Sustainable Development Plan

Hastings Secondary College – Port Macquarie Campus

May 2021

JHA

CONSULTING ENGINEERS

This report is prepared for the nominated recipient only and relates to the specific scope of work and agreement between JHA and the client (the recipient). It is not to be used or relied upon by any third party for any purpose.

DOCUMENT CONTROL SHEET

Project Number	200360
Project Name	Hastings Secondary College – Port Macquarie Campus Schematic Design Report – Final Issue
Description	Sustainable Development Plan
Key Contact	Eddith Chu

Prepared By

Company	JHA
Address	Level 23, 101 Miller Street, North Sydney NSW 2060
Phone	61-2-9437 1000
Email	Eddith.Chu@jhaengineers.com.au
Website	www.jhaservices.com
Author	Eddith Chu
Checked	Lawrence Yu
Authorised	Stefan Takac

Revision History

Issued To	Revision and Date								
SINSW	REV	Draft	Draft V2	Draft V3					
C/- Currie & Brown	DATE	22/02/21	25/02/21	10/03/21					
SINSW – Final Schematic Design Submission	REV	Final v1	Final V2	Final V3					
	DATE	26/03/21	16/04/21	11/05/21					
	REV								
	DATE								

CONTENTS

1 EXECUTIVE SUMMARY

JHA Consulting Engineers has been commissioned by School Infrastructure NSW (SINSW) on behalf of the Department of Education (DOE) to prepare Sustainability Development Plan to accompany a State Significant Development Application (SSDA) to the NSW Department of Planning, Industry and Environment (DPIE) for proposed upgrades to Hastings Secondary College (Port Macquarie Campus), previously known as Port Macquarie High School.

Hastings Secondary College consists of two campuses, being Westport and Port Macquarie. This report has been prepared for proposed works at the Port Macquarie Campus, which consists of two properties, the main campus and the Ag Plot.

The works subject to this proposal are to be carried out on the main Port Macquarie campus which is located at 16 Owen Street, Port Macquarie (the site). The site has a secondary street frontage to Burrawan Street and adjoins Oxley Oval along the eastern boundary.

On 23 December 2020, the Secretary of the DPIE issued Secretary's Environmental Assessment Requirements (SEARs) for SSD Application No. 11920082. This report has been prepared in accordance with the SEARs requirements.

2 INTRODUCTION

2.1 PROPOSED DEVELOPMENT

- The upgrades will support high-quality educational outcomes to meet the needs of students within the local community and deliver innovative learning and teaching spaces as follows:
- Demolition works to accommodate new works;
- Upgrade to school entry;
- Construction of new two (2) storey Creative and Performing Arts (CAPA) building;
- Construction of new Police Citizens Youth Club (PCYC);
- Partial refurbishment of Building L;
- Refurbishment and alteration to Building B;
- Removal of Building S and demountable buildings;
- New lift connections, covered outdoor learning area (COLA) and covered walkways;
- Associated earthworks, landscaping, stormwater works, service upgrades; and
- Tree removal/ tree safety works.

No change to current staff or student numbers is proposed.

2.2 SITE LOCATION

The site is located approximately 1.2km south east of the Port Macquarie town centre, with access from Oxley Highway (Gordon Street) via Owen Street to the centre, William Street via Owen Street to the north and Burrawan Street via Owen Street to the south. A maintenance access road exists to the east of the site along Burrawan Street.

The site is located at 16 Owen Street, Port Macquarie and is legally known as Lot 111 in DP 1270315. The Port Macquarie Campus site is located within a coastal setting (east), with residential (single two storey and residential flat buildings) located to the west and south and Port Macquarie Bowling Club to the north. The surrounding street network provides on-street parking. Maintenance vehicular access is located off Burrawan Street.

No Natural watercourses are mapped as traversing the site. Scattered vegetation is located throughout the site, with a small area of vegetation concentrated towards the pedestrian access area.

The Port Macquarie Campus site is gently sloping downwards in three general 'platforms' towards the north, with distinct views out towards the ocean and the Hastings River. It also has a distinct view line to the row of Norfolk pine trees along the coastline. The siting of the campus provides many opportunities for ongoing cultural connection to Country. Current built form has an established language of two (2) story, face brick, low pitched metal roof buildings.

Figure 1 – Aerial photo of site

2.3 SUSTAINABLE DEVELOPMENT (SD) PLAN FRAMEWORK

This project is required to comply with the Secretary's Environmental Assessment Requirements (SEARs). The initiatives outlined within this report illustrate a pathway to demonstrate compliance with these requirements. However the ESD strategy will evolve and adapt over time as the design develops, and as such the assessed ESD credentials of the project may change.

The SEARs requirement include the following in relation to ESD:

"18. Ecologically Sustainable Development Report

Report prepared to detail how the proposal addresses the ESD principles under the EP&A Regulations and identifies the ESD initiatives incorporated into the proposed development.

The report must identify:

- How ESD principles (clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) would be incorporated in the design and ongoing operation phases of the development.
- Proposed measures to minimise consumption of resources, water (including water sensitive urban design) and energy.
- How the future development would be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact. This should be based on materiality assessment and include waste reduction design measures, future proofing, use of sustainable and low carbon materials, energy and water efficient design (including water sensitive urban design) and technology and use of renewable energy).
- How environmental design will be achieved in accordance with the GANSW Environmental Design in Schools Manual (GANSW, 2018).

The report must provide:

- An assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level.
- A statement regarding how the design of the development is responsive to the NARCliN projected impacts of climate change.
- An integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and non-potable water, and water sensitive urban design
- The following policy/policies and/ or guideline/ guidelines must be addressed in this deliverable:
- NSW and ACT Government Regional Climate Modelling (NARCliM) climate change projections.
- Plans and diagrams must include key dimensions, RLs, scale bar and north point."

The project will be targeting the following sustainability ratings, illustrating commitment to economic, social and environmental sustainability, alongside improved student/staff wellbeing and comfort:

- National Construction Code (NCC) Section J – Energy Efficiency Targets (i.e.: exceeding targets); and
- Achieve a certified 4 Star Green Star Design & As Built V1.3 rating

In addition, the project has included the design principles of the Educational Facilities Standards and Guidelines (EFSG) which is further detailed in Section 5 of this report. The EFSG is a suite of information to aid in the planning, design and use of NSW Department of Education school facilities.

The items listed above of the SEARS requirements are addressed in sections 3, 4, 5 & 6 and appendixes of this report respectively.

3 RESPONSE TO SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS (SEARS)

The principles of Secretary's Environmental Assessment Requirements as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 have been incorporated into the design and on-going operation phases of the development as follows:

3.1 THE PRECAUTIONARY PRINCIPLE

Namely, that 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. In the application of the precautionary principle, public and private decisions should be guided by:

(i) Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and;
(ii) An assessment of the risk-weighted consequences of various options.

PROJECT RESPONSE:

This development is being designed in accordance with a wide range of ESD goals that pertain to the design, construction and operational stages. The development team will ensure that the building minimises the impact on the environment in the areas of energy, water and materials. The design will incorporate high performance glazing and shading strategy, together with energy efficient appliances, water efficient fixtures and water conservation. In conjunction with the use of renewable energy which will together contributes to significant strides toward minimising climate change impacts.

In addition to the above a Risk Management Plan (RMP) will be undertaken to include the assessment of natural and urban hazards (e.g. flood, storm, heatwaves, bush fires, extreme storm and other weather events). Increasing resilience to natural hazards must be considered in the business case development so that associated costs are budgeted. (EFSG, DG02.08) With considering the NSW and ACT Government Regional Climate Modelling (NARCliM) climate change projections, there will be no significant temperature change for the proposed site with comparing the temperature of 1990 – 2009 to 2020-2079.

3.2 INTER-GENERATIONAL EQUITY

Namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

PROJECT RESPONSE:

This development will not cause any significant impact on the health, diversity and productivity of the environment and will provide a community benefit in the form of upgraded teaching, learning and working facilities. The project will contribute to a lively community environment and add architectural interest to the surrounding area.

Refer pto the Risk Management Plan for the details of climate risks identified for this project and the relative responses, actions and responsibilities for high and extreme risks identified. (EFSG, DG02.08)

3.3 CONSERVATION OF BIOLOGICAL DIVERSITY AND ECOLOGICAL INTEGRITY

Namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration

PROJECT RESPONSE:

An Assessment of the biodiversity values of the site, and the impact of the proposed development on these values has been carried out. The assessment finds that the proposed development will not impact significant, threatened or endangered flora and fauna.

3.4 IMPROVED VALUATION, PRICING AND INCENTIVE MECHANISMS

Namely, that environmental factors should be included in the valuation of assets and services, such as:

(i) Polluter pays, that is, 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.

PROJECT RESPONSE:

The design of this development has employed lifecycle costing to determine the optimum strategy with regards to major items of plant, with decisions being made based on whole of life costs rather than capital expenditure only.

The Whole of Life cost considerations will be followed along with consideration of: long-term maintenance, access, quality, life-span, multi-service integration and interface, innovation, future improvement, value of money and sustainability, ESD & Green Star. (EFSG, DG01.03)

Waste management plan will be implemented to cover the construction and demolition waste and operational waste. (EFSG, DG02.07)

3.5 OVERVIEW

Through the inclusion of the above and the sustainability initiatives outlined within this report the project clearly addresses the ESD Principles as defined in clause 7(4) of schedule 2 of the Environmental Planning and Assessment Regulation 2000. Further detail of the general sustainability initiatives are outlined in Section 4.

4 SUSTAINABLE DESIGN INITIATIVES

4.1 SUSTAINABILITY BENCHMARKING

In accordance with the NSW Resource Efficiency Policy all new facilities must be designed and built to exceed by 10% the reference building energy consumption as specified in National Construction Code (NCC) Section J deemed-to-satisfy provision.

The design team must include Ecologically Sustainable Development principles in new school buildings to a level that could achieve a 4 Star Green Star certified rating.

See also Section 5.9

4.2 ENVELOPE

Intelligent design and material selection ensure that thermal comfort is not entirely achieved by a mechanical means. Passive design initiatives such as performance glazing, shading and use of insulation will reduce demand on the mechanical air conditioning systems resulting in a reduction of energy consumption and greenhouse gas emissions.

4.2.1 Building Envelope Performance

The building fabric will be designed to meet or exceed the NCC 2019 requirements for building envelope. Thermal breaks will be incorporated into walls and roofs where appropriate.

4.2.1.1 Building Fabric

The preliminary minimum performance requirements obtained under JV3 provision for the development (Class 9b) at the proposed location (Climate Zone 5) as per the NCC 2019 Section J - Energy Efficiency are as per Section J report.

This will necessitate the use of insulation in the walls, floor and roof. Insulation reduces heat flow and consequent heat loss in winter and heat gain in summer. This minimises the heating and cooling load demand on the air conditioning systems.

Light coloured roof material is recommended to be used to reflect more sunlight and reduce summer heat gain.

4.2.1.2 Glazing

It is recommended that windows will be high performance glazing systems. Glazing is the majority source of heat transfer between internal conditioned spaces to the outside, the specification of glazing could impact directly to the heat gain in summer and heat loss in winter. Performance glazing substantially reduces heat transmission. This particularly reduces heat loss in winter; therefore, internal heat gain from equipment, lighting and people are better contained. Also, performance glazing absorbs the infrared portion of sunlight and reduces the amount of heat transferred into the conditioned space. This will correspond in a reduction of both heating and cooling loads.

The building will comply with NCC Section J Energy Efficiency by means of Performance Solution JV3 as appropriate. A preliminary assessment is done and result as per Section J report.

4.3 SHADING AND DAYLIGHTING

The proposed CAPA have been designed to have roof covered walkway and shaded balconey to the North. This will avoid the unwanted heat gains from the northern sun.

The provision of south facing glazing allows for increased natural daylight into the visual arts room whilst minimising unwanted passive solar heat gain. The large portion of north windows are shaded by roof eaves and sunlight screens that will reduce the amount of summer solar radiation through windows.

The proposed PCYC have been designed to have enclosed courts on the western part of the building with eave covered highlight windows only. The proposed window on east and west are less than 30% of the façade area and majorly to the court, the windows to the habitable rooms are minimal. These will avoid unwanted heat gain from the north, east and west sun.

The proposed building has sufficient glazing to the south which allows for natural daylight whilst minimising unwanted passive solar heat gain.

The proposed design for Block B are for internal changes only, no proposed work to the external façade.

The proposed refurbishment of Block L has been designed to allow more solar accesses to the lower ground level and no façade changes to the other level.

The provision of less glazing allows for minimising unwanted passive solar heat gain from the east and west. The all of east windows are shaded by roof eaves that will reduce the amount of summer solar radiation through windows.

These passive design features allow for enriched daylighting and greater access to external views for occupants. Additional daylighting reduces the reliance on artificial light and benefits alertness, mood and productivity. External views provide a connection to nature and the school setting and also help to create an environment constructive learning.

4.4 NATURAL VENTILATION

Adequate natural air movement makes an important contribution in creating a comfortable indoor environment and reducing the need for mechanical ventilation by carrying accumulated heat out and replacing it with cooler external air. This is important during the summer months where heat build-up within spaces can be quickly removed with the availability of suitable breeze at the site.

The design team proposed to utilise natural ventilation and air circulation through ceiling fans and openable windows.

4.5 ENERGY EFFICIENCY

Each climate zone under the Building Code has different design and conditioning requirements to minimise energy use for heating and cooling. Good balance of heating and cooling reduction techniques are required to create an energy efficient development.

4.5.1 HEATING, COOLING AND VENTILATION SYSTEMS

All habitable spaces of the proposed development are to be air conditioned. All rooms to be naturally ventilated. Mechanically assisted natural ventilation required to areas which do not comply with best design practices for natural ventilation.

All areas which are air conditioned will be heated with reverse cycle air conditioning and no gas or electric panel heaters will be used for the proposed development.

All bathroom, storage, and general exhaust to be naturally ventilated where possible, with mechanical ventilation required where necessary. Printing, storage, comms and cleaner room to be mechanically ventilated via in-line or roof mounted fans.

The air-conditioning and ventilation systems shall be designed to comply with, or exceed, the minimum requirements of NCC 2019 Section J5.

Ductwork and pipework systems will be designed to reduce system pressure losses to reduce fan and pump motor power. This includes the selection of equipment for reduced coil and vessel pressure drops and being generous with ductwork and pipework sizes to reduce friction losses.

These initiatives will provide significant savings in energy use.

4.5.2 LIGHTING

Lighting will be designed to comply with, or exceed the minimum requirements of NCC 2019 Section J6.

Fittings incorporating the latest lamp technologies will be installed to minimise energy use and provide efficient artificial lighting systems.

The proposed development shall be illuminated using LED fittings and be controlled via automatic control system.

Lighting in each learning area shall be provided with a daylight sensor to reduce light output or turn off lights when sufficient daylight is provided within the space. For large spaces the perimeter lighting shall be on a separate zone to make maximum use of daylight.

See also Section 5.3.1

4.5.3 CONTROLS

All new lighting and Heating, Ventilation and Air Conditioning (HVAC) installed will be controlled by time switch or motion sensor for energy conservation for:

- Workshop
- GLAs
- Office areas

A period bell alarm timer system shall be installed to control luminaires in appropriate rooms.

The automatic switching shall operate as per the EFSG requirements.

See also Section 5.3.2

4.5.4 ELECTRICITY METERING

Electricity metering and sub-metering shall be specified in accordance with the Green Star requirement for the CAPA and PCYC buildings and EFSG to monitor and manage electricity consumption for Block B & L.

4.5.5 PHOTOVOLTAICS

Collecting solar energy has been chosen as a key ESD strategy for the project, with an aspirational goal of reducing the building's energy consumption and greenhouse gas emissions from a renewable source via the provision of a roof-mounted photovoltaic system.

See also Section 5.3.4

4.5.6 VERTICAL TRANSPORT

The use of lifts within the development will be discouraged by providing visually prominent staircases for all floors.

4.6 INDOOR AIR QUALITY (IAQ)

The quality of indoor air has a significant impact on our health and environment. Poor indoor air quality can resulting in adverse health effect such as allergy, asthma, etc.

The outdoor air ventilation rates shall be in accordance with AS 1668.2 for mechanically ventilated spaces. Mechanical ventilation systems shall be linked to CO_2 sensors and designed to not exceed 1,500ppm for more than 20 consecutive minutes in each day.

Ventilation system shall be designed to minimise the entry of outdoor pollutants.

4.7 WATER CONSERVATION

The following initiatives are proposed to ensure that significant water savings be achieved.

4.7.1 Fittings and Fixtures

It is an EFSG requirement that all water fittings and fixtures such as showerheads, water tap outlets and toilet cisterns must have, or exceed, the following Australian Government's Water Efficiency Labelling Scheme (WELS) star ratings.

Water Fittings / fixtures	Minimum WELS Rating
Shower head rating	3.5 stars (>4.5 but <=6.0 l/min)
Toilets and urinals	4 stars
Washing machines	4.5 stars
Dishwashers	5 stars
Taps and flow controllers	5 stars

In addition:

- Flow restrictors can be used to minimise water usage and wastage for staff amenities.
- Taps with timed flow can be used to minimise water usage and wastage in student amenities.

See also Section 5.4.1

4.7.2 On-Site Alternative Water Supply

Rainwater tank will be installed on the site and the location will be shown on plan to reduce the demand on drinking water supplies, and will be connect to locally identified end use such as irrigation or toilet flushing system.

To manage the risk of contamination, tanks for drinking and non-drinking water use are to be designed and installed in accordance with HB 230 Rainwater Tank Design and Installation Handbook, Managing Urban Stormwater Harvesting and Reuse AS3500.

See also Section 5.4.2

4.7.3 METERING

Sub-metering shall be specified in accordance with the Green Star requirements for CAPA, PCYC and EFSG for Block B & L to mixed irrigation systems, laboratory buildings, amenities blocks, canteens and any other major water use on the site.

4.8 MATERIALS

4.8.1 LOW VOC / LOW FORMALDEHYDE MATERIALS

Adhesives, sealants, flooring and paint products will be selected to contain low or no Volatile Organic Compounds (VOCs) and all engineered wood products used in exposed or concealed applications are specified to contain low or no formaldehyde to avoid harmful emissions that can cause illness and discomfort for occupants.

See also 5.5.2

4.8.2 RECYCLED CONTENT

Loose furnishings within the building shall be selected based on their recycled content, end-of-life recyclability and product stewardship agreements. By selecting loose furnishings which comply with independent environmental

certification, for example *Eco specifier* or *Good Environmental Choice Australia*, the project will confidently reduce environmental impacts and waste from furnishings over the life of the building.

Steel and concrete will comply with Green Star requirements, pending feasibility.

- For steel frame buildings at least 60% of the fabricated structural steelwork shall be supplied by a steel fabricator/ contractor accredited to the Environmental Sustainability Charter of the Australian Steel institute (ASI).
- For concrete framed buildings at least 60% (by mass) of all reinforcing bar and mesh is produced using energy-reducing processes in its manufacture.

No rainforest timbers, or timbers from high conservation forests, are to be used unless plantation grown. Sustainable timber shall be specified for at least 95% (by cost) of all timber products used on the project. This can be achieved by using products certified by a forest certification scheme and from a reused source.

4.9 WASTE

Waste collection and disposal plays an important role in the protection of the environment and the health of the population in the urban areas.

A waste management plan is prepared in accordance with the EFSG requirements so that to assess and monitor the waste management process during construction and demolition, as well as waste produced during occupation within the development.

The waste management plan has incorporate how to minimise the amount of waste generated, maximise the reuse, recycling and reprocessing construction waste materials and minimise the volume to materials disposed to landfill. See also Section 5.7

4.10 WATER SENSITIVE URBAN DESIGN

External area design will implement best practice of water sensitive urban design, including permeable paving and indigenous low water usage plants to increase stormwater retention, decrease total suspended solids and mitigate the urban heat island effect. The carbon sequestration of the plants will also contribute to the combating of climate change contributions.

5 EFSG SUSTAINABILITY TARGETS

5.1 OVERVIEW

The Educational Facilities Standards and Guidelines (EFSG) have been developed by the NSW Department of Education, to assist the management, planning, design, construction and maintenance of new and refurbished school facilities. The EFSG is to be treated as a reference guide that provides a starting point to allow for a consistent standard of delivery across various types of school developments.

The EFSG Design Guide considers a framework incorporating several aspects of design including extensive Ecologically Sustainable Development (DG02) requirements. The following categories are covered within the EFSG DG02 Design Guide:

- NSW Government Resource Efficiency Policy
- Energy Conservation
- Water conservation
- Sustainable Materials
- Ecological Conservation
- Waste Management
- Climate Change Adaptation
- Sustainability Benchmarking

The proceeding sections outline how the project addresses each of the requirements of the EFSG DG02 Design guideline.

5.2 NSW GOVERNMENT RESOURCE EFFICIENCY POLICY

The purpose of the *NSW Government Resource Efficiency Policy* is to reduce NSW government agency operating costs by implementing resource efficiency measures, and its implementation is mandatory for all NSW Government agencies, including the Department of Education. The proposed project is targeting a 4 star Green Star Design & As-Built certified rating for the CAPA and PCYC buildings and the EFSG sustainability initiatives will be addressed for Block B & L.

5.3 ENERGY CONSERVATION

In accordance with the *NSW Government Resource Efficiency Policy* all new facilities must be designed and built so that energy consumption is predicted to be at least 10% lower than if built to minimum compliance with National Construction Code requirements. The energy consumption reduction must be achieved without including renewable energy generation in the calculation.

5.3.1 LIGHTING

Lighting will be designed to comply with or exceed the minimum requirements of NCC 2019 Section J6.

Fittings incorporating the latest lamp technologies will be installed to minimise energy use and provide efficient artificial lighting systems.

The proposed development shall be illuminated using LED fittings and be controlled via automatic control system.

Lighting in each learning area shall be provided with a daylight sensor to reduce light output or turn off lights when sufficient daylight is provided within the space. For large spaces the perimeter lighting shall be on a separate zone to make maximum use of daylight.

See also Section 4.5.2

5.3.2 LIGHTING AND HVAC CONTROLS

All new lighting and HVAC systems installed in schools must have timed or sensor feedback functionality for energy conservation.

See also Section 4.5.3

5.3.3 ENERGY EFFICIENT APPLIANCES AND EQUIPMENT

In accordance with the *NSW Government Resource Efficiency Policy*, all new electrical equipment for the proposed project will be at least 0.5 stars above the market average star rating. In categories where no star ratings are available, equipment purchased should be recognised as high efficiency either by being ENERGY STAR® accredited, in a high efficiency band under Australian Standards or being above-average efficiency of Greenhouse and Energy Minimum Standards (GEMS) registered products.

5.3.4 RENEWABLE ENERGY GENERATION

Collecting solar energy has been chosen as a key ESD strategy for the project, with an aspirational goal of reducing the building's energy consumption and greenhouse gas emissions from a renewable source via the provision of a roof-mounted photovoltaic system.

See also Section 4.5.5

5.4 WATER CONSERVATION

5.4.1 WATER EFFICIENT APPLIANCES

It is an EFSG requirement that all water fittings and fixtures such as showerheads, water tap outlets and toilet cisterns must have or exceed the following Australian Government's Water Efficiency Labelling Scheme (WELS) star ratings.

Water Fittings / Fixtures	Minimum WELS Rating
Shower head rating	3.5 stars (>4.5 but <=6.0 l/min)
Toilets and urinals	4 stars
Washing machines	4.5 stars
Dishwashers	5 stars
Taps and flow controllers	5 stars

In addition:

- Flow restrictors can be used to minimise water usage and wastage for staff amenities.
- Taps with timed flow can be used to minimise water usage and wastage in student amenities.

See also Section 4.7.1

5.4.2 ROOF WATER HARVESTING AND TANK STORAGE

Rainwater tanks will be installed on the site to reduce the demand on drinking water supplies, and will be connect to locally identified end use such as irrigation or toilet flushing system.

To manage the risk of contamination, tanks for drinking and non-drinking water use are to be designed and installed in accordance with HB 230 Rainwater Tank Design and Installation Handbook, Managing Urban Stormwater Harvesting and Reuse AS3500.

See also Section 4.7.2

5.4.3 STORMWATER MANAGEMENT

Stormwater management will be designed and aim to minimise the transportation of toxicants to waterways and other offsite environments, and maintain the existing hydrological regimes.

Refer to relevant local regulations for Stormwater pollution reduction targets.

Refer to DG95 Stormwater for further requirements on system design.

5.5 SUSTAINABLE MATERIALS

5.5.1 TIMBER

No rainforest timbers, or timbers from high conservation forests, are to be used for the proposed development. Use only recycled timber, engineered and glued timber composite products, or timber from plantations or from sustainably managed regrowth forests that is FSC, AFS or PEFC certified.

5.5.2 LOW VOC

Adhesives, sealants, flooring and paint products will be selected to contain low or no Volatile Organic Compounds (VOCs) and all engineered wood products used in exposed or concealed applications are specified to contain low or no formaldehyde to avoid harmful emissions that can cause illness and discomfort for occupants.

See also Section 4.8.1

5.5.3 PESTICIDES

It is proposed that no chemical pesticides and termiticide are to be used on site and this will be included in project Environmental Management Plan.

5.6 ECOLOGICAL CONSERVATION

This development is proposed on a previously developed school site.

An assessment of the biodiversity values of the site, and the impact of the purposed development on these values has been carried out. The assessment finds that the proposed development will not impact significant, threatened or endangered flora and fauna.

See also Section 3.3

5.7 WASTE MANAGEMENT

Waste collection and disposal plays an important role in the protection of the environment and the health of the population in urban areas.

A waste management plan is prepared in accordance with the EFSG requirements so that to assess and monitor the waste management process during construction and demolition, as well as waste produced during occupation within the development.

The waste management plan has incorporate how to minimise the amount of waste generated, maximise the reuse, recycling and reprocessing construction waste materials and minimise the volume to materials disposed to landfill.
See also Section 4.9

5.8 CLIMATE CHANGE ADAPTATION

This development will not cause any significant impact on the health, diversity and productivity of the environment and will provide a community benefit in the form of upgraded teaching, learning and working facilities. The project will contribute to a lively community environment and add architectural interest to the surrounding area.

Refer project RMP for the details of climate risks identified for this project and the relative responses, actions and responsibilities for high and extreme risks identified. (EFSG, DG02.08)

See also Section 3.2

5.9 SUSTAINABILITY BENCHMARKING

In accordance with the *NSW Resource Efficiency Policy* all new facilities must be designed and built to exceed by 10% the reference building energy consumption as specified in National Construction Code (NCC) Section J deemed-to-satisfy provision.

The design team must include Ecologically Sustainable Development principles in new school buildings to a level that could achieve a 4 Star Green Star certified rating.

See also Section 4.1

6 GREEN STAR DESIGN & AS BUILT (CAPA & PCYC BUILDIGNS ONLY)

Proposed development is targeting a formal certification of 4 Star Green Star rating for the new buildings only.

6.1 OVERVIEW

The Green star rating system is a comprehensive tool for assessing environmental performance of Australian buildings.

The Green Star framework incorporates ESD principles which are comprised of nine categories. Points are awarded across each category for credits that are incorporated into the project. The Design and As-built documentation is then verified through two rounds of independent assessments by the Green Building Council of Australia (GBCA). This section outlines Hastings Secondary College Port Macquarie Campus CAPA & PCYC building's strategy for achieving the principles of a formal certification 4 Star rating under the Green Star Design and As Built tool version 1.3.

6.2 THE GREEN STAR RATING SCALE

The Green Star rating is determined by comparing the percentage of available points achieved out for the total available points. The rating scale shown below details the percentage thresholds for the star ratings awarded.

% of available points	Rating	Outcome
Less than 10	Zero Star	Assessed
10 – 19	One Star	Minimum Practice
20 – 29	Two Star	Average Practice
30 – 44	Three Star	Good Practice
45 – 59	Four Star	Australian Best Practice
60 – 74	Five Star	Australian Excellence
75+	Six Star	World Leadership

Credit points available for proposed project (Both CAPA & PCYC):

Category	Total Points Targeted CAPA	Total Points Targeted PCYC
Management	14	14
Indoor Environment Quality	17	17
Energy	22	22
Transport	9	10
Water	12	12
Materials	14	14
Land Use & Ecology	6	6
Emissions	5	5
Innovation	10	10
Not Applicable	1	1
Total	99 points + 10 innovation	100 points + 10 innovation

6.3 GREEN STAR TARGETED CREDITS

Category	Total Points Targeted CAPA	Total Points Targeted PCYC
Management	13	13
Indoor Environment Quality	11	11
Energy	4	4
Transport	3	3
Water	4	4
Materials	7	7
Land Use & Ecology	2	2
Emissions	4	4
Innovation	2	1
Total	50 points	49 points
Project Score	50.5	49

7 APPENDIX A – EFSG SCHEDULE

PROJECT:		Hastings Secondary College Port Macquarie Campus				
Theme	Indicator	Sustainability initiatives / requirements from the EFSG This is an extract only from the relevant EFSG. For full requirements refer to https://efsg.det.nsw.edu.au/welcome	EFSG	EFSG type	Crossover with Green Star	Standard evidence to demonstrate compliance
Energy & carbon	EC1: Energy efficiency	**Improvement over NCC** All new facilities must be designed and built so that energy consumption is predicted to be at least 10% lower than if build to minimum compliance with National Construction Code requirements.The energy consumption reduction must be achieved without including renewable energy generation in the calculation.	DG02.03	Mandatory	DAB c15E.0 GHG Emissions Reduction - Conditional Requirement	1. Energy modelling report / Predictive energy modelling and thermal comfort assessment. Report needs to show at least 10% improvement of building over minimum NCC requirements; and 2. As-built evidence that model is an accurate representation of the building, e.g. drawings; and 3. Specifications / calculations supporting modelling inputs, e.g. window energy rating scheme certificates, calculated R-values of walls, roofs, etc. 4. As an alternative to 2 and 3 above, a Statement by energy modeller confirming that the moel accurately represents the building.
Energy & carbon	EC1: Energy efficiency	**Energy conservation** Design and construct all school buildings within the parameters specified in the: - NSW Public Works Energy Manual for Buildings - Building Code of Australia (BCA) Section J for Energy Efficiency The NSW Public Energy Manual for Buildings provides an energy-saving strategy by identifying aspects of the building and services where reductions in operating and maintenance costs can be made through proper selection of: - Building fabric - Insulation materials - Shading and ventilation - Services and control It also requires the formulation of an energy impact statement.	DG65.02	Mandatory	DAB c15 GHG Emissions Reduction	1) Section J report 2) Energy impact statement
Energy & carbon	EC1: Energy efficiency	**Daylighting** - Designers must seek to maximise natural daylight in all learning and administration spaces to reduce energy usage through windows and skylights - Including daylight sensors in rooms to reduce light output or turn off light when sufficient daylight is provided within the space - When the space is large and perimeter lighting is adjacent to windows, perimeter lighting is on a separate zone to make maximum use of daylight	DG2.3.1 DG12	Mandatory	DAB c15 GHG Emissions Reduction	1. Daylight modelling report demonstrating how natural daylight has been maximised in all habitable spaces; and 2. As built drawings demonstrating that the model accurately represents the building (i.e. window size and location; skylights installed, etc.); and 3. Specifications supporting inputs used in modelling (e.g. skylights and glass specs)
Energy & carbon	EC1: Energy efficiency	**Shading devices** On exposed facades subject to direct sunlight, external window shading has been considered as part of the building design	DG2.3.1	Mandatory	DAB c15 GHG Emissions Reduction	1. As built drawings
Energy & carbon	EC1: Energy efficiency	**Lighting energy conservation** Lighting system must have timed or sensor feedback functionality for energy conservation	DG2.3.2	Mandatory	DAB c15 GHG Emissions Reduction	1. As built mechanical drawings / statement from head contractor
Energy & carbon	EC1: Energy efficiency	**Energy efficient lighting** - LED lighting must be installed - The design of the lighting systems and the selection of fittings is to be undertaken based on a Whole of Life approach - System must support sustainable design principles including reducing energy consumption - Use light sources lamps and control gear with a long life	DG2.3.1 SG63.01	Mandatory	DAB c15 GHG Emissions Reduction	1. As built electrical drawings
Energy & carbon	EC1: Energy efficiency	**Maximum illumination power densities** Section J part 6 of the National Construction Code provides tables that define the maximum illumination power density that is acceptable in various locations. This, and all other elements of Section J part 6 should be applied appropriately.	DG63.05.01	Mandatory	DAB c15 GHG Emissions Reduction	1) Lighting drawings 2) Lighting specifications / schedules 3) Lighting modelling report showing compliant power densities
Energy & carbon	EC1: Energy efficiency	**Lighting control** The required communication protocol for the luminaires is DALI. The following systems for the control of luminaires fitted with DALI control gear are considered acceptable: - Diginet Rapix suite of products. - Clipsal C-bus suite of products - Philips Dynalite suite of products - KNX based systems Systems must be designed to be as simple as possible. This simplicity must extend from the topography to ease of use. It is a specific requirement that programming of any control system must be relatively simple and not limited to costly specialist consultants. Allowances should be made in system design specifications for user group training of control systems and for the programming of the system as part of the commissioning and hand over process. All equipment and manuals necessary to operate and maintain the system must be provided to the school and Asset Management	DG63.06.01	Mandatory	DAB c15 GHG Emissions Reduction DAB c4 Building Information	1) Commissioning report 2) Confirmation from AMU that all relevant manuals have been handed over
Energy & carbon	EC1: Energy efficiency	**Constant light output / Daylighting** -Constant Light Output (CLO) systems consisting of dimming luminaires and light level sensors are highly recommended as they are effective in maintaining the required illuminance values. CLO systems ensure that the lit environment remains compliant at the lowest possible Watts per square metre for the reasonable operating life of the luminaires. Maintained illuminance values required for design compliance will result in areas being over-lit for a large proportion of their operating life without a CLO system. - Sensors can be fitted to each luminaire or by utilising sensors that control groups of luminaires. - Once in operation a CLO system delivers compliant light levels over the life of a system by reducing the light through dimming and ramping the levels up over the lifespan of the luminaire. These systems should be seamless and invisible in operation to users of the locations. - Daylight Harvesting can be delivered as a component of a CLO system and requires no additional hardware above and beyond that required for a CLO to operate. - Daylight harvesting is recommended in areas where there is a rapid transition from natural day light to a dark environment, such as when entering a multi deck or underground car park from a street in full daylight, or in a classroom where daylight from windows is within the field of view.	DG63.06.02 DG63.06.03	Mandatory	DAB c15 GHG Emissions Reduction	1) Lighting drawings 2) Lighting modelling report showing compliant power densities
Energy & carbon	EC1: Energy efficiency	**Switching strategy** - Local switching should be provided where it is identified that the users can benefit from manual operation of the lighting and other lighting automation technology is considered cost prohibitive. The switching should be clearly marked and robust. - Achieve energy efficient switching in Schools by: The use of multiple switching groups Automatic control of these groups to operate as follows: Controlled luminaires are to automatically turn-off nominally 3 minutes after the bell sounds. Turn-off is to be in two steps other than in small rooms, one step after 3 minutes and the second group 2 minutes later (5 min). If the lighting is required for the next period, occupants of that room can prevent the lights turning off by pressing the ON switch/es after the bell sounds. The luminaires in each room can be turned off at any time by pressing the OFF switch/es. The off signal is to be capable of transmission at the end of normal school hours or at other selected times without the bells sounding, with the lighting turning off in two steps (other	DG63.07 DG65.03.01	Negotiable / TBC	DAB c15 GHG Emissions Reduction	1) Electrical & lighting drawings showing switching groups and automatic controls
Energy & carbon	EC1: Energy efficiency	**Energy efficient HVAC system** HVAC system must have timed or sensor feedback functionality for energy conservation Systems shall be designed to minimise energy consumption. System design / equipment selection is to be based on whole of life cost analysis. Specifically air conditioning equipment should: - support sustainable design principles including reducing energy consumption; and - be easily accessible and serviceable – easy to maintain with minimal impact on school operations / activities when maintenance is being performed. All new school buildings are to be designed to meet or exceed the requirements of building regulations for conditioned spaces	DG2.3.2 DG55 DG16.09	Mandatory	DAB c15 GHG Emissions Reduction	1. As built mechanical drawings / statement from head contractor; 2. Whole of life cost analysis demonstrating systems were selected based on WOL performance.

Energy & carbon	EC1: Energy efficiency	**Energy efficient appliances & equipment** Electrical equipment must be at least 0.5 stars above the market average star rating or comply with high efficiency standards specified in the GREP	DG2.3.3	Mandatory	DAB c15 GHG Emissions Reduction	1. Schedule of appliances and equipment with their star ratings or performance standards, signed by head contractor or architect. All appliances and equipment required in the GREP must be listed, incl air conditioning equipment, electric motors, transformers, etc.
Energy & carbon	EC1: Energy efficiency	**Heat loss/gain** Building/HVAC design must consider: - Climate/ micro-climate: This data must come from the current AIRAH handbook and where a specific area is not referenced in the handbook, the Bureau of Meteorology statistics must be utilised. - Orientation: exposure to sun(solar) and wind - Natural Ventilation and cross ventilation - Insulation, thermal capacity and time lag of building fabric. - Energy and Resources Cost: Initial and on-going, of heating and cooling. Reduced energy consumption provides future cost savings and a reduced carbon footprint. - Activities / Equipment that may produce excess heat. Energy modelling software must be used to determine heating and cooling loads as part of the Whole of Life analysis that must be undertaken. (i.e. Camel or Carrier).	DG04.01	Mandatory	DAB c15 GHG Emissions Reduction	1. Thermal modelling report 2. As built evidence demonstrating that model is an accurate representation of the building 3. Specifications/ calculations supporting modelling inputs
Energy & carbon	EC1: Energy efficiency	**Passive design** The need for active cooling and heating shall be minimised by employing passive / sustainable design principles. Windows: The size and proportions of windows need to be carefully considered in the design to provide maximum efficiency and a balance between the ESD factors such as; maximising daylight in rooms but avoiding unnecessary solar heat gain and thermal loss etc. Roofing: The colour selected will have an impact on the thermal performance. Light colours will reflect more of the sun's heat and darker colours absorb more of the sun's heat, which will be transferred into the roof structure. Unless prevented by glare issues to surrounding development, light colours must be selected to reduce the thermal load from solar heating and contribute to heat island effect mitigation. Orientation (as close to True North as possible). With appropriate shading, this will provide a balanced approach to reducing summer heat ingress and encouraging solar warmth during winter. Appropriate glazing/ shading strategy (related to orientation and local environment), Depending on the climate, windows would be minimised on southern, eastern & western elevations with external shading on western and eastern facades). Use of thermal mass (to stabilise internal temperatures). Insulation: maximise insulation in line with	DG55 DG06.02 DG27.12	Mandatory / Recommended	DAB c15 GHG Emissions Reduction	1. Thermal modelling report 2. As built evidence demonstrating measures implemented to reduce need for active cooling / heating 3. Passive design report by Architect listing all passive design initiatives implemented
Energy & carbon	EC1: Energy efficiency	**Ventilation strategy** A ventilation strategy must be developed to ensure that sufficient ventilation is provided to all spaces to meet the requirements of the BCA/NCC and associated standards. Specifically ventilation equipment must be designed from a whole-of-life perspective and: - Enable healthy learning environments with indoor air quality (IAQ) that supports learning and teaching (i.e. IAQ that is fit for purpose for schools) - Support sustainable design principles including reducing energy consumption - Be accessible and serviceable - easy to maintain with minimal impact on school use when maintenance is being performed	DG57.01	Mandatory	DAB c15 GHG Emissions Reduction	1) Cooling system strategy including WOL analysis 2) Concept plans 3) Construction drawings 4) Trade-based specification 5) As built drawings
Energy & carbon	EC1: Energy efficiency	**Natural ventilation** - Is required to all classrooms for comfort in summer and to maintain a healthy indoor environment. - Where cross ventilation may be restricted (i.e. where rooms are located on each side of a corridor, at least one whole wall of operable windows plus ceiling fans are required, to provide air movement. - Some windows need to be operable in driving rain and so must be protected with appropriately designed weather hoods, eaves overhang or other method of protection.	DG05.01	Mandatory	DAB c15 GHG Emissions Reduction	As built drawings demonstrating windows have been installed as required.
Energy & carbon	EC1: Energy efficiency	**Mechanically assisted cross-ventilation** In two storey blocks where cross flow ventilation is not possible to the lower floor, mechanically assisted cross ventilation is to be provided to the lower floor learning spaces nominated in the EFSG. The ventilation system is to be sized to provide at least 7 air changes per hour. The system is to be thermostatically controlled to activate when room temperature exceeds 28 deg C and is to run continuously until the room temperature drops below 27 deg C. Additionally the system is not to be activated unless the outdoor temperature is lower than the indoor temperature and is to be immediately de-activated as soon as the outdoor temperature exceeds indoor air temperature. Provide programmable seven-day time clock and 0-2 hrs adjustable after-hour timer to control each mechanically assisted exhaust ventilation system.	DG57.18	Mandatory	DAB c15 GHG Emissions Reduction	As built mechanical drawings and specifications Extracts from commissioning report
Energy & carbon	EC1: Energy efficiency	**Ceiling void ventilation** Provide ventilation so as to remove hot air build-up in large enclosed roof spaces. Roof mounted turbo ventilators are an approved method. - The size and number of ventilators to be included will depend upon the volume and use of the individual rooms and the local climatic conditions to provide suitable air changes and room cross ventilation. - Provide a minimum of two roof ventilators to each Secondary General Learning Space or a Primary Home Base unless otherwise directed, or other number recommended by the manufacturer for the size of the space (whichever is the greater). - Ventilator throat diameter to be no less than 400mm.	DG05.02 DG37	Mandatory	DAB c15 GHG Emissions Reduction	As built mechanical drawings demonstrating ventilation has been installed as required.
Energy & carbon	EC1: Energy efficiency	**Roof ventilator control** Provide controls for the operation of the motorised dampers on the roof ventilators. Generally one switch is required for each space within the school where roof ventilators are installed	DG65.16	Mandatory	DAB c15 GHG Emissions Reduction	Mechanical / electrical drawings showing controls
Energy & carbon	EC1: Energy efficiency	**Wind powered roof ventilators** School buildings can use wind powered roof ventilators with dampers to provide effective summer ventilation. Design to suit local ambient climatic conditions to ensure correct sizes, locations and numbers are provided for each particular application. Co-ordinate the locations of ventilators with the ceiling fans to achieve effective air movement. Fan assisted ventilators should also be considered on days of low wind Provide a wall mounted switch to open /close the damper.	DG57.14	Mandatory	DAB c15 GHG Emissions Reduction	As built mechanical drawings showing location of roof ventilators if installed
Energy & carbon	EC1: Energy efficiency	**Ventilation in sanitary spaces** - Greater air circulation than that required by building regulations is required, with sufficient natural ventilation or mechanical ventilation, to disperse odours and /or humidity. - Cross ventilation is to be used where possible. - Provide mechanical ventilation to all Disabled Toilets. - Operate the system by time control equipment (time switches or run-on timers as appropriate).	DG05.04 DG57.16	Mandatory	DAB c15 GHG Emissions Reduction	As built mechanical drawings demonstrating ventilation has been installed as required.
Energy & carbon	EC1: Energy efficiency	**Ventilation in storage spaces** - Permanent air ventilation openings are to be provided (without compromising security), to prevent concentration of odours.	DG05.05	Mandatory	DAB c15 GHG Emissions Reduction	As built mechanical drawings demonstrating ventilation has been installed as required.
Energy & carbon	EC1: Energy efficiency	**Ventilation in permanent learning spaces and libraries** Where feasible / practical: - Ceiling fans shall be installed where ceiling height is equal to or greater than 2,700mm. - Wall fans shall be installed where ceiling heights are less than 2,700mm	DG55	Mandatory	DAB c15 GHG Emissions Reduction	As built drawings demonstrating ceiling/wall fans have been installed as required.

Energy & carbon	EC1: Energy efficiency	**Indoor environment controls** - Both the thermal comfort and indoor air quality shall be controlled automatically within specified parameters. - Controls shall be simple and intuitive to use. - A prominent green light shall highlight to occupants when conditions are suited to opening windows and doors to utilise natural ventilation. - A prominent blue light shall highlight to occupants when the air conditioning is operating. - The lights shall be clearly labelled with trafolyte labels as follows: + Green light – "External conditions are suited to opening windows and doors" + Blue light – "Air conditioning is operating. Windows and doors should be closed" - Temperature and CO2 sensors are to be installed within the space and be readily accessible for maintenance. - Sensors must be located so as to accurately record the actual room temperature and indoor air quality (CO2). - Controls shall be designed to minimise energy consumption – e.g.: by minimising over cooling and heating and automatically switching off when the space is unoccupied. - Controls shall be designed so that the system/s will shut down automatically if a room is unoccupied for greater than 10 minutes (except in specific cases such as designated computer rooms). - Controls shall be properly labelled and suitably located in the space (preferably near the light switch) and incorporate: + a key operated auto / manual / off switch; and + a push on / push off adjustable hour run timer. The run timer shall be adjustable from 1 to 4 hours and initially be set at 2 hours	DG55	Mandatory	DAB c15 GHG Emissions Reduction	1) As built evidence demonstrating controls have been installed as required. 2) Commissioning report / statement by head contractor confirming controls have been set as required
Energy & carbon	EC1: Energy efficiency	**Access for maintenance** All systems and equipment that is installed within a school is to be provided with suitable access to ensure that this equipment is safely and efficiently maintainable. In order to ensure that maintenance is available, on the completion of all buildings, drawings are to be provided showing the completed (As Built) building including all equipment and equipment access arrangements. **Communication services** DoE requires a 4 hour on-site training session for up to four persons on the use of the SCS. Training is to be accompanied by appropriate documentation and a video that demonstrates operation of the system and its components, including patching, cable management for voice, video and data of the SCS installed on site. Include explanation of detailed drawings left on site. The video / CD ROM may be generated from the on-site training for future use by DoE school staff. The Project Manager will, in consultation with the School Principal, nominate the timing of this session together with the number of attendees. Manuals are to be handed to the school during the training session. Include in copies of all cabling test reports and the (minimum) 20-year warranty certificate the manual. As built documentation and manufacturers warranty and test results are required **Building user's guide** Produce a Building User's Guide to enable the client to understand the building systems and operate systems to maximise efficiency. This must: - Clearly and concisely describe the operation of building and its services - Detail a reasonable maintenance program	DG16.10 DG64.10 DG65.02	Mandatory	DAB c4 Building Information	1) As built drawings including all equipment access arrangements for maintenance 2) Training records 3) Operation manuals 4) Manufacturers warranties and cabling test reports 5) Building user's guide
Energy & carbon	EC2: Scope 1 & 2 emissions	**Renewable energy** A grid connected solar PV system must be installed in line with DG66 requirements Where feasible, PV systems shall be installed to offset as much of the electricity consumed by the school as is practicable	DG2.3.4 DG55	Mandatory	Emissions Reduction; DAB c16 Peak Electricity Demand	1) As installed drawings of PV system 2) Energy modelling report showing renewable energy generation
Energy & carbon	EC2: Scope 1 & 2 emissions	**Energy storage** Battery used as energy storage of grid or solar energy may be used for grid forming, grid support, peak-demand management and load shifting, and self-consumption of renewable electricity. Energy storage is substantiated when: - there is historical evidence of grid outages and a need for backup power; - there are critical loads which require an uninterruptible power supply or backup power supply; - It is economical for energy storage systems to supplement or replace an existing backup generator (financial assessment required); - the DNSP requires that the energy storage be implemented; - The financial benefit of the system outweighs the cost of the system. This can be demonstrated by calculating and showing that the Levelised Cost of Electricity (LCOE) from a battery energy system with a certain operation regime is less than the retail tariff rate experienced at the site, or by showing that the BESS can reduce energy cost at the site and	DG66.8.3	Mandatory	DAB c15 GHG Emissions Reduction; DAB c16 Peak Electricity Demand Reduction	1) As installed drawings of battery storage system
Energy & carbon	EC2: Scope 1 & 2 emissions	**Heaters** Electric heating must be preferred over gas heating. Where gas heating is considered, it must be approved by SINSW Sustainability Heating equipment must be designed from a whole-of life perspective and: - Support sustainable design principles including reducing energy consumption and carbon emissions - Be accessible and serviceable - easy to maintain with minimal impact on school use when maintenance is being performed	DG56	Mandatory	DAB c15 GHG Emissions Reduction	1) If reverse cycle air conditioning is installed, confirmation that gas heaters are not installed, OR 2) Evidence that the gas heaters installed are energy efficient
Energy & carbon	EC2: Scope 1 & 2 emissions	**Water heaters** - Hot water and tempered water generation for schools must be carefully considered to ensure that a Whole of Life assessment is undertaken to minimise life cycle costs and carbon emissions - Environmentally friendly options such as solar heating (if vandal resistant) and heat pumps are preferred energy sources to minimise energy consumption.	DG53.09	Mandatory	DAB c15 GHG Emissions Reduction	1. WOL cost assessment for hot water systems 2. Hydraulic drawings/schematics showing installed DHW systems
Energy & carbon	EC3: Scope 3 emissions	Transport plan	N/A	N/A	DAB c17 Sustainable Transport	
Energy & carbon	EC3: Scope 3 emissions	**Bicycle storage** Provide 1 space for every 20 students to AS2890.3 standard	SG552 4.36	TBC	DAB c17 Sustainable Transport	
Water	W1: Water use efficiency	**Potable water conservation** WATER CONSERVATION STRATEGIES must be implemented on school sites, including: Manual Flush Urinal Systems: New and replacement urinals must use manual in lieu of automatic flushing mechanisms. A microwave-activated urinal flushing system may be used as an alternative. Water Conserving Taps: Use metal flow control valves and /or push down taps with pre set flow limits. All new water-using appliances must be at least 0.5 stars above the average Water Efficiency Labelling and Standards (WELS) star rating by product type, except toilets and urinals, which must be purchased at the average WELS star rating. Refer to DG53.02 for specific rating requirements. Harvest Rainwater: Where practical, harvest roof water and connect to a pumped rainwater supply system to authorities' requirements for landscaped areas and toilet flushing	DG53	Mandatory	DAB c18 Potable Water	1. Schedule of fixtures and fittings showing type of urinals and taps installed are as required
Water	W1: Water use efficiency	**Fixture efficiency** All products must be rated to AS 6400 to the following minimum WELS ratings: - Tapware to 5 star flow rating requirements - Showers to have 3 star flow rating requirements - Water Closet Pans to 4 star flow rating requirements - Flow restrictors can be used to minimise water usage and wastage for staff amenities - Taps with timed flow can be used to minimise water usage and wastage in student amenities. In any case, all new water-using appliances must be at least 0.5 stars above the average WELS star rating by product type, except toilets and urinals, which must be purchased at the average WELS star rating. Where WELS rating is not available, use the alternative WaterMark rating scheme.	DG53.02 DG2.4.1	Mandatory	DAB c18B.1 Potable Water - Sanitary Fixture Efficiency	1. Schedules of materials, fixtures, fittings and equipment with WELS/WaterMark ratings, demonstrating compliance and identifying those with flow restrictors and timed flow.

Water	W1: Water use efficiency	**Hydraulic services** Hydraulic services should: - Support sustainable design principles including reducing water consumption and waste production. - Appropriately treat any trade waste to ensure minimal environmental impact - Be accessible and serviceable - easy to maintain with minimal impact on school use when maintenance is being performed - Use products with a long life span – many hydraulic services are concealed so durability is essential	DG51.01	Mandatory	DAB c18 Potable Water	1) Hydraulic report showing sustainability initiatives implemented to reduce potable water consumption 2) As built drawings showing trade waste arrestors
Water	W1: Water use efficiency	**Water sub-metering** In addition to the main water meter for the site provide sub meters for the following: - Mixed irrigation systems - Laboratory buildings - Amenities blocks - Canteens - Any other major water use on the site	DG53.04	Mandatory		1) As built hydraulic drawings
Water	W2 – Proportion of potable vs non-potable water	**Rainwater collection** It is DoE policy to include roof water harvesting and tank storage in new schools and to encourage it where practical in existing schools, to reduce the demand on drinking water supplies. Tank water can connect to drip irrigation systems for adjacent landscape/gardens with the major preference being for gravity fed supply to minimise ongoing maintenance.	DG53.14 DG2.4.2 DG53.01	Mandatory	DAB c18B.2 Rainwater Reuse	1) As built hydraulic drawings showing tank connection to end uses and capacity
Water	W2 – Proportion of potable vs non-potable water	**Fire system water reuse** Where schools are required to install a sprinkler system for fire safety, it is recommended to install a closed loop system must be installed to capture and reuse fire systems testing and maintenance water, or by useing an alternative non-potable water source.	DG2.4.2	Optional	DAB c18B.5 Fire System Test Water	Fire engineering report
Water	W2 – Proportion of potable vs non-potable water	**Ground water** Where ground water is available for use for irrigation purposes in drought affected locations, enquiries must be undertaken with the Department of Planning, Industry and Environment to determine the suitability of a ground water system.	DG53.03	Mandatory	DAB c18 Potable Water	1. Relevant due diligence report / investigation
Water	W3 – Responsible water discharge	**Stormwater management** Must aim to minimise the transportation of toxicants to waterways and other offsite environments, and maintain the existing hydrological regimes. Due diligence for flooding must be done early to inform building and landscaping design	DG2.4.3	Mandatory	DAB c26 Stormwater	Stormwater modelling report showing stormwater pollution and flows. Civil / Hydraulic drawings showing management measures. Water sensitive urban design report (if WSUD was use4)
Water	W3 – Responsible water discharge	**Trade waste** Arrestors for acid, grease, plaster and clay of adequate capacity must be installed to treat wastewater from science laboratories, kitchens, art rooms and canteens as required in DG52.	DG52	Mandatory	Not covered in Green Star	1) As built drawings showing trade waste arrestors or 2) Letter by Hydraulic Engineer confirming arrestor have been installed as required
Waste & materials	WM1: Materials selection and use	**Life cycle assessment (environmental)** Environmental impacts of products and materials has been assessed and inform material selection	DG01.03	Recommended	DAB c19A - Life cycle assessment	Life cycle assessment report
Waste & materials	WM1: Materials selection and use	**Whole of life costing (WOL)** Total cost of ownership (TCO) assessment / Analysis of direct and indirect costs and benefits / Life cycle costing analysis When calculating the whole of life cost for the different materials / building elements or systems, the following must be considered: - the total initial capital cost of the system/s – including design, project management, builder and building services works in connections etc. - resources (energy and where applicable water) consumption. - Maintenance. - the replacement of component parts. - disposal costs - ecological sustainable options - durability - vandalism - safety The whole of life cost shall be calculated over the estimated life of the asset/s.	DG01 All design guides for selection of materials and building systems	Recommended	GSC c20 - Return on Investment	Life cycle costing report for relevant system
Waste & materials	WM1: Materials selection and use	**Sustainable materials** Construction materials must be selected based on the following: - Adequately and economically perform their intended functions, and also have lower adverse environmental impacts throughout their life cycle (refer to DG 3) - Contain reduced or no hazardous substances (e.g. low VOC) to ensure effective indoor environmental quality. Reduce the demand for rare or non-renewable resources. - Have low embodied energy and water. - Are made from or contain recycled materials or can be reused or recycled at the end of their useful life.	DG02.05	Optional	DAB c21 Sustainable Products	Environmental Product Declarations of products / materials used; Product certificates (like GECA, FSC, et3) Suppliers' declarations confirming recycled contents in products Bill of quantities
Waste & materials	WM1: Materials selection and use	**Sustainable timber** - No rainforest timbers, or timbers from high conservation forests, are to be used unless plantation grown. Use only recycled timber, engineered and glued timber composite products, or timber from plantations or from sustainably managed regrowth forests that is FSC, AFS or PEFC certified - All timber used is to be termite (white ant) resistant or treated to be termite resistant to the appropriate hazard level.	DG2.5.1 DG21.05.01	Mandatory	DAB c20.2 Responsible Building Materials - Timber	1. Evidence of chain of custody 2. Bill of quantities
Waste & materials	WM1: Materials selection and use	**Built for disassembly** Consider the use of building materials which are able to be disassembled for re-use, in conjunction with considerations for the addition and removal of accommodation over time.	DG02.07	Mandatory		
Waste & materials	WM1: Materials selection and use	**Concrete** - Use materials complying with AS based on the Whole of Life approach to materials selection. - Do not use breccia or dolerite in concrete mixes. - Fly ash is a manufacturing bi-product that can be used as a cement replacement but should limited to a maximum of 20% by weight of cement content.	DG21.02	Mandatory	DAB c19B.1	Structural specifications and drawings Structural Engineer's report showing %cement replacement
Waste & materials	WM2 – Resource efficient school operations	**Operational waste** A waste storage area must be included in all new school sites. The provision of space must include source separation including bin stations and appropriate signage of waste and receptacles for multiple waste streams, including: - Organics - Comingled containers - Paper & cardboard - Container deposit scheme - Soft plastic - General waste Designers must refer to AS 4123.7 Mobile waste containers - Colours, markings, and designation requirements for further guidance on bin colour, waste stream and waste type. Safe methods for vehicle access and the transfer of waste must also be considered. For new and refurbished schools, an operational waste management plan (OWMP) must be developed to establish operational waste targets, identify opportunities for reuse and recycling in the operation of the facilities and make adequate provision for the facilities to accommodate for the OWMP. The OWMP must address all requirements from DG 2.7.2	DG02.07	Mandatory	DAB c8 Operational Waste	Operational waste management plan Operational waste reports showing diversion rates
Waste & materials	WM2 – Resource efficient school operations	**Building flexibility** Position structural members considering the future flexibility of the structure. Avoid ad hoc placing of columns internally, giving preference to uniformity in layout. Design all internal walls as non-load bearing to enable future flexibility.	DG21.1.16	Mandatory	Not covered in Green Star	As built drawings or statement by relevant professional
Waste & materials	WM3 – Responsible management of waste	**Construction waste** Consider opportunities for re-use and recycling of materials in the construction phase	DG02.07	Mandatory	DAB c22 Construction and Demolition Waste	Construction waste reports showing percentage of waste re-used and recycled (diverted from landfill)

Waste & materials	WM3 – Responsible management of waste	**Operational waste** A waste storage area must be included in all new school sites, with the provision of space for the separation of waste and receptacles for multiple waste streams, including: - general rubbish, - co-mingled recycling, - paper and cardboard, - secure waste, and - green waste. Safe methods for vehicle access and the transfer of waste must also be considered.	DG02.07	Mandatory	DAB c8 Operational Waste	As-built drawings showing location of waste storage area
Place	P1 – Green infrastructure	**Environmental conservation education** The design of the facilities provide unique and valuable environmental conservation learning opportunities and effective environmental modelling to the wider community.	DG02.06	Mandatory		Statement / Report by qualified ecologist
Place	P1 – Green infrastructure	**Productive landscape** Consider including opportunities for development of community garden within the site and relationships with community groups for this to occur.	DG02.06	Optional	GSC c14.2 Local Food Production	Site plan demonstrating location and size of community garden
Place	P1 – Green infrastructure	**Drinking water catchment protection** For developments within drinking water catchment areas, a water cycle management study is to be included with the Development Application for Education Facility developments involving: - Agriculture facilities - Biosolids and effluent re-use schemes - Sewerage systems or works (including package sewerage treatment plants) - Stormwater or works involving the disposal of untreated runoff	DG51.07	Mandatory	GSC c24 Integrated Water Cycle	1. Water cycle management study 2. Evidence that recommendations in the study have been followed / implemented
Place	P2 – Community & heritage connections	**Site investigations for place making / community connections** The following detailed reports/ surveys/ information should be considered in developing the business case: - Local environment/ character - Climate and microclimate - Heritage significance / impact - Appraisal of physical and visual factors affecting site development - Available transport/ road infrastructure servicing the site - Geo-technical and Soil reports will be required for each site to investigate the suitability of the topsoil and anticipated sub-grade materials for horticultural purposes. - Testing for toxic residues must be undertaken in all areas identified as being a possible risk - i.e. filled or dumped ground.	DG03.02	Negotiable	GSC c12 Culture, Heritage and Identity DAB 24.2 Contamination and Hazardous Materials	1) Relevant reports/surveys developed (these ideally include recommendations for further development stages) 2) Evidence demonstrating recommendations / best practice solutions have been implemented/addressed.
Place	P2 – Community & heritage connections	**Sense of place** The following design principles to every landscape zone of the school. - A healthy and safe landscape - A sense of place - A sustainable landscape - A low maintenance landscape	DG90.04	TBC	Not covered in Green Star	1) Landscape design report 2) Landscape drawings
Place	P2 – Community & heritage connections	**Community use of facilities** Some school facilities are used out of hours for activities such as weekend church groups, sport events and public meetings. Liaise with the Project Director to gain an understanding of any shared use, or community use arrangements that are being considered for the site. New schools should be designed so that direct access to the open play space, fields , hall and gym can be achieved without the public gaining access to the buildings.	DG16.08	TBC	DAB c30B Community Benefits	1. Confirmation by the Architect that direct access has been provided to open space and any other facilities that could be shared with the community. 2) A list of community engagement activities undertaken to develop a community benefits strategy. 3) Plans clearly outlining how the outcomes from the community benefits strategy have been implemented in the project 4) Joint-use or lease agreements where already in place
Place	P2 – Community & heritage connections	Reconciliation action plan	N/A	N/A	DAB c30D Reconciliation Action Plan	1) DoE's Reconciliation Action Plan 2) Evidence of the project's relationship with the RAP, e.g. actions implemented in line with RAP, etc.
Place	P3 – Welcoming learning spaces	**Daylighting** Maximise natural daylight in all habitable spaces to improve indoor amenity and create a pleasant environment.	DG2.3.1	Mandatory	DAB c12 Visual Comfort	1. Daylight modelling report demonstrating how natural daylight has been maximised in all habitable spaces; and 2. As built drawings demonstrating that the model accurately represents the building (i.e. window size and location; skylights installed, etc.); and 3. Specifications supporting inputs used in modelling (e.g. skylights and glass specs)
Place	P3 – Welcoming learning spaces	**Daylight glare control** Discomforting glare and brightness contrasts must be avoided. Designers must seek to: - Exclude direct sunlight from all learning spaces, libraries, administrative offices and staff studies for the period of 9.00am to 3.30pm including Eastern Daylight Saving Time between 21st September to 21st March (equinoxes). - Exclude direct sunlight from desk level in all learning spaces between 9am and 3:30pm. Sun exclusion and glare control can be achieved by the use of elements such as; Sun shades, eave extensions, vertical blades and the like. Glare must only be controlled by blinds as a last resort. Designers must prepare sun diagrams in the design phase as a minimum requirement.	DG12 DG07.01	Mandatory	DAB c12.0 Glare Reduction	1. Daylight glare modelling report / sun diagrams showing direct sunlight has been excluded as required. 2. Drawings supporting inputs of model, showing location of blinds and any other glare control device
Place	P3 – Welcoming learning spaces	**Lighting comfort** - Consider the furniture layouts to determine the orientation of luminaires. Especially when positioning luminaires in Materials Technology spaces to ensure adequate illumination on machines and work surfaces; - avoid potential stroboscopic effects and avoid shadows from ductwork - Mount luminaires as high as possible, but generally no higher than 4000mm AFFL (excluding Gymnasiums and Halls), to improve luminance uniformity and reduce direct glare in the direction of normal view - The standard lamp colour temperature is 4,000°K, except in certain toilet areas where the Design Guide requires the use of blue colours - Compliance with the uniformity requirements of the applicable standard should be demonstrated by the presentation of the output from lighting design software. - Unified Glare Rating (UGR) must be calculated using design software and compliant with the maximum recommended in AS/NZS 1680.1:2006	DG63.03 DG63.03.05	Mandatory	DAB c11 Lighting Comfort	1) Lighting drawings 2) Architectural drawings 3) Lighting specifications / schedules 4) Product data sheets 5) Isolux plot drawings 6) Lighting modelling report showing compliant uniformity and UGRs
Place	P3 – Welcoming learning spaces	**Lighting modelling** Lighting designs should be carried out utilising industry standard lighting design software such as AGI32, Dialux or Relux. Modelling must provide output that clearly demonstrates that the proposed design is compliant with the standards including but not limited to the following parameters: - Maintained illuminance values (average, maximum and minimum) on horizontal surfaces such as floors or working planes as required, broken down to identify the parameters defined in AS/NZS1680.4 or AS/NZS1158 as applicable - Maintained illuminance values (average, maximum and minimum) on vertical surfaces such as walls, shelves or racks as required, broken down to identify the parameters defined in AS/NZS1680.4 or AS/NZS1158 as applicable - Unified Glare Rating (UGR) as defined by AS/NZS1680, - Uniformity as defined by the applicable standard for indoor or outdoor illumination, - Lighting power density in System Watts/m2	DG63.03.02	Mandatory	DAB c11.1 General Illuminance and Glare Reduction	Lighting modelling report confirming compliance with required standards and parameters
Place	P3 – Welcoming learning spaces	**External access lighting** External Access Lighting shall be provided to illuminate building entrances, footpaths, sheltered walkways, roadways and car park. External Access Lighting must: - Be minimal and designed to prevent glare to pedestrians, nearby residents and to motorists. Evidence of compliance with AS4282, AS/NZS 1158 and other applicable Australian Standards must be provided by the designer. - Be located so as to link various sources of illumination such as street lighting (for carpark and roadways) and internal security lighting (for footpaths, walkways and entrances). - Illuminate building entry doors. - Highlight 'accident-prone' areas such as changes in level, stairs and ramps. - Provide vertical illumination.	DG63.08.01	Mandatory	DAB c27.0 Light Pollution to Neighbouring Bodies	1) As built drawings indicating the location of all external luminaires 2) Letter by lighting designer describing glare prevention measures

Place	P3 – Welcoming learning spaces	The inclusion of active cooling within school facilities is directed by the Department's Air Cooling policy: 2.1 Schools with a long term average mean maximum January temperature of 33 oC and above: Generally, air conditioning is to be provided to all school buildings. 2.2 Schools with a long term average mean maximum January temperature of below 33oC: Air conditioning is to be installed in all permanent learning spaces and libraries forming part of each projects scope. - Thermal modelling is undertaken to demonstrate that learning spaces and libraries have been designed to achieve a predicted mean vote (PMV) of +/- 0.5 for 95% of occupied hours	DG06.03 DG55.01 DG55.02	Mandatory	DAB c14 Thermal Comfort	1) Mechanical drawings showing HVAC systems installed, or 2) Confirmation from sub-contractors that services have been installed and commissioned as required; and 3) Modelling report showing required PMV is achieved. Modelling report to be done in line with methodology described in Draft thermal comfort and indoor air quality interim performance brief for DG55
Place	P3 – Welcoming learning spaces	**Background noise levels** - HVAC systems shall be designed in accordance with the recommended internal noise levels noted in table 1 of DG55.02. The noise levels are the result from the cumulative contribution of traffic noise (via the façade) PLUS the building air-conditioning /ventilation systems. The noise measurement and documentation must be provided by a qualified acoustic consultant and in accordance with AS/NZS 2107. Noise measurement must account for all internal and external noise including noise arising from building services equipment, noise emission from outdoor sources such as traffic, and (where known) noise from industrial process. Occupancy noise is excluded. Compliance shall be demonstrated through measurement, and the measurements shall be conducted in at least 10% of the spaces in the nominated area. The selection of representative spaces must be justified and must consider how the spaces are considered to be the most conservative with respect to both internal, and external noise sources. The range of measurement locations shall be representative of all spaces available within the nominated area. All relevant building systems must be in operation at the time of measurement. Projects less than 500m2 Gross Floor Area (GFA) must account for measurements conducted in at least 95% of spaces within the nominated area.	DG55.02 DG08.06	Mandatory	DAB c10.1 Internal Noise Levels	1. Road, rail, aircraft, industrial and rain noise assessment as per DG11.02 2. Report by qualified acoustics consultant demonstrating noise measurements are compliant.
Place	P3 – Welcoming learning spaces	**Room-to-room noise control** The following elements have prescriptive acoustic performance or construction requirements: - Operable walls (between general learning areas, all schools): Rw 45 - Entry doors to occupied teaching, music, drama and sports spaces: Solid core, minimum 35 mm thick with acoustic weather (where external) seals on all rebated closing faces. Gap at floor to be minimized. - Internal glazed sections in walls and vision panels in or adjacent to internal doors: minimum 10.38 mm laminated glass. In some situations acoustic windows may be needed for satisfactory noise separation. - Construction separating wastewater pipework from occupied spaces: Rw 40 - Where adjacent to an occupied space (and not serving that space), hydraulic supply pipework and wastewater pipework shall be separated from the adjacent occupied space. Construction between the adjacent spaces in this instance shall be a 'staggered stud'	DG11.05	Mandatory	DAB c10.3 Acoustic Separation	1. Detailed drawings including the acoustic design specification of operable walls, entry doors, internal glazed sections, etc. OR 2. Statement by a qualified acoustics consultant confirming compliance
Place	P3 – Welcoming learning spaces	**Noise emissions** Generally noise emission to the environment from mechanical services noise sources (such as air conditioners) are the subject of a development consent conditions. In NSW the development consent conditions will refer to the Industrial Noise Policy (INP) or Local Council requirement. Where no condition regarding noise sources exists for a school development, noise emission from such sources should be designed, in-principle, to satisfy the requirements of the Industrial Noise Policy.	DG11.04	Optional	Not covered in Green Star	
Place	P3 – Welcoming learning spaces	**Acoustic post-occupancy evaluation** Post Occupancy evaluations are often undertaken to assess the performance of recently completed or existing facilities. Where a Post Occupancy Evaluation is to be undertaken it should be conducted by the project team or acoustic engineer and should be undertaken of selected acoustic parameters only. Evaluation may include: - Internal noise levels, - Room acoustics, - Noise emission, - Room-to-room acoustics performance	DG11.07	Optional	GSP c13 Internal Noise Levels	1. Commitment by SI to conduct acoustic post-occupancy evaluation
Place	P3 – Welcoming learning spaces	**Low VOC-emitting materials** All surface coatings, and other volatile organic compound (VOC) emitting products including adhesives, sealants, carpets, carpet tiles, and carpet underlays, must be made from low-VOC emission materials. Paints must meet the limits stipulated in the Australian Paint Approval Scheme's (APAS) VOC limits for low VOC paints. Adhesives and sealants must not exceed the maximum VOC limits stipulated in Table 13.1.1B of the Green Star – Design & As Built v1.3 tool. Carpets must not exceed the total VOC limits stipulated in Table 13.1.2B of the Green Star – Design & As Built v1.3 tool.	DG2.5.2	Mandatory	DAB c13 Indoor Pollutants	Product specifications, certificates, safety datasheets that demonstrate low-VOC contents Bill of quantities
Place	P3 – Welcoming learning spaces	**Low formaldehyde-emitting materials** Only low formaldehyde-emitting engineered wood products should be used, such as those that meet the Australian Standards for formaldehyde emission limit E1 (NICNAS classification) or lower.	DG2.5.2	Mandatory	DAB c13 Indoor Pollutants	Product specifications, certificates, safety datasheets that demonstrate low-formaldehyde contents Bill of quantities
Place	P3 – Welcoming learning spaces	**Ventilation in printing rooms** The ventilation system is to be designed to serve the whole room and is not intended to provide localised exhaust at equipment. - Discharge air from the ventilation unit to the outside of the building via a vermin proofed louvre. - Draw make-up air from inside the building through wall or door grilles. - Locate the inlet/s and exhaust to achieve good airflow across the room in plan and elevation to pick up all machine emissions. -Ensure the airflow doesn't draw equipment emissions across operator's face. -Note that the room door in many schools may be left open in normal daily operation. Allow for this when locating the exhaust fan so that cross ventilation is achieved with make-up air drawn through the door opening. - Required speed range: minimum of 6 air changes per hour and maximum of 15 air	DG57.07	Mandatory	DAB c9.3 Exhaust or Elimination of Pollutants	1. Mechanical drawings and specifications showing compliant printing room ventilation
Place	P3 – Welcoming learning spaces	**Chemical store ventilation** - Provide mechanical exhaust system with high and low level exhaust points to all chemical stores, with a minimum of 15 air changes per hour flow rate. - Discharge air according to the requirements of BCA. The discharge outlet is to be fitted with bird wire mesh. - Provide make up air to all chemical stores, (to replace exhausted air) through openings in an external wall, fitted with weatherproof louvres. All grilles and louvres are to be fitted with vandal proof bars and be fitted with vermin mesh. - For security and fire rating reasons do not use windows/doors or door grilles for air intake. - The chemical stores ventilation systems are to run continuously.	DG57.09	Mandatory	Not covered in Green Star	
Place	P3 – Welcoming learning spaces	**Pesticide free environments** Schools must be designed, constructed and maintained, without using chemicals for termite and other pest control. No chemical pesticides and termicide to be used. Preventive treatments to be by physical means and careful design to minimise risk	DG2.5.3	Mandatory	Not covered in Green Star	Statement by head contractor that no pesticides or termites have been used.
Place	P3 – Welcoming learning spaces	**Green cleaning**	N/A	N/A	GSP c6 Green Cleaning	1) WEB Clean School User Guide 2) Green Cleaning specifications
Place	P3 – Welcoming learning spaces	**Fly free indoors** Fly screening must be provided in all schools to the doors, windows and other openings in food preparation, biology, and non-water-closet toilet spaces or where specifically nominated in the EFSG. Schools in localities where fly incidence constitutes a health hazard (especially trachoma or other nuisance) will require fly screens to all opening sashes.	DG31.01	Mandatory	Not covered in Green Star	As-built drawings showing fly screening has been provided as required

Place	P3 – Welcoming learning spaces	For mechanically ventilated spaces: 1. Outdoor air ventilation rates are in accordance with requirements of AS 1668.2. 2. Mechanical ventilation systems shall be linked to CO2 sensors to provide demand-controlled ventilation within each space to ensure that CO2 levels are maintained below the required CO2 threshold. 3. Mechanical ventilation systems shall be designed to provide adequate access for maintenance and cleaning. 4. Ventilation systems are designed to maintain an average daily CO2 concentration as per the latest NCC code, and so that the maximum concentration does not exceed 1,500ppm for more than 20 consecutive minutes in each day. 5. The required outdoor air ventilation rates and CO2 concentrations shall be maintained without the need for any human intervention e.g. the opening of windows or external louvres. 6. Ventilation systems shall be designed minimise the entry of outdoor pollutants through ensuring that the ventilation system design is in accordance with the relevant parts of AS 1668.2. and ASHRAE Standard 62.1. 7. Where local sources of pollutants are present e.g. photocopiers, minimum exhaust ventilation flow rates should be provided in accordance with AS1668.2: Table B1.	DG55.02	Mandatory	DAB c9 Indoor Air Quality	Mechanical drawings and specifications Extracts from commissioning report
Place	P3 – Welcoming learning spaces	**Ecological conservation** Schools sites must conserve for future generations, the biological diversity of genetic materials, species and ecosystems on that site and consider the surrounding natural environment. The design of the facilities must provide unique and valuable environmental conservation learning opportunities and effective environmental modelling to the wider community. Schools must model best practice design, material use, systems and operational methodology, demonstrating human's connections to nature and the operation of natural cycles of sun, wind, rain and the four seasons. Schools must connect with nature and incorporate biophilic design principles. Open space must allow for exploration, and biodiversity and earth education to enhance the site's outdoor learning potential. New and refurbished schools must: Preserve or re-establish native flora (unless it poses a safety risk or cannot be designed around) and create new landscapes through liaising with local government authorities, Landcare and environmental groups, and the use of native low water use plants. Consider opportunities for development of community garden within the site and relationships with community groups for this to occur. Adequate due diligence must be conducted where biodiversity or high ecological value is identified on the site. For more details see DG90 Landscape Design	DG02.06	Mandatory	DAB c23 Ecological Value GSC c29 Ecological Value (incl Biodiversity Enhancement)	1) Biodiversity or ecological assessment / local flora and fauna survey 2) Biodiversity management plan describing measures for the conservation and protection of threatened species or communities, biodiversity enhancement, tree protection, etc. 3) Evidence demonstrating measures have been implemented to protect and enhance endangered species / ecological communities identified; to preserve or re-establish native flora; etc.
Place	P3 – Welcoming learning spaces	-All new facilities must meet current DTS provisions of the NCC and the associated standards. Generally AS 1428.1 is the minimum design standard for access and mobility. However, it is DoE's policy that any enhanced requirements noted in AS 1428.2 be incorporated in any new design. -Additionally, DoE have enhanced circulation requirements as noted in DG / CIRCULATION - Provide hearing augmentation system for areas that have amplification, generally within Gymnasium, libraries, movement studios and Communal Halls, provide a system to assist the aurally challenged to hear music and speech within the main auditorium and on the stage - Provide the International Symbol for Deafness to indicate that an assistive hearing device is installed.	DG19.01 DG65.14	Mandatory	DAB 30D Universal design	1) Accessibility plan 2) As-built drawings or other evidence demonstrating that minimum and enhanced accessibility requirements have been provided for walkways, corridors, ramps, etc. 3) Photographic or other evidence of signage installed
Place	P3 – Welcoming learning spaces	**Weather protection** Circulation areas provided between administrative, staff and all student spaces (except Agriculture), should be protected from sun, rain and unfavourable winds.	DG08.05	Mandatory	Not covered in Green Star	As built drawings showing circulation areas are protected as required
Place	P3 – Welcoming learning spaces	**Open play space** Open play space must be provided for students to access during recess, lunch breaks and for outdoor learning. Open play space can be comprised of - Paved and grassed areas - Rooftops and terraces - Covered outdoor areas The designated open play space must be easily monitored and managed by school staff. Where a joint use agreement can be negotiated with a local council or land owner, the required play space can be located off-site, providing the facilities are - In close proximity to the school - Easily accessible - Safe and secure Designs must aim to achieve a minimum of 10m2 per student. Where this figure is not achievable the proposed m2 per student of the completed project must not be less than the existing m2 per student currently on the site.	DG10.03	Mandatory	Not covered in Green Star	Plan view drawings showing provision of open space
Place	P3 – Welcoming learning spaces	**Staff room**	N/A	N/A	GSI c Amenity Space	1) Extracts from the EFSG requirements for staff rooms 2) Evidence of staff room delivered accordingly
Place	P3 – Welcoming learning spaces	**Healthy canteen policy**	N/A	N/A	DAB c30D Integrating Healthy Environments	1) Research report behind Healthy Canteen Policy 2) Evidence that policy initiative has been incorporated into the school under assessment.
Place	P3 – Welcoming learning spaces	**Safety by design** - The Work Health and Safety Act and the Department of Education principles of student safety and welfare mandate the avoidance of accidents through careful design of facilities - The designer must ensure, so far as is reasonably practicable, that the plant, substance or structure is designed to minimise risks to the health and safety of all parties who will work on a site connected with its design as well as the end users of the facility. - An important part of the Safety by Design principle is recording the risk assessments that are conducted during the design and providing to the client, owners, any users/occupiers of the facilities and those who will be building or maintaining the facilities, details of risks and hazards identified. - The design of facilities should not only be inherently safe but visually and pragmatically safe and not tempt students or the general public into unsafe practice. Examples: <u>Glazing</u>: The safety of occupants is paramount where glass is being used, especially in areas subject to human impact. All glazing types and thickness are to comply with the relevant AS as a minimum. <u>Hot water</u>: To minimise scalding risk all hand basins, showers and the kitchen sink in practical activities areas serving IO/IS classes, require "warm" rather than "hot" water provided at a specified temperature, by mixing hot and cold water through a Thermostatic Mixing Valve. (Note: Tempering Valves are not permitted in schools) <u>Drinking water tanks</u>: Ensure rainwater is not collected from areas containing lead materials. All coating materials used inside the reservoir must be suitable for drinking water and guaranteed against liner leakage for a period of 20 years. A filtering and UV system to be provided where drinking water tanks are present.	DG14.02 DG31.03 DG53.11 DG53.16 DG53.17	Mandatory	Not covered in Green Star	1. Safety risk assessments 2. Short report identifying safety-by-design principles incorporated / Sign off by head contractor confirming all mandatory requirements in DG14 have been addressed. 3. Manufacturer's certificate to AS/NZS 4020 for tanks
Place	P3 – Welcoming learning spaces	**Microbial control** As a measure to prevent legionella, heated water to hand basins, showers etc. shall be stored at temperature above 65 C. Thermostatic mixing valves are to be used for tempered water generation at each point of use. Valves need to comply with microbe disinfection requirements - "Code of Practice for Thermostatic Mixing Valves NSW" as approved by the NSW Health Department.	DG51.09 DG53.11	Mandatory	DAB c28 Microbial Control	1. Letter by hydraulic engineer confirming hot water is stored above 65 deg and that valves comply with code of practice.

		Security Safety in Design and Crime Prevention Through Environmental Design (CPTED) principles are to be implemented in project planning stage. Advice on the electronic surveillance systems can be sought early in the design phase. CCTV systems are required in several locations where indicated in the Rooms and Spaces Technical Data table, including: - Secondary clinic - Primary sick bay - Library				1) Crime risk assessment or equivalent 2) Evidence of designing out crime principles implemented 3) Security services plans, schedules and forms by School Security Unit (SSU) 4) SSU specification and evidence of input on project specification
Place	P3 – Welcoming learning spaces		DG14.10 DG65.08 DG65.10	TBC	GSC c15 Safe Places	
		Hazardous materials Where a new school is to be developed a Hazardous materials study is to be conducted, including: - Asbestos Containing Materials (ACM) - Synthetic Mineral Fibres (SMF) - Polychlorinated Biphenyl's (PCB) - Lead Paint - Ozone Depleting Substances Any existing structures and all parts of the site should be examined in order to determine the presence of hazardous materials before commencement of any renovation or demolition. Inspection should be conducted by organisations with the National Association of Testing Authorities (NATA) accreditation complying with the requirements of AS/NZS ISO.IEC 17020 for the inspection of hazardous materials (HazMat) including asbestos. Hazardous Materials inspection reports should be produced in accordance with the requirements of the various Safe Work Australia "Codes of Practice" for the management and control of hazardous substances. Where hazardous materials are found a Hazardous Materials Management Plan should be			DAB 24.2 Contamination and Hazardous Materials	1. Hazardous materials study / site inspection report / survey 2. Management plans for hazardous materials identified 3. Remediation strategies implemented 4. Environmental auditor certificates / clearance certificates
Place	P3 – Welcoming learning spaces	prepared	DG48.01	Mandatory		
		Digital infrastructure New buildings and refurbishments are required to provide a common wireless solution compatible across the school, providing a consistent user experience and support mechanism. This involves the replacement of existing legacy wireless equipment, such as wireless access points and site switches				
Place	P3 – Welcoming learning spaces		DG64.12.02	Mandatory	GSC c22.2 Digital Infrastructure	1) Contracts describing the network infrastructure specification and operational requirements
		Sustainability benchmarking Ecologically Sustainable Development principles must be included in any new school buildings to a level that the building could be benchmarked to achieve a 5 Star Green Star rating if located in Sydney, Newcastle, or Wollongong metropolitan areas or a 4 star Green Star rating if located elsewhere in NSW. Benchmarking must be undertaken against the Green Star credits using the edition of the Green Star scorecard current at the time of the assessment. The filled out scorecard must demonstrate the project can achieve enough points for the required rating. Formal Green Star certification is not mandatory				
Place	P3 – Welcoming learning spaces		DG02.09	Mandatory	All credits	1) Green Star scorecard demonstrated the final desing is benchmarked to the required rating (by a Green Star Accredited Professional)
		Site investigations for resilience The following detailed reports/ surveys/ information should be considered in developing the business case: - Slope, drainage and erosion issues including flood risks (if any) - Geotechnical and soil conditions - Airborne pollutants - Bushfire risks - Appraisal of available services infrastructure - Climate change risk assessment must be undertaken considering at least two different climate change scenarios An environmental risk report will be required for developments proposed within sensitive natural environments or sites subject to natural risks (i.e. flood prone sites, bush fire areas).				1) Detailed reports or surveys developed
Resilience	R1 – Preparation for shocks		DG03.02	Negotiable	DAB c3 Adaptation and Resilience	2) Environmental risk report 3) Evidence demonstrating recommendations have been implemented and risks addressed through design responses.
		Bushfire protection Development applications on bush fire prone land must be accompanied by a Bush Fire Assessment Report demonstrating compliance with the aim and objectives of Planning for Bush Fire Protection and the specific objectives and performance criteria for the land use proposed. Local Authorities and the Rural Fire Service can provide advice on the design of buildings in bush fire prone areas. The Building Code of Australia and AS3959 "Construction of buildings in bushfire-prone areas" set out the requirements for buildings which are within close proximity to a defined bush fire zone. Mandatory landscape management strategies: - Keep the amount of fuel (leaves, twigs, logs, dead grass) in the vicinity of buildings to a minimum. - Ensure trees are located at away from buildings to avoid branches overhanging and leaves collecting on roofs. - Do not plant shrubs against buildings. - The crowns of trees planted on the hazard side of the development should not be contiguous. - Plant fire resistant trees and shrubs on the hazard side of the development to reduce the potential impact of wind, fire intensity, radiant heat, and rate of spread as well as intercepting burning embers. - Avoid combustible fencing materials. - Provide irrigation and garden sprinklers to water areas near the buildings (subject to water authority approval).				1) Bush fire assessment report 2) Statement by Architect / fire consultant outlining building strategies implemented in line with BCA and AS3959. 3) Bush fire management plan outlining management strategies implemented 4) Landscape plans detailing bush fire management measures implemented
Resilience	R1 – Preparation for shocks		DG13.01	Mandatory	DAB c3 Adaptation and Resilience	
		Climate change adaptation Sites and school communities must be able to withstand natural and urban hazards and adaptively respond to climate change over time, especially for projects involving vulnerable communities e.g. climate generating exacerbated flood, storm surge, inundation, heatwaves, bush fires, extreme storm and other weather events. School facilities must be able to withstand natural hazards and adapt to shocks and stresses to avoid social and economic costs of interrupted operation and repairing or replacing damaged assets. To achieve this, increasing resilience to natural hazards must be considered in the business case development so that associated costs are budgeted. An initial assessment of natural hazards and project vulnerability must be carried out, in consultation with resilience experts, to inform the business case and identify hazards where further analysis is required. Where significant risks are identified in the initial assessment, a comprehensive climate change risk assessment must be undertaken. Any high or extreme risks identified must be addressed through design measures.				1) Climate risk assessment, and 2) Climate adaptation plan 3) Emergency management plan
Resilience	R2 – Preparation for stresses		DG02.08	Mandatory	DAB c3 Adaptation and Resilience	

8 APPENDIX B – GREEN STAR SCORE CARD (CAPA)

Green Star - Design & As Built Scorecard

Project:	CAPA	**Round:**	1
Targeted Rating:	4 Star - Best Practice		

Points Available (Targeted)	Project Score (Targeted)	NA Targeted
99.0	50.5	1.0

CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA		POINTS AVAILABLE	POINTS TARGETED	NA AVAILABLE
Management					**14**		
Green Star Accredited Professional	To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended.	1.1	Accredited Professional		1	1	-
Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2.0	Environmental Performance Targets		-	Complies	-
		2.1	Services and Maintainability Review		1	1	-
		2.2	Building Commissioning		1	1	-
		2.3	Building Systems Tuning		1	1	-
		2.4	Independent Commissioning Agent		1		-
Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan		2	2	-
Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information		1	1	-
Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance		1	1	-
		5.2	End of Life Waste Performance	A. Contractual Agreements	1	1	-
Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering		-	Complies	-
		6.1	Monitoring Systems		1	1	-
Responsible Construction Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan		-	Complies	-
		7.1	Environmental Management System		1	1	-
		7.2	High Quality Staff Support		1	1	-
Operational Waste	A. Performance Pathway	8A	Performance Pathway: Specialist Plan		1	1	-
		8B	Prescriptive Pathway: Facilities		0		-
Total					**14**	**13**	

Indoor Environment Quality					17		
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes		1	1	0.0
		9.2	Provision of Outdoor Air	☐ A. Comparison to Industry Standards ☑ B. Performance Based Approach ☐ C. Natural Ventilation	2		0.0
		9.3	Exhaust or Elimination of Pollutants	☐ A. Removing the Source of Pollutants ☑ B. Exhausting the Pollutants Directly to the Outsic	1		0.0
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels		1	1	0.0
		10.2	Reverberation		1.00	1	0.00
		10.3	Acoustic Separation	A. Sound Reduction	1.00		0.00
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort		Complies	Complies	-
		11.1 General Illuminance and Glare Reduction	11.1.1 General Illuminance	☑ A. Non Residential Spaces ☐ B. Residential Spaces	1.00	1	0.00
			11.1.2 Glare Reduction	☑ A. Prescriptive Method 1 ☐ B. Prescriptive Method 2 ☐ C. Performance Method			
		11.2	Surface Illuminance	☑ A. Prescriptive Method ☐ B. Performance Method ☐ C. Residential Spaces (Prescriptive Method)	1.00	1	0.00
		11.3	Localised Lighting Control		1.00	1	0.00
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	☐ A. Fixed Shading Devices ☑ B. Blinds or Screens ☐ C. Daylight Glare Model	Complies	Complies	-
		12.1	Daylight	☐ A. Prescriptive Methodology ☑ B. Compliance Using Daylight Factor ☐ C. Compliance Using Daylight Autonomy	2	1	0.0
		12.2	Views		1	1	0.0
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1 Paints, Adhesives, Sealants and Carpets	13.1.1 Paints, Adhesives and Sealants	☑ A. Product Certification ☐ B. Laboratory Testing ☐ C. No Paints, Adhesives or Sealants	1.00	1	0.00
			13.1.2 Carpets	☑ A. Product Certification ☐ B. Laboratory Testing ☐ C. No Carpets			
		13.2	Engineered Wood Products	☑ A. Product Certification ☐ B. Laboratory Testing	1.00	1	0.00
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	☑ A. Naturally Ventilated Spaces ☑ B. Mechanically Ventilated Spaces ☐ C. Residential Spaces	1	1	0.0
		14.2	Advanced Thermal Comfort	☐ A. Naturally Ventilated Spaces ☐ B. Mechanically Ventilated Spaces ☐ C. Residential Spaces ☐ D. Industrial spaces	1		0.0

Total			**17**	**11**	

Energy				**22**		
		15A.0	Conditional Requirement: Prescriptive Pathway	-	Complies	-
		15A.1	Building Envelope	0		-
		15A.2	Wall-Glazing Construction and Retail Display Glazing	0		-
		15A.3	Lighting	0.00		-
		15A.4	Ventilation and Air Conditioning	0		-
		15A.5	Domestic Hot Water	0		-
		15A.6	Transition Plan	0		-
		15A.7	Fuel Switching	0		-
		15A.8	On-Site Storage	0		-
		15A.9	Vertical Transportation	0		-
		15A.10	Off-Site Renewables	0		-
		15B.0	Conditional Requirement: NatHERS Pathway	-		-
		15B.1	Thermal and Energy Performance	0		-
		15B.2 Building Services and Appliances	15B.2.1 Lighting	0		-
			15B.2.2 Ventilation and Air Conditioning ☐ A. Mechanically Conditioned Spaces ☐ B. Spaces With Mechanical Heating Only ☐ C. Naturally Ventilated Spaces	0		-
			15B.2.3 Domestic Hot Water	0		-
			15B.2.4 Appliances & Equipment	0		-
			15B.2.5 Fuel Switching	0		-
			15B.2.6 On-Site Storage	0		-
			15B.2.7 Vertical Transportation	0		-
			15B.2.8 Passive Laundry Facilities	0		-
			15B.2.9 Unoccupied Areas	0		-
			15B.2.10 Off-Site Renewables	0		-
		15C.0	Conditional Requirement: BASIX Pathway	-		-
		15C.1	BASIX Greenhouse Gas Reductions	0		-
		15C.2	Off-Site Renewables	0		-

Greenhouse Gas Emissions	E. Reference Building Pathway	15D.0	Conditional Requirement: NABERS Pathway	-		-
		15D.1	NABERS Energy Greenhouse Gas Emissions Reduction	0		-
		15D.2	Off-Site Renewables	0		-
		15D.3 Additional Prescriptive Measures	15D.3.1 Transition Plan	0		-
			15D.3.2 Fuel Switching	0		-
			15D.3.3 On-Site Storage	0		-
		15E.0	Conditional Requirement: Reference Building Pathway	-	Complies	-
		15E.1	GHG Emissions Reduction: Building Fabric	4		-
		15E.2	GHG Emissions Reduction	16	3	-
		15E.3	Off-Site Renewables	8		-
		15E.4	District Services	7		-
		15E.5 Additional Prescriptive Measures	15E.5.1 Transition Plan	1		-
			15E.5.2 Fuel Switching	2		-
			15E.5.3 On-Site Storage	1		-
		15H.0	Conditional Requirement: Industrial Prescriptive Pathway	-		-
		15H.1	Building Envelope	0		-
		15H.2	Wall-Glazing Construction	0		-
		15H.3 Lighting	15H.3.1 Internal Lighting	0		-
			15H.3.2 External Lighting	0		-
		15H.4	Ventilation and Air Conditioning	0		-
		15H.5	Domestic Hot Water	0		-
		15H.6	Transition Plan	0		-
		15H.7	Fuel Switching	0		-
		15H.8	On-site Storage	0		-
		15H.9	Provision of Structure for PV	0		-
		15H.10	Off-site Renewables	0		-
		15I.0	Conditional Requirement: On-site Renewables Pathway	-		-
		15I.1	On-site Renewable Energy	0		-
Peak Electricity Demand Reduction	A. Prescriptive Pathway	16A	Prescriptive Pathway: On-Site Energy Generation	1	1	-
		16B	Modelled Performance Pathway: Reference Building	0		-
Total				**21**	**4**	

Transport							
					9		
Sustainable Transport	B. Prescriptive Pathway	17A	Performance Pathway		0		-
		17B.1	Access by Public Transport		3	1	-
		17B.2	Reduced Car Parking Provision		1	1	0.0
		17B.3	Low Emission Vehicle Infrastructure	A. Parking for Fuel-Efficient Vehicles	0		0.0
		17B.4	Active Transport Facilities		1		-
		17B.5	Walkable Neighbourhoods	A. Proximity to Amenities	1	1	-
		17C.1	Access by Public Transport		0		-
		17C.2	Reduced Car Parking Provision		0		-
		17C.3	Low Emission Vehicle Infrastructure	☐ A. Parking for Fuel-Efficient Vehicles ☐ B. Parking for Electric Vehicles ☐ C. Parking for Car Share Vehicles ☐ D. No Parking Spaces Provided ☐ E. Low Emission Facility Transport	0		-
		17C.4	Active Transport Facilities		0		-
		17C.5	Proximity to Amenities		0		-
Total					7	3	

Water							
					12		
Potable Water	B. Prescriptive Pathway	18A	Potable Water - Performance Pathway		0		-
		18B.1	Sanitary Fixture Efficiency		1	1	-
		18B.2	Rainwater Reuse		1	1	-
		18B.3	Heat Rejection		2	2	-
		18B.4	Landscape Irrigation		1		0.0
		18B.5	Fire Protection System Test Water		1		0.0
Total					6	4	

Materials							
					14		

Life Cycle Impacts	B. Prescriptive Pathway - Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment		0		-
		19A.2	Additional Reporting	☐ A. Additional Life Cycle Impact Reporting ☐ B. Material Selection Improvement ☐ C. Construction Process Improvement ☐ D. LCA Design Review	0		-
		19B.1 Concrete	19B.1.1 Portland Cement Reduction		2	1	-
			19B.1.2 Water Reduction		0.5	0.5	-
			19B.1.3 Aggregates Reduction	B. Fine Aggregate Reduction	0.5	0.5	-
		19B.2 Steel	B. Reduced Use of Steel Reinforcement		1	1	-
		19B.3	Building Reuse	19B.3.1 Façade Reuse	2		-
				19B.3.2 Structure Reuse	2		-
		19B.4	Structural Timber	19B.4.0 Responsible Sourcing	-		-
				19B.4.1 Reduced Embodied Impacts	3		-
		19C.1 Concrete	19C.1.1 Portland Cement Reduction		0		-
			19C.1.2 Water Reduction		0		-
			19C.1.3 Aggregates Reduction	A. Course Aggregate Reduction	0		-
		19C.2 Steel	19C.2.1 Reduced Mass of Steel Framing	A. High Strength Steel	0		-
			19C.2.2 Reduced Use of Steel Reinforcement		0		-
		19C.3	Building Reuse	19C.3.1 Façade Reuse	0		-
				19C.3.2 Structure Reuse	0		-
		19C.4	Structural Timber	19C.4.0 Responsible Sourcing	-		-
				19C.4.1 Reduced Embodied Impacts	0		-
Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1	Structural and Reinforcing Steel	20.1.0 Responsible Steel Maker	-	Complies	-
				A. Responsible Steel Fabricator	1	1	0.0
		20.2	Timber	☑ A. Certified Timber ☑ B. Reused Timber	1	1	0.0
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	B. Best Practice Guidelines for PVC	1	1	0.0
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	☐ A. Reused Products ☐ B. Recycled Content Products ☐ C. Environmental Product Declarations (EPDs) ☐ D. Third Party Certification ☐ E. Stewardship Programs	3		-
Construction and Demolition Waste	A. Fixed Benchmark	22.0	Reporting Accuracy	A. Compliance Verification Summary	-	Complies	-
		22A	Fixed Benchmark		1	1	-
		22B	Percentage Benchmark		0		-

Total					**12**	**7**	

Land Use & Ecology					**6**		
Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	A. EPBC	-		-
		23.1	Ecological Value		3		-
Sustainable Sites	To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land.	24.0	Conditional Requirement		-	Complies	-
		24.1	Reuse of Land	A. Previously Developed Land	1	1	-
		24.2	Contamination and Hazardous Materials	☐ A. Site Contamination ☐ B. Hazardous Materials	1		0.0
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	25.1	Heat Island Effect Reduction		1	1	-
Total					**6**	**2**	

Emissions					**5**		
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge		1	1	-
		26.2	Stormwater Pollution Targets		1	1	-
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies		-	Complies	-
		27.1	Light Pollution to Night Sky	A. Control of Upward Light Output Ratio (ULOR)	1	1	-
Microbial Control: Legionella Impacts from Cooling Systems	B. Waterless Heat Rejection Systems	28A	Natural Ventilation		0	0	-
		28B	Waterless Heat Rejection Systems		1	1	-
		28C	Water-Based Heat Rejection Systems		0		-
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerants Impacts	A. Calculating TSDEI	1		-
Total					**5**	**4**	

Innovation				**10**		
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process			-
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in	30B	Market Transformation			-

Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks	10	2	-
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge			-
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	30E	Global Sustainability			-
Total				**10**	**2**	

TOTALS	**TARGETED**
CORE POINTS	**48.0**
INNOVATION POINTS	**2.0**
NA POINTS	**1.0**
POINTS AVAILABLE	**99.0**
PROJECT SCORE	**50.5**

9 APPENDIX C – GREEN STAR SCORE CARD (PCYC)

Green Star - Design & As Built Scorecard

Project:	PCYC	**Round:**	1
Targeted Rating:	4 Star - Best Practice		

Points Available (Targeted)	Project Score (Targeted)
100.0	49.0

CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA		POINTS AVAILABLE	POINTS TARGETED
Management					**14**	
Green Star Accredited Professional	To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended.	1.1	Accredited Professional		1	1
Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2.0	Environmental Performance Targets		-	Complies
		2.1	Services and Maintainability Review		1	1
		2.2	Building Commissioning		1	1
		2.3	Building Systems Tuning		1	1
		2.4	Independent Commissioning Agent		1	
Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan		2	2
Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information		1	1
Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance		1	1
		5.2	End of Life Waste Performance	A. Contractual Agreements	1	1
Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering		-	Complies
		6.1	Monitoring Systems		1	1
Responsible Construction Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan		-	Complies
		7.1	Environmental Management System		1	1
		7.2	High Quality Staff Support		1	1
Operational Waste	A. Performance Pathway	8A	Performance Pathway: Specialist Plan		1	1

Operational Waste	A. Performance Pathway	8B	Prescriptive Pathway: Facilities		0	
Total					**14**	**13**

Indoor Environment Quality					**17**	
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes		1	1
		9.2	Provision of Outdoor Air	☐ A. Comparison to Industry Standards ☑ B. Performance Based Approach ☐ C. Natural Ventilation	2	
		9.3	Exhaust or Elimination of Pollutants	☐ A. Removing the Source of Pollutants ☑ B. Exhausting the Pollutants Directly to the Outsi	1	
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels		1	1
		10.2	Reverberation		1.00	1
		10.3	Acoustic Separation	A. Sound Reduction	1.00	
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort		Complies	Complies
		11.1 General Illuminance and Glare Reduction	11.1.1 General Illuminance	☑ A. Non Residential Spaces ☐ B. Residential Spaces	1.00	1
			11.1.2 Glare Reduction	☑ A. Prescriptive Method 1 ☐ B. Prescriptive Method 2 ☐ C. Performance Method		
		11.2	Surface Illuminance	☑ A. Prescriptive Method ☐ B. Performance Method ☐ C. Residential Spaces (Prescriptive Method)	1.00	1
		11.3	Localised Lighting Control		1.00	1
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	☐ A. Fixed Shading Devices ☑ B. Blinds or Screens ☐ C. Daylight Glare Model	Complies	Complies
		12.1	Daylight	☐ A. Prescriptive Methodology ☑ B. Compliance Using Daylight Factor ☐ C. Compliance Using Daylight Autonomy	2	1
		12.2	Views		1	1
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1 Paints, Adhesives, Sealants and Carpets	13.1.1 Paints, Adhesives and Sealants	☑ A. Product Certification ☐ B. Laboratory Testing ☐ C. No Paints, Adhesives or Sealants	1.00	1
			13.1.2 Carpets	☑ A. Product Certification ☐ B. Laboratory Testing ☐ C. No Carpets		
		13.2	Engineered Wood Products	☑ A. Product Certification ☐ B. Laboratory Testing	1.00	1
				☑ A. Naturally Ventilated Spaces		

Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	☑ B. Mechanically Ventilated Spaces ☐ C. Residential Spaces	1	1
		14.2	Advanced Thermal Comfort	☐ A. Naturally Ventilated Spaces ☐ B. Mechanically Ventilated Spaces ☐ C. Residential Spaces ☐ D. Industrial spaces	1	
Total					**17**	**11**

Energy					**22**	
		15A.0	Conditional Requirement: Prescriptive Pathway		-	Complies
		15A.1	Building Envelope		0	
		15A.2	Wall-Glazing Construction and Retail Display Glazing		0	
		15A.3	Lighting		0.00	
		15A.4	Ventilation and Air Conditioning		0	
		15A.5	Domestic Hot Water		0	
		15A.6	Transition Plan		0	
		15A.7	Fuel Switching		0	
		15A.8	On-Site Storage		0	
		15A.9	Vertical Transportation		0	
		15A.10	Off-Site Renewables		0	
		15B.0	Conditional Requirement: NatHERS Pathway		-	
		15B.1	Thermal and Energy Performance		0	
		15B.2 Building Services and Appliances	15B.2.1 Lighting		0	
			15B.2.2 Ventilation and Air Conditioning	☐ A. Mechanically Conditioned Spaces ☐ B. Spaces With Mechanical Heating Only ☐ C. Naturally Ventilated Spaces	0	
			15B.2.3 Domestic Hot Water		0	
			15B.2.4 Appliances & Equipment		0	
			15B.2.5 Fuel Switching		0	
			15B.2.6 On-Site Storage		0	
			15B.2.7 Vertical Transportation		0	
			15B.2.8 Passive Laundry Facilities		0	
			15B.2.9 Unoccupied Areas		0	

Greenhouse Gas Emissions	E. Reference Building Pathway		15B.2.10 Off-Site Renewables	0	
		15C.0	Conditional Requirement: BASIX Pathway	-	
		15C.1	BASIX Greenhouse Gas Reductions	0	
		15C.2	Off-Site Renewables	0	
		15D.0	Conditional Requirement: NABERS Pathway	-	
		15D.1	NABERS Energy Greenhouse Gas Emissions Reduction	0	
		15D.2	Off-Site Renewables	0	
		15D.3 Additional Prescriptive Measures	15D.3.1 Transition Plan	0	
			15D.3.2 Fuel Switching	0	
			15D.3.3 On-Site Storage	0	
		15E.0	Conditional Requirement: Reference Building Pathway	-	Complies
		15E.1	GHG Emissions Reduction: Building Fabric	4	
		15E.2	GHG Emissions Reduction	16	3
		15E.3	Off-Site Renewables	8	
		15E.4	District Services	7	
		15E.5 Additional Prescriptive Measures	15E.5.1 Transition Plan	1	
			15E.5.2 Fuel Switching	2	
			15E.5.3 On-Site Storage	1	
		15H.0	Conditional Requirement: Industrial Prescriptive Pathway	-	
		15H.1	Building Envelope	0	
		15H.2	Wall-Glazing Construction	0	
		15H.3 Lighting	15H.3.1 Internal Lighting	0	
			15H.3.2 External Lighting	0	
		15H.4	Ventilation and Air Conditioning	0	
		15H.5	Domestic Hot Water	0	
		15H.6	Transition Plan	0	
		15H.7	Fuel Switching	0	
		15H.8	On-site Storage	0	
		15H.9	Provision of Structure for PV	0	
		15H.10	Off-site Renewables	0	

		15I.0	Conditional Requirement: On-site Renewables Pathway		-	
		15I.1	On-site Renewable Energy		0	
Peak Electricity Demand Reduction	A. Prescriptive Pathway	16A	Prescriptive Pathway: On-Site Energy Generation		1	1
		16B	Modelled Performance Pathway: Reference Building		0	
Total					**21**	**4**

Transport					**10**	
Sustainable Transport	B. Prescriptive Pathway	17A	Performance Pathway		0	
		17B.1	Access by Public Transport		3	1
		17B.2	Reduced Car Parking Provision		1	1
		17B.3	Low Emission Vehicle Infrastructure	D. No Parking Spaces Provided	1	
		17B.4	Active Transport Facilities		1	
		17B.5	Walkable Neighbourhoods	A. Proximity to Amenities	1	1
		17C.1	Access by Public Transport		0	
		17C.2	Reduced Car Parking Provision		0	
		17C.3	Low Emission Vehicle Infrastructure	☐ A. Parking for Fuel-Efficient Vehicles ☐ B. Parking for Electric Vehicles ☐ C. Parking for Car Share Vehicles ☐ D. No Parking Spaces Provided ☐ E. Low Emission Facility Transport	0	
		17C.4	Active Transport Facilities		0	
		17C.5	Proximity to Amenities		0	
Total					**7**	**3**

Water				**12**	
Potable Water	B. Prescriptive Pathway	18A	Potable Water - Performance Pathway	0	
		18B.1	Sanitary Fixture Efficiency	1	1
		18B.2	Rainwater Reuse	1	1
		18B.3	Heat Rejection	2	2

		18B.4	Landscape Irrigation		1	
		18B.5	Fire Protection System Test Water		1	
Total					**6**	**4**

Materials					**14**	
Life Cycle Impacts	B. Prescriptive Pathway - Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment		0	
		19A.2	Additional Reporting	☐ A. Additional Life Cycle Impact Reporting ☐ B. Material Selection Improvement ☐ C. Construction Process Improvement ☐ D. LCA Design Review	0	
		19B.1 Concrete	19B.1.1 Portland Cement Reduction		2	1
			19B.1.2 Water Reduction		0.5	0.5
			19B.1.3 Aggregates Reduction	B. Fine Aggregate Reduction	0.5	0.5
		19B.2 Steel	B. Reduced Use of Steel Reinforcement		1	1
		19B.3	Building Reuse	19B.3.1 Façade Reuse	2	
				19B.3.2 Structure Reuse	2	
		19B.4	Structural Timber	19B.4.0 Responsible Sourcing	-	
				19B.4.1 Reduced Embodied Impacts	3	
		19C.1 Concrete	19C.1.1 Portland Cement Reduction		0	
			19C.1.2 Water Reduction		0	
			19C.1.3 Aggregates Reduction	A. Course Aggregate Reduction	0	
		19C.2 Steel	19C.2.1 Reduced Mass of Steel Framing	A. High Strength Steel	0	
			19C.2.2 Reduced Use of Steel Reinforcement		0	
		19C.3	Building Reuse	19C.3.1 Façade Reuse	0	
				19C.3.2 Structure Reuse	0	
		19C.4	Structural Timber	19C.4.0 Responsible Sourcing	-	
				19C.4.1 Reduced Embodied Impacts	0	
		20.1	Structural and Reinforcing Steel	20.1.0 Responsible Steel Maker	-	Complies
				A. Responsible Steel Fabricator	1	1

Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.2	Timber	☑ A. Certified Timber ☑ B. Reused Timber	1	1
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	B. Best Practice Guidelines for PVC	1	1
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	☐ A. Reused Products ☐ B. Recycled Content Products ☐ C. Environmental Product Declarations (EPDs) ☐ D. Third Party Certification ☐ E. Stewardship Programs	3	
Construction and Demolition Waste	A. Fixed Benchmark	22.0	Reporting Accuracy	A. Compliance Verification Summary	-	Complies
		22A	Fixed Benchmark		1	1
		22B	Percentage Benchmark		0	
Total					**12**	**7**

Land Use & Ecology					**6**	
Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	A. EPBC	-	
		23.1	Ecological Value		3	
Sustainable Sites	To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land.	24.0	Conditional Requirement		-	Complies
		24.1	Reuse of Land	A. Previously Developed Land	1	1
		24.2	Contamination and Hazardous Materials	☐ A. Site Contamination ☐ B. Hazardous Materials	1	
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	25.1	Heat Island Effect Reduction		1	1
Total					**6**	**2**

Emissions					**5**	
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge		1	1
		26.2	Stormwater Pollution Targets		1	1
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies		-	Complies
		27.1	Light Pollution to Night Sky	A. Control of Upward Light Output Ratio (ULOR)	1	1
Microbial Control: Legionella Impacts from Cooling Systems	B. Waterless Heat Rejection Systems	28A	Natural Ventilation		0	
		28B	Waterless Heat Rejection Systems		1	1

Cooling Systems		28C	Water-Based Heat Rejection Systems		0	
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerants Impacts	A. Calculating TSDEI	1	
Total					**5**	**4**

Innovation					**10**	
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process		10	
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in	30B	Market Transformation			
Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks			1
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge			
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	30E	Global Sustainability			
Total					**10**	**1**

TOTALS	**TARGETED**
CORE POINTS	**48.0**
INNOVATION POINTS	**1.0**
NA POINTS	**0.0**
POINTS AVAILABLE	**100.0**
PROJECT SCORE	**49.0**