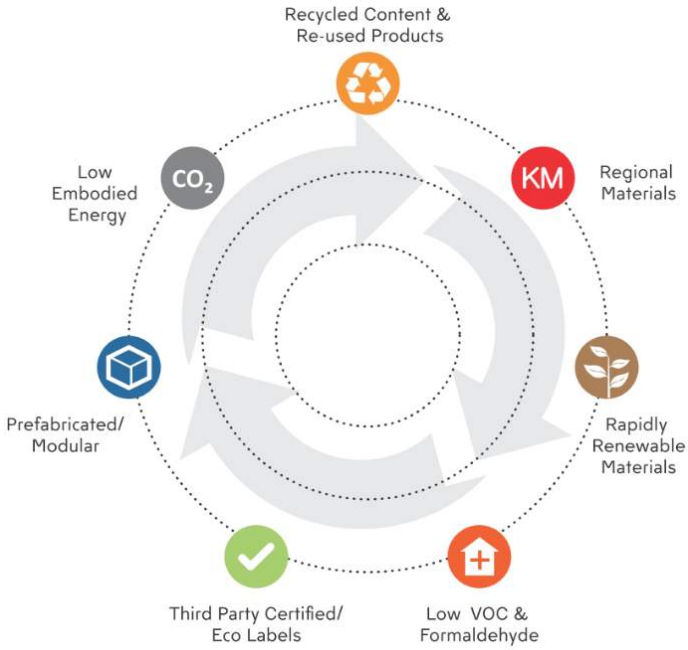
The following water initiatives have been proposed and their individual merits will be assessed further during future design stages:

- **Water efficient fixtures / fittings will be specified.** These include fittings such as taps, showerheads, toilets, zip taps, dishwashers etc certified under the WELS rating scheme.
- **Sensors** within water networks to identify possible leaks and act quickly to reduce losses
- **Rainwater Reuse** - Rainwater collection and reuse are included in the design. Collected water will be used for cooling towers and landscape irrigation. Toilet flushing was considered but ruled out due to the clinical requirements of the facility
- **Cooling Towers** – Use of treated rainwater for cooling towers will reduce potable water demands
- **Fire Systems test water** capture and storage for re-use using the rainwater tank will be accessed
- **Drip and demand-controlled irrigation** to optimise irrigation supply

6.6 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 applied 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

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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.
- **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.
- **High recycled content or recyclability** – Furniture items with high recycled or recyclability content to be considered.
- **Site waste management plan**. During the demolition and construction phase, a project-specific site waste management plan (WMP) will be developed and implemented, for recycling of demolition and construction waste.

6.7 Health and Wellbeing

Indoor Environmental Quality

The following occupant comfort strategies have been 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.

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6.8 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 to protect and improve waterway health by replicating the natural water cycle. This would include measures to prevent stormwater contamination, control sedimentation and erosion during construction and operation of the building, such as rainwater reuse etc.
- **Water Sensitive Urban Design –** WSUD features such as bio-swales can help manage stormwater quality and quantity without the need for mechanical treatment methods. The landscape strategy has been designed to incorporate WSUD features
- **Pollution of the night sky** should be minimised by ensuring that the electric lighting within the site should not cause any direct beam of light into the night sky. Light pollution can disturb the habitat of migratory birds and impacts the behaviour of nocturnal animals in the site vicinity.
- **Emissions from HVAC refrigerants** and insulation products have the capacity to damage the ozone layer. For the proposed design, refrigerants with zero ODP and Low GWP should be specified and installed within all the proposed HVAC systems.
- **Construction Environmental Management Plan (EMP) – An CEMP will be developed.** This measure is intended to reduce the environmental impacts associated with the construction of new buildings. The CEMP will be developed and implemented for the construction stage, including demolition and excavation, to address environmental, worker health and safety and community risks. The CEMP is a project specific plan and developed using State and Federal Guidelines and standards. The main contractor will implement an Environmental Management System certified to the ISO 14001 standard to ensure the objectives of the CEMP are met.

Water Sensitive Urban Design example

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7.0 HI ESD Framework Pre-assessment

7.1 Process

When	What	Who
At design and before planning application lodged	ESD Report and Evaluation Tool	HI Project ESD consultant
Tender documentation	ESD Report, Evaluation Tool and Specification	HI Project ESD consultant
Before Award	Evaluate HC ESD response	Project Team incl ESD consultant
Before Commencement	Documentation validating detailed design meets target	Contractors ESD consultant
Within 6 months of Completion	As built evaluation	HI Project ESD consultant

During the design stages, the design team will incorporate the targeted ESD requirements with supports from the ESD consultant.

During the tender phase, the ESD consultant will collect design stage documentation (e.g. drawings, specifications, reports) and produce an ESD Performance Specification to confirm design compliance against the ESD targets. The aim is to provide confidence to the Contractor that the design achieves the required performance rating.

HI ESD consultant will then perform a peer review role and review the Contractor as-built documentation to confirm compliance against the targeted rating.

Steensen Varming have led the coordination process for the HI ESD Evaluation tool and will continue to assess progress during future design and construction stages of each targeted credit and associated strategy.

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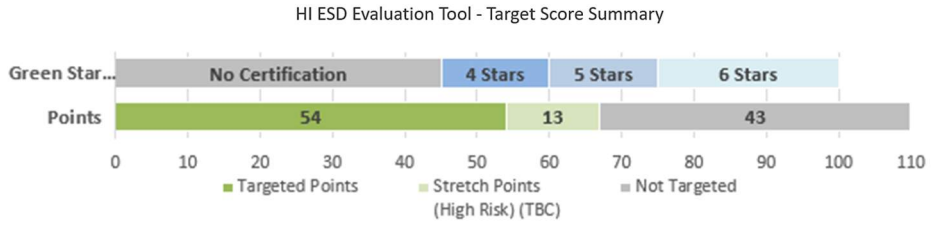
7.2 ESD Evaluation Tool Assessment

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

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

The status of the assessment includes 54 low risk points and 13 higher risk points (totalling 67 points). There is a sensible buffer above minimum threshold at this stage to confirm that the minimum requirement of 60 points is feasible.

All low and higher risk credits are considered achievable, but the higher risk credits require some further investigation to ensure they are adequately incorporated into the design and achieve the necessary performance. This work to confirm these credits will continue during the detailed design and construction stages. 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.



HI ESD Evaluation Tool Score Summary

Category	Available Points	Low / Med Risk	High Risk	Total Targeted
Management	14	13	1	14
Indoor environmental quality	17	11	3	14
Energy	22	5	1	6
Transport	10	3	1	4
Water	12	4	0	4
Materials	14	7	1	8
Land use & ecology	6	2	1	3
Emissions	5	4	0	4
Innovation	10	4	6	10
Total	**110**	**53**	**14**	**67**
4 star Target	**45**	**Pass**		**Pass**
5 star Target	**60**	**Fail**		**Pass**

The full Matrix should be reviewed for detailed credit requirements as provided in the ESD scorecard included in Appendix A. As the project progresses, if some credits are deemed unachievable, alternative credits and strategies will be explored.

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8.0 Next Steps

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

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

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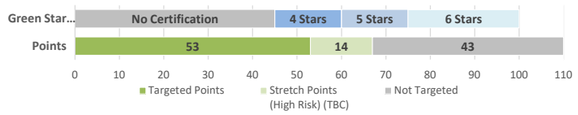
9.0 Appendices

9.1 Appendix A – HI ESD Evaluation Tool & Pre-assessment

ESD Scorecard Rev 00 - SD

Based on Green Star - Design & As Built v1.3

Project:	Shoalhaven Hospital
Targeted Rating:	5 Star (60 points + 5 buffer points)
Current points targeted:	67



Blue shading Min. Exp. In GS Buildings

Total Points Available	Points Targeted	Higher Risk Points
100	53	14

Credit Name (As per Green Star)	Code (UL Coding inline with Green Star)	Sub-Criteria (As per Green Star)	Criteria Requirements (As per Green Star)	Design Stage Primary Custodian (Primary responsibility)	Credit Risk (Credit attainment)	Points Available (As per Green Star)	Points Targeted	Higher Risk Points Targeted
MANAGEMENT					**MAN**	**14**	**13**	**1**
Green Star Accredited Professional (GSAP)	1.1	Accredited Professional	GSAP contractually engaged to provide advice, support and information related to Green Star principles, structure, timing and processes at all stages of the project leading to certification. GSAP is required to undertake at least one Green Star workshop with the project team and meeting minutes must sufficiently demonstrate GSAP involvement.	Client/Building Owner, GSAP	Low	**1**	**1**	
Commissioning and Tuning	2.0	Environmental Performance Targets	Environmental performance targets must be set and documented for the project through the development of a Design Intent Report or an Owner's Project Requirements report. These documents must outline; a) Description of the basic functions/operations/maintenance of the nominated building systems; b) Targets for the project energy & water consumption, and budgets for all nominated systems; c) Description of how energy, water and aspects of indoor environment quality are metered and monitored.	Client/Building Owner, FM/ICA	Low	**-**	**Complies**	
	2.1	Services and Maintainability Review	A comprehensive 'Services and Maintainability Review' must be conducted during design stage and prior to construction. This can be conducted by the Head Contractor (where applicable), an Owner's Representative (e.g. FM sub-contractor) or the ICA (where applicable). The design review must address the following for all nominated building systems; commissionability, controllability, maintainability, operability (fitness for purpose) and safety.	Client/Building Owner, FM/ICA	Moderate	**1**	**1**	
	2.2	Building Commissioning	Pre-commissioning & commissioning must be undertaken to CIBSE, ASHRAE and/or AIRAH standards/guidelines. The commissioning process must generate key documents a) Commissioning Specification, b) Commissioning Plan and c) Commissioning Report. The Commissioning Specification must list the commissioning requirements for each system, not simply reference compliance "to the relevant standard". The Commissioning Report is a summary of the commissioning undertaken and that all documents were adhered to and the nominated systems have been commissioned. AIR TIGHTNESS (PERMEABILITY) IS NOW A REQUIREMENT OF THIS CREDIT	Services Engineers, Client/Building Owner	High	**1**	**0**	1
	2.3	Building Systems Tuning	A 12 month building tuning period is required to be implemented with a minimum of quarterly reviews and tuning, inclusive of analysis of data from the monitoring systems and assessment of feedback from occupants. Specific documentation/actions required are; a) O&M Manuals developed and provided to building owner; b) a Building Tuning Plan is developed; c) a Building Tuning Team is formed.	Mechanical Engineer, Client/Building Owner	Low	**1**	**1**	
	2.4	Independent Commissioning Agent	An ICA must be appointed from design stage and one of the above points targeted. The ICA must advise, monitor, and verify the commissioning and tuning of the nominated building systems throughout the design, tender, construction, commissioning and tuning phases. ICA must satisfy Green Star qualifications & experience requirements.	Client/Building Owner, ICA	Low	**1**	**1**	**0**
Adaptation and Resilience	3.0	Implementation of a Climate Adaptation Plan	Undertake the development of a Climate Adaptation Plan in accordance with recognised standards. A minimum of two risk items identified within the CAP are addressed by specific design responses.	ESD, Architects, Services Engineers, Building Owner	Low	**2**	**2**	
Building Information	4.1	Building Information	A Building User Information package must be developed for the building and its content must be appropriate for the occupants ("day to day users"). Specific Green Star content requirements must be satisfied. A key requirement is that the BUI is communicated digitally such as digital signage, interactive information kiosks, websites, apps or mobile devices etc written for the building tenants.	Services Engineers, Architect, Building Owner	Low	**1**	**1**	
Commitment to Performance	5.1	Environmental Building Performance	80% of the GFA must be covered by a performance agreement with at least 2 environmental metrics (emissions, energy, water, waste or IEQ).	Client/Building Owner, Services Engineers	Low	**1**	**1**	
	5.2	End of Life Waste Performance	80% of the GFA must be covered by a formal commitment to by the owner to extend the life of finishes to all common areas to at least 10 years (barring minor wear & tear).	Client/Building Owner	Low	**1**	**1**	
Metering and Monitoring	6.0	Metering	MANDATORY CREDIT REQUIREMENT: Accessible metering to be provided to monitor building energy & water consumption, including all common & major uses (Base Building). Metering shall be provided to allow for monitoring of relevant areas or functional space types. In most cases, floor-by-floor metering will suffice, however if a floor comprises separate space types, each shall be metered separately. Each tenancy shall be provided with sub-metering (NB - Authority Meters will meet this as they are required per tenancy). All sub-meters shall meet NABERS requirements pertaining to accuracy and be located in areas that allow regular monitoring &	Electrical, Mechanical, Hydraulic Engineer, Building Owner	Low	**-**	**Complies**	

Credit Name (As per Green Star)	Code (UL Coding inline with Green Star)	Sub-Criteria (As per Green Star)	Criteria Requirements (As per Green Star)	Design Stage Primary Custodian (Primary responsibility)	Credit Risk (Credit attainment)	Points Available (As per Green Star)	Points Targeted	Higher Risk Points Targeted
	6.1	Monitoring Systems	Two key requirements must be met: a) A sub-meter monitoring strategy must be developed in accordance with a recognised standard (CIBSE TM 39), and shall provide a metering schedule which identifies location, type of meter & resource, end-use demand, and estimated energy consumption. b) Sub-meters must be connected to an automated system capable of capturing and processing sub-meter data, and shall have the functionality to produce reports, alter owner/FM to missing data or meter failures, alarms when use increases beyond defined thresholds, and other functionality to provide a useful monitoring system. c) MUST MEET THE METERING INTEGRITY REQUIREMENTS OF GREEN STAR d) PROVIDE A DETAILED PROCESS ON HOW TO DEAL WITH FAULTS LOCATED IN AN ACCESSIBLE LOCATION	Electrical, Mechanical, Hydraulic Engineer, Building Owner	Low	1	1	
Responsible Construction Practices	7	Environmental Management Plan	MANDATORY CREDIT REQUIREMENT: A project specific Environmental Management Plan (EMP) is required to be prepared and must be compliant with best practice guidelines such as the NSW Environmental Management System Guidelines. All sub-contractors are required to adhere to the requirements of the EMP. Scope of EMP shall meet Green Star minimum requirements.	Client/Building Owner, Contractor	Low	-	Complies	
	7.1	Formalised Environmental Management System	Formalised Environmental Management System must be implemented on site and must have been certified by a third-party organisation which provides independent verification of system compliance. EMS must be certified to ISO14001, BS 7750 or European Community EMAS. Certification to these standards must be valid before and throughout construction and all sub-contractors are required to adhere to the requirements of the EMP.	Client/Building Owner, Contractor	Low	1	1	
	7.2	High Quality Staff Support	1 point is available where high quality staff support practices are in place that: - Promote positive mental and physical health outcomes of site activities and culture of site workers, through programs and solutions on site. To comply with this requirement programs and policies beyond OH&S to promote health and Wellbeing on-site for both physical and mental health outcomes; and - Enhance site workers' knowledge on sustainable practices through on-site, off-site, or online education programs. Training for at least three days on site provide through one or more of: On-site training, such as by including the items above as part of site induction practices. - Off-site training, such as by providing sustainability training to site workers via a TAFE or similar program within the last 3 years . - Online training, such as by a third party service that can provide training on sustainability topics and track personnel who have taken the relevant materials within the last three years.	Client/Building Owner, Contractor	Moderate	1	1	
Operational Waste	8A	Performance Pathway - Specialist Plan	An Operational Waste Management Plan (WMP) shall be developed by a qualified professional, in accordance with best practice guidelines (e.g. City of Sydney Policy for Waste Minimisation in New Developments). The WMP scope must meet minimum Green Star requirements. Waste Auditor professional shall meet Green Star minimum qualifications & experience requirements. RECYCLING TO BE COLLECTED BY BUILDING'S WASTE SERVICE. COMINGLED RECYCLING IS PERMISSIBLE TO THE EXTENT THAT IT IS ACCEPTED BY THE WASTE COLLECTION SERVICE	Client/Building Owner, Waste Auditor	Low	1	1	
	~~Man 8B~~	~~Prescriptive Pathway - Facilities~~	~~Facilities are in place to collect and separate distinct waste streams, and where these facilities meet best practice access requirements for collection by the relevant waste contractor.~~	~~Client/Building Owner~~	~~Moderate (Design Evolution Required)~~	~~1~~		
INDOOR ENVIRONMENT QUALITY					**IEQ**	**17**	**11**	**3**
Quality of Indoor Air	9.1	Ventilation System Attributes	Three requirements are to be met: a) Mechanical services to be designed in accordance with ASHRAE Standard 62.1:2013 with regards to separation distances between OA intakes and pollution sources) such that the entry of outdoor pollutants is mitigated; b) Mechanical services shall be designed for ease of maintenance and cleaning with adequate access provided to both sides of moisture or debris generating (i.e. coils & filters) components within the air distribution system; c) Prior to occupation, all new and existing ductwork is cleaned in accordance with recognised standards.	Mechanical Engineer, Client/Building Owner	Low	1	1	
	9.2	Provision of Outside Air	For mechanically ventilated spaces 1 point is awarded where; a) Outdoor air is provided at a rate 50% greater that the minimum required by AS1668.2:2012 or ASHRAE 62.1:2003 OR b) CO_2 concentrations are maintained below 800ppm with CO_2 sensors located within each enclosed space or as regularly as temperature sensors, or monitor an area no greater than 500m2. 2 points awarded for Outdoor air provided at 100% above AS1668.2; OR CO_2 concentrations are maintained below 700ppm with CO_2 sensors	Mechanical Engineer, Client/Building Owner	Low	2	1	

Credit Name (As per Green Star)	Code (UL Coding inline with Green Star)	Sub-Criteria (As per Green Star)	Criteria Requirements (As per Green Star)	Design Stage Primary Custodian (Primary responsibility)	Credit Risk (Credit attainment)	Points Available (As per Green Star)	Points Targeted	Higher Risk Points Targeted
	I9.3	Exhaust or Elimination of Pollutants	Credit criteria is achieved where one or any combination of the following are achieved; a) Removing the source of the pollutants - Print/photocopy/ cooking equipment/vehicle exhausts are compliant with ECMA-328, RAL-UZ 171 or GGPS.003 emissions standards or are not present within the Nominated Area; b) Exhausting pollutants directly to outside where they exist in accordance with a recognised standards; c) Printing and photocopy equipment is enclosed in a dedicated area and exhausted directly to outside or to a dedicated exhaust riser. d) Cooking process and equipment - All kitchens are ventilated in accordance with AS1668.2-2012 and are separated from other areas. Kitchenettes with only simple reheat equipment are excluded from the scope. e) Vehicle exhausts - Spaces with vehicle exhausts are compliant with AS1668.2-2012.	Mechanical Engineer, Client/Building Owner	Low	1	1	
Acoustic Comfort	10.1	Internal Noise Levels	Internal ambient noise levels within the nominated area are no more than 5dB(A) above the satisfactory sound levels provided in Table 1 AS/NZS 2107:2016. Noise measurement must account for all internal and external noise sources . Noise measurement and documentation must be provided by a qualified acoustic consultant. Compliance demonstrated through measurement at commissioning/practical completion sampling 10% of spaces representative of the nominated area and space diversity. GFA<500sqm require 95% of spaces to be measured. Mixed mode building to be calculated as if Mechanical.	Acoustic	Low	1	1	
	10.2	Reverberation	Reverberation time within dedicated teaching spaces must be in the lower range of 'Recommended Reverberation Time' provided in Table 1 of AS/NZ 2107:2016. 2016 VERSION OF STANDARD NOW REFERENCED	Acoustic	Moderate	1	0	1
	10.3	Acoustic Separation	Noise transmission within enclosed spaces is addressed through the achievement of a weighted sound reduction index of at least Rw 45 fixed partitions without door or glazed without door and at least Rw 35 for all partitions containing a door, or suitable performance is achieved though measurement. Acoustic consultant can use their discretion on glazed partitions on whether 35 or 45 is used.	Acoustic	Moderate	1	0	1
Lighting Comfort	11.0	Minimum Lighting Comfort	MANDATORY CREDIT REQUIREMENT: All lights within the nominated area are; a) Flicker-free through the application of Class A1 and/or A2 ballasts, high-frequency ballasts for fluorescent lamps or electronic ballasts in HID lamps; AND b) Accurately address the perception of colour in the space with a minimum CRI of 80.	Specialist Lighting / Electrical Engineer, Architect	Low	-	Complies	
	11.1	General Illuminance and Glare Reduction	a) Maintained illuminance levels comply with best practice guidelines and glare is eliminated as demonstrated in accordance with three options 11.1.2A, 11.1.2B & 11.1.2C.	Specialist Lighting / Electrical Engineer, Architect	Low	1	1	
	11.2	Surface Illuminance	Within the nominated area, a combination of lighting and surfaces improve uniformity of lighting to give visual interest. Targeted compliance via 11.2.A. An additional compliance method 11.2.C is applicable to residential spaces (although they can also demonstrate compliance via 11.2.A) 11.2.A requires 95% of the spaces in the nominated area must have: - An surface reflectance for ceilings of at least 0.75; and - 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. The surface reflectance value of 0.75 corresponds to a matte flat white ceiling. The surface reflectance value for the final finish must be obtained from the manufacturer's data sheet. 11.2.C requires at least one wall in each living space, kitchen and bedrooms are provided with at least one specific wall-washing or a wall mounted fitting.	Specialist Lighting / Electrical Engineer, Architect	Moderate	1	1	0
	11.3	Localised control	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.	Specialist Lighting / Electrical Engineer, Architect	Moderate	1	1	0
Visual Comfort	12.0	Glare Reduction	MANDATORY CREDIT REQUIREMENT: Within the nominated area glare from sunlight is reduced through a combination of blinds, screens, fixed devices or other means. Glare reduction is to be demonstrated through methods 12.0A Fixed Shading Devices, 12.0B Blinds or Screens and/or 12.0C Daylight Glare Model.	Architect	Low	-	Complies	
	12.1	Daylight	Up to 2 points are available where a percentage of the nominated area receives compliant levels of daylight during 80% of the nominated hours. Prescriptive methodology pursued, where the daylight access is determined using manual calculations for simple designs that determine the zone of compliance for each orientation. Calculations must comply with the GBCA's Green Star Daylight and Views Hand Calculation Guide, for the requirements of this pathway. 1 point - 40% of nominated area 2 points - 60% of nominated area	Architect	Low	2	0	1
	12.2	Views	60% of the nominated area has a clear line of sight to a high-quality internal view or an external view. All floor areas within 8m from a compliant window, atrium or view can be considered to meet this criterion.	Architect	Low	1	1	

Credit Name (As per Green Star)	Code (UL Coding inline with Green Star)	Sub-Criteria (As per Green Star)	Criteria Requirements (As per Green Star)	Design Stage Primary Custodian (Primary responsibility)	Credit Risk (Credit attainment)	Points Available (As per Green Star)	Points Targeted	Higher Risk Points Targeted
Indoor Pollutants	13.1	Paints, adhesives, sealants and carpets	95% of all internally applied paints, adhesives, sealants and carpets meet stipulated VOC limits. http://new.gbca.org.au/product-certificationschemes/.	Architect, Client/Building Owner	Low	**1**	**1**	
	13.2	Engineered wood products	95% of all engineered wood products meet stipulated formaldehyde limits. http://new.gbca.org.au/product-certificationschemes/	Architect, Client/Building Owner	Low	**1**	**1**	
Thermal Comfort	14.1	Thermal Comfort	For 95% of the nominated area and 98% of occupied hours a high degree of thermal comfort is achieved: Naturally Ventilated Spaces The internal temperatures in each space are within 80% (1 point) OR 90% (2 points) of Acceptability Limit 1 of ASHRAE Standard 55-2013 Mechanically Ventilated Spaces a) The space meets specified prescriptive criteria for Thermal Comfort of the PMV +/- 1 (1 point) OR +/- 0.5 (2 points) for >98% of occupied hours; OR b) Prescriptive DTS thermal comfort criteria are satisfied (DB 20-24DegC, RH 40-60%, terminal velocity < 0.2m/s, turndown ability, zone size limitations, SHGC <0.3 and U-Total <3.0W/m2K) no greater than 250 W/m2 through glass- 1 POINT ONLY. Residential Spaces (Class 2 NOT Class 3) An average NatHERS rating of 7 Stars (1 point) OR 8 Stars (2 points) or greater is achieved.	Mechanical Engineer	Low	**1**	**1**	
	14.2	Advanced Thermal Comfort	.--Same as above--		Low	**1**	**0**	
ENERGY					**ENE**	**22**	**5**	**1**
Greenhouse Gas Emissions	15.0	Conditional Requirement: Performance Pathway (Reference Building Pathway)	GREEN STAR CONDITIONAL REQUIREMENT: All projects are required to comply with the conditional requirements. A 5 star rating may use a maximum of 1 point under prescriptive measures to meet the minimum point threshold (3 points). Project teams must demonstrate that the operational GHG from the proposed building are less than those of an equivalent Benchmark Building (10% improvement over NCC) and that the GHG emissions from the intermediate building are less than those of the reference building.	Architect, ESD Consultant, Client/Building Owner	Moderate	-	**Complies**	
	15E.1	Performance Pathway: Improving on the Building Fabric	Up to 4 points are awarded on a continuous sliding scale based on the improvement of the Proposed Building façade compared to a DTS compliant façade. 0% improvement (0 points) to 8% improvement (4 points maximum);	Architect, Façade Consultant, ESD Consultant, Client/Building Owner	Moderate	**4**	**0**	
	15E.2	Performance Pathway: GHG Emissions Reduction - Proposed building relative to Benchmark Building)	Up to 16 points are awarded based on the reduction of greenhouse gas emissions of the Proposed Building compared to the Benchmark Building. Conditional Requirement (15E.0): Better than 10% over NCC compliance (2 points) Additional Reductions: 10% emissions reduction (3.4 points) up to 100% emissions reduction (16 points maximum)	Architects, Mechanical, Electrical, Hydraulic Engineers, ESD Consultant, Client/Building Owner	Moderate	**16**	**2**	**1**
	15E.5.1	Performance Pathway: Prescriptive measures	Project teams aim to reduce their fossil fuel use and develop a transition plan to phase them out. It must show a commitment to make the transition by 2030.	Architects, Mechanical, Electrical, Hydraulic Engineers, ESD Consultant, Client/Building Owner	Moderate	**1**	**0**	
	15E.5.2	Performance Pathway: Prescriptive measures	No fossil fuels are burned on site to generate electricity, heating or cooling	Architects, Mechanical, Electrical, Hydraulic Engineers, ESD Consultant, Client/Building Owner	Moderate	**2**	**2**	
Peak Electricity Demand Reduction	16.1-A	Prescriptive Pathway: Onsite Energy Generation	1 out of 2 points are available where it is demonstrated that the use of on-site electricity generation systems reduces the total peak electricity demand by at least 15%		Moderate (Design Evolution Required)	**1**	**0**	

Credit Name (As per Green Star)	Code (UL Coding inline with Green Star)	Sub-Criteria (As per Green Star)	Criteria Requirements (As per Green Star)	Design Stage Primary Custodian (Primary responsibility)	Credit Risk (Credit attainment)	Points Available (As per Green Star)	Points Targeted	Higher Risk Points Targeted
	16B	Modelled Performance Pathway: Reference Building Pathway	Up to 2 points are available where it is demonstrated that the project's predicted peak electricity demand has been reduced below that of a Reference Building: - 20% : 1 point - 30%: 2 points	Electrical Engineer/ ESD Consultant	Moderate (Design Evolution Required)	**2**	**1**	**0**
TRANSPORT					**TRA**	**10**	**3**	**1**
Sustainable Transport	17A.1	Performance Pathway	Up to 10 points are available where the proposed transport solutions on the site decrease emissions from transport, decreases mental and social impacts of commuting and encourages healthier uptake of active transport options. Points are based on a holistic approach to reducing the impacts from transport where the Proposed Building performance is compared to Reference Building performance across the following indicators: - Emissions reduction; - Active mode encouragement; - Vehicle kilometres travelled reduction; - Walkable location Points are awarded by completing the Sustainability Impacts from Transport Calculator and required the development of a detailed Travel Plan. Any change between the Proposed and Reference scenarios must be supported with significant evidence base on building occupant surveys, evidence of staff living locations, evidence of staff commuter times, incentive programs related to use of public transport and working from home. **REQUIREMENT TO BE COMPLETED BY TRAFFIC CONSULTANT**	Traffic Consultant	Moderate	**10**		
	17B.1	Access by Public Transport	Up to 3 points are available based on the accessibility of the site by Public Transport. The score is calculated using the 'Access by Public Transport Calculator'.	Traffic Consultant	Not Targeted	**3**	**0**	
	17B.2	Reduced Car Parking Provision	0.5 points or 1 point is awarded where there is a reduction of car parking spaces for the proposed building when compared to the maximum rates allowed as determined by the Car Parking Accessibility Index (calculated automatically from the PT Accessibility Calculator). Where a building has multiple uses, a hybrid rate shall be determined based on the proportion attributable to each. Total building occupancy as defined by the Building Surveyor in accordance with the BCA. Projects in a campus style situation where multiple car parking facilities/spaces exist to service large number of buildings must demonstrate that the number of car parks within 800m of the site has not increased at a ratio higher than what is allowed by this credit to claim the point(s).	Architect/ Traffic Consultant	Not Targeted	**1**	**1**	
	Tra-17-B.3	Low Emission Vehicle Infrastructure	1 point is awarded where parking spaces and/or dedicated infrastructure is provided to support the uptake of low-emission vehicles. One of the following must be satisfied; a) 15% of parking is for fuel efficient vehicles (with a maximum of 5% for motorcycle parking); b) 5% of parking is for electric vehicles and charging infrastructure is provided for each space; c) Dedicated car share space(s) **AND** vehicle(s) are provided at the rate of 1 per 70 building occupants (Residential Class 1a & Class 2 only)	Architect, Electrical Engineer	Medium	**1**	**1**	**0**
	17B.4	Active Transport Facilities	1 point is awarded where bicycle parking and associated facilities are provided to a proportion of regular occupants and visitors in accordance with the outlined Green Star requirements. Facilities can be provided within the building's boundary or outside. Secure bicycle parking is defined as that which is in accordance with AS2890.3. End-of-Trip facilities are defined as showers, changing amenities with appropriate drying space and lockers. The design of EoT facilities must be appropriate to encourage their use. 7.5% of staff/regular occupants 5% Peak Visitors for Class 3 to 9, Class 9b tertiary education 10% of 75% of the total student capacity. 1.2 Locker Per Bicycle Space, Showers 8 Per first 500 + 2 per extra 250 occupants USE DESIGN OCCUPANCY	Architect/ Traffic Consultant	Not Targeted	**1**	**1**	
	17B.5	Walkable Neighbourhood	1 point is awarded where it is demonstrated that the building complies with one of the following requirements; a) 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. OR b) The project achieves a "Walk Score" of at least 70 for industrial buildings, or at least 80 for all other types of buildings, as determined using the website www.walkscore.com, using the 'Street Smart' method of calculation.	Traffic Consultant	High	**1**	**0**	**1**
WATER					**WAT**	**12**	**4**	**0**

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Potable Water	18A	Potable Water - Performance Pathway	Up to 12 points are available based the reduction in potable water consumption of the Proposed Building when compared to a Reference Building. This credit addresses potable water consumption from the use of sanitary fixtures, appliances, HVAC, irrigation systems and swimming pools. Compliance requirements and guidance for the modelled performance pathway is detailed in the Green Star Potable Water Calculator. WELS HAS BEEN ADJUSTED 4 STAR SHOWERS AND 6 STAR WC'S (VACUUM) ARE NOW AVAILABLE	Architects, Civil, Mechanical, Landscape, Fire, Hydraulics Consultants	Low	**12**	**0**	
	18B.1	Sanitary Fixture Efficiency	To ensure that all sanitary fixtures are within one star of the WELS rating as stated in Table 18B.1 of Green Star Taps / Urinals / Dishwashers=6 Stars Toilets / Clothes washing machines=5 Stars Showers=3 Star (>4.5 but <=6.0)	Architects, Hydraulics	Low	**1**	**1**	**0**
	18B.2	Rainwater Reuse	Rainwater tank must be installed to collect and reuse rainwater within the project's site boundary as deemed appropriate by the project team. The rainwater tank volume must meet the following criteria: GFA 2.500 (m2) ------ 25 (kL) GFA 5.000 (m2) ------ 50 (kL) GFA 10.000 (m2) ------ 100 (kL) GFA 20.000 (m2) ------ 200 (kL) Note that this table is an over-simplified sizing indication. Tanks should be sized based on the collection area, rainfall and the demands for rainwater use on the project	Hydraulics Consultant	Moderate (Design Evolution Required)	**1**	**1**	**0**
	18B.3	Heat Rejection	To comply, the project must be either naturally ventilated (allowing for use of ceiling fans or similar) or the HVAC system must not use water for heat rejection.	Mechanical Engineer	Low	**2**	**0**	**0**
	18B.4	Landscape Irrigation	Project must have either drip irrigation with moisture sensors override or where no potable water is used for irrigation.	Landscape Consultant	Moderate (Design Evolution Required)	**1**	**1**	
	18B.5	Fire System Test Water	1 point is awarded where one of the conditions are 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 calculated on the basis that any single zone is drained down annually. - If sprinkler systems are installed each floor must be fitted with isolation valves or shut-off points for floor-by-floor testing.	Fire Engineer	Low	**1**	**1**	
MATERIALS					**MAT**	**14**	**7**	**1**
Life Cycle Impacts	19.A.1	Comparative Life Cycle Assessment	Up to 6 points are available where Whole-of-Building (WoB) and Whole-of-Life (cradle to grave) Life Cycle Assessment (LCA) is conducted for the Proposed Building and a Reference Building. Points are awarded based on the extent of environmental impact reduction achieved against six environmental impact categories when compared to the Reference Building. ENERGY CONTRIBUTION IS CAPPED AT 3 POINTS OUT OF POSSIBLE 6	LCA Consultant, Architect / Structural Engineer	Moderate	**6**	**0**	
	19.A.2	Additional Life Cycle Impact Reporting	Up to 4 additional points are available where the LCA is used to inform the building's design process or as built outcome. Any combination of the below four initiatives may be targeted: - Additional life cycle impact reporting (Human Toxicity, Land Use, Resource Depletion - Water, Ionising Radiation, Particulate matter); - Material selection improvement; - Construction process improvement; or - LCA Design Review - Continuous design review: First Consideration CD, First Iteration, Subsequent iterations changes made reported to the design team, Minutes of design review meetings reflecting the intent of incorporation of LCA considerations..	LCA Consultant, Architect / Structural Engineer	Moderate	**4**	**0**	
	19.B.1.1	Portland Cement Reduction	Reduced use of Portland cement (1 point for 30%, 2 points for 40%) by mass.	Structural Engineer	Low	**2**	**1**	
	19.B.1.2	Water Reduction	0.5 point is available where the mix water for all concrete used in the project contains at least 50% captured or reclaimed water (measured across all concrete mixes in the project).	Structural Engineer	Low	**0.5**	**0.5**	
	19B.1.3	Aggregate Reduction	0.5 point is available where either: 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 use of such materials does not increase the use of Portland cement by over five kilograms per cubic meter of concrete; 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 meter of concrete.	Structural Engineer	Moderate	**0.5**	**0.5**	
	19.B.2A/B	Steel	For steel framed buildings, 1 point is available for reducing the mass of steel framing compared to standard practice. For concrete framed buildings, 1 point is available when there is a reduction in the mass of steel reinforcement used when compared to standard practice.	Structural Engineer	Moderate	**1**	**1**	

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	19.B.3.1	Building Reuse - Façade Reuse	Reuse of the building façade (1 point for 50% by area, 2 points for 80%)	Structural Engineer	Not Targeted	**2**	**0**	
	19.B.3.2	Building Reuse - Structure Reuse	Retaining of the Structure (1 point for 30% by mass, 2 points for 60%).	Structural Engineer	Not Targeted	**2**	**0**	
	19.B.4	Structural Timber	The minimum requirement is met where all structural timber used in the building is responsibly sourced. If the structural timber used represents less than 30% of the building's GFA, then the 'Life Cycle Impacts – Structural Timber' pathway (19B.4) cannot be targeted. FSC or PEFC certified. Up to 3 points are available where the building is constructed from the following proportion of structural timber: 1 point for 30% of the building's GFA; 2 points for 70% of the building's GFA; and 3 points for 90% of the building's GFA.	Structural Engineer	Not Targeted	**3**	**0**	
Responsible Building Materials	20.1	Responsible Steel Maker and Fabricator	1 point is awarded where; a) 95% of the building's steel is sourced from a Responsible Steel Maker (ISO14001 certified EMS for manufacturing facility AND the steelmaker is a member of the World Steel Association's Climate Action Programme); AND b1) For concrete framed building, at least 60% (by mass) of all reinforcing bar and mesh is produced using energy-reducing processes in its manufacture (measured by average mass by steel maker annually); OR b2) For steel-framed buildings, 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).	Structural Engineer	Low	**1**	**1**	
	20.2	Timber	1 point is awarded where at least 95% (by cost) of all timber used in the building and construction works are certified by a forest certification scheme that meets the GBCA's 'Essential" criteria for forest certification or is from a reused source.	Structural Engineer, Architect	Moderate	**1**	**1**	
	20.3	Cables, pipes, floors and blinds	1 point is awarded where 90% by cost of all cables, pipes, flooring and blinds in the project either; a) Do not contain PVC and have an Environmental Product Disclosure (EPD); OR b) Meet Best Practice Guidelines for PVC as per GBCA requirements.	Mechanical, Hydraulic, Civil, Electrical Engineers/ Architect	Low	**1**	**1**	
Sustainable Products	21.1	Sustainable Products	Up to 3 points are awarded when products meet transparency and sustainability requirements under any combination of the following categories; Reused Products, Recycled Content, Environmental Product Declarations, 3rd Party Certifications, or Stewardship Programs. Points are awarded on the basis of the Total Contract Value which is represented by product cost that satisfies the requirements. Awarded as follows; 1 point - 3.0% of contract value 2 points - 6.0% of contract value 3 points - 9.0% of contract value	Architect	High	**3**	**0**	**1**
Construction and Demolition Waste	22	Reduction of Construction and Demolition Waste	The minimum requirement is met where the waste contractors and waste processing facilities servicing the project demonstrate compliance with the Green Star Construction and Demolition Waste Reporting Criteria. 1 point is available where the construction waste going to landfill is reduced by: 22A - Minimizing the total amount of waste sent to landfill when compared against a typical building (>15kg/sqm 0 points, 12.5-15kg/sqm 0.5 points, <10kg/sqm 1 point); OR **22B - Diverting a significant proportion of waste (>90% of total) from going to landfill (1 point).**	Client/ Building Owner, Contractor	Moderate	**1**	**1**	
LAND USE AND ECOLOGY					**ECO**	**6**	**2**	**1**
Ecological Value	23.0	Endangered, Threatened or Vulnerable Species	MANDATORY REQUIREMENT: It must be demonstrated that no critically endangered, endangered or vulnerable species, or ecological communities were present on the site at the time of purchase.	Architect	Low	**-**	**Complies**	
	23.1	Ecological Value	Up to 3 points are awarded where the ecological value of the site is improved by the project. The number of points awarded is determined by the Green Star - Change of Ecological Value Calculator based on a comparison of the condition of the site before and after the project. (POINTS CHANGED IN V1.2) Improvement in Ecological Value — Points Achieved 0.01 — 1 0.10 — 2 0.20 — 3	Landscape Consultant / Ecologist	Moderate	**3**	**0**	
Sustainable Sites	24.0	Conditional Requirement	GREEN STAR CONDITIONAL REQUIREMENT: It must be demonstrated that at the date of site purchase or date of 'option contract', the project site did not include old growth forest, prime agricultural land, wetlands of 'High National Importance', or did not impact on 'Matters of National Significance'.	Client/Building Owner	Low	**-**	**Complies**	

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	24.1	Reuse of Land	1 point is awarded where at the date of site purchase, 75% of the site was previously developed; or If 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. Previously developed land: land that is or was occupied by a permanent structure, associated curtilage, road, car park or other hardstand. (Excluded: Land in built up areas which has not been previously developed, even if it contains certain urban features such as paths)	Architect	High	1	0	1
	24.2	Best Practice Site Remediation	1 point is awarded where the site, or an existing building, was previously contaminated and the site has been remediated in accordance with best practice remediation strategies.	Architect, Contractor	Medium	1	1	0
Heat Island Effect	25.1	Heat Island Effect Reduction	1 point is available if at least 75% of the whole site area comprises building or landscaping elements that reduce the impact of heat island effect. Solar Hot Water and Photovoltaic Panels features are to be excluded from the calculation of site area percentages for both compliant and noncompliant areas	Architect	Moderate	1	1	0
EMISSIONS					**EMI**	**5**	**4**	**0**
Stormwater	26.1	Peak Discharge To Stormwater	1 point is available where the post-development peak event discharge volume from the site does not exceed the pre-development peak event stormwater discharge using the Average Recurrence Interval (ARI) as defined by Green Star. NOTE - If Man-3.1 Climate Adaptation & Resilience credit is targeted, the risk assessment will impact the ARI used for this credit(1 ARI for low risk and 5 ARI for medium-high risk). If this credit is not targeted, the ARI to be used should be consistent with local requirements/guidelines.	Civil Engineer, Hydraulics Engineer	Low	1	1	
	26.2	Pollution Targets	PRE-REQUISITE CREDIT (PEAK DISCHARGE REQUIREMENT MUST BE MET): 1 point is awarded where it is demonstrated that all stormwater discharged from the site meets the Green Star stormwater "Pollution Reduction Targets A" or meet statutory requirements whichever is the higher level of filtration. INNOVATION points available for Table B/C adherence.	Civil Engineer, Hydraulics Engineer	Low	1	1	
Light Pollution	27.0	Light Pollution to Neighbouring Properties	MANDATORY CREDIT REQUIREMENT: It must be demonstrated that the project complies with AS 4282 'Control of the Obtrusive Effects of Outdoor Lighting'.	Electrical Engineer, Lighting, Architect	Low	-	**Complies**	
	27.1	Light Pollution to Night Sky	1 point is awarded where it is demonstrated that a specified reduction in light pollution has been achieved by the project, where either; a) the Upward Light Output Ratio (ULOR) is controlled OR b) Direct luminance is controlled.	Electrical Engineer. Lighting, Architect	Moderate	1	1	
Microbial Control	28.1	Microbial Control	1 point is awarded where one of the following is demonstrated; a) The project is naturally ventilated; b) The project is provided with waterless heat rejection; c) The project is provided with water-based heat rejection that is design and built in accordance with AS/NZS 3666.1:2011 and includes measures for Legionella control and Risk Management in accordance with Victorian Public Health & Wellbeing Act 2008.	Mechanical Engineer	Moderate	1	0	
Refrigerant Impacts	29.1	Refrigerant Impacts	1 point is awarded where one of the following requirements is satisfied: a) The combined Total System Direct Environmental Impact of systems containing refrigerants is less than 15; b) The Total System Direct Environmental Impact of systems containing refrigerants is between 15 and 35 ***AND a leak detection system is in place including an automated refrigerant recovery system capable of recovering over 95% (by weight) of refrigerant;*** c) All refrigerants in the project have an ODP of 0 AND GWP of 10 or less; d) No refrigerants are used within the project The Total System Direct Environmental Impact is calculated using the Impacts from Refrigerants Calculator'. Specific information is required on each piece of equipment which contains refrigerant including refrigerant ODP, refrigerant GWP, mass of refrigerant, leakage risks, charge efficiency (kg/kW) and equipment life.	Mechanical Engineer	Moderate	1	1	0
INNOVATION					**INN**	**10**	**4**	**6**

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Innovative Technology or Process	30.A	Innovative Technology or Process	Projects within the Schools Infrastructure NSW v1.3 Umbrella (GS-6039DA) may target one (1) point under credit criterion 30A Innovative Technology or Process for the Principal's Dashboard initiative. This dashboard allows the school Principal to track maintenance, energy, water and solar usage, and spend data against student numbers, GFA and other measures to compare asset performance on a monthly or annual basis against itself or other schools. It is expected that the Principal's Dashboard includes quarterly review and feedback cycles, that new modules are added as they are developed and that log-on rates, time spent on the site, click through (drill-down) rates, and email requests for additional information are monitored and tracked.	Architect, Client/Building Owner	Moderate			
	30.A	Thermal Comfort	Individual Comfort Control (UFAD or similar)	-	Not Targeted	**1**		
	15	INNOVATION: Innovative Technology or Process - Onsite Renewable Energy	Additional points are available on a continuous sliding scale for the installation of significant renewable energy generation systems which contribute 5% (1 point) to 10% (2 points maximum) of the Base Building energy demand.	-	Not Targeted	**2**		
	30.A	Greenhouse Gas Emissions	One (1) point is available where Building Integrated Photovoltaic (BIPV) systems contribute to the reduction of greenhouse gas emissions by at least 15%. This point can be awarded in addition to the 'Onsite Renewable Energy' points highlighted above	-	Not Targeted	**1**		
	30.A	INNOVATION: Innovation Challenge - Microbial Control in DHW	1 point is awarded where it is demonstrated that DHW systems have been designed to manage the risk of microbial contamination. Operational practices may be used, however the design of the system must also include features that facilitate the achievement of the credit.	-	Not Targeted	**1**		
	18a	INNOVATION: Innovative Technology or Process - Process Cooling Heat Rejection	An additional point is available where water use from process cooling in medical, laboratory or industrial equipment is at least 10% of the building's total water demand and either; a) 95% of the water requirement for once-through cooling systems is sourced from non-potable water; OR b) Once through cooling systems are avoided.	-	Not Targeted	**1**		
Market Transformation	30.B	Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world. The GBCA is more likely to award innovation points for projects that: - Increase the knowledge and capacity of the building industry; - Increase the knowledge of sustainable building practices in regional areas; - Change the regulatory environment; - Use technologies or strategies which, if adopted widely, would likely result in a significant reduction of impacts in the built environment.		Not Targeted			
	30.B	Greenhouse Gas Emissions - Passive Design	Projects that achieve more than 15 points through passive design or without energy generation or the purchase of offsets or Green Power in the 'Greenhouse Gas Emissions' credit can claim an innovation point.	-	Not Targeted	**1**		
	2.b	Soft Landings Framework	Soft Landings Framework. An additional 1 point is available where commissioning & tuning is undertaken in accordance with the BSRIA "Soft Landings Framework". This framework provides the structure "for project teams to stay engaged after practical completion, hand-holding the client during the first months of operation to fine-tune and de-bug systems and ensure the occupiers understand how to control and best use their new work environment. The Soft Landings process is designed to extend up to three years post-completion. The Soft Landings Framework includes procedures and example checklists which act as signposts for design teams to help end-users get to grips with their often unfamiliar and complex buildings. It allows for a full programme of post-occupancy evaluation that the project team can use to improve a building's performance and make it sustainable over the long term."	-	Not Targeted	**1**		
	20	INNOVATION: Market Transformation - DFMA/MMC	Projects within the Schools Infrastructure NSW v1.3 Umbrella (GS-6039DA) may target one (1) point under 30B Market Transformation in Green Star - Design & As Built for seeking to integrate sustainability in the approach 'Design for Manufacture and Assembly' (DfMA). It is recognised that sustainability is a key issue in the supply chain that can be addressed through DfMA. By analysing the lifecycle impacts, greenhouse gas emissions and energy analysis of prefabricated reusable building modules, the project team can help inform industry on the environmental performance of off-site constructed facilities	Client/Building Owner	Low	**1**		
Improving on Green Star Benchmarks	30.C	Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark (environment, social, economic). The following Innovation credits are specifically referenced in the Green Star DAB Submissions Guideline document;	-	Not Targeted			
	30.C	Greenhouse Gas Emissions - Building Air Permeability Rates	Requires Air Permeability Rate to complies with a lower maximum rate and a larger test areas applies.	Client/Building Owner	Not Targeted	**2**		
	30.C	Greenhouse Gas Emissions - Reference Building Pathway	On-site energy renewable systems produce 5% more energy than what is required by the building. Energy must be exported or stored on site. One (1) point is available for a 5% improvement, with a maximum of two (2) points available for a 10% improvement.	-	Not Targeted	**2**		
	30.C	Comparative Life Cycle Assessment	One (1) Innovation point is awarded where the cumulative impact reduction as defined within the credit is increased by 20% to a total of 150%. An additional 20% improvement is rewarded with a second point	-	Not Targeted	**2**		
	30.C	Product Transparency and Sustainability	One (1) Innovation point is awarded where the percentage of compliant products is increased by 3% to 12%. A further 3% improvement is rewarded with a second point.	-	Not Targeted	**2**		

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	30.C	Supplementary or Tenancy Fitout Review	One (1) Innovation point is awarded where the project team and building owners carry out a comprehensive services and maintainability review on Tenancy systems	-	Not Targeted	1		
		Improving on Green Star Benchmarks Ultra Low VOC Paints	One additional point is awarded where over 50% of paints (by cost) specified in the building have a maximum TVOC content of 5g/L, verified by one of the approved test methods.	Architect, Client/Building Owner	Low	1	1	
		INNOVATION: Improving on Green Star Benchmarks 15%Fuel Efficient Vehicles	Credit 17 requires **one** of the following: a) 15% of parking is for fuel efficient vehicles (with a maximum of 5% for motorcycle parking); b) 5% of parking is for electric vehicles and charging infrastructure is provided for each space; c) Dedicated car share space(s) AND vehicle(s) are provided at the rate of 1 per 70 building occupants (Residential Class 1a & Class 2 only), or d) no parking spaces provided	Architect, Client/Building Owner	Not Targeted	1		
		INNOVATION: Improving Green Star Benchmarks - Discharge to Sewer	An additional point is available where it is demonstrated that no less than a 90% reduction in flow to sewer is achieved as calculated using the Green Star Potable Water Calculator.	-	Not Targeted	1		
		Improving on Green Star Benchmarks Reduction of Construction Waste	1 additional point is available where the construction and demolition waste which is not recycled and directed to landfill is no greater than 5kg/m2 GFA.	Client/Building Owner, Contractor	Moderate	1		1
		Improving on Green Star Benchmarks Stormwater Pollution Targets	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 26.2.	Civil	Low	2	1	
Innovation Challenge		Carbon Neutral Buildings	An Innovation Challenge for projects seeking net zero emissions in scope 1, scope 2, and scope 3 is available for project teams. For more information, contact GBCA or check the Innovation section of our website.	-	Not Targeted	1		
		Culture, Heritage and Identity	Site/area of heritage value is preserved and/or refurbished and made visible/celebrated.	-	Not targeted	1		
		Reconciliation Action Plan	Organisations that take formal steps to provide opportunities for Aboriginal & Torres Strait Islander peoples. Building must play a key role in the RAP targets		Not targeted	1		
		Affordable Housing	Project contains mix and diversity of affordable houses Inc. incentive program for appliances.	-	Not Applicable	1		
		Environmental Product Declarations	4% of the project contract value is represented by materials with EPDs for 1 point and 8% for 2	-	Not targeted	1		
		Local Procurement 1	A percentage of the products/materials were from/made in Australia	-	Not Targeted	1		
		Local Procurement 2	A percentage of the labour and services by the building or fit out come from the local area.	-	Not Targeted	1		
		Community Benefits	Assess needs of community, develop strategy, implement plan and deliver specific outcomes. Projects within the Schools Infrastructure NSW v1.3 Umbrella (GS-6039DA) may target one (1) point under Innovation Challenge Community Benefits, using the Schools Infrastructure policy 'Community Use of School Facilities' and the 'Share Our Spaces' program guide in lieu of a Needs Analysis Report	Client/Building Owner, Architect	Low	1		
		Social Return on Investment	Analyse direct costs and benefits of project impact including productivity, health, crime etc.	-	Not targeted	1		
		Design for Active Living	Assess activities of >80% of building users and develop solutions to increase activity.	-	Not targeted	1		
		Marketing Excellence	Specific marketing drivers have been researched and a project specific strategy developed.	-	Not Targeted	1		
		Market Intelligence	Pre and post occupancy survey of building users - BOSSA or other is suitable.	-	Not Targeted	1		
		High performance site office	Site shed design complies with 75% of the requirements of the credit checklist.	-	Not Targeted	1		
		Integrating Health Environments	Projects within the Schools Infrastructure NSW v1.3 Umbrella (GS-6039P) may target one (1) point under Innovation Challenge Integrating Healthy Environments, providing the Healthy Canteen Policy research report in lieu of a community analysis report. Additionally, rather than providing a monitoring plan, Schools Infrastructure may focus on implementing the program in stages across all schools within NSW.	Client/Building Owner	Low	1		
		Improving on Green Star Benchmarks Indoor Pollutants - Mattresses (health and hospital projects only)	One point awarded where 95% of all mattresses that are to be supplied to the building meet the GreenGuard emission criteria for bedding.		Moderate	1	0	1
		Financial Transparency	Agree to complete the 'Financial Transparency Disclosure Template' that comprehensively itemises design, construction, documentation and project costs. In the case of building operations, the information provided will relate to the cost of collecting documentation, building operations and any building upgrades.	-	Low	1		0
		Innovation Challenge - Plants	One additional point is awarded where indoor plants are evenly distributed across the nominated area and are regularly maintained. One or more plants with a soil area of at least 500cm2 is required per 10m2 of nominated area. Small enclosed rooms of less than 10m2 must contain one plant.	-	Not targeted	1		

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		Reconciliation Action Plan	Reconciliation Action Plans provide a roadmap and targets for organisations to provide opportunities for Australia's First People and ensure Aboriginal and Torres Strait Islander culture is treasured as a part of Australia's everyday life. The project must play a central role in the delivery of the Reconciliation Action Plan.		Not targeted	1		
		Innovation Challenge - Water Sensitive Urban Design	Water Sensitive Urban Design (WSUD)	-	High	1		1
		Innovation Challenge Universal Design	Projects within the Schools Infrastructure NSW v1.3 Umbrella (GS-6039P) may target one (1) point under Innovation Challenge Universal Design, providing the Education Facilities Sustainable Guidelines (EFSG) in lieu of a needs analysis report. The GBCA acknowledges that the schools have been designed to ensure that students who have accessibility requirements have access to the everyday learning environment that all students have and are not separated from their peers.	Architect, Client/Building Owner	Low			
Global Sustainability Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star rating tools.		Global Sustainability Credit from GS Buildings	Exposure to Toxins - On Site Testing for VOC and Formaldehyde levels		Moderate	1		1
		Enjoyable Places Global Sustainability Credit from GS Buildings	The building delivers memorable, beautiful, vibrant communal or public places where people want to gather and participate in the community. The spaces are inclusive, safe, flexible, and enjoyable.		Not Targeted	1		
		Contribution to Place Global Sustainability Credit from GS Buildings	The building's design contributes to the liveability of the wider urban context and enhances the public realm. OR Independent reviews are held during the development of the design.		Not Targeted	1		
		Procurement and Workforce Inclusion Global Sustainability	The project implements a social procurement plan 2% of the project total contract value has been directed to generate employment for disadvantaged and under-represented groups		Not Targeted			
		Culture, Heritage and Identity Global Sustainability Credit from GS Buildings	Culture, Heritage and Identity The building's design reflects and celebrates local demographics and identities, the history of the place and any hidden or minority entities. Or, This outcome was arrived to through meaningful engagement with community groups early in the design process.		Low	1		1
		Circulation Network Part 1 Design aesthetic staircases	At least one staircase is open to regular occupants, services all floors of the project and is aesthetically designed through the inclusion of at least two independent strategies from the following list on each floor: (Music / Artwork / Light levels of at least 215 lux when in use / Daylight)		Low	1	1	
		Part 1 - L03 Circadian Lighting Design	In regularly occupied spaces, electric lighting is used to achieve light levels shown below as measured on the vertical plane at eye level of the occupant. (Between 9 a.m. and 1 p.m. and may be lowered after 8 p.m. at night. Option 1: At least 150 EML [136 melanopic equivalent daylight D65]		Moderate	1		1
		Part 1 Manage Pesticides	Pesticide minimization: One of the following requirements is met: a. Outdoor pesticide use is eliminated. b. Hazards associated with outdoor pesticide use are minimized through Pesticides Management plans and use of the least hazardous products.		low	1		
		Digital Infrastructure	Providing high-speed broadband using fixed wireless connectivity of speeds of 25-50Mbps/5-20Mbps. (Green Star Communities)		Low	1	1	
		Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star rating tools. Target 1 point from WELL Building Tool	Architect, Client/Building Owner	Low	1		
Global Sustainability	30.E	Global Sustainability	Projects within the Schools Infrastructure NSW Umbrella project GS-6039DA may target one (1) point under 30E Global Sustainability for Green Star- Communities v1.1 credit 3.1 Stakeholder Engagement Strategy using the SINSW Community Communications Strategy. The SINSW Community Communications Strategy has been assessed for alignment with the core principles of IAP2 and it is noted that although these are not explicitly referenced, the Strategy has been	Architect, Client/Building Owner	Low	1		